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PATTLE DELAMORE PARTNERS LTD

Kaitaia Wastewater Treatment Plant Trade Waste Effects Assessment

Far North District Council

solutions *for your environment*

Kaitaia Wastewater Treatment Plant Trade Waste Effects Assessment

Prepared for

Far North District Council

June 2021

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Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Far North District Council, Broadspectrum, Anderson Environmental, Junken New Zealand and Analytica Laboratories. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

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Executive Summary

Pattle Delamore Partners (PDP) were engaged by Far North District Council (FNDC) to:

1) undertake a water quality monitoring programme to characterise the Juken New Zealand Limited (JNL) trade waste discharge and the effect JNLs discharge has on the Kaitaia Wastewater Treatment Plant (WWTP); and,

2) assess the toxicity effects of products used by JNL on the WWTP and receiving environment (Awanui River).

Following the monitoring programme and analysis of the data, the JNL discharge does not show any impact on the operation of the Kaitaia WWTP. No toxicants are expected to have an impact either on the WWTP or the receiving environment. The only toxicant that was noted at any stage to be higher than the toxicity trigger for fish life was Formaldehyde. However, when the Formaldehyde reaches the Kaitaia WWTP the toxicant has either degraded or been diluted to a point that it is not toxic to fish life.

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1.0 Introduction

Pattle Delamore Partners (PDP) were engaged by Far North District Council (FNDC) to undertake a water quality monitoring programme to characterise the Juken New Zealand Limited (JNL) trade waste discharge and the effect the discharge has on the Kaitaia Wastewater Treatment Plant (WWTP).

PDP has carried out the monitoring programme as described in Appendix A. Appendix A also includes further detail on the monitoring schedule, sampling locations and parameters measured.

This report outlines the results of the monitoring and provides a discussion about the impact of JNL on the Kaitaia WWTP.

2.0 Results

The results have been split into two separate sections. The first section provides results from sampling of the JNL discharge and from the Kaitaia WWTP influent. This allows us to assess the direct impact of contaminants from JNL on the Kaitaia WWTP at its influent. The second section provides results from sampling of the effluent of the Kaitaia WWTP and the Awanui River. This allows us to assess the consistency of the discharge and impact of the discharge on the Awanui River. All laboratory results can be found in Appendix B.

2.1 JNL and Kaitaia WWTP Influent Results

Figures 1 to 9 show the various contaminants measured at the JNL discharge and Kaitaia WWTP sampling locations. Further discussion will be provided in Section 3.0.

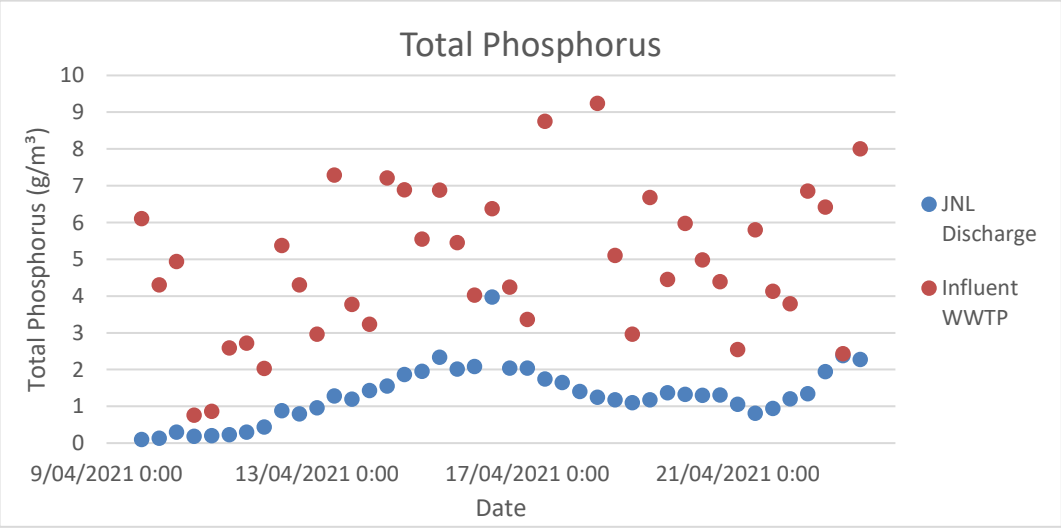

Figure 1: Total Phosphorus measured at JNL and Kaitaia WWTP Influent

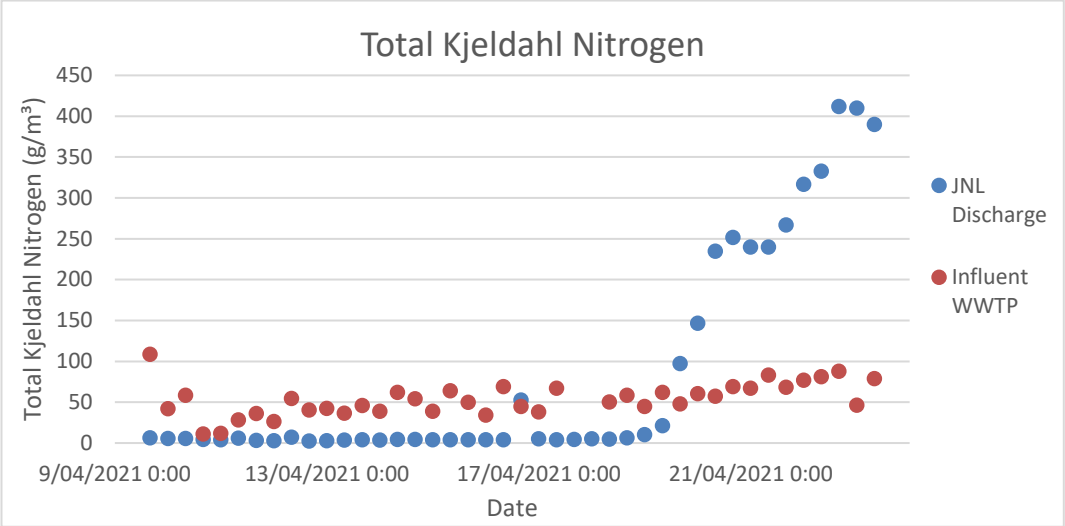

Figure 2: Total Kjeldahl Nitrogen measured at JNL and Kaitaia WWTP Influent

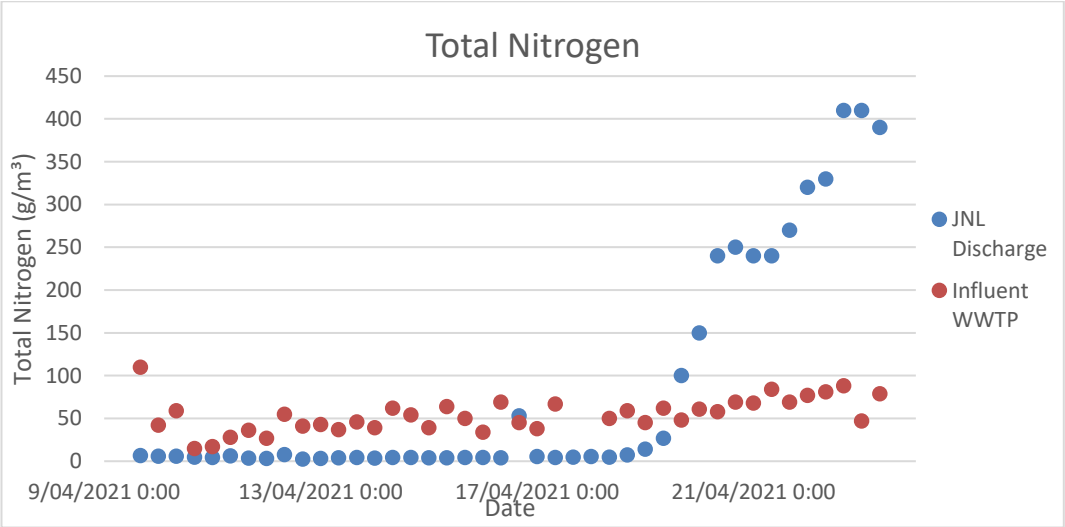

Figure 3: Total Nitrogen measured at JNL and Kaitaia WWTP Influent

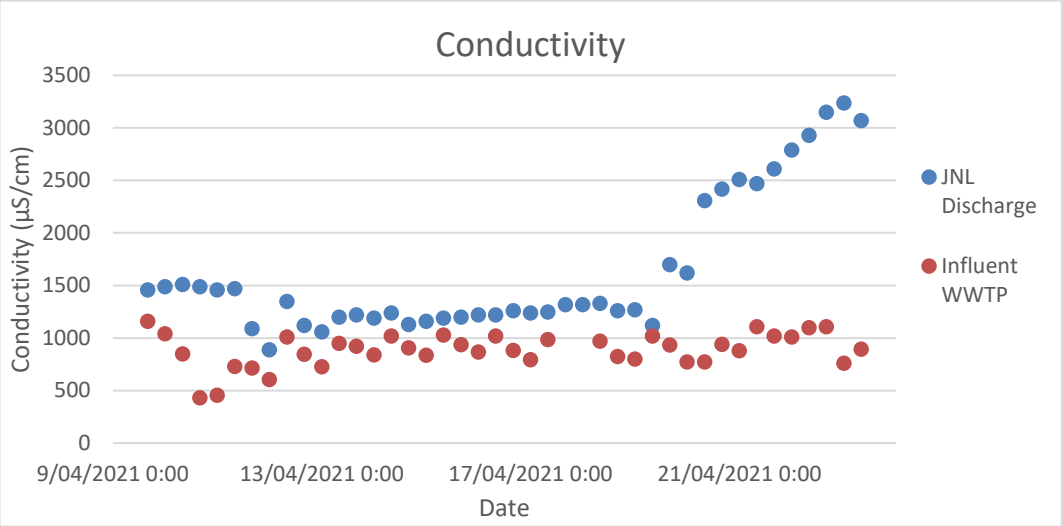

Figure 4: Conductivity measured at JNL and Kaitaia WWTP Influent

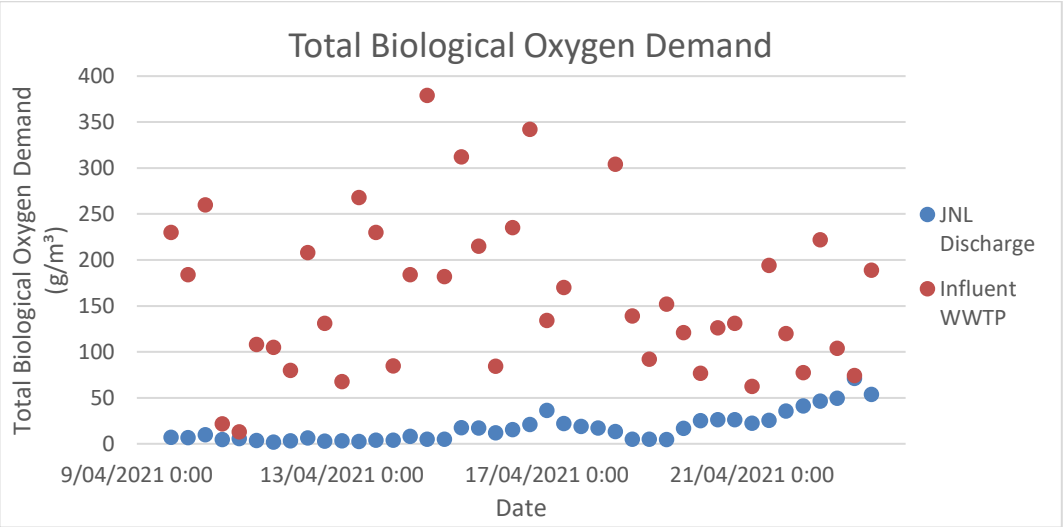

Figure 5: Total Biological Oxygen Demand measured at JNL and Kaitaia WWTP Influent

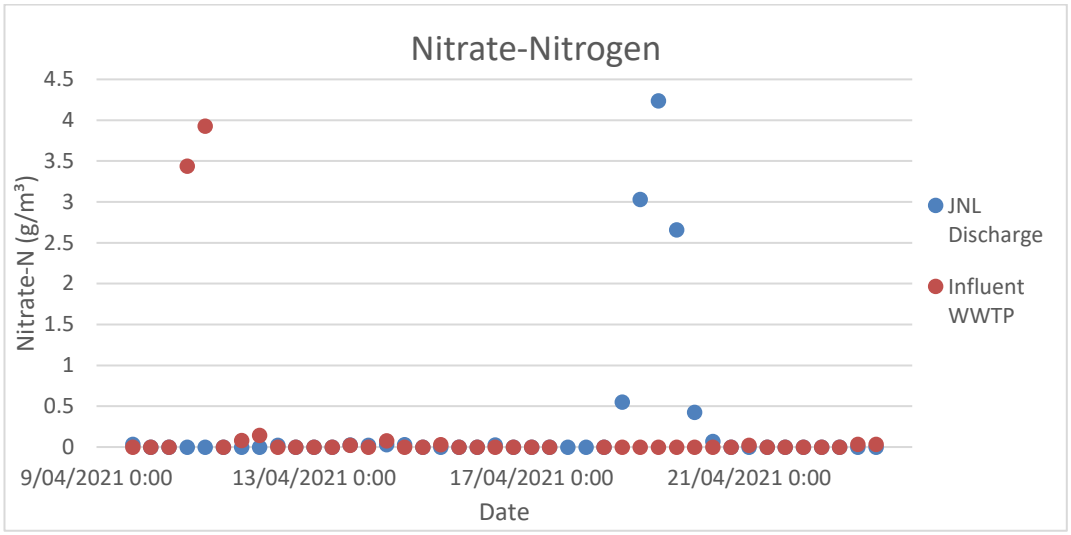

Figure 6: Nitrate-Nitrogen measured at JNL and Kaitaia WWTP Influent

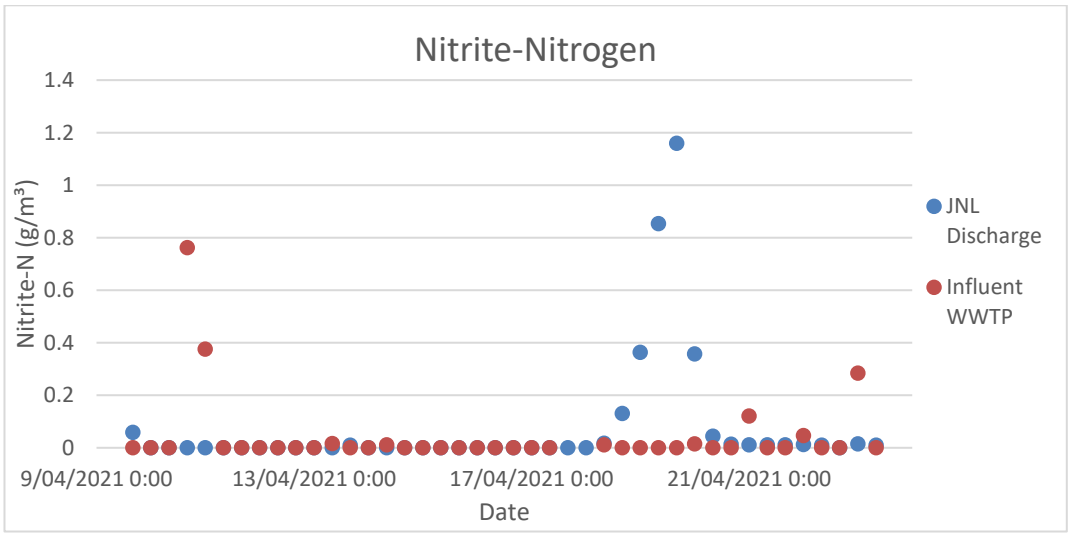

Figure 7: Nitrite-Nitrogen measured at JNL and Kaitaia WWTP Influent

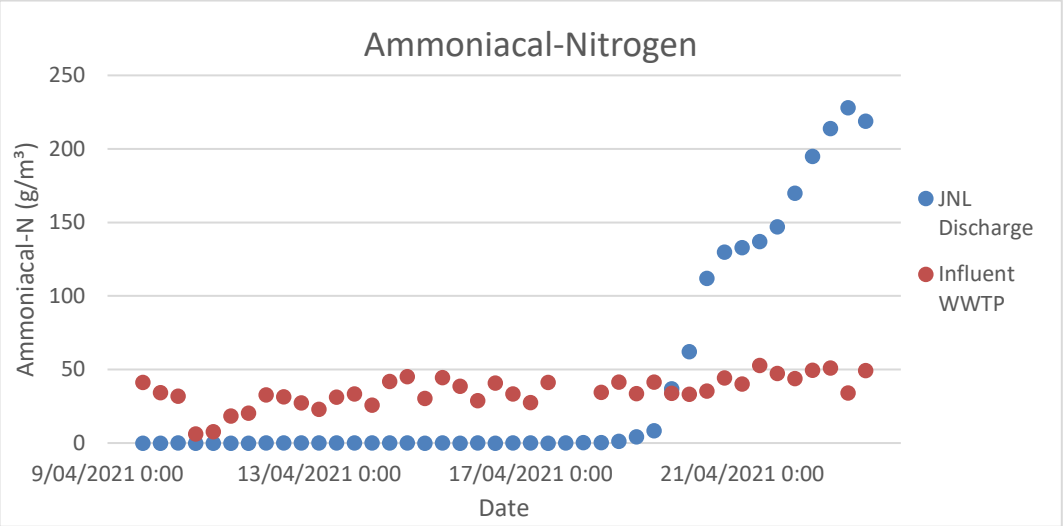

Figure 8: Ammoniacal-Nitrogen measured at JNL and Kaitaia WWTP Influent

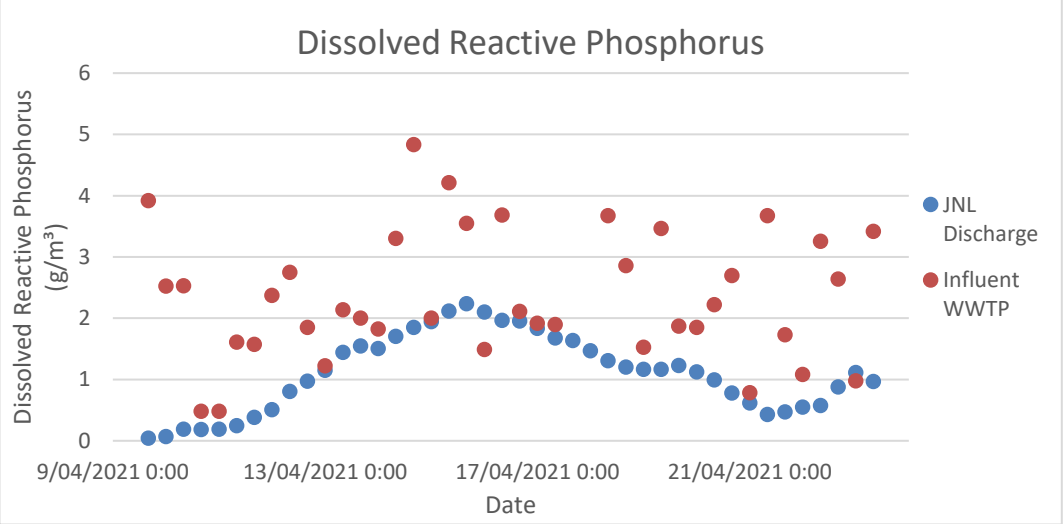

Figure 9: Dissolved Reactive Phosphorus measured at JNL and Kaitaia WWTP Influent

2.2 Kaitaia WWTP Effluent and Awanui Upstream/Downstream Results

Figures 10 to 19 show various contaminants measured at the Kaitaia WWTP effluent, Awanui River Upstream and downstream monitoring locations. Further discussion will be provided in Section 3.0. Additional sampling was carried out on the WWTP effluent, Awanui Upstream and Downstream on the 19th, 20th and 21st of May. This is further explained in Section 3.2.1.

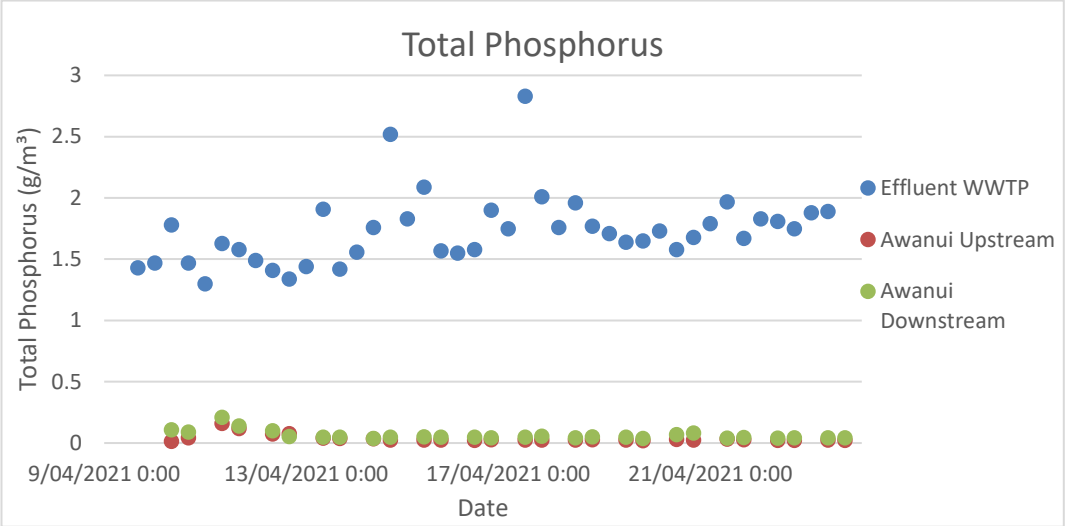

Figure 10: Total Phosphorus measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

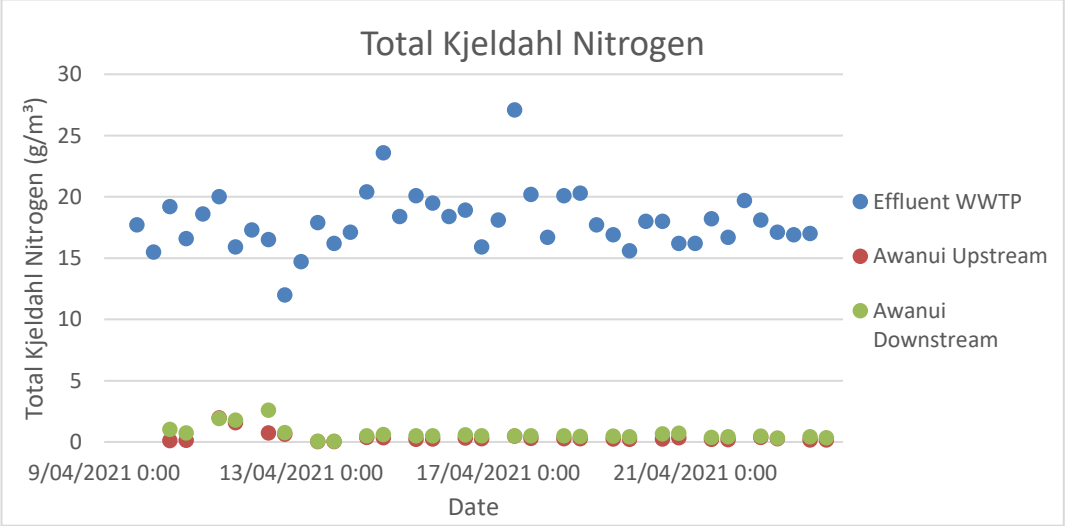

Figure 11: Total Kjeldahl Nitrogen measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

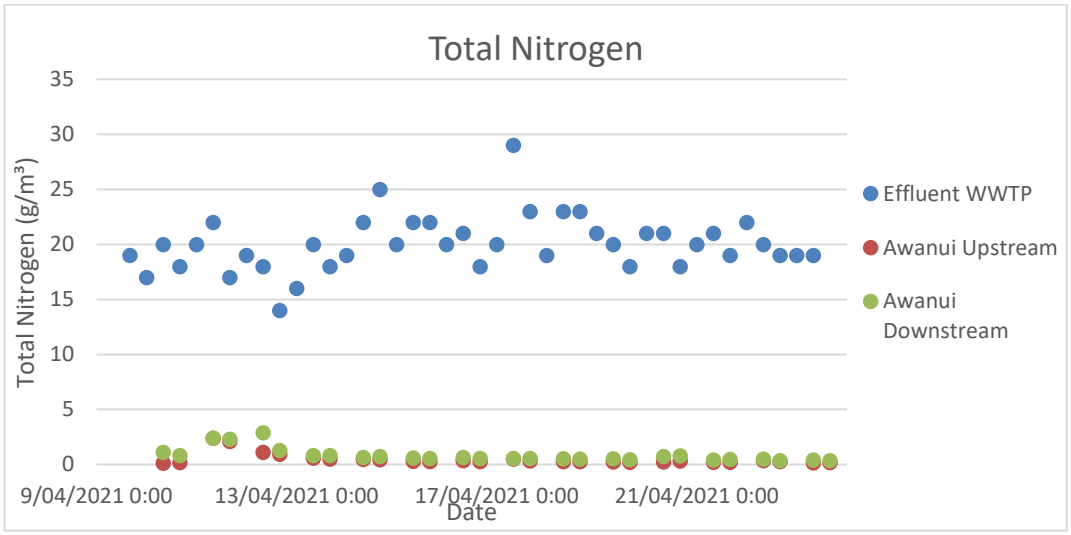

Figure 12: Total Nitrogen measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

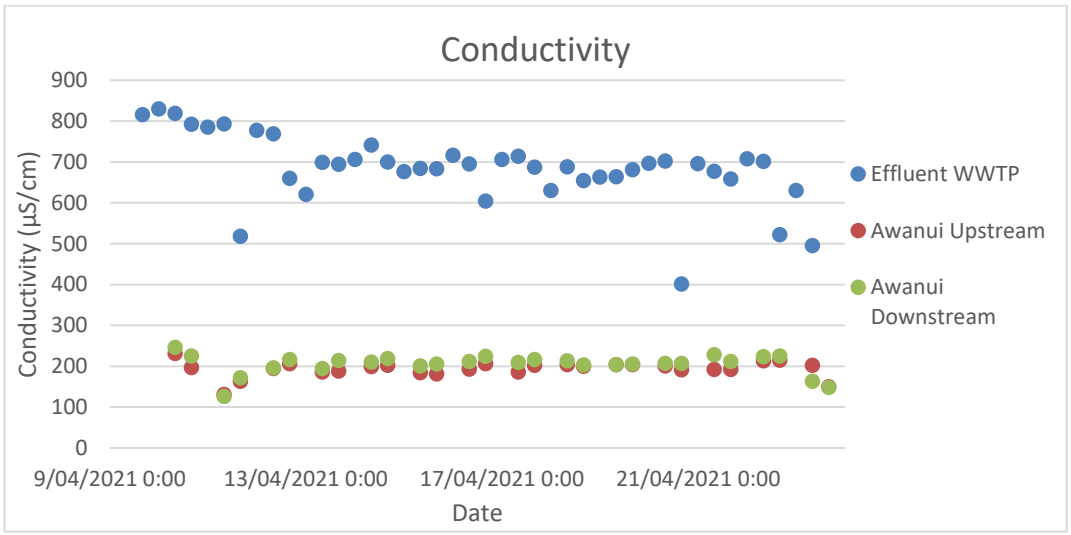

Figure 13: Conductivity measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

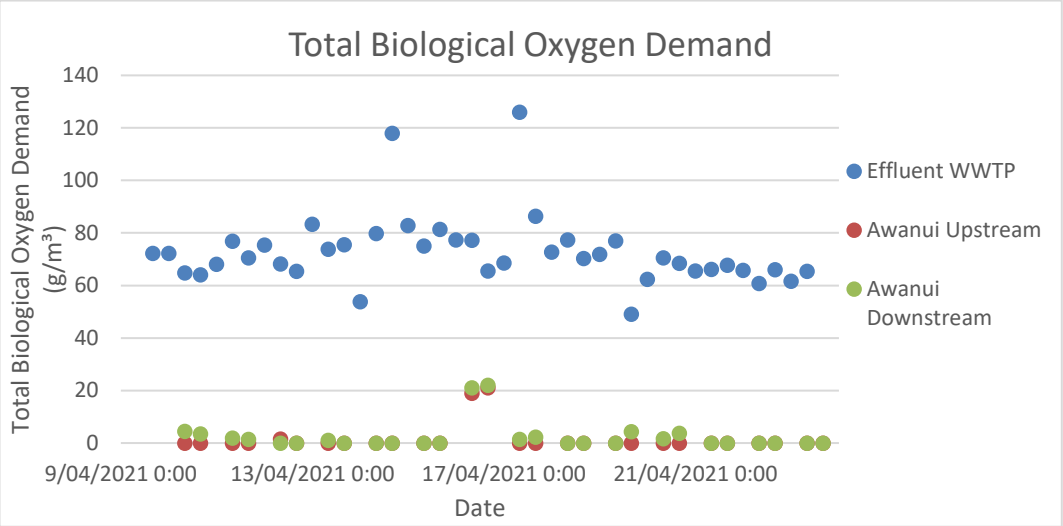

Figure 14: Total Biological Oxygen Demand measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

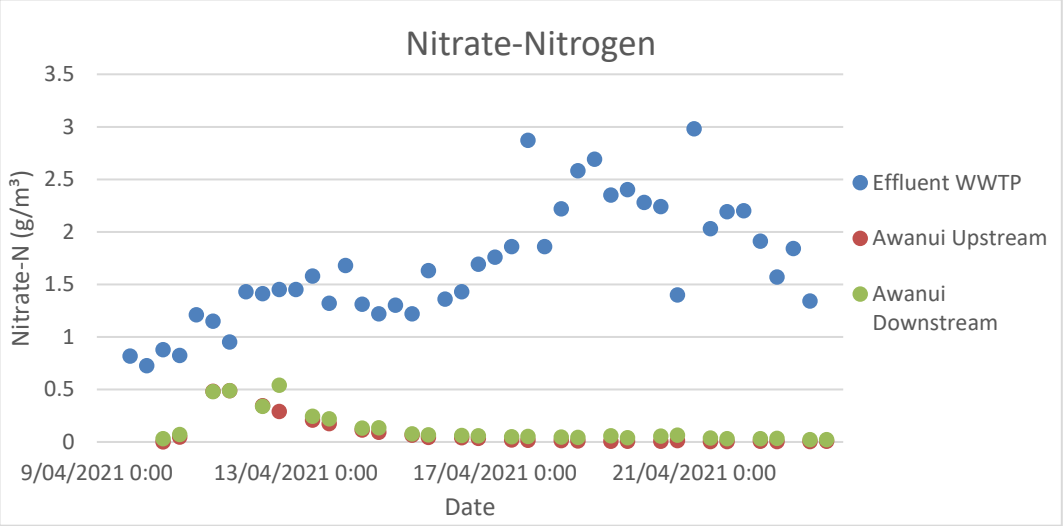

Figure 15: Nitrate-Nitrogen measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

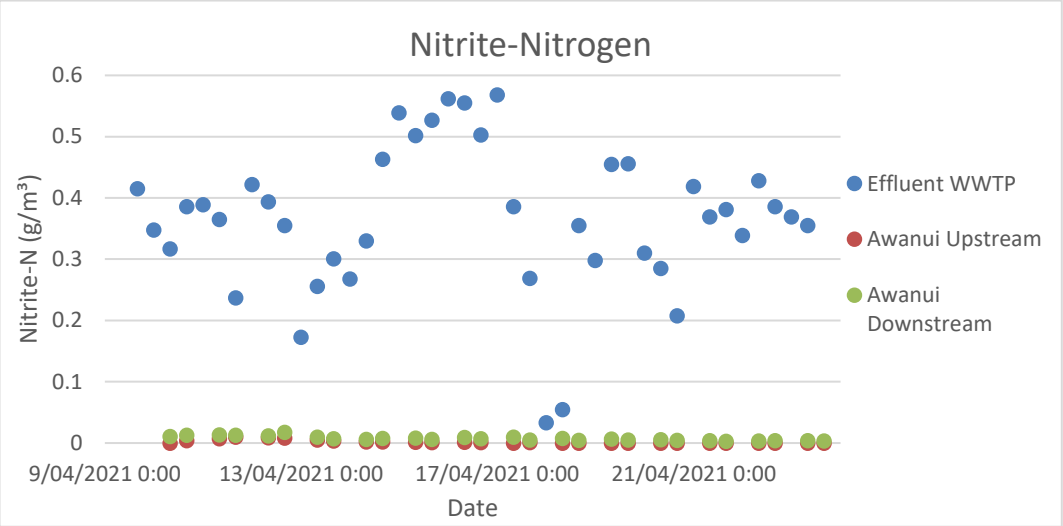

Figure 16: Nitrite-Nitrogen measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

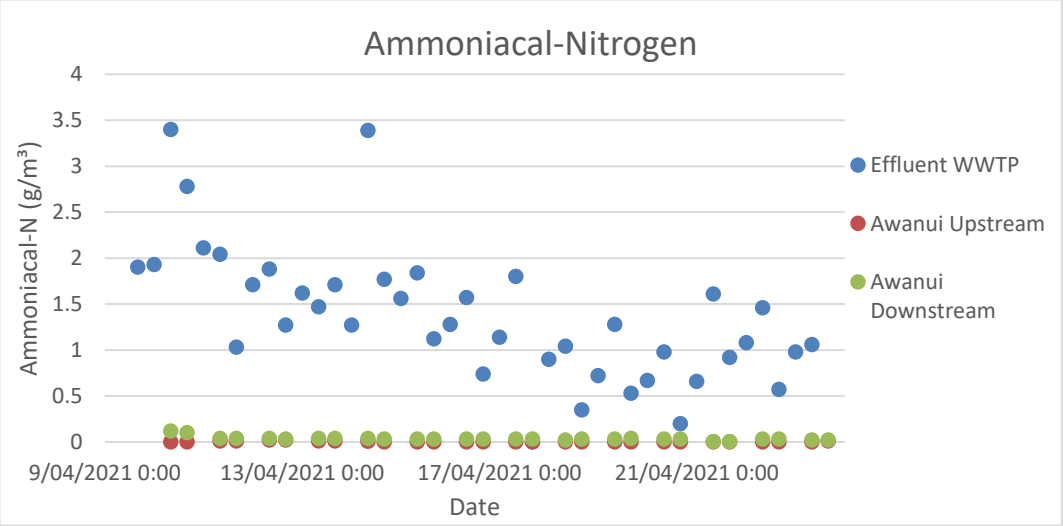

Figure 17: Ammoniacal-Nitrogen measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

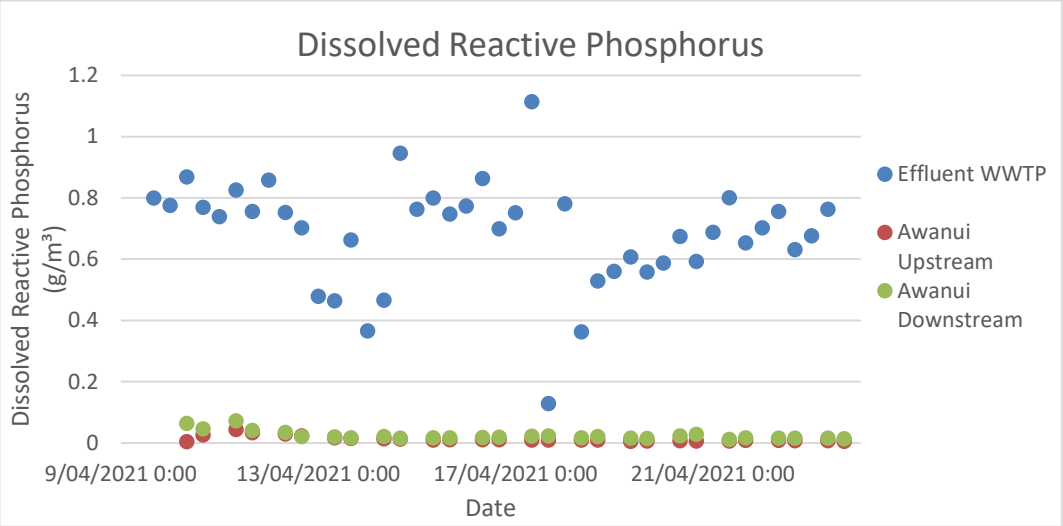

Figure 18: Dissolved Reactive Phosphorus measured at Kaitaia WWTP Effluent, Awanui Upstream and Awanui Downstream

2.3 Toxicity Sampling

The Kaitaia WWTP resource consent AUT.00932.01.03 (Appendix C) condition 8e states that:

> "*There shall be no acute toxicity, or significant adverse effects of chronic toxicity, to natural aquatic life by reason of a concentration of toxic substances.*"

Therefore, PDP conducted additional sampling for concentrations of toxicants that are likely to originate from the processes that occur on the JNL site. The toxicants are identified within the safety data sheets (SDS) (Appendix D) from the JNL products. PDP used the SDS sheets to determine the analysis required. Figures 19 to 23 show the results of the toxicant sampling. Samples were collected as a 24-hour composite. Further discussion on results of this testing is provided in Section 3.3.

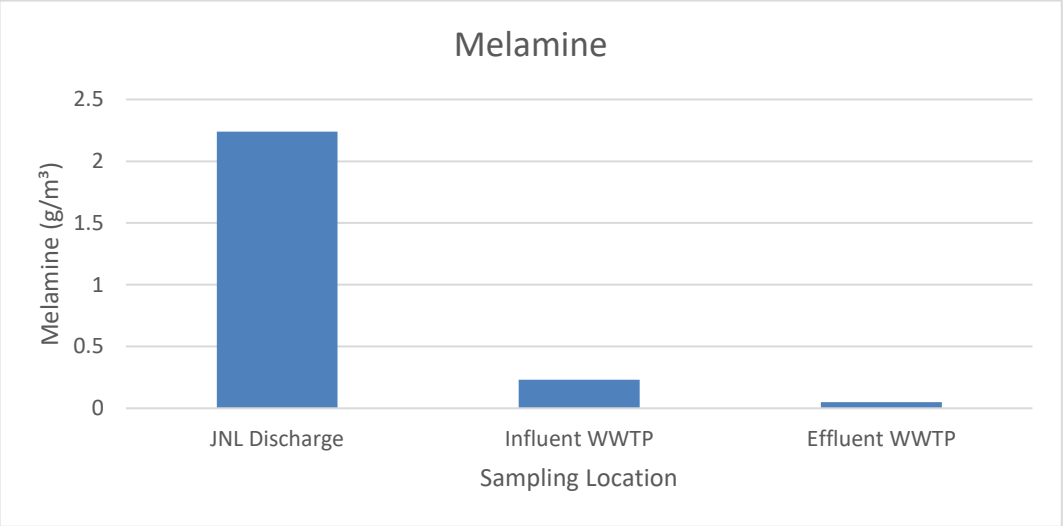

Figure 19: Melamine measured at JNL, Kaitaia WWTP Influent and Kaitaia WWTP Effluent

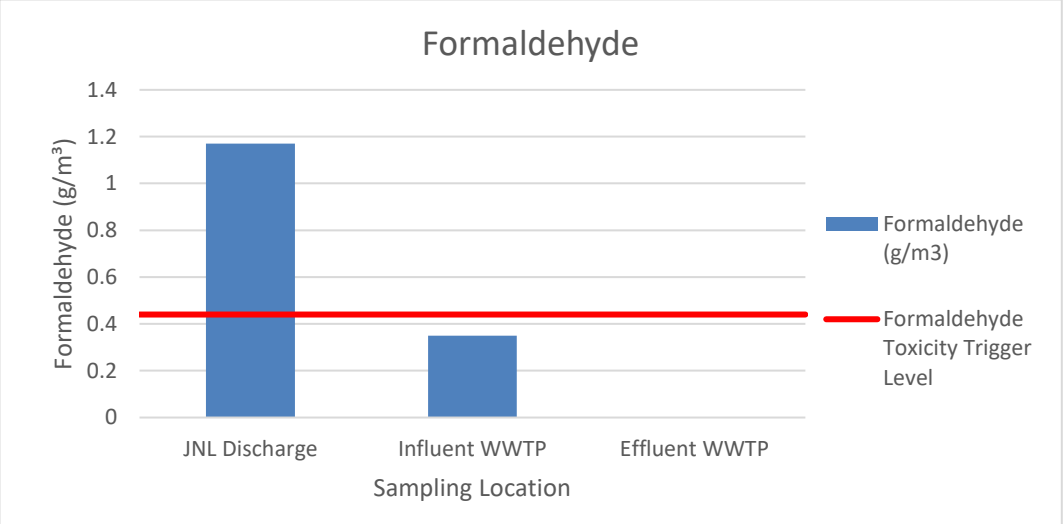

Figure 20: Formaldehyde measured at JNL, Kaitaia WWTP Influent and Kaitaia WWTP Effluent

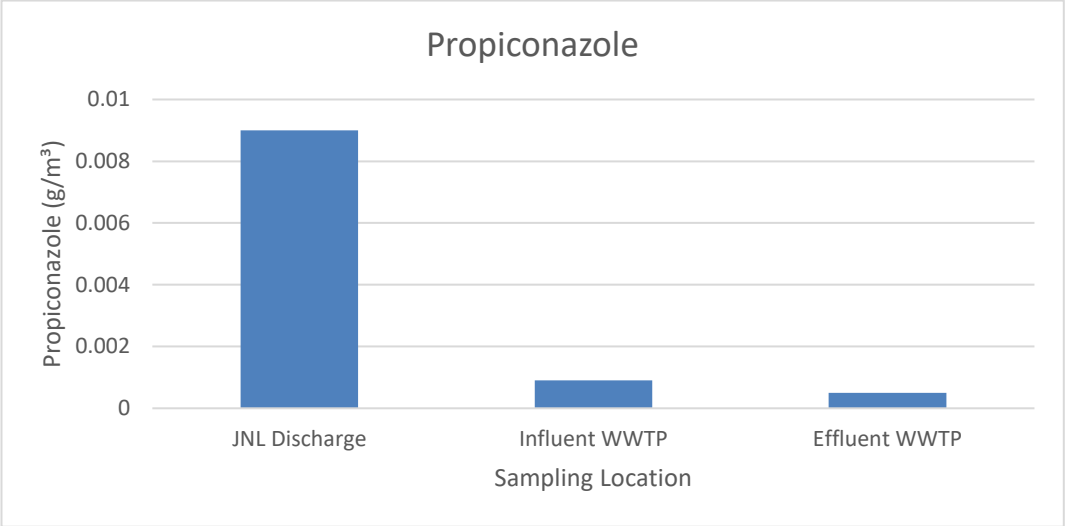

Figure 21: Propiconazole measured at JNL, Kaitaia WWTP Influent and Kaitaia WWTP Effluent

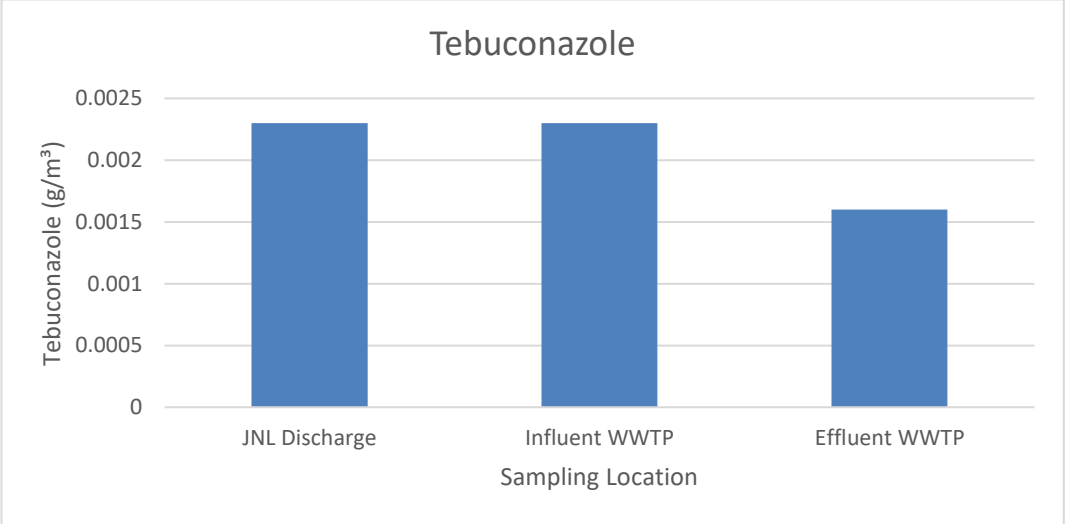

Figure 22: Tebuconazole measured at JNL, Kaitaia WWTP Influent and Kaitaia WWTP Effluent

Note: Total Petroleum Hydrocarbons and Permethrin were also sampled, however both contaminants were below the laboratory detection limit (0.5 g/m^3 and 0.0001 g/m^3 respectively) so were omitted from the report.

3.0 Discussion

3.1 JNL and Kaitaia Influent Effects

Throughout the 2-week monitoring period the parameters identified within Appendix A were measured at the outlet of the JNL wastewater treatment plant, and the influent to the municipal Kaitaia wastewater treatment plant.

Overall, the figures provided in Section 2.1 show that for the initial monitoring period (9 April to 18 April), it appears the JNL discharge had little to no effect on the influent to Kaitaia WWTP.

However, from the 19th of April, monitoring results show that there was an increase in Nitrogen (both Total Kjeldahl Nitrogen and Total Nitrogen), Conductivity, Nitrate-Nitrogen, Nitrite-Nitrogen and Ammonia discharging from JNL. The increase in discharge of these contaminants within the JNL effluent caused a slight increase (on average approximately 15%) in concentrations found at the Kaitaia WWTP influent.

Total Suspended Solids, pH, Total Phosphorus, Total Biological Oxygen Demand and Dissolved Reactive Phosphorus were not affected during this time.

Due to the increases in concentrations, JNL were requested to provide feedback on why the increases in concentrations were evident in their discharge. The feedback received stated that:

> *"Normally [JNL] would put Waste Activated Sludge through the centrifuge, but as [JNL] had an issue with the centrifuge at that time, the Waste Activated Sludge was diverted to the stagnate pond, thus causing any overflow from this pond back into the system" Trent Hemana (Quality and Environmental Technician, JNL) Pers. Comms 2021*

As JNL could explain why their discharge increased dramatically in nitrogen and ammonia the effect on the plant could potentially be measured more accurately. Although only a slight increase (approximately 15%) was observed at the influent to the Kaitaia WWTP plant, additional sampling at the effluent of the Kaitaia WWTP plant was conducted to determine if the increased concentrations were observed in the effluent stream.

It is understood from communication with FNDC that the Kaitaia WWTP has a residence time of 44 days (±50 %), therefore it is expected that the full extent of the increased JNL discharge may be observed in the Kaitaia WWTP effluent stream between 22 and 66 days. The impact of the increased concentration discharge from JNL is further detailed in Section 3.2.1

3.2 Kaitaia Effluent and Awanui Effects

The two-week monitoring program (Appendix A) was used to further characterise the JNL discharge effects on the effluent of the Kaitaia WWTP and on the

receiving environment of the Awanui River. As noted above the residence time within the pond is understood to be approximately 44 days (±50 %), therefore the effluent discharge concentrations are reflective of conditions entering the plant between 22 and 66 days prior. It is assumed that the concentration of contaminants from the JNL discharge did not change drastically before the start of the monitoring program.

The impact of the JNL discharge on the Kaitaia WWTP effluent was determined as negligible as the contaminant concentrations throughout the monitoring period remained consistent. All contaminants show a decrease in concentration from the influent to the plant, except for Nitrate-N and Nitrite-N. The increase in Nitrate-N and Nitrite-N indicates that the plant during this time is functioning as designed as Ammoniacal-N is converted into Nitrates and Nitrites. This type of treatment is typical of an oxidation pond design.

The effluent discharge was assessed against the resource consent (AUT.00932.01.03) condition 8. The consent conditions vary for ammoniacal nitrogen depending on pH at the time of sampling (i.e. pH of 9 has a consent level for ammoniacal nitrogen level of 0.18 g/m^3, whereas, a pH of 6.0 has a consent level for ammoniacal nitrogen of 2.57g/m^3). As pH was not analysed at the same time, this condition was unable to be compared at this time. However further to condition 8 the consent outlines that:

> *"In the event that the background concentration of total ammoniacal nitrogen exceeds the above concentration, then the discharge shall not result in an increase in concentration of more than 0.10g/m in the Awanui River[3]"*

The results from the monitoring program indicate that 2 samples out of 28 exceeded this increase in concentration, however the average concentration increase for the monitoring period was 0.024 g/m^3.

3.2.1 Additional Effluent Sampling

Additional sampling was carried out on the Kaitaia WWTP effluent to determine the impact of the increased discharge of Ammoniacal-N and Nitrogen from JNL (19 to 23 April). The sampling was carried out for an additional three days from 19 May to 21 May 2021. All parameters were sampled as per the original monitoring schedule. It was hoped that the impact from the increased JNL contaminant concentrations at their discharge would be evident in the Kaitaia WWTP effluent stream.

On closer inspection of the results (Appendix E) the concentrations for Total Nitrogen and Ammoniacal-N were within the range expected in the effluent from the Kaitaia WWTP. However, it was noted that there was an increase in Nitrate-N and Nitrite-N found in the effluent stream compared to the original monitoring period which indicates the pond treatment system is working as designed by converting ammoniacal-N to Nitrates and Nitrites.

All other parameters were within expected concentrations.

3.3 Toxicity Effects

A number of timber products are manufactured at JNL and the possible toxicants from the plant were determined using the safety data sheets (SDS) (Appendix D) from the JNL products.

Below is a summary of the possible toxicants that may occur from the products developed on site as well as their possible toxicity effects.

1. Polymeric diphenylmethane diisocyanate: The main monomers that could leach from this material are isocyanates 2,4-MDI (cas 5873-54-1) and 4,4-MDI (cas 101-68-8). Isocyantes has been given a low toxicity risk in water. These react with water to form amines and carbon dioxide.

2. Melamine Urea Formaldehyde Resin: The main leachate from this would be formaldehyde.

3. Formaldehyde: Formaldehyde is highly soluble in water but is also readily biodegradable and is broken down within a few hours by sunlight or bacteria present in the soil or water. Formaldehyde is shown to have low to moderate toxicity to aquatic organisms and its potential impact is significantly reduced due to the rapid rate with which it biodegrades. Figure 20 indicates that melamine concentrations in the JNL Discharge are above the toxicity trigger level but by the time it gets to the influent of the Kaitaia WWTP, it is well below the toxicity trigger level and very small amounts are observed in the Kaitaia WWTP effluent.

4. Petroleum Wax: Petroleum wax is not expected to leach. Petroleum wax consists of a mixture of hydrocarbon molecules and is insoluble in water and if introduced into ponds or streams will likely float on the surface due to it being less dense than water. Long term chronic toxicity for aquatic invertebrates (Daphnia magna) show no chronic toxicity at or below its maximum attainable water solubility (ECHA).

5. Tebuconazole: This is a triazole fungicide which is rated as being safe for humans by US Food and Drug Administration. Tebuconazole is considered to be not rapidly degradable, and no degradation occurs either by hydrolysis or photolysis. (CLH report for Tebuconazole, 2012). Based on current toxicological data Tebuconazole is not expected to pose a significant acute risk to fish, aquatic invertebrates, aquatic plants, birds and small animals but may pose a chronic risk (US EPA, 2000).

   Short term aquatic invertebrate toxicity lowest for *Mysidopsis Bahia* at LC_{50} (Lethal Dose which causes the death of 50% of a group of test animals) of 0.46 g/m^3 and long term is 0.035 g/m^3. Algae and aquatic plants were found to be between 0.036 g/m^3 and 0.237 g/m^3. For fish,

short term toxicity is lowest for *Salmo gairdneri* at LC_{50} of 4.4 g/m^3 and long term is around 1 g/m^3. Figure 22 shows that the concentrations in the JNL discharge, Kaitaia WWTP Influent and Effluent are well below the lowest toxicity of 0.035 mg/L for chronic toxicity for aquatic invertebrates.

6. Propiconazole: Propiconazole is a triazole fungicide used in agriculture as well as in combination with permethrin in wood preserver formulations. The LC_{50} for fish was found to range between 0.85 g/m^3 to 9.8 g/m^3 (US EPA ECOTOX). The Propiconazole concentration in the JNL discharge is well below the toxicity limit of the most sensitive fish (Rainbow Trout) of 0.85 g/m^3 and falls to almost non-detectable limits once reaching the Kaitaia WWTP.

7. Permethrin

   Permethrin is an insecticide which is used often used in conjunction with the fungicide Propiconazole to preserve wood products.

   Permethrin is broken down by soil microorganisms and sunlight on the soil surface or water surface. Permethrin is not very soluble in water and adsorbs strongly to sediment and often precipitates out.

   Permethrin is highly toxic to fish and other animals that live in fresh water. The LC_{50} for fish was found to range between <0.01 g/m^3 to 0.092 g/m^3 (US EPA ECOTOX). Although highly toxic to fish, permethrin concentrations in the JNL discharge and Kaitaia WWTP influents and effluents were found to be below the lab detection limit of <0.0001 g/m^3.

8. Bifenthrin

   Bifenthrin is an insecticide similar to Permethrin. Bifenthrin has low solubility in water and often adheres to sediment. Although Bifenthrin is hardly soluble in water, it is very toxic to aquatic life. The LC_{50} for fish was found to range between <0.01 g/m^3 to 0.015 g/m^3 (US EPA ECOTOX). Although highly toxic to fish bifenthrin concentrations in the JNL discharge and WWTP influents and effluents were found to be below the lab detection limit of <0.0001 g/m^3.

4.0 Conclusion

Overall, the JNL discharge for the initial monitoring period does not show any impact on the contaminant concentrations found within the effluent stream from Kaitaia WWTP. Therefore, it is expected that the discharge from JNL does not have an impact on the receiving environment as the WWTP is treating wastewater as it is designed to.

With regards to toxicants sampled, none are expected to have an impact due to the low concentrations found at the Kaitaia WWTP. The only toxicant that was noted at any stage to be higher than the toxicity trigger for fish life was Formaldehyde. However, when the Formaldehyde reaches Kaitaia WWTP the toxicant has either degraded or been diluted to a point that it is not toxic to fish life.

Based on the results provided above, JNL does not impact the Kaitaia WWTP measurably. It is important to note that this is based on the current pond system at Kaitaia. If further changes are made to the treatment process, JNL's discharge should be factored into the design to ensure the effects are considered and treated.

5.0 References

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ECHA, Paraffin waxes (petroleum), hydrotreated. , https://echa.europa.eu/sv/registration-dossier/-/registered-dossier/15316/6/2/3

http://agrilife.org/fisheries2/files/2013/09/SRAC-Publication-No.-4600-Toxicities-of-Agricultural-Pesticides-to-Selected-Aquatic-Organisms1.pdf

RIVM/SEC (2012), CLH Report for Tebuconazole, Proposal for Harmonised Classification and Labelling, https://echa.europa.eu/documents/10162/13626/clh_report_tebuconazole_en.pdf

US EPA, ECOTOX Knowledgebase Ecotoxicity Database. https://cfpub.epa.gov/ecotox/

US EPA (2000), Ecological Risk Assessment for Section 3 Registration of Tebuconazole on Wheat, Cucurbits, Bananas, Turnips, Tree Nuts, hops and Sunflowers,

https://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-128997_25-Jul-00_a.pdf

Appendix A

Monitoring Plan

Auckland Tauranga Wellington Christchurch

PATTLE DELAMORE PARTNERS LTD

Kaitaia Wastewater Treatment Plant Monitoring Plan

Far North District Council

Kaitaia Wastewater Treatment Plant Monitoring Plan

Prepared for

Far North District Council

November 2020

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Hamish Jones

Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Far North District Council and Junken Nisho Limited. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared by PDP on the specific instructions of Far North District Council for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

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1.0 Introduction

Far North District Council (FNDC) engaged Pattle Delamore Partners Limited (PDP) to develop a monitoring programme to assess the effects of the trade waste discharge by Junken Nisho Limited (JNL) on the receiving Kaitaia Wastewater Treatment Plant (WWTP) and the receiving environment (the Awanui River). JNL have two wood processing mills that produce LVL and Plywood panels and operate 24 hours a day, producing wastewater 24 hours a day.

With the WWTP resource consent expiring in 2021, the information provided from the monitoring programme will help FNDC determine:

- the discharge conditions required to be applied for (for the new resource consent);
- (outside of scope) how to address any impacts the JNL trade waste discharge may be having on the WWTP process, and/or;
- discharge limits into the receiving environment (Awanui River).

2.0 Monitoring Plan

The following sections outline the monitoring programme and implementation strategy to determine the impact of the trade waste discharge from JNL.

2.1 Monitoring Locations

Five monitoring locations have been identified to characterise the impacts of the JNL trade waste discharge on the WWTP. The monitoring locations consist of four at and around the WWTP with the other at the existing JNL discharge sampling point.

The four monitoring locations at the WWTP consist of:

1. Influent to the WWTP;
2. Effluent of the WWTP;
3. Awanui River upstream of discharge point; and,
4. Awanui River downstream of discharge point.

Sampling at these locations will enable FNDC to characterise the effects of the trade waste discharge from JNL on the WWTP and the receiving environment identified as the Awanui River.

The sampling location for the JNL location is at the existing effluent sampling point prior to discharge to the FNDC wastewater network. JNL currently samples from this location via a manual grab sample and it is suggested this location is used for this sampling programme via an autosampler.

Appendix A shows all monitoring locations required for the sampling programme.

2.2 Sample Regime

To determine the impact of the trade waste discharge from JNL on the Kaitaia WWTP, it is expected that sampling will need to be conducted throughout the day, during the sampling period. To do so, autosamplers will be deployed at three locations (JNL Discharge Point and Influent and effluent points of the WWTP). The autosamplers will be set up to sample every 10 minutes and extract approximately 150 ml of sample each time, which will fill one 1 L discrete bottle per hour. This is to ensure that sampling is conducted to assess the effects on the WWTP from the 24/7 JNL discharge into the FNDC wastewater network. The autosampler holds 24 bottles which will need to be emptied and restocked daily.

It is proposed that JNL staff do not collect the samples or manage/maintain the autosampler themselves. It is recommended that FNDC engage/employ an additional resource with appropriate sampling skills to carry out the sampling at JNL. JNL will provide daily flow rate data (at 10 minute intervals) to FNDC throughout the monitoring programme

The other two sampling locations (upstream and downstream of the WWTP discharge point on the Awanui River) will be done via grab samples. Grab samples will be collected at 8 am, 12 pm and 4 pm. It is expected that sampling at these times will provide a representative sample of the impacts of the discharge on the receiving environment due to the long residence time within the WWTP treatment ponds. These samples will be collected daily. The samples will be collected from approximately 10cm beneath the surface of the river and as close to the middle of the River as possible. The downstream location is restricted by the inflow from the drainage channel to the north east of the WWTP. The upstream location should be within 50 m of the WWTP discharge location. (Note: the exact location of the WWTP discharge into the Awanui River has not been identified in this report.)

Due to the residence time in the WWTP being approximately 35 days, it is assumed that the JNL discharge will remain consistent before, during and after the monitoring programme, which shall allow the different sampling points to be compared at during this monitoring period.

With regards to the locations that are sampled by autosamplers, to provide the appropriate volume of samples for the analysis by the laboratory, (4 discrete sample bottles will need to be composited). Therefore, a full 24 hours' worth of sampling will provide six sets of samples to be sent to an IANZ accredited laboratory for analysis.

The process for compositing 4 bottles together is to take the 4 relevant bottles combine the entire sample into a clean bucket, then distribute into the various laboratory sample containers. The bucket shall be rinsed with clean water (type 1/distilled water) between each set of sample composites. Different buckets will be used for the different sample locations.

Once collected, each sample will be then sent to the lab for analysis. Based on the acceptance criteria of Watercare Laboratory Services the autosampler does not need to be refrigerated or chilled. However, when sending to the Laboratory, samples are to be placed in a chilly bin with ice.

Due to the 24-hour acceptance criteria for some analysis, samples will need to be sent twice daily, once in the morning and once in the afternoon. It is important to ensure couriers will be able to deliver samples within this timeframe.

This sampling regime will be carried out for a minimum period of two weeks. Once the two-week sampling period has been completed, the results shall be assessed and a decision made on if additional sampling should be carried out and on what frequency and timeframe.

2.3 Sample Contaminants

All samples collected will need to be tested for the following analytes:

- Total Nitrogen (TN);
- Nitrate-N;
- Nitrite-N;
- Total Kjeldahl Nitrogen (TKN);
- Ammoniacal Nitrogen;
- Total Phosphorus (TP);
- Dissolved Reactive Phosphorus (DRP);
- Conductivity;
- pH;
- Total Suspended Solids (TSS); and,
- Total BOD (TBOD).

The IANZ accredited laboratory used, shall provide the appropriate bottles for sampling prior to each sampling event.

2.4 Laboratory Analysis

Laboratory analysis of all samples shall be undertaken at an IANZ approved laboratory. As part of the analysis, the laboratory shall report on the uncertainty and limits of detection of each testing method undertaken for each analyte. It is suggested that samples be sent to Watercare Laboratory Services for analysis.

A chain of custody form shall be filled out every time samples are sent to the laboratory for analysis. The chain of custody will be kept and made available if required.

Samples delivered to the laboratory shall be within the acceptable criteria set out by the lab for sample reception. The criteria for each lab can be different, therefore the same lab should be used as much as practically possible. Samples will be packed with ice, in an upright position to ensure sample integrity throughout the travel to the laboratory. A breakdown of acceptance criteria for Watercare Laboratory Services and the associated sample analyses required above is provided in Table 1.

Table 1: Sample Acceptance Criteria

Sample Contaminant Analyses	Acceptance Criteria
TN (Including Nitrate-N and Nitrite-N), Ammoniacal-N, TKN, TP, DRP, and Conductivity	Chilled
TSS, pH, and TBOD	Chilled and within 24 hours of sample taken
Note: Based on Watercare Services Laboratory Acceptance Criteria.	

Table 2 below provides a breakdown of the bottles required for the analysis. Please note that the autosampler samples will be composited to ensure sample volume is maintained.

Table 2: Sample Bottles Required

Sample Analyses	Sample Bottle
TKN, TP, TSS, pH, BOD and DRP and Conductivity	2L General Bottle
TN, Nitrate-N, Nitrite-N, Ammoniacal Nitrogen	100 ml Sulfuric Acid Preserved
Note: Based on Watercare Services Laboratory Acceptance Criteria.	

2.5 Contaminant Load Calculations

Flow calculations from the JNL pump station, Kaitaia WWTP influent point and effluent point shall be available to ensure contaminant flux can be calculated at each location. Awanui River flow data shall be obtained from the Northland Regional Council's Awanui River at Waikuruki hydrometric station. The downstream flow will be a combination of the Awanui River hydrometric station flow data and the flow date from the discharge pipe of the WWTP. This will provide an estimate of the flow impacts of the plant on the receiving environment.

To determine contaminant flux for the day the following calculation shall be made:

Instantaneous Flux (g/s) = Mean Daily Flow Discharge (l/s) x Concentration (mg/l)

Daily Flux (kg/day) = Instantaneous Flux x 86.4

2.6 Monitoring Schedule

Table 3 provided below outlines the full monitoring schedule.

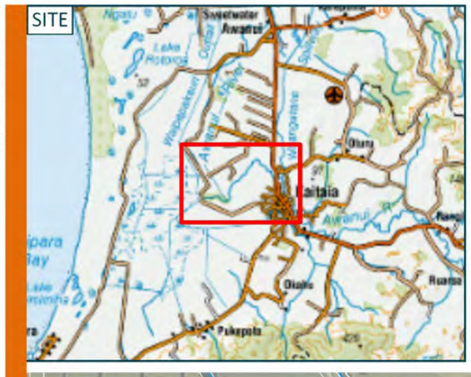
Table 3: Monitoring Plan		
Location	**Coordinates (x,y)**	**Sample Timing**
Awanui River Upstream	E1620970 N6114842	Grab samples to be taken at 8am, 12pm and 4pm. TBC after two weeks.
Awanui River Downstream	E1620716 N6114952	Grab samples to be taken at 8am, 12pm and 4pm. TBC after two weeks.
Inlet of WWTP	E1620444 N6114244	Aliquots will be sampled every ten minutes and a discrete bottle used for an individual hour for first two weeks. TBC after two weeks.
Outlet of WWTP	E1620829 N6114897	Aliquots will be sampled every ten minutes and a discrete bottle used for an individual hour for first two weeks. TBC after two weeks.
JNL Discharge	E1623732 N6116696	Aliquots will be sampled every ten minutes and a discrete bottle used for an individual hour for first two weeks. TBC after two weeks. Ideally a third party will undertake the sampling and compositing initially. It is at FNDCs discretion to allow JNL to carry out their own sampling.

3.0 Conclusion

The monitoring plan described will allow FNDC to characterise the effects of the trade waste discharge by JNL on the WWTP in Kaitaia. The monitoring plan is subject to change depending on communication between FNDC and JNL. The plan is also subject to change after the initial two weeks of sampling, pending the results of the automated 24-hour sampling and grab samples.

Appendix A

Detailed Sampling Location Map



PUCKEYS OUTFALL
BELL RD
WHANGATANE DR
JNL DISCHARGE
NORTH PARK DR
NORTH RD
DONALD RD
DONALD LANE
GILL RD
PUCKEY RD
TERRY CRES
SH 1
DAVIS ST
MATILDA PL
ALLEN BELL DR
PARKDALE CRES
TAUPATA PL
KOHURU ST
WATTS ST
KITCHENER ST
KORIMAKO LANE
GRIGG ST
JAMIESON RD
MIRO PL
MELODY LANE
MATTHEWS AVE
DUNN ST
EMPIRE ST
WATER LANE
PUKEPOTO RD
PLAZA LANE
WARD ST
COMMERCE ST
TAHUNA RD
WILLIAMS ST
FOLEY ST
LAKE RD
PUCKEY AVE
TAAFFE ST
WEST LANE
MELBA ST
EAST LANE
ARCHIBALD ST
VEGAR ST
POMPALLIER WLK
EDEN TCE
DOMINION RD
BANK ST
CHURCH RD
REDAN RD
SOUTH RD
KAITAIA
DOWNSTREAM SAMPLE
UPSTREAM SAMPLE
EFFLUENT FROM WASTEWATER TREATMENT PLANT
INFLUENT TO WASTEWATER TREATMENT PLANT
BONNETT RD
N

KEY :
SAMPLE LOCATION

0 100 200 400
METRES
SCALE : 1:12,500 (A3)

FOR DISCUSSION
2/11/2020

NO.	REVISION	DATE	BY
A	ISSUED FOR REVIEW	NOV 20	NE

SOURCE:
1. AERIAL IMAGERY (FLOWN 2017) SOURCED FROM THE LINZ DATA SERVICE www.linz.govt.nz/about-linz/linz-data-service/help/using-linz-data/attributing-aerial-imagery-data AND LICENCED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET DERIVED FROM LINZ DATA.

CLIENT
Far North District Council

FIGURE
FIG 1: SAMPLE LOCATIONS

PROJECT
FAR NORTH DISTRICT COUNCIL WASTEWATER DISCHARGE MONITORING

A031576800.aprx - A031576800IS001

Appendix B

Laboratory Results

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Pattle Delamore Partners Ltd
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Attention: Phil Hook
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Email: phil.hook@pdp.co.nz

Lab Reference: 21-16443
Submitted by: Emma Anderson
Date Received: 13/04/2021
Testing Initiated: 13/04/2021
Date Completed: 16/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16443-1	21-16443-2	21-16443-3
Total Suspended Solids	g/m^3	*3*	10	110	124
pH	pH	*1*	8.0	7.6	7.7

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

Matthew Counsell, B.Sc.
Inorganics Team Leader

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Attention: Phil Hook
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Email: emma@aemonitoring.co.nz

Lab Reference: 21-16654
Submitted by: Emma Anderson
Date Received: 14/04/2021
Testing Initiated: 14/04/2021
Date Completed: 19/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16654-1	21-16654-2	21-16654-3
Total Suspended Solids	g/m^3	*3*	15	183	111
pH	pH	*1*	8.1	7.8	7.8

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Lab Reference: 21-16940
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 15/04/2021
Date Completed: 20/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
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Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab sampled from tap	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-16940-1	21-16940-2	21-16940-3
Total Suspended Solids	g/m^3	*3*	7	188	215
pH	pH	*1*	7.7	7.7	7.8

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

Sharelle Frank, B.Sc. (Tech)
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Lab Reference: 21-16956
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 15/04/2021
Date Completed: 27/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 11/04/2021 1610 to 12/04/2021 0005 10cm	JNL Plant Composite 12/04/2021 0010 to 12/04/2021 0805 10cm	JNL Plant Composite 12/04/2021 0810 to 12/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 11/04/2021 1640 to 12/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 12/04/2021 0040 to 12/04/2021 0835 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-1	21-16956-2	21-16956-3	21-16956-4	21-16956-5
Total Nitrogen	g/m^3	*0.1*	3.5	3.1	7.6	36	27
Total Kjeldahl Nitrogen	g/m^3	*0.1*	3.48	3.14	7.54	36.2	26.7
Electrical Conductivity	µS/cm	*0.2*	1,090	889	1,350	715	605
Total Phosphorus	g/m^3	*0.005*	0.30	0.44	0.88	2.72	2.03
Total Biochemical Oxygen Demand	g/m^3	*1*	1.7	3.2	6.2	105	80.0
Conductivity of Water (mS/m)	mS/m	*0.02*	109	89.0	135	71.0	60.0

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 12/04/2021 0840 to 12/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 1705 to 12/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 0105 to 12/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 0905 to 12/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-6	21-16956-7	21-16956-8	21-16956-9	21-16956-10
Total Nitrogen	g/m^3	*0.1*	55	17	19	18	1.1
Total Kjeldahl Nitrogen	g/m^3	*0.1*	54.9	15.9	17.3	16.5	0.73
Electrical Conductivity	µS/cm	*0.2*	1,010	518	777	769	194
Total Phosphorus	g/m^3	*0.005*	5.37	1.58	1.49	1.41	0.076
Total Biochemical Oxygen Demand	g/m^3	*1*	208	70.6	75.4	68.2	1.5
Conductivity of Water (mS/m)	mS/m	*0.02*	101	52.0	78.0	77.0	19.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-11	21-16956-12	21-16956-13
Total Nitrogen	g/m^3	*0.1*	2.9	0.93	1.3
Total Kjeldahl Nitrogen	g/m^3	*0.1*	2.58	0.63	0.76
Electrical Conductivity	µS/cm	*0.2*	196	205	216
Total Phosphorus	g/m^3	*0.005*	0.10	0.079	0.055
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0
Conductivity of Water (mS/m)	mS/m	*0.02*	20.0	20.0	22.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 11/04/2021 1610 to 12/04/2021 0005 10cm	JNL Plant Composite 12/04/2021 0010 to 12/04/2021 0805 10cm	JNL Plant Composite 12/04/2021 0810 to 12/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 11/04/2021 1640 to 12/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 12/04/2021 0040 to 12/04/2021 0835 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-1	21-16956-2	21-16956-3	21-16956-4	21-16956-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	0.0240	0.0828	0.143
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	<0.05	0.07	0.19	20.4	32.8
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.381	0.507	0.804	1.573	2.372

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 12/04/2021 0840 to 12/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 1705 to 12/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 0105 to 12/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 0905 to 12/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-6	21-16956-7	21-16956-8	21-16956-9	21-16956-10
Nitrate-N	g/m^3	*0.002*	<0.02	0.950	1.43	1.41	0.344
Nitrite-N	g/m^3	*0.001*	<0.01	0.237	0.422	0.394	0.00882
Ammonia as N	g/m^3	*0.005*	31.4	1.03	1.71	1.88	0.02
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	2.748	0.756	0.859	0.753	0.030

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			12/04/2021	12/04/2021	12/04/2021
Analyte	Unit	*Reporting Limit*	21-16956-11	21-16956-12	21-16956-13
Nitrate-N	g/m^3	*0.002*	0.339	0.291	0.540
Nitrite-N	g/m^3	*0.001*	0.0118	0.00839	0.0178
Ammonia as N	g/m^3	*0.005*	0.04	0.02	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.035	0.024	0.022

Method Summary

TN	Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).
TKN	Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).
Electrical Conductivity	Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).
Total Phosphorus	Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)
BOD	Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).
NO3-N	Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)
NO2-N	Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).
Ammonia-N	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).
Dissolved Reactive Phosphorus	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
Inorganics Team Leader

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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Lab Reference: 21-16959
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 15/04/2021
Date Completed: 27/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	JNL Plant Composite 10/04/2021 0000 to 10/04/2021 0755 10cm	JNL Plant Composite 10/04/2021 0810 to 10/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	Kaitaia WWTP Influent Composite 10/04/2021 0000 to 10/04/2021 0755 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-1	21-16959-2	21-16959-3	21-16959-4	21-16959-5
Total Phosphorus	g/m^3	*0.005*	0.098	0.13	0.30	6.10	4.30
Total Nitrogen	g/m^3	*0.1*	6.6	5.8	5.9	110	42
Total Kjeldahl Nitrogen	g/m^3	*0.1*	6.51	5.80	5.87	109	42.3
Electrical Conductivity	µS/cm	*0.2*	1,460	1,490	1,510	1,160	1,040
Total Biochemical Oxygen Demand	g/m^3	*1*	7.2	6.8	9.9	230	184
Conductivity of Water (mS/m)	mS/m	*0.02*	146	149	151	116	104

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 10/04/2021 0835 to 10/04/2021 1630 10cm	Kaitaia WWTP Effluent Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 0000 to 10/04/2021 0755 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 0900 to 10/04/2021 1655 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-6	21-16959-7	21-16959-8	21-16959-9	21-16959-10
Total Phosphorus	g/m^3	*0.005*	4.94	1.43	1.47	1.78	0.016
Total Nitrogen	g/m^3	*0.1*	59	19	17	20	0.11
Total Kjeldahl Nitrogen	g/m^3	*0.1*	58.6	17.7	15.5	19.2	0.11
Electrical Conductivity	µS/cm	*0.2*	850	816	830	819	231
Total Biochemical Oxygen Demand	g/m^3	*1*	260	72.3	72.3	64.8	<1.0
Conductivity of Water (mS/m)	mS/m	*0.02*	85.0	82.0	83.0	82.0	23.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-11	21-16959-12	21-16959-13
Total Phosphorus	g/m^3	*0.005*	0.11	0.043	0.092
Total Nitrogen	g/m^3	*0.1*	1.1	0.18	0.82
Total Kjeldahl Nitrogen	g/m^3	*0.1*	1.02	0.13	0.73
Electrical Conductivity	µS/cm	*0.2*	246	197	225
Total Biochemical Oxygen Demand	g/m^3	*1*	4.5	<1.0	3.5
Conductivity of Water (mS/m)	mS/m	*0.02*	25.0	20.0	23.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	JNL Plant Composite 10/04/2021 0000 to 10/04/2021 0755 10cm	JNL Plant Composite 10/04/2021 0810 to 10/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	Kaitaia WWTP Influent Composite 10/04/2021 0000 to 10/04/2021 0755 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-1	21-16959-2	21-16959-3	21-16959-4	21-16959-5
Nitrate-N	g/m^3	*0.002*	0.0324	<0.02	<0.02	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	0.0588	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.05	<0.05	0.14	41.4	34.4
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.043	0.067	0.187	3.917	2.524

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 10/04/2021 0835 to 10/04/2021 1630 10cm	Kaitaia WWTP Effluent Composite 09/04/2021 1600 to 09/04/2021 2355 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 0000 to 10/04/2021 0755 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 0900 to 10/04/2021 1655 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-6	21-16959-7	21-16959-8	21-16959-9	21-16959-10
Nitrate-N	g/m^3	*0.002*	<0.02	0.817	0.726	0.877	<0.0020
Nitrite-N	g/m^3	*0.001*	<0.01	0.415	0.348	0.317	<0.0010
Ammonia as N	g/m^3	*0.005*	31.9	1.90	1.93	3.40	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	2.531	0.800	0.776	0.869	0.005

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			10/04/2021	10/04/2021	10/04/2021
Analyte	Unit	*Reporting Limit*	21-16959-11	21-16959-12	21-16959-13
Nitrate-N	g/m^3	*0.002*	0.0301	0.0456	0.0716
Nitrite-N	g/m^3	*0.001*	0.0110	0.0040	0.0128
Ammonia as N	g/m^3	*0.005*	0.12	<0.005	0.10
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.065	0.027	0.047

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
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Technologist

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Certificate of Analysis

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Lab Reference: 21-16960
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 23/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 12/04/2021 1610 to 13/04/2021 0005 10cm	JNL Plant Composite 13/04/2021 0010 to 13/04/2021 0805 10cm	JNL Plant Composite 13/04/2021 0810 to 13/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 12/04/2021 1640 to 13/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 13/04/2021 0040 to 13/04/2021 0835 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-1	21-16960-2	21-16960-3	21-16960-4	21-16960-5
Total Phosphorus	g/m^3	*0.005*	0.79	0.96	1.28	4.30	2.96
Total Nitrogen	g/m^3	*0.1*	2.6	3.2	3.9	41	43
Total Kjeldahl Nitrogen	g/m^3	*0.1*	2.58	3.16	3.91	40.8	42.7
Electrical Conductivity	µS/cm	*0.2*	1,120	1,060	1,200	845	729
Total Biochemical Oxygen Demand	g/m^3	*1*	2.8	3.3	5.6	131	67.8
Conductivity of Water (mS/m)	mS/m	*0.02*	112	106	120	85.0	73.0

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 13/04/2021 0840 to 13/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 1705 to 13/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 0105 to 13/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 0905 to 13/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-6	21-16960-7	21-16960-8	21-16960-9	21-16960-10
Total Phosphorus	g/m^3	*0.005*	7.29	1.34	1.44	1.91	0.042
Total Nitrogen	g/m^3	*0.1*	37	14	16	20	0.59
Total Kjeldahl Nitrogen	g/m^3	*0.1*	36.6	12.0	14.7	17.9	0.38
Electrical Conductivity	µS/cm	*0.2*	951	660	621	699	186
Total Biochemical Oxygen Demand	g/m^3	*1*	268	65.4	83.3	73.8	<1.0
Conductivity of Water (mS/m)	mS/m	*0.02*	95.0	66.0	62.0	70.0	19.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-11	21-16960-12	21-16960-13
Total Phosphorus	g/m^3	*0.005*	0.050	0.038	0.049
Total Nitrogen	g/m^3	*0.1*	0.81	0.49	0.81
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.56	0.31	0.59
Electrical Conductivity	µS/cm	*0.2*	194	188	214
Total Biochemical Oxygen Demand	g/m^3	*1*	1.1	<1.0	<1.0
Conductivity of Water (mS/m)	mS/m	*0.02*	19.0	19.0	21.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 12/04/2021 1610 to 13/04/2021 0005 10cm	JNL Plant Composite 13/04/2021 0010 to 13/04/2021 0805 10cm	JNL Plant Composite 13/04/2021 0810 to 13/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 12/04/2021 1640 to 13/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 13/04/2021 0040 to 13/04/2021 0835 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-1	21-16960-2	21-16960-3	21-16960-4	21-16960-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.11	0.08	0.10	27.4	23.1
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.972	1.153	1.442	1.848	1.223

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 13/04/2021 0840 to 13/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 12/04/2021 1705 to 13/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 0105 to 13/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 0905 to 13/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-6	21-16960-7	21-16960-8	21-16960-9	21-16960-10
Nitrate-N	g/m^3	*0.002*	<0.02	1.45	1.45	1.58	0.206
Nitrite-N	g/m^3	*0.001*	0.0158	0.355	0.173	0.256	0.00522
Ammonia as N	g/m^3	*0.005*	31.3	1.27	1.62	1.47	0.01
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	2.136	0.703	0.479	0.465	0.017

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			13/04/2021	13/04/2021	13/04/2021
Analyte	Unit	*Reporting Limit*	21-16960-11	21-16960-12	21-16960-13
Nitrate-N	g/m^3	*0.002*	0.243	0.174	0.219
Nitrite-N	g/m^3	*0.001*	0.00959	0.0035	0.00735
Ammonia as N	g/m^3	*0.005*	0.04	0.009	0.04
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.021	0.015	0.017

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

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Certificate of Analysis

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Email: emma@aemonitoring.co.nz

Lab Reference: 21-16962
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 28/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 10/04/2021 1610 to 111/04/2021 0005 10cm	JNL Plant Composite 11/04/2021 0010 to 11/04/2021 0805 10cm	JNL Plant Composite 11/04/2021 0810 to 11/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 10/04/2021 1640 to 11/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 11/04/2021 0040 to 11/04/2021 0835 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-1	21-16962-2	21-16962-3	21-16962-4	21-16962-5
Total Phosphorus	g/m^3	*0.005*	0.18	0.20	0.23	0.76	0.86
Total Kjeldahl Nitrogen	g/m^3	*0.1*	4.56	4.19	6.18	11.2	12.2
Total Nitrogen	g/m^3	*0.1*	4.6	4.2	6.2	15	17
Electrical Conductivity	µS/cm	*0.2*	1,490	1,460	1,470	431	455
Total Biochemical Oxygen Demand	g/m^3	*1*	4.6	5.7	3.6	21.7	12.9
Conductivity of Water (mS/m)	mS/m	*0.02*	149	146	147	43.0	45.0

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 11/04/2021 0840 to 11/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 1705 to 11/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 0105 to 11/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 0905 to 11/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-6	21-16962-7	21-16962-8	21-16962-9	21-16962-10
Total Phosphorus	g/m^3	*0.005*	2.59	1.47	1.30	1.63	0.16
Total Kjeldahl Nitrogen	g/m^3	*0.1*	28.5	16.6	18.6	20.0	1.95
Total Nitrogen	g/m^3	*0.1*	28	18	20	22	2.4
Electrical Conductivity	µS/cm	*0.2*	731	792	785	793	131
Total Biochemical Oxygen Demand	g/m^3	*1*	108	64.1	68.1	76.9	<1.0
Conductivity of Water (mS/m)	mS/m	*0.02*	73.0	79.0	78.0	79.0	13.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-11	21-16962-12	21-16962-13
Total Phosphorus	g/m^3	*0.005*	0.21	0.12	0.14
Total Kjeldahl Nitrogen	g/m^3	*0.1*	1.92	1.57	1.77
Total Nitrogen	g/m^3	*0.1*	2.4	2.1	2.3
Electrical Conductivity	µS/cm	*0.2*	126	163	172
Total Biochemical Oxygen Demand	g/m^3	*1*	1.9	<1.0	1.4
Conductivity of Water (mS/m)	mS/m	*0.02*	13.0	16.0	17.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 10/04/2021 1610 to 111/04/2021 0005 10cm	JNL Plant Composite 11/04/2021 0010 to 11/04/2021 0805 10cm	JNL Plant Composite 11/04/2021 0810 to 11/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 10/04/2021 1640 to 11/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 11/04/2021 0040 to 11/04/2021 0835 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-1	21-16962-2	21-16962-3	21-16962-4	21-16962-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	3.44	3.93
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	0.762	0.376
Ammonia as N	g/m^3	*0.005*	<0.05	<0.05	<0.05	6.30	7.86
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.186	0.188	0.248	0.482	0.481

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 11/04/2021 0840 to 11/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 10/04/2021 1705 to 11/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 0105 to 11/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 11/04/2021 0905 to 11/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-6	21-16962-7	21-16962-8	21-16962-9	21-16962-10
Nitrate-N	g/m^3	*0.002*	<0.02	0.824	1.21	1.15	0.481
Nitrite-N	g/m^3	*0.001*	<0.01	0.386	0.389	0.365	0.00729
Ammonia as N	g/m^3	*0.005*	18.4	2.78	2.11	2.04	0.01
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.610	0.770	0.739	0.826	0.045

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			11/04/2021	11/04/2021	11/04/2021
Analyte	Unit	*Reporting Limit*	21-16962-11	21-16962-12	21-16962-13
Nitrate-N	g/m^3	*0.002*	0.478	0.488	0.488
Nitrite-N	g/m^3	*0.001*	0.0134	0.00957	0.0127
Ammonia as N	g/m^3	*0.005*	0.04	0.009	0.04
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.076	0.034	0.042

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Sharelle Frank, B.Sc. (Tech)
Technologist

Kayley Rowell, B.Sc.(Tech)
Laboratory Technician

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Certificate of Analysis

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Attention: Phil Hook
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Email: phil.hook@pdp.co.nz

Lab Reference: 21-17199
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 15/04/2021
Date Completed: 21/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17199-1	21-17199-2	21-17199-3
Total Suspended Solids	g/m^3	*3*	19	131	141
pH	pH	*1*	7.6	7.5	7.6

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

Sharelle Frank, B.Sc. (Tech)
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Laboratory Technician

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Lab Reference: 21-17203
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 3/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 13/04/2021 1610 to 14/04/2021 0005 10cm	JNL Plant Composite 14/04/2021 0010 to 14/04/2021 0805 10cm	JNL Plant Composite 14/04/2021 0810 to 14/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 13/04/2021 1640 to 14/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 14/04/2021 0040 to 14/04/2021 0835 10cm
Date Sampled			14/04/2021	14/04/2021	14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-1	21-17203-2	21-17203-3	21-17203-4	21-17203-5
Total Phosphorus	g/m^3	*0.005*	1.19	1.43	1.55	3.77	3.23
Total Kjeldahl Nitrogen	g/m^3	*0.1*	4.27	3.76	4.50	46.0	39.1
Total Nitrogen	g/m^3	*0.1*	4.3	3.8	4.5	46	39
Electrical Conductivity	µS/cm	*0.2*	1,220	1,190	1,240	922	840
Conductivity of Water (mS/m)	mS/m	*0.02*	122	119	124	92.0	84.0
Total Biochemical Oxygen Demand	g/m^3	*1*	3.9	3.9	8.2	230	84.8

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 14/04/2021 0840 to 14/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 1705 to 14/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 0105 to 14/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 0905 to 14/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			14/04/2021	14/04/2021	14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-6	21-17203-7	21-17203-8	21-17203-9	21-17203-10
Total Phosphorus	g/m^3	*0.005*	7.21	1.42	1.56	1.78	0.035
Total Kjeldahl Nitrogen	g/m^3	*0.1*	62.3	16.2	17.1	20.4	0.36
Total Nitrogen	g/m^3	*0.1*	62	18	19	22	0.47
Electrical Conductivity	µS/cm	*0.2*	1,020	694	706	741	199
Conductivity of Water (mS/m)	mS/m	*0.02*	102	69.0	71.0	74.0	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	184	75.5	53.9	79.8	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-11	21-17203-12	21-17203-13
Total Phosphorus	g/m^3	*0.005*	0.038	0.026	0.050
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.51	0.34	0.59
Total Nitrogen	g/m^3	*0.1*	0.64	0.43	0.73
Electrical Conductivity	µS/cm	*0.2*	210	202	219
Conductivity of Water (mS/m)	mS/m	*0.02*	21.0	20.0	22.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 13/04/2021 1610 to 14/04/2021 0005 10cm	JNL Plant Composite 14/04/2021 0010 to 14/04/2021 0805 10cm	JNL Plant Composite 14/04/2021 0810 to 14/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 13/04/2021 1640 to 14/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 14/04/2021 0040 to 14/04/2021 0835 10cm
Date Sampled			14/04/2021	14/04/2021	14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-1	21-17203-2	21-17203-3	21-17203-4	21-17203-5
Nitrate-N	g/m^3	*0.002*	0.0283	0.0206	0.0302	0.0225	<0.02
Nitrite-N	g/m^3	*0.001*	0.0108	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.21	0.14	0.26	33.4	25.9
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.548	1.507	1.706	2.003	1.823

Nutrients Suite

		Client Sample ID	Kaitaia WWTP Influent Composite 14/04/2021 0840 to 14/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 13/04/2021 1705 to 14/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 0105 to 14/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 0905 to 14/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
		Date Sampled	14/04/2021	14/04/2021	14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-6	21-17203-7	21-17203-8	21-17203-9	21-17203-10
Nitrate-N	g/m^3	*0.002*	0.0776	1.32	1.68	1.31	0.113
Nitrite-N	g/m^3	*0.001*	0.0114	0.301	0.268	0.330	0.0020
Ammonia as N	g/m^3	*0.005*	42.0	1.71	1.27	3.39	0.006
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.301	0.663	0.366	0.467	0.014

Nutrients Suite

		Client Sample ID	Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
		Date Sampled	14/04/2021	14/04/2021	14/04/2021
Analyte	Unit	*Reporting Limit*	21-17203-11	21-17203-12	21-17203-13
Nitrate-N	g/m^3	*0.002*	0.130	0.0921	0.133
Nitrite-N	g/m^3	*0.001*	0.00614	0.0017	0.00747
Ammonia as N	g/m^3	*0.005*	0.04	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.022	0.013	0.016

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
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Lab Reference: 21-17462
Submitted by: Emma Anderson
Date Received: 17/04/2021
Testing Initiated: 19/04/2021
Date Completed: 22/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17462-1	21-17462-2	21-17462-3
Total Suspended Solids	g/m^3	*3*	22	264	135
pH	pH	*1*	7.6	7.5	7.5

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

Karam Wadi, B.E. (Hons)
Technologist

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Lab Reference: 21-17676
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 3/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Please interpret BOD results for fraction (7), (8) and (9) with caution due to the presence of algae within the sample.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 14/04/2021 1610 to 15/04/2021 0005 10cm	JNL Plant Composite 15/04/2021 0010 to 15/04/2021 0805 10cm	JNL Plant Composite 15/04/2021 0810 to 15/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 14/04/2021 1640 to 15/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 15/04/2021 0040 to 15/04/2021 0835 10cm
Date Sampled			15/04/2021	15/04/2021	15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-1	21-17676-2	21-17676-3	21-17676-4	21-17676-5
Total Phosphorus	g/m^3	*0.005*	1.86	1.95	2.33	6.89	5.55
Total Kjeldahl Nitrogen	g/m^3	*0.1*	4.50	4.05	4.12	54.3	38.9
Total Nitrogen	g/m^3	*0.1*	4.5	4.1	4.1	54	39
Electrical Conductivity	µS/cm	*0.2*	1,130	1,160	1,190	907	838
Conductivity of Water (mS/m)	mS/m	*0.02*	113	116	119	91.0	84.0
Total Biochemical Oxygen Demand	g/m^3	*1*	5.1	4.8	17.6	379	192

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 15/04/2021 0840 to 15/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 1705 to 15/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 0105 to 15/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 0905 to 15/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			15/04/2021	15/04/2021	15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-6	21-17676-7	21-17676-8	21-17676-9	21-17676-10
Total Phosphorus	g/m^3	*0.005*	6.88	2.52	1.83	2.09	0.025
Total Kjeldahl Nitrogen	g/m^3	*0.1*	64.1	23.6	18.4	20.1	0.22
Total Nitrogen	g/m^3	*0.1*	64	25	20	22	0.29
Electrical Conductivity	µS/cm	*0.2*	1,030	700	676	684	184
Conductivity of Water (mS/m)	mS/m	*0.02*	103	70.0	68.0	68.0	18.0
Total Biochemical Oxygen Demand	g/m^3	*1*	312	118	82.8	75.0	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-11	21-17676-12	21-17676-13
Total Phosphorus	g/m^3	*0.005*	0.052	0.025	0.049
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.49	0.24	0.49
Total Nitrogen	g/m^3	*0.1*	0.58	0.28	0.57
Electrical Conductivity	µS/cm	*0.2*	201	181	205
Conductivity of Water (mS/m)	mS/m	*0.02*	20.0	18.0	21.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 14/04/2021 1610 to 15/04/2021 0005 10cm	JNL Plant Composite 15/04/2021 0010 to 15/04/2021 0805 10cm	JNL Plant Composite 15/04/2021 0810 to 15/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 14/04/2021 1640 to 15/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 15/04/2021 0040 to 15/04/2021 0835 10cm
Date Sampled			15/04/2021	15/04/2021	15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-1	21-17676-2	21-17676-3	21-17676-4	21-17676-5
Nitrate-N	g/m^3	*0.002*	0.0302	<0.02	<0.02	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.13	0.05	0.06	45.2	30.5
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.852	1.945	2.117	4.831	2.002

Nutrients Suite

	Client Sample ID		Kaitaia WWTP Influent Composite 15/04/2021 0840 to 15/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 14/04/2021 1705 to 15/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 0105 to 15/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 0905 to 15/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
	Date Sampled		15/04/2021	15/04/2021	15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-6	21-17676-7	21-17676-8	21-17676-9	21-17676-10
Nitrate-N	g/m^3	*0.002*	0.0296	1.22	1.30	1.22	0.0635
Nitrite-N	g/m^3	*0.001*	<0.01	0.463	0.539	0.502	0.0014
Ammonia as N	g/m^3	*0.005*	44.5	1.77	1.56	1.84	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	4.210	0.946	0.763	0.800	0.010

Nutrients Suite

	Client Sample ID		Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
	Date Sampled		15/04/2021	15/04/2021	15/04/2021
Analyte	Unit	*Reporting Limit*	21-17676-11	21-17676-12	21-17676-13
Nitrate-N	g/m^3	*0.002*	0.0776	0.0436	0.0682
Nitrite-N	g/m^3	*0.001*	0.00832	0.0011	0.00603
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.018	0.011	0.017

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
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Lab Reference: 21-17677
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 29/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 15/04/2021 1610 to 16/04/2021 0005 10cm	JNL Plant Composite 16/04/2021 0010 to 16/04/2021 0805 10cm	JNL Plant Composite 16/04/2021 0810 to 16/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 15/04/2021 1640 to 16/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 16/04/2021 0040 to 16/04/2021 0835 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-1	21-17677-2	21-17677-3	21-17677-4	21-17677-5
Total Phosphorus	g/m^3	*0.005*	2.01	2.08	3.97	5.45	4.02
Total Kjeldahl Nitrogen	g/m^3	*0.1*	4.33	4.27	4.07	50.0	34.2
Total Nitrogen	g/m^3	*0.1*	4.3	4.3	4.1	50	34
Electrical Conductivity	µS/cm	*0.2*	1,200	1,220	1,220	938	869
Conductivity of Water (mS/m)	mS/m	*0.02*	120	122	122	94.0	87.0
Total Biochemical Oxygen Demand	g/m^3	*1*	17.3	12.0	15.5	215	84.2

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 16/04/2021 0840 to 16/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 1705 to 16/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 0105 to 16/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 0905 to 16/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-6	21-17677-7	21-17677-8	21-17677-9	21-17677-10
Total Phosphorus	g/m^3	*0.005*	6.37	1.57	1.55	1.58	0.022
Total Kjeldahl Nitrogen	g/m^3	*0.1*	69.2	19.5	18.4	18.9	0.31
Total Nitrogen	g/m^3	*0.1*	69	22	20	21	0.35
Electrical Conductivity	µS/cm	*0.2*	1,020	683	716	695	193
Conductivity of Water (mS/m)	mS/m	*0.02*	102	68.0	72.0	70.0	19.0
Total Biochemical Oxygen Demand	g/m^3	*1*	235	81.4	77.4	77.3	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-11	21-17677-12	21-17677-13
Total Phosphorus	g/m^3	*0.005*	0.048	0.028	0.043
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.58	0.25	0.49
Total Nitrogen	g/m^3	*0.1*	0.65	0.28	0.56
Electrical Conductivity	µS/cm	*0.2*	212	206	224
Conductivity of Water (mS/m)	mS/m	*0.02*	21.0	21.0	22.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 15/04/2021 1610 to 16/04/2021 0005 10cm	JNL Plant Composite 16/04/2021 0010 to 16/04/2021 0805 10cm	JNL Plant Composite 16/04/2021 0810 to 16/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 15/04/2021 1640 to 16/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 16/04/2021 0040 to 16/04/2021 0835 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-1	21-17677-2	21-17677-3	21-17677-4	21-17677-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	0.0264	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.05	0.06	<0.05	38.8	28.8
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	2.235	2.100	1.963	3.550	1.489

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 16/04/2021 0840 to 16/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 15/04/2021 1705 to 16/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 0105 to 16/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 0905 to 16/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-6	21-17677-7	21-17677-8	21-17677-9	21-17677-10
Nitrate-N	g/m^3	*0.002*	<0.02	1.63	1.36	1.43	0.0399
Nitrite-N	g/m^3	*0.001*	<0.01	0.527	0.562	0.555	0.0012
Ammonia as N	g/m^3	*0.005*	40.9	1.12	1.28	1.57	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.683	0.748	0.774	0.864	0.011

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			16/04/2021	16/04/2021	16/04/2021
Analyte	Unit	*Reporting Limit*	21-17677-11	21-17677-12	21-17677-13
Nitrate-N	g/m^3	*0.002*	0.0597	0.0323	0.0575
Nitrite-N	g/m^3	*0.001*	0.00945	0.0011	0.00731
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.019	0.011	0.020

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
Inorganics Team Leader

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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Attention: Phil Hook
Phone: 0211105473
Email: emma@aemonitoring.co.nz

Lab Reference: 21-17680
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 3/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 16/04/2021 1610 to 17/04/2021 0005 10cm	JNL Plant Composite 17/04/2021 0010 to 17/04/2021 0805 10cm	JNL Plant Composite 17/04/2021 0810 to 17/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 16/04/2021 1640 to 17/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 17/04/2021 0040 to 17/04/2021 0835 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-1	21-17680-2	21-17680-3	21-17680-4	21-17680-5
Total Phosphorus	g/m^3	*0.005*	2.04	2.04	1.74	4.24	3.36
Total Kjeldahl Nitrogen	g/m^3	*0.1*	52.9	5.42	4.37	45.0	38.4
Total Nitrogen	g/m^3	*0.1*	53	5.4	4.4	45	38
Electrical Conductivity	µS/cm	*0.2*	1,260	1,240	1,250	883	794
Conductivity of Water (mS/m)	mS/m	*0.02*	126	124	125	88.0	79.0
Total Biochemical Oxygen Demand	g/m^3	*1*	21.0	36.4	22.0	342	134

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 17/04/2021 0840 to 17/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 1705 to 17/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 0105 to 17/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 0905 to 17/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-6	21-17680-7	21-17680-8	21-17680-9	21-17680-10
Total Phosphorus	g/m^3	*0.005*	8.75	1.90	1.75	2.83	0.026
Total Kjeldahl Nitrogen	g/m^3	*0.1*	67.3	15.9	18.1	27.1	0.47
Total Nitrogen	g/m^3	*0.1*	67	18	20	29	0.49
Electrical Conductivity	µS/cm	*0.2*	987	604	706	714	186
Conductivity of Water (mS/m)	mS/m	*0.02*	99.0	60.0	71.0	71.0	19.0
Total Biochemical Oxygen Demand	g/m^3	*1*	170	65.5	68.6	126	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-11	21-17680-12	21-17680-13
Total Phosphorus	g/m^3	*0.005*	0.050	0.026	0.056
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.49	0.30	0.50
Total Nitrogen	g/m^3	*0.1*	0.55	0.32	0.55
Electrical Conductivity	µS/cm	*0.2*	209	202	216
Conductivity of Water (mS/m)	mS/m	*0.02*	21.0	20.0	22.0
Total Biochemical Oxygen Demand	g/m^3	*1*	1.4	<1.0	2.3

Nutrients Suite

Client Sample ID			JNL Plant Composite 16/04/2021 1610 to 17/04/2021 0005 10cm	JNL Plant Composite 17/04/2021 0010 to 17/04/2021 0805 10cm	JNL Plant Composite 17/04/2021 0810 to 17/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 16/04/2021 1640 to 17/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 17/04/2021 0040 to 17/04/2021 0835 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-1	21-17680-2	21-17680-3	21-17680-4	21-17680-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	0.14	0.06	<0.05	33.4	27.6
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.955	1.836	1.679	2.111	1.920

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 17/04/2021 0840 to 17/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 16/04/2021 1705 to 17/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 0105 to 17/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 0905 to 17/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-6	21-17680-7	21-17680-8	21-17680-9	21-17680-10
Nitrate-N	g/m^3	*0.002*	<0.02	1.69	1.78	1.86	0.0194
Nitrite-N	g/m^3	*0.001*	<0.01	0.503	0.568	0.386	<0.0010
Ammonia as N	g/m^3	*0.005*	41.2	0.74	1.14	1.80	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.986	0.700	0.752	1.115	0.010

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			17/04/2021	17/04/2021	17/04/2021
Analyte	Unit	*Reporting Limit*	21-17680-11	21-17680-12	21-17680-13
Nitrate-N	g/m^3	*0.002*	0.0503	0.0154	0.0510
Nitrite-N	g/m^3	*0.001*	0.00979	0.0011	0.00525
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.023	0.010	0.024

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
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Certificate of Analysis

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Attention: Phil Hook
Phone: 0211105473
Email: emma@aemonitoring.co.nz

Lab Reference: 21-17682
Submitted by: Emma Anderson
Date Received: 15/04/2021
Testing Initiated: 16/04/2021
Date Completed: 29/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 17/04/2021 1610 to 18/04/2021 0005 10cm	JNL Plant Composite 18/04/2021 0010 to 18/04/2021 0805 10cm	JNL Plant Composite 18/04/2021 0810 to 18/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 18/04/2021 0840 to 18/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 1705 to 18/04/2021 0100 10cm
Date Sampled			18/04/2021	18/04/2021	18/04/2021	18/04/2021	18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-1	21-17682-2	21-17682-3	21-17682-6	21-17682-7
Total Phosphorus	g/m^3	*0.005*	1.65	1.40	1.25	9.24	2.01
Total Kjeldahl Nitrogen	g/m^3	*0.1*	4.56	5.46	4.84	50.3	20.2
Total Nitrogen	g/m^3	*0.1*	4.6	5.5	4.9	50	23
Electrical Conductivity	µS/cm	*0.2*	1,320	1,320	1,330	971	687
Conductivity of Water (mS/m)	mS/m	*0.02*	132	132	133	97.0	69.0
Total Biochemical Oxygen Demand	g/m^3	*1*	19.0	17.2	13.2	304	86.4

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Effluent Composite 18/04/2021 0105 to 18/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 18/04/2021 0905 to 18/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm	Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm
Date Sampled			18/04/2021	18/04/2021	18/04/2021	18/04/2021	18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-8	21-17682-9	21-17682-10	21-17682-11	21-17682-12
Total Phosphorus	g/m^3	*0.005*	1.76	1.96	0.026	0.044	0.027
Total Kjeldahl Nitrogen	g/m^3	*0.1*	16.7	20.1	0.25	0.49	0.27
Total Nitrogen	g/m^3	*0.1*	19	23	0.26	0.54	0.28
Electrical Conductivity	µS/cm	*0.2*	630	688	204	213	200
Conductivity of Water (mS/m)	mS/m	*0.02*	63.0	69.0	20.0	21.0	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	72.8	77.4	<1.0	<1.0	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - PM 10cm
Date Sampled			18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-13
Total Phosphorus	g/m^3	*0.005*	0.051
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.45
Total Nitrogen	g/m^3	*0.1*	0.49
Electrical Conductivity	µS/cm	*0.2*	203
Conductivity of Water (mS/m)	mS/m	*0.02*	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 17/04/2021 1610 to 18/04/2021 0005 10cm	JNL Plant Composite 18/04/2021 0010 to 18/04/2021 0805 10cm	JNL Plant Composite 18/04/2021 0810 to 18/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 18/04/2021 0840 to 18/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 17/04/2021 1705 to 18/04/2021 0100 10cm
Date Sampled			18/04/2021	18/04/2021	18/04/2021	18/04/2021	18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-1	21-17682-2	21-17682-3	21-17682-6	21-17682-7
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	2.87
Nitrite-N	g/m^3	*0.001*	<0.01	<0.01	0.0169	0.0115	0.269
Ammonia as N	g/m^3	*0.005*	0.18	0.29	0.34	34.5	<0.05
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.635	1.467	1.309	3.673	0.129

Nutrients Suite

	Client Sample ID		Kaitaia WWTP Effluent Composite 18/04/2021 0105 to 18/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 18/04/2021 0905 to 18/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm	Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm
	Date Sampled		18/04/2021	18/04/2021	18/04/2021	18/04/2021	18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-8	21-17682-9	21-17682-10	21-17682-11	21-17682-12
Nitrate-N	g/m^3	*0.002*	1.86	2.22	0.0110	0.0446	0.0089
Nitrite-N	g/m^3	*0.001*	0.332	0.546	<0.0010	0.00784	<0.0010
Ammonia as N	g/m^3	*0.005*	0.90	1.04	<0.005	0.02	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.781	0.363	0.010	0.017	0.010

Nutrients Suite

	Client Sample ID		Awanui River Downstream of Discharge - PM 10cm
	Date Sampled		18/04/2021
Analyte	Unit	*Reporting Limit*	21-17682-13
Nitrate-N	g/m^3	*0.002*	0.0420
Nitrite-N	g/m^3	*0.001*	0.0044
Ammonia as N	g/m^3	*0.005*	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.022

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
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Certificate of Analysis

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Lab Reference: 21-17884
Submitted by: Emma Anderson
Date Received: 17/04/2021
Testing Initiated: 19/04/2021
Date Completed: 28/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-17884-1	21-17884-2	21-17884-3
Total Suspended Solids	g/m^3	*3*	16	128	147
pH	pH	*1*	7.5	7.3	7.7

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Attention: Phillip Hook
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Email: phil.hook@pdp.co.nz

Lab Reference: 21-17931
Submitted by: Emma Anderson
Date Received: 21/04/2021
Testing Initiated: 19/04/2021
Date Completed: 28/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-17931-1	21-17931-2	21-17931-3
Total Suspended Solids	g/m^3	*3*	27	463	126
pH	pH	*1*	8.2	7.6	7.8

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Attention: Phillip Hook
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Lab Reference: 21-18223
Submitted by: Emma Anderson
Date Received: 21/04/2021
Testing Initiated: 19/04/2021
Date Completed: 28/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-18223-1	21-18223-2	21-18223-3
Total Suspended Solids	g/m^3	*3*	25	160	130
pH	pH	*1*	8.0	8.0	7.4

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Lab Reference: 21-18500
Submitted by: Emma Anderson
Date Received: 23/04/2021
Testing Initiated: 19/04/2021
Date Completed: 29/04/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-18500-1	21-18500-2	21-18500-3
Total Suspended Solids	g/m^3	*3*	30	337	140
pH	pH	*1*	8.3	7.5	7.7

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Lab Reference: 21-18746
Submitted by: Emma Anderson
Date Received: 24/04/2021
Testing Initiated: 27/04/2021
Date Completed: 6/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

	Client Sample ID		JNL Plant Grab	Kaitaia WWTP Influent Grab 10cm	Kaitaia WWTP Effluent Grab 10cm
	Date Sampled		23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-18746-1	21-18746-2	21-18746-3
Total Suspended Solids	g/m^3	*3*	58	250	134
pH	pH	*1*	8.2	7.3	7.5

Method Summary

Total Suspended Solids	Measured gravimetrically following filtration through glass micro-fibre filters. (APHA 2540 D - Modified - Online edition).
pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H^+ B. Online edition).

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Lab Reference: 21-19242
Submitted by: Emma Anderson
Date Received: 29/04/2021
Testing Initiated: 16/04/2021
Date Completed: 6/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 21/04/2021 1610 to 22/04/2021 0005 10cm	JNL Plant Composite 22/04/2021 0010 to 22/04/2021 0805 10cm	JNL Plant Composite 22/04/2021 0810 to 22/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 21/04/2021 1640 to 22/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 22/04/2021 0040 to 22/04/2021 0835 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-1	21-19242-2	21-19242-3	21-19242-4	21-19242-5
Total Phosphorus	g/m^3	*0.005*	0.94	1.20	1.34	4.13	3.79
Total Kjeldahl Nitrogen	g/m^3	*0.1*	267	317	333	68.5	76.9
Total Nitrogen	g/m^3	*0.1*	270	320	330	69	77
Electrical Conductivity	µS/cm	*0.2*	2,610	2,790	2,930	1,020	1,010
Conductivity of Water (mS/m)	mS/m	*0.02*	261	279	293	102	101
Total Biochemical Oxygen Demand	g/m^3	*1*	35.5	41.3	46.4	120	77.4

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 22/04/2021 0840 to 22/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 1705 to 22/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 0105 to 22/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 0905 to 22/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-6	21-19242-7	21-19242-8	21-19242-9	21-19242-10
Total Phosphorus	g/m^3	*0.005*	6.85	1.67	1.83	1.81	0.023
Total Kjeldahl Nitrogen	g/m^3	*0.1*	81.3	16.7	19.7	18.1	0.36
Total Nitrogen	g/m^3	*0.1*	81	19	22	20	0.37
Electrical Conductivity	µS/cm	*0.2*	1,100	658	708	701	213
Conductivity of Water (mS/m)	mS/m	*0.02*	110	66.0	71.0	70.0	21.0
Total Biochemical Oxygen Demand	g/m^3	*1*	222	67.7	65.8	60.8	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-11	21-19242-12	21-19242-13
Total Phosphorus	g/m^3	*0.005*	0.041	0.024	0.044
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.48	0.26	0.31
Total Nitrogen	g/m^3	*0.1*	0.51	0.26	0.35
Electrical Conductivity	µS/cm	*0.2*	223	215	225
Conductivity of Water (mS/m)	mS/m	*0.02*	22.0	22.0	23.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 21/04/2021 1610 to 22/04/2021 0005 10cm	JNL Plant Composite 22/04/2021 0010 to 22/04/2021 0805 10cm	JNL Plant Composite 22/04/2021 0810 to 22/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 21/04/2021 1640 to 22/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 22/04/2021 0040 to 22/04/2021 0835 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-1	21-19242-2	21-19242-3	21-19242-4	21-19242-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	0.0115	0.0127	0.0102	<0.01	0.0464
Ammonia as N	g/m^3	*0.005*	147	170	195	47.3	44.0
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.471	0.549	0.576	1.733	1.084

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 22/04/2021 0840 to 22/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 1705 to 22/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 0105 to 22/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 0905 to 22/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-6	21-19242-7	21-19242-8	21-19242-9	21-19242-10
Nitrate-N	g/m^3	*0.002*	<0.02	2.19	2.20	1.91	0.0057
Nitrite-N	g/m^3	*0.001*	<0.01	0.381	0.339	0.428	<0.0010
Ammonia as N	g/m^3	*0.005*	49.6	0.92	1.08	1.46	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.254	0.654	0.703	0.756	0.009

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			22/04/2021	22/04/2021	22/04/2021
Analyte	Unit	*Reporting Limit*	21-19242-11	21-19242-12	21-19242-13
Nitrate-N	g/m^3	*0.002*	0.0302	0.0045	0.0335
Nitrite-N	g/m^3	*0.001*	0.0036	<0.0010	0.0040
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.016	0.008	0.016

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

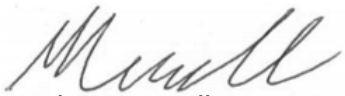
BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)



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Lab Reference: 21-19243
Submitted by: Emma Anderson
Date Received: 29/04/2021
Testing Initiated: 16/04/2021
Date Completed: 6/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 20/04/2021 1610 to 21/04/2021 0005 10cm	JNL Plant Composite 21/04/2021 0010 to 21/04/2021 0805 10cm	JNL Plant Composite 21/04/2021 0810 to 21/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 20/04/2021 1640 to 21/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 21/04/2021 0040 to 21/04/2021 0835 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-1	21-19243-2	21-19243-3	21-19243-4	21-19243-5
Total Phosphorus	g/m^3	*0.005*	1.31	1.05	0.81	4.39	2.54
Total Kjeldahl Nitrogen	g/m^3	*0.1*	252	240	240	69.4	67.4
Total Nitrogen	g/m^3	*0.1*	250	240	240	69	68
Electrical Conductivity	µS/cm	*0.2*	2,420	2,510	2,470	941	881
Conductivity of Water (mS/m)	mS/m	*0.02*	242	251	247	94.0	88.0
Total Biochemical Oxygen Demand	g/m^3	*1*	26.3	22.2	25.4	131	62.4

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 21/04/2021 0840 to 21/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 1705 to 21/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 0105 to 21/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 0905 to 21/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-6	21-19243-7	21-19243-8	21-19243-9	21-19243-10
Total Phosphorus	g/m^3	*0.005*	5.80	1.68	1.79	1.97	0.032
Total Kjeldahl Nitrogen	g/m^3	*0.1*	83.5	16.2	16.2	18.2	0.20
Total Nitrogen	g/m^3	*0.1*	84	18	20	21	0.20
Electrical Conductivity	µS/cm	*0.2*	1,110	401	696	677	192
Conductivity of Water (mS/m)	mS/m	*0.02*	111	40.0	70.0	68.0	19.0
Total Biochemical Oxygen Demand	g/m^3	*1*	194	68.5	65.6	66.2	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-11	21-19243-12	21-19243-13
Total Phosphorus	g/m^3	*0.005*	0.040	0.029	0.047
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.36	0.19	0.43
Total Nitrogen	g/m^3	*0.1*	0.40	0.20	0.46
Electrical Conductivity	µS/cm	*0.2*	228	192	212
Conductivity of Water (mS/m)	mS/m	*0.02*	23.0	19.0	21.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 20/04/2021 1610 to 21/04/2021 0005 10cm	JNL Plant Composite 21/04/2021 0010 to 21/04/2021 0805 10cm	JNL Plant Composite 21/04/2021 0810 to 21/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 20/04/2021 1640 to 21/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 21/04/2021 0040 to 21/04/2021 0835 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-1	21-19243-2	21-19243-3	21-19243-4	21-19243-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	0.0223
Nitrite-N	g/m^3	*0.001*	0.0134	0.0112	0.0117	<0.01	0.121
Ammonia as N	g/m^3	*0.005*	130	133	137	44.4	40.2
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.777	0.619	0.427	2.696	0.786

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 21/04/2021 0840 to 21/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 1705 to 21/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 0105 to 21/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 21/04/2021 0905 to 21/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-6	21-19243-7	21-19243-8	21-19243-9	21-19243-10
Nitrate-N	g/m^3	*0.002*	<0.02	1.40	2.98	2.03	0.0023
Nitrite-N	g/m^3	*0.001*	<0.01	0.208	0.419	0.369	<0.0010
Ammonia as N	g/m^3	*0.005*	52.9	0.20	0.66	1.61	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.673	0.593	0.688	0.801	0.007

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			21/04/2021	21/04/2021	21/04/2021
Analyte	Unit	*Reporting Limit*	21-19243-11	21-19243-12	21-19243-13
Nitrate-N	g/m^3	*0.002*	0.0352	0.0026	0.0302
Nitrite-N	g/m^3	*0.001*	0.0042	<0.0010	0.0029
Ammonia as N	g/m^3	*0.005*	0.02	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.012	0.009	0.017

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

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Submitted by: Emma Anderson
Date Received: 29/04/2021
Testing Initiated: 16/04/2021
Date Completed: 6/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 19/04/2021 1610 to 20/04/2021 0005 10cm	JNL Plant Composite 20/04/2021 0010 to 20/04/2021 0805 10cm	JNL Plant Composite 20/04/2021 0810 to 20/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 19/04/2021 1640 to 20/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 20/04/2021 0040 to 20/04/2021 0835 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-1	21-19244-2	21-19244-3	21-19244-4	21-19244-5
Total Phosphorus	g/m^3	*0.005*	1.37	1.32	1.30	4.45	5.97
Total Kjeldahl Nitrogen	g/m^3	*0.1*	97.4	147	235	48.0	60.5
Total Nitrogen	g/m^3	*0.1*	100	150	240	48	61
Electrical Conductivity	µS/cm	*0.2*	1,700	1,620	2,310	934	772
Conductivity of Water (mS/m)	mS/m	*0.02*	170	162	231	93.0	77.0
Total Biochemical Oxygen Demand	g/m^3	*1*	16.8	25.1	26.2	121	76.8

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 20/04/2021 0840 to 20/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 1705 to 20/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 0105 to 20/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 0905 to 20/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-6	21-19244-7	21-19244-8	21-19244-9	21-19244-10
Total Phosphorus	g/m^3	*0.005*	4.98	1.65	1.73	1.58	0.031
Total Kjeldahl Nitrogen	g/m^3	*0.1*	57.6	15.6	18.0	18.0	0.23
Total Nitrogen	g/m^3	*0.1*	58	18	21	21	0.23
Electrical Conductivity	µS/cm	*0.2*	774	681	697	702	201
Conductivity of Water (mS/m)	mS/m	*0.02*	77.0	68.0	70.0	70.0	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	126	49.1	62.4	70.6	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-11	21-19244-12	21-19244-13
Total Phosphorus	g/m^3	*0.005*	0.070	0.026	0.084
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.66	0.33	0.71
Total Nitrogen	g/m^3	*0.1*	0.72	0.34	0.78
Electrical Conductivity	µS/cm	*0.2*	207	191	207
Conductivity of Water (mS/m)	mS/m	*0.02*	21.0	19.0	21.0
Total Biochemical Oxygen Demand	g/m^3	*1*	1.7	<1.0	3.7

Nutrients Suite

Client Sample ID			JNL Plant Composite 19/04/2021 1610 to 20/04/2021 0005 10cm	JNL Plant Composite 20/04/2021 0010 to 20/04/2021 0805 10cm	JNL Plant Composite 20/04/2021 0810 to 20/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 19/04/2021 1640 to 20/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 20/04/2021 0040 to 20/04/2021 0835 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-1	21-19244-2	21-19244-3	21-19244-4	21-19244-5
Nitrate-N	g/m^3	*0.002*	2.66	0.426	0.0712	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	1.16	0.358	0.0443	<0.01	0.0149
Ammonia as N	g/m^3	*0.005*	36.9	62.2	112	33.9	33.2
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.230	1.122	0.995	1.874	1.848

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 20/04/2021 0840 to 20/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 1705 to 20/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 0105 to 20/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 20/04/2021 0905 to 20/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-6	21-19244-7	21-19244-8	21-19244-9	21-19244-10
Nitrate-N	g/m^3	*0.002*	<0.02	2.40	2.28	2.24	0.0050
Nitrite-N	g/m^3	*0.001*	<0.01	0.456	0.310	0.285	<0.0010
Ammonia as N	g/m^3	*0.005*	35.4	0.53	0.67	0.98	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	2.221	0.559	0.588	0.675	0.008

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			20/04/2021	20/04/2021	20/04/2021
Analyte	Unit	*Reporting Limit*	21-19244-11	21-19244-12	21-19244-13
Nitrate-N	g/m^3	*0.002*	0.0553	0.0113	0.0650
Nitrite-N	g/m^3	*0.001*	0.00566	<0.0010	0.0048
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.03
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.024	0.007	0.029

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

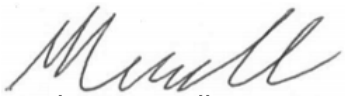
BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)



Matthew Counsell, B.Sc.
Inorganics Team Leader

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Certificate of Analysis

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Attention: Phil Hook
Phone: 0211105473
Email: emma@aemonitoring.co.nz

Lab Reference: 21-19245
Submitted by: Emma Anderson
Date Received: 29/04/2021
Testing Initiated: 16/04/2021
Date Completed: 7/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 22/04/2021 1610 to 23/04/2021 0005 10cm	JNL Plant Composite 23/04/2021 0010 to 23/04/2021 0805 10cm	JNL Plant Composite 23/04/2021 0810 to 23/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 22/04/2021 1640 to 23/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 23/04/2021 0040 to 23/04/2021 0835 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-1	21-19245-2	21-19245-3	21-19245-4	21-19245-5
Total Phosphorus	g/m^3	*0.005*	1.94	2.38	2.27	6.42	2.43
Total Kjeldahl Nitrogen	g/m^3	*0.1*	412	410	390	87.9	46.4
Total Nitrogen	g/m^3	*0.1*	410	410	390	88	47
Electrical Conductivity	µS/cm	*0.2*	3,150	3,240	3,070	1,110	762
Conductivity of Water (mS/m)	mS/m	*0.02*	315	324	307	111	76.0
Total Biochemical Oxygen Demand	g/m^3	*1*	49.7	71.3	53.8	104	74.4

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 23/04/2021 0840 to 23/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 1705 to 23/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 23/04/2021 0105 to 23/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 23/04/2021 0905 to 23/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-6	21-19245-7	21-19245-8	21-19245-9	21-19245-10
Total Phosphorus	g/m^3	*0.005*	8.00	1.75	1.88	1.89	0.026
Total Kjeldahl Nitrogen	g/m^3	*0.1*	79.2	17.1	16.9	17.0	0.16
Total Nitrogen	g/m^3	*0.1*	79	19	19	19	0.16
Electrical Conductivity	µS/cm	*0.2*	894	522	630	495	202
Conductivity of Water (mS/m)	mS/m	*0.02*	89.0	52.0	63.0	50.0	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	189	66.0	61.7	65.4	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-11	21-19245-12	21-19245-13
Total Phosphorus	g/m^3	*0.005*	0.043	0.024	0.043
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.41	0.17	0.35
Total Nitrogen	g/m^3	*0.1*	0.44	0.18	0.38
Electrical Conductivity	µS/cm	*0.2*	163	150	148
Conductivity of Water (mS/m)	mS/m	*0.02*	16.0	15.0	15.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	<1.0

Nutrients Suite

Client Sample ID			JNL Plant Composite 22/04/2021 1610 to 23/04/2021 0005 10cm	JNL Plant Composite 23/04/2021 0010 to 23/04/2021 0805 10cm	JNL Plant Composite 23/04/2021 0810 to 23/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 22/04/2021 1640 to 23/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 23/04/2021 0040 to 23/04/2021 0835 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-1	21-19245-2	21-19245-3	21-19245-4	21-19245-5
Nitrate-N	g/m^3	*0.002*	<0.02	<0.02	<0.02	<0.02	0.0339
Nitrite-N	g/m^3	*0.001*	<0.01	0.0150	0.0103	<0.01	0.284
Ammonia as N	g/m^3	*0.005*	214	228	219	51.0	34.1
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.878	1.112	0.968	2.638	0.979

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 23/04/2021 0840 to 23/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 22/04/2021 1705 to 23/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 23/04/2021 0105 to 23/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 23/04/2021 0905 to 23/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-6	21-19245-7	21-19245-8	21-19245-9	21-19245-10
Nitrate-N	g/m^3	*0.002*	0.0356	1.57	1.84	1.34	0.0029
Nitrite-N	g/m^3	*0.001*	<0.01	0.386	0.369	0.355	<0.0010
Ammonia as N	g/m^3	*0.005*	49.4	0.57	0.98	1.08	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.416	0.632	0.677	0.764	0.008

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			23/04/2021	23/04/2021	23/04/2021
Analyte	Unit	*Reporting Limit*	21-19245-11	21-19245-12	21-19245-13
Nitrate-N	g/m^3	*0.002*	0.0224	0.0073	0.0219
Nitrite-N	g/m^3	*0.001*	0.0043	<0.0010	0.0034
Ammonia as N	g/m^3	*0.005*	0.02	0.01	0.02
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.016	0.006	0.014

Method Summary

Total Phosphorus Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)

TKN Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).

TN Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).

Electrical Conductivity Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).

BOD Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).

NO3-N Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)

NO2-N Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).

Ammonia-N Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).

Dissolved Reactive Phosphorus Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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Lab Reference: 21-19246
Submitted by: Emma Anderson
Date Received: 29/04/2021
Testing Initiated: 16/04/2021
Date Completed: 10/05/2021
Order Number:
Reference: A03576801

Sampling Site: Juken New Zealand, Kaitaia WWTP and Awanui River

Report Comments

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Specific testing dates are available on request.

Water Aggregate Properties and Nutrients

Client Sample ID			JNL Plant Composite 18/04/2021 1610 to 19/04/2021 0005 10cm	JNL Plant Composite 19/04/2021 0010 to 19/04/2021 0805 10cm	JNL Plant Composite 19/04/2021 0810 to 19/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 18/04/2021 1640 to 19/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 19/04/2021 0040 to 19/04/2021 0835 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-1	21-19246-2	21-19246-3	21-19246-4	21-19246-5
Total Phosphorus	g/m^3	*0.005*	1.18	1.10	1.18	5.10	2.96
Total Kjeldahl Nitrogen	g/m^3	*0.1*	6.70	10.4	21.5	58.8	44.9
Total Nitrogen	g/m^3	*0.1*	7.4	14	27	59	45
Electrical Conductivity	µS/cm	*0.2*	1,260	1,270	1,120	825	800
Conductivity of Water (mS/m)	mS/m	*0.02*	126	127	112	82.0	80.0
Total Biochemical Oxygen Demand	g/m^3	*1*	5.1	4.8	4.7	139	91.9

Water Aggregate Properties and Nutrients

Client Sample ID			Kaitaia WWTP Influent Composite 19/04/2021 0840 to 19/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 18/04/2021 1705 to 19/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 0105 to 19/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 0905 to 19/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-6	21-19246-7	21-19246-8	21-19246-9	21-19246-10
Total Phosphorus	g/m^3	*0.005*	6.68	1.77	1.71	1.64	0.026
Total Kjeldahl Nitrogen	g/m^3	*0.1*	62.2	20.3	17.7	16.9	0.24
Total Nitrogen	g/m^3	*0.1*	62	23	21	20	0.24
Electrical Conductivity	µS/cm	*0.2*	1,020	654	663	664	204
Conductivity of Water (mS/m)	mS/m	*0.02*	102	65.0	66.0	66.0	20.0
Total Biochemical Oxygen Demand	g/m^3	*1*	152	70.3	71.9	77.0	<1.0

Water Aggregate Properties and Nutrients

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-11	21-19246-12	21-19246-13
Total Phosphorus	g/m^3	*0.005*	0.048	0.021	0.038
Total Kjeldahl Nitrogen	g/m^3	*0.1*	0.47	0.20	0.41
Total Nitrogen	g/m^3	*0.1*	0.53	0.21	0.45
Electrical Conductivity	µS/cm	*0.2*	204	204	205
Conductivity of Water (mS/m)	mS/m	*0.02*	20.0	20.0	21.0
Total Biochemical Oxygen Demand	g/m^3	*1*	<1.0	<1.0	4.4

Nutrients Suite

Client Sample ID			JNL Plant Composite 18/04/2021 1610 to 19/04/2021 0005 10cm	JNL Plant Composite 19/04/2021 0010 to 19/04/2021 0805 10cm	JNL Plant Composite 19/04/2021 0810 to 19/04/2021 1605 10cm	Kaitaia WWTP Influent Composite 18/04/2021 1640 to 19/04/2021 0035 10cm	Kaitaia WWTP Influent Composite 19/04/2021 0040 to 19/04/2021 0835 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-1	21-19246-2	21-19246-3	21-19246-4	21-19246-5
Nitrate-N	g/m^3	*0.002*	0.551	3.03	4.24	<0.02	<0.02
Nitrite-N	g/m^3	*0.001*	0.131	0.364	0.853	<0.01	<0.01
Ammonia as N	g/m^3	*0.005*	1.28	4.24	8.47	41.6	33.7
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	1.204	1.166	1.166	2.858	1.529

Nutrients Suite

Client Sample ID			Kaitaia WWTP Influent Composite 19/04/2021 0840 to 19/04/2021 1635 10cm	Kaitaia WWTP Effluent Composite 18/04/2021 1705 to 19/04/2021 0100 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 0105 to 19/04/2021 0900 10cm	Kaitaia WWTP Effluent Composite 19/04/2021 0905 to 19/04/2021 1700 10cm	Awanui River Upstream of Discharge - AM 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-6	21-19246-7	21-19246-8	21-19246-9	21-19246-10
Nitrate-N	g/m^3	*0.002*	<0.02	2.58	2.69	2.35	0.0077
Nitrite-N	g/m^3	*0.001*	<0.01	0.355	0.298	0.455	<0.0010
Ammonia as N	g/m^3	*0.005*	41.5	0.35	0.72	1.28	<0.005
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	3.466	0.529	0.561	0.608	0.006

Nutrients Suite

Client Sample ID			Awanui River Downstream of Discharge - AM 10cm	Awanui River Upstream of Discharge - PM 10cm	Awanui River Downstream of Discharge - PM 10cm
Date Sampled			19/04/2021	19/04/2021	19/04/2021
Analyte	Unit	*Reporting Limit*	21-19246-11	21-19246-12	21-19246-13
Nitrate-N	g/m^3	*0.002*	0.0586	0.0052	0.0400
Nitrite-N	g/m^3	*0.001*	0.00665	<0.0010	0.00507
Ammonia as N	g/m^3	*0.005*	0.03	<0.005	0.04
Dissolved Reactive Phosphorus (FIA)	g/m^3	*0.002*	0.016	0.007	0.015

Method Summary

Total Phosphorus	Samples analysed colourimetrically following an acid digestion. (APHA 4500 P H - Modified - Discrete Analyser - Online edition)
TKN	Samples analysed colourimetrically following an acid digestion. (APHA 4500-N_{Org} D - Modified - Discrete Analyser - Online edition).
TN	Sum of Total Kjeldahl Nitrogen (APHA 4500 N_{org} - Modified - Online edition), Nitrate-N and Nitrite-N (APHA 4500 NO_3 I - Online edition). (APHA 4500-N A - Online Edition).
Electrical Conductivity	Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).
BOD	Dissolved oxygen measured using a dissolved oxygen electrode after a 5 day incubation period. (APHA 5210 B - Online edition).
NO3-N	Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO_{3-} I. Online edition)
NO2-N	Samples analysed colourimetrically by flow injection analysis following filtration. (APHA 4500-NO_3 I. Online edition).
Ammonia-N	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH_3 H - Modified - Online edition).
Dissolved Reactive Phosphorus	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)

Matthew Counsell, B.Sc.
Inorganics Team Leader

Sharelle Frank, B.Sc. (Tech)
Technologist

Appendix C

Resource Consent

File: 932
01 to 03
Change to conditions

Document date: 16.04.2015

Resource Consent

Pursuant to the Resource Management Act 1991, the Northland Regional Council (hereinafter called "the Council") does hereby grant a Resource Consent to:

FAR NORTH DISTRICT COUNCIL, PRIVATE BAG 752, KAIKOHE 0400

To undertake the following activities associated with the operation of the Kaitaia Wastewater Treatment System:

(*Note: all location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection*).

AUT.000932.01.03: To discharge treated wastewater to the Awanui River on Pt Lot 4A DP 4093 Blk V Takahue SD, at or about location co-ordinates 1620752E 6114931N.

AUT.000932.02.02: To discharge contaminants (primarily odour) to air from a wastewater treatment system presently located on Section 87 Blk V Takahue SD, at or about location coordinates 1620595E 6114496N.

AUT.000932.03.02: To discharge contaminants to ground via seepage from a wastewater treatment system located on Section 87 Blk V Takahue SD, at or about location co-ordinates 1620595E 6114496N.

Subject to the following conditions:

AUT.000932.01.03 and AUT.000932.03.02: Discharge to Awanui River and Seepage to Ground

1 The volume of treated wastewater discharged from the sewage treatment plant to the Awanui River shall not, based on a 30 day rolling average of dry weather discharges, exceed 3,100 cubic metres per day. Compliance with this condition shall be based on the average of the 30 most recent "dry weather discharge days". For the purposes of this consent, a "dry weather discharge day" is any day on which there is less than 1 millimetre of rainfall, and that day occurs after three consecutive days either without rainfall or with rainfall of less than 1 millimetre on each day.

Advice Note: *The rainfall measurements used to determine a dry weather discharge day shall be based on the nearest appropriate rainfall recorder site. This recorder site shall be selected in consultation with the Northland Regional Council.*

2 The Consent Holder shall install and maintain a flow meter with an accuracy of ±5% on the outlet of the wastewater treatment system to measure the volume of treated wastewater discharged to the Awanui River.

3 The Consent Holder shall monitor the exercise of these consents in accordance with the Monitoring Programme in Schedule 1 (**attached**).

4 The Consent Holder shall prepare monthly reports of the results of all monitoring required to be undertaken in accordance with Condition 3, that shall include both the raw data and averages and/or medians calculated to determine compliance with the conditions of these consents, and a summary showing the level of compliance for those parameters for which limits have been defined. The monthly reports shall be in a format agreed to by the Northland Regional Council and shall be forwarded to the Northland Regional Council prior to the tenth working day of the following month. Where the monitoring is required to be undertaken over a period greater than a month, then the results of that monitoring event shall be included in the next scheduled monitoring report. If the monitoring results indicate a non-compliance with any consent condition, then the Consent Holder shall report the results to the Northland Regional Council within 24 hours of receiving the analysis results.

5 The Consent Holder shall keep records of the daily volume of the treated wastewater discharged to the Awanui River, as measured by the meter required to be maintained on the outlet of the wastewater treatment system in accordance with Condition 2. In addition, the Consent Holder shall keep records of the 30 day rolling average dry weather discharge, as defined in Condition 1. These records shall be recorded in a format agreed to by the Northland Regional Council and shall be forwarded to the Northland Regional Council by 15 May, for the preceding six months of November to April, and by 15 November, for the preceding months of May to October.

6 The F-specific bacteriophage concentrations in the final treated wastewater, as measured at Northland Regional Council Sampling Site 100373, shall not exceed the following:

(a) 50^{th} percentile of 140 plaque forming units; or

(b) 90^{th} percentile of 750 plaque forming units.

Compliance with this condition shall be determined in accordance with Section 2 of Schedule 1 **(attached).**

7 The Consent Holder shall provide and maintain easy and safe access to the following sampling point, as shown on the Northland Regional Council Plan No 3475 (**attached**):

(a) Northland Regional Council Sampling Site Number 100373, a point located at the outlet from the treatment system, at or about location co-ordinates 1620772E 6114688N.

8 Notwithstanding any other conditions, the exercise of these consents shall not cause the water quality of the Awanui River, as measured at Northland Regional Council Monitoring Site 100370, immediately upstream of its confluence with the Waihoe Channel to fall below the following when compared with the water quality at Northland Regional Council Monitoring Site 100369 (Awanui River 50 metres upstream of the discharge):

(a) The natural temperature of the water shall not change by more than 3 degrees Celsius;

(b) The natural pH of the water shall be within the range 6.5 to 9.0;

(c) The concentration of dissolved oxygen shall not be reduced by more than 20%;

(d) There shall be no production of conspicuous oil or grease films, scums or foams, floatable or suspended materials, or emissions of objectionable odour;

(e) There shall be no acute toxicity, or significant adverse effects of chronic toxicity, to natural aquatic life by reason of a concentration of toxic substances. Compliance with this requirement shall be determined from the results of whole effluent toxicity monitoring in accordance with Section 4.3 of the Monitoring Programme in Schedule 1 (**attached**);

(f) The hue of the waters shall not be changed by more than 10 Munsell units;

(g) The waters shall not be tainted so as to make them unpalatable to farm animals, nor contain toxic substances to the extent that they are unsuitable for consumption by farm animals. The microcystin concentration shall not exceed 2.3 micrograms per litre, expressed as microcystin-LR, for samples taken in accordance with Section 4.2.3 of the Monitoring Programme in Schedule 1 (**attached**);

(h) No significant increase in the *Escherichia coli* concentration; and

(i) The concentration of total ammoniacal nitrogen shall not exceed the following:

pH of Water at the Time Sampling	Total Ammoniacal Nitrogen [[NH_3 + NH_4]-N) (grams per cubic metre)
6.0	2.57
6.1	2.56
6.2	5.54
6.3	2.52
6.4	2.49
6.5	2.46
6.6	2.43
6.7	2.38
6.8	2.33
6.9	2.26
7.0	2.18
7.1	2.09
7.2	1.99
7.3	1.88
7.4	1.75
7.5	1.61
7.6	1.47
7.7	1.32
7.8	1.18
7.9	1.03
8.0	0.90
8.1	0.78
8.2	0.66
8.3	0.56
8.4	0.48
8.5	0.40
8.6	0.34

pH of Water at the Time Sampling	Total Ammoniacal Nitrogen [[NH_3 + NH_4]-N) (grams per cubic metre)
8.7	0.29
8.8	0.24
8.9	0.21
9.0	0.18

In the event that the background concentration of total ammoniacal nitrogen, as measured at Northland Regional Council Site Number 100369 (Awanui River 50 metres upstream of discharge) exceeds the above concentration, then the discharge shall not result in an increase in concentration of more than 0.10 grams per cubic metre.

9 The Consent Holder shall undertake an assessment of the degree of infiltration of stormwater and/or groundwater into the Kaitaia sewage reticulation system. If there is excessive infiltration into the wastewater treatment system occurring, then a programme for infiltration reduction shall be provided to the Northland Regional Council. If an infiltration reduction programme is undertaken, the results of infiltration investigations, work undertaken, progress made and priorities for further work, shall be included in the Annual Review Report, required to be prepared in accordance with Condition 15.

AUT.000932.02.02 Discharge to Air

10 The Consent Holder's operations shall not give rise to any discharge of contaminants to the air at or beyond the property boundary of the treatment plant site (presently being Section 87 Blk V Takahue SD), which is deemed by a suitably trained and experienced Enforcement Officer of the Northland Regional Council to be noxious, dangerous, offensive or objectionable to such an extent that it has, or is likely to have, an adverse effect on the environment.

General Conditions

11 The wastewater treatment system shall be correctly operated and maintained in an effective and workmanlike manner. In addition the Consent Holder shall implement the following improvements within two years of the date of commencement of this consent:

(a) The discharge of wastewater from the ponds by wave wash over the bunds onto adjacent land shall be prevented; and

(b) An appropriately designed influent screen shall be installed at the inlet to the first oxidation pond. For the purpose of this condition, an "appropriately designed influent screen" is one that removes all large solids that would not degrade within the treatment system; is self cleaning and is sized to allow wastewater to pass through the screen under all influent flow regimes.

12 The Consent Holder shall prepare and submit a Management Plan covering all aspects of the operation and maintenance of the wastewater treatment system, including the discharge structure, for certification by the Northland Regional Council, within six months of the date of commencement of these consents.

The Management Plan shall include, but not be limited to, the following:

(a) Specification of the design wastewater volume, dimensions, design loading and expected treatment performance of each component of the treatment system in which wastewater treatment occurs.

(b) A schedule of inspection, servicing, and maintenance actions to be carried out on the wastewater treatment system. This will include a schedule for the repair of damaged wave bands around the oxidation pond edges.

(c) Where it is not practical to schedule maintenance activities, such as the desludging of oxidation ponds, a monitoring programme shall be provided to demonstrate that the design treatment capacity is maintained, and criteria shall be provided to trigger required maintenance. Particular attention shall be given to the method used for measuring the depth of wastewater and sludge in treatment ponds in which soft sludge accumulates. When desludging of the oxidation ponds is required, a detailed plan of the proposed desludging shall be provided to Northland Regional Council at least one month prior to commencement of any desludging works.

(d) Contingency measures for unauthorised discharges. These shall include measures to be undertaken following the discharge of wastewater by wave wash over the pond bunds onto surrounding land.

(e) Methods to be used to combat nuisances that might arise in the treatment system including midges and other insects, and blue-green algae (cyanobacteria).

Note: *Algicides, including copper sulphate, and insecticides shall not to be used within the oxidation ponds without the prior written approval of the Northland Regional Council.*

13 The operation and maintenance of the wastewater treatment system shall be undertaken in accordance with the certified Management Plan required to be prepared in accordance with Condition 12, but also always subject to the conditions of these consents. Any changes to the Management Plan shall be subject to the written certification of the Northland Regional Council.

14 The Consent Holder shall, in consultation with the Northland Regional Council, review the Management Plan two years after the date of commencement of these consents, and thereafter at no greater than five yearly intervals. Any changes to the Management Plan as a result of a review shall be subject to the written certification of the Northland Regional Council. The Consent Holder shall meet all reasonable costs of each review.

15 The Consent Holder shall prepare an Annual Review Report for the previous year (1 April to 31 March) that shall include, but not be limited to, the following:

(a) A summary of all activities required by the Management Plan; and

(b) A summary of the results of all monitoring required to be undertaken in accordance with Conditions 3, 4 and 5.

(c) An assessment of the effects of any significant intermittent loadings to the wastewater treatment system during the year from activities such as discharges by septic tank cleaning contractors and discharges from sources of potentially high organic loading such as stock truck washing facilities on the effectiveness of the treatment process, and consequently the receiving water quality.

The Annual Review Report shall be forwarded to the Northland Regional Council by 1 May each year.

16 The Consent Holder shall, for the purposes of adequately monitoring these consents as required under Section 35 of the Act, on becoming aware of any incident or situation that does not comply with these consents, immediately advise the Northland Regional Council of the incident. In the event of any unauthorised discharge of contaminants (excluding those to air) outside of the boundaries of the treatment plant, the Consent Holder shall immediately notify the Medical Officer of Health, Northland Health Ltd.

The Consent Holder shall then supply a written report to the Northland Regional Council within one week detailing:

(a) The nature of the non-compliance;

(b) The location of the discharge and receiving environment;

(c) The time of discharge;

(d) The duration of discharge;

(e) The quantity of contaminant discharged;

(f) The nature of contaminant discharged (eg. raw sewage, primary, secondary treated sewage);

(g) The measures taken to mitigate the effects on the environment and public health; and

(h) The proposed measures to prevent similar discharges in future.

17 The Consent Holder shall, for the purposes of adequately monitoring these consents as required under Section 35 of the Act, maintain records of any complaints relating to the operation of these consents received by the Consent Holder, as detailed below:

(a) The name and address of the complainant (where provided);

(b) The date and time the complaint is received;

(c) The duration of the event that gave rise to the complaint;

(d) The location from which the complaint arose;

(e) The weather conditions prevailing at that time;

(f) Any events in the management and operation of any processes that may have given rise to the complaint; and

(g) Any actions taken by the Consent Holder, where possible, to minimise contaminant emissions.

The Consent Holder shall notify the Northland Regional Council as soon as is practicable of any complaint received. Records of the above shall also be sent to the Northland Regional Council immediately upon request.

18 The Northland Regional Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of these consents. Such notice may be served annually during the month of May. The review may be initiated for any one or more of the following purposes:

(a) To deal with any adverse effects on the environment that may arise from the exercise of these consents and which it is appropriate to deal with at a later stage, or to deal with any such effects following assessment of the results of the monitoring of these consents and/or as a result of the Northland Regional Council's monitoring of the state of the environment in the area.

(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

(c) To provide for compliance with rules in any regional plan that has been made operative since the commencement of these consents.

(d) To deal with any inadequacies or inconsistencies the Northland Regional Council considers there to be in the conditions of these consents, following the establishment of the activities the subject of these consents.

(e) To deal with any material inaccuracies that may in future be found in the information made available with the application. (Notice may be served at any time for this reason.)

(f) To change existing conditions relating to, or impose new limits on, the quality of the discharges and/or the receiving waters.

The Consent Holder shall meet all reasonable costs of each review.

EXPIRY DATE: 30 NOVEMBER 2021

The original resource consent CON19970093201 dated Seventeenth day of August 2005 was authorised by Cr Lorraine Hill, Hearing Committee Chairperson under delegated authority from the Council. This change to consent conditions is granted this Sixteenth day of April 2015 under delegated authority from the Council by:

Stuart Savill
Consents Programme Manager – Water and Wastes

SCHEDULE 1

MONITORING PROGRAMME

The Consent Holder (or its authorised agent) shall monitor Resource Consent 0932 in accordance with the following monitoring programme.

1. FINAL DISCHARGE VOLUME

The daily wastewater discharge volume shall be recorded together with the local daily rainfall over the same 24-hour period, in accordance with Condition 1.

2. INFLUENT AND DISCHARGE MONITORING FOR VIRAL INDICATOR

The concentration of F-specific bacteriophage shall be determined in the final discharge at monthly intervals.

Compliance with the 50th and 90th percentile values set out in Condition 6 shall be determined over a fixed 12 month period. The 50th and 90th percentile values shall be calculated using the 12 most recent monthly monitoring results required under this Schedule and any supplementary monitoring results from audit sampling undertaken by the Northland Regional Council within the relevant 12 month period.

The number of allowable exceedances within a 12 month period for the 50th and 90th percentile are shown in the following table:

Number of samples	**50th percentile value: Allowable number of exceedances**	**90th percentile value: Allowable number of exceedances**
12	6	1
13	7	1
14	7	1
15	8	2
16	8	2

A non-compliance occurs when the number of exceedances for a percentile value is greater than that allowable for the number of samples used to calculate the percentile.

If a non-compliance occurs, then the 12 month period for that percentile begins again.

An allowable exceedance of a percentile value shall only be as a result of natural variation in the treated wastewater quality from a well maintained and effectively operating treatment system.

3. TREATMENT POND DISSOLVED OXYGEN MONITORING

The concentration of dissolved oxygen in each wastewater treatment pond shall be measured every three months at three points at approximately equal intervals around the edge of each wastewater treatment pond. Measurements shall be taken at least 60 centimetres from the water's edge and at least 5 centimetres below the water's surface. Dissolved oxygen monitoring in the treatment ponds shall be co-ordinated with the monitoring required by Section 4 of the monitoring programme.

4. DISCHARGE AND RECEIVING WATER MONITORING

4.1 Sites

The following sites (shown on NRC Plan 3475, **attached**) shall be monitored.

NRC Monitoring Site Number	Location Description
100373	Discharge from treatment plant. (Outlet from treatment system).
100369	Awanui River 50 metres upstream of treatment system discharge.
100370	Awanui River immediately upstream of its confluence with the Waihoe Channel.

4.2 Sampling Procedures, Determinands and Frequency

4.2.1 Discharge Monitoring (NRC Site 100373)

A single triplicate(See Note 2) sample of discharged wastewater shall be collected once each month. All samples shall be taken between 1000 and 1200 hours and analysed for the following determinands:

Temperature(See Note 3)
pH
Dissolved oxygen concentration(See Note 3) and percentage saturation
5 day biochemical oxygen demand (See Note 1)
Total suspended solids
Total ammoniacal nitrogen
Escherichia coli(See Note 4)
F-specific bacteriophage

The discharge sampling shall be undertaken on the same day as the receiving water sampling. If possible, each discharged wastewater sample shall be taken from the discharge which enters the body of receiving water from which the upstream sample receiving water sample has been taken, and from which the downstream receiving water sample is to be taken.

4.2.2 Receiving Water Monitoring

The Awanui River shall be monitored 50 metres upstream of the discharge from the treatment plant (Northland Regional Council Site 100369), and at the downstream boundary of the mixing zone, being Northland Regional Council Site 100370.

One triplicate(See Note 2) upstream and downstream sample per month shall be collected. All samples shall be taken between 1000 and 1200 hours and analysed for the following determinands:

Temperature(See Note 3)
pH
Dissolved oxygen concentration(See Note 3) and percentage saturation
Total ammoniacal nitrogen
Escherichia coli(See Note 4)

Notes:

(1) The "total" five day biochemical oxygen demand shall be measured and nitrogenous inhibitors shall not be added to the samples prior to analysis.

(2) Triplicate sampling shall involve collection of three separate samples taken at least five minutes apart during the same sampling event. Analysis shall be conducted on a composite sample made up of equal volumes of each triplicate sample.

(3) Temperature and dissolved oxygen concentration shall be measured in the field using a meter in accordance with standard procedures and triplicate measurements are not required for these parameters, apart from the measurement of dissolved oxygen in the treatment ponds, which is to be measured in accordance with Section 3.0.

(4) *Escherichia coli shall, unless otherwise agreed to with the Northland Regional Council, be measured using the ColilertTM method.*

4.2.3 Blue-green Algal Toxicity

During periods when blue-green algae are prominent in the pond discharge one triplicate sample shall be taken each week from NRC Sampling Site 100370, and analysed for microcystins, expressed as microcystin-LR.

4.3 Whole Effluent Toxicity Testing

Monitoring of whole effluent toxicity (WET) shall be undertaken on samples of discharged wastewater. The monitoring programme shall consist of an initial screening study of four samples taken at two monthly intervals commencing within two months of the date of commencement of this consent. The results shall be reviewed by the Northland Regional Council, and provided no significant toxicity is detected, whole effluent toxicity monitoring shall be undertaken annually on two samples taken at least two months apart during the December to March period.

The Consent Holder shall, at least one month prior to commencing whole effluent toxicity testing, provide a proposed programme for whole effluent toxicity monitoring to the Northland Regional Council for approval. The proposed programme shall include protocols for effluent sampling, handling and transport, test species and methods to be used, sample dilutions to be used in the tests, methods of interpretation of results, and a criterion for unacceptable toxicity. The whole effluent toxicity testing shall not commence until the written approval of the Northland Regional Council has been obtained for the whole effluent toxicity monitoring programme.

4.4 Record of Significant Odours

A record shall be kept of any significant odours at or outside the treatment plant boundary. The record shall identify the source and cause of any significant odour, duration of the odour, wind strength and direction, remedial action undertaken, and the degree of success of the remedial action.

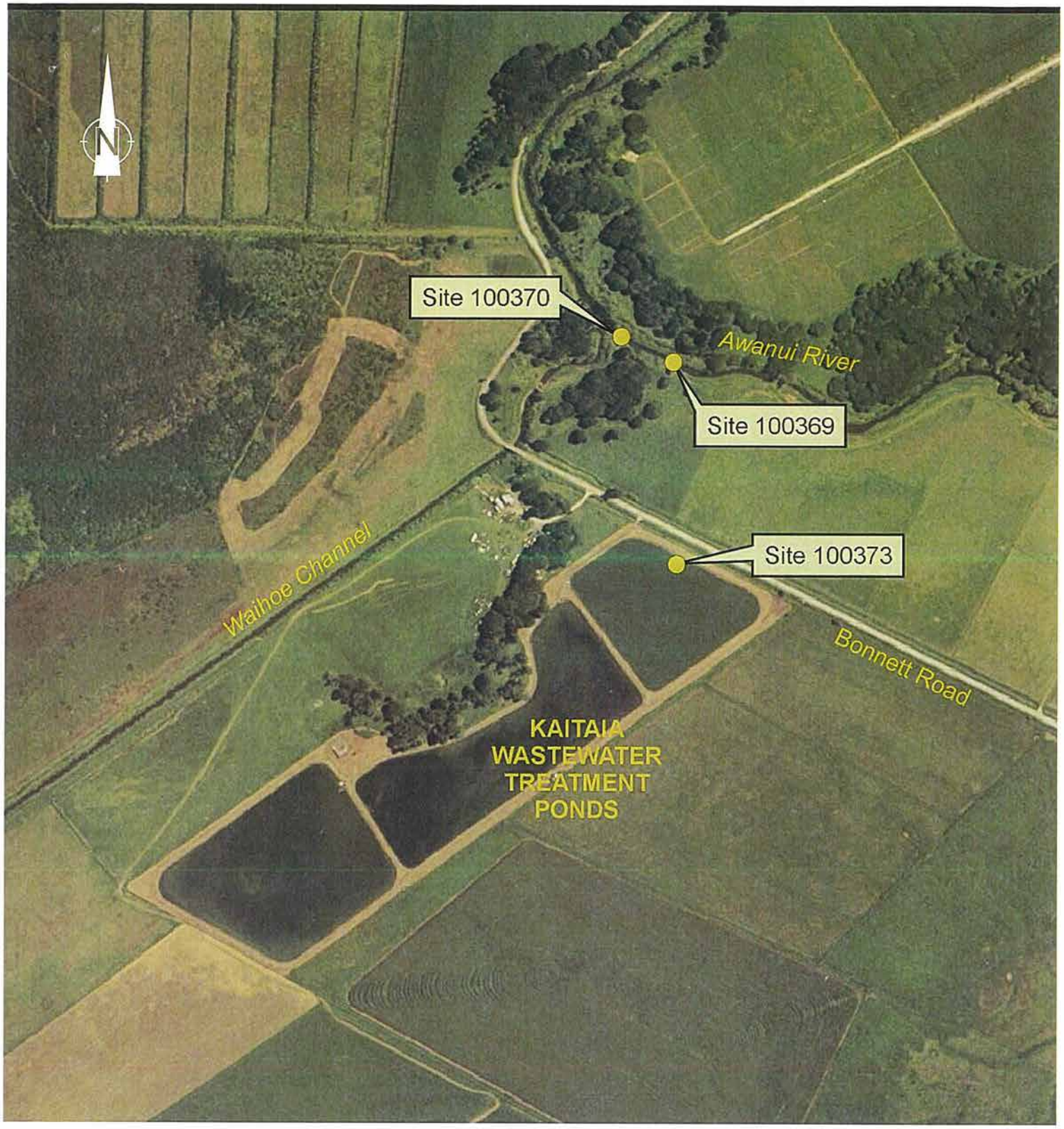
5 SAMPLE COLLECTION, SAMPLE CONTAINERS AND TRANSPORT, AND ANALYTICAL METHODS

All samples shall be collected using standard procedures and in appropriate laboratory supplied containers.

All samples collected as part of this monitoring programme shall be transported in accordance with standard procedures and under chain of custody to the laboratory.

All samples collected shall be analysed at a laboratory with registered quality assurance procedures[#], and all analyses shall be undertaken using standard methods, where applicable.

[#] Registered Quality Assurance Procedures are procedures which ensure that the laboratory meets recognised management practices as would include registrations such as ISO 9000, ISO Guide 25, Ministry of Health Accreditation, IANZ.



Site Number	Co-ordinates (NZTM)	Site Name
NRC Site 100373	1620772 - 6114688	Outlet from Treatment System
NRC Site 100369	1620782 - 6114914	50m upstream of discharge
NRC Site 100370	1620713 - 6114952	100m downstream of discharge

NORTHLAND REGIONAL COUNCIL

RESOURCE CONSENT
CON19970093201
For
Far North District Council
Sampling Sites
Kaitaia Wastewater Treatment Plant

Scale:	N.T.S.	
Drawn:	CNA	07/04
App'd:		
Plan No.	3475	

Appendix D

Material Safety Data Sheets

SAFETY DATA SHEET

Section 1. Identification of the material and the supplier

Product: H1.2 - H3.1 Treated Strandboard (Superstrand)
Product Code:
Product Use: Building and construction
Sheet flooring, wall and ceiling panels, general purpose panel use.

Contact Information:

New Zealand Contact

Juken New Zealand Ltd
Level 3 AMP Centre
29 Customs Street West
Auckland 1010

Telephone 64 9 373 3933

Emergency Telephone 24 hour:
New Zealand 0800 764 766 (NZ Poisons and Hazardous Chemicals)
Australia 13 11 26 (Poisons Information Centre)

Date of SDS Preparation: 11 March 2020

Section 2. Hazards Identification

This product is not hazardous in New Zealand according to the EPA Hazardous Substances (Classification) Notice 2017

This product is not classified as hazardous in Australia according to the Globally Harmonised System of Classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Skin contact: Skin contact with wood dust and the cured resin may cause discomfort and irritation. Some individuals may experience an allergic response leading to reddening of the infected area and dermatitis.

Eye contact: Wood dust and resin can cause discomfort and can be very irritating via mechanical irritation (e.g. splinter).

Inhalation: Inhalation of wood dust and resin may be irritating to the nose, throat and lungs. Wood dust and/or formaldehyde may cause nasal dryness. Exposure to wood dust can cause chronic obstructive lung disease. Exposure to saw fumes containing wood terpenes causes obstructive impairment to lung function.

Ingestion: Not considered to cause a problem in the unlikely event of this occurrence.

Section 3. Composition / Information on Ingredients

Ingredients	Wt%	CAS NUMBER.
Wood Strands	> 85%	None
Polymeric diphenylmethane diisocyanate	< 10%	9016-87-9
Petroleum wax	< 2%	64742-61-6
Tebuconazole	< 0.05%	107534-96-3
Propiconazole	< 0.05%	60207-90-1

Permethrin **OR** Bifenthrin	< 0.05% < 0.01%	52645-53-1 82657-04-3

Formaldehyde*	< 0.5mg/L	50-00-0

* Testing is in accordance with methods outlined in AS/NZS 4266.1:2017 Reconstituted wood-based panels section 17

Section 4. First Aid Measures (for construction uses)

Recommended on site emergency facilities: Comprehensive First Aid kit plus access to eye wash facilities.

Routes of Exposure:

If in Eyes	Hold eyelids open and immediately irrigate eye with copious amounts of water for a minimum of 15 minutes. Remove contact lenses if safe to do so. If irritation persists: seek immediate medical advice
If on Skin	Some individuals may have a sensitization to the wood resins or chemical preservative residues. Seek medical advice if a large area of redness or skin irritation develops. Protect skin from direct contact with treated timber.
If Inhaled	Wood dust must not be inhaled. Immediately remove patient to fresh air if breathing difficulties or asthma symptoms. Immediately seek medical advice if patient has a history of asthma and does not carry an inhaler.
If Ingested	Give at least 200mL of water. If any adverse reaction occurs, seek medical attention.

Section 5. Fire Fighting Measures

Hazard Type	Combustible timber
Hazards from decomposition products	Primarily carbon monoxide and smoke particulates from timber combustion. Effect from treatment chemicals is negligible.
Suitable Extinguishing media	Extinguish fires with water jet or water spray.
Precautions for firefighters and special protective clothing	Firefighters should wear self-contained breathing apparatus if there is a risk of exposure to smoke particulates and gaseous products from combustion. Unprotected personnel should be moved upwind from a fire involving large stacks of treated timber.
HAZCHEM CODE	**None allocated**

Section 6. Accidental Release Measures

Dust Significant quantities of large surface area timber particles (sawdust, shavings, small off-cuts, machining dust) must not be left on a site where they can be washed away or buried in the subsoil.

Notify local pollution authority if large spill of timber particles occurs into a stream or waterway. Treatment chemicals increase the risk of harm to marine organisms.
Dispose of treated off cuts to authorised landfill. Consult Regional Council for disposal options
Clean spillage area with detergent and water. Wash and dry any contaminated protective equipment before re-use.

Section 7. Handling and Storage

HANDLING:

- Wear protective clothing.
- Wash hands before smoking, eating, drinking or using the toilet
- Keep away from sparks, open flames, hot surfaces. No smoking.

STORAGE:

- Store in a dry, well-ventilated place, away from sources of heat or ignition
- Store away from incompatibilities listed in Section 10.

Section 8 Exposure Controls / Personal Protection

WORKPLACE EXPOSURE STANDARDS (provided for guidance only)

Substance		TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³
Wood dust (soft wood)			2		
Permethrin			10		
Bifenthrin			5		
Formaldehyde vapour	(8 hour shift)	0.5			
	(12 hour shift)	0.33			

Workplace Exposure Standard – Time Weighted Average (WES-TWA). The time-weighted average exposure standard designed to protect the worker from the effects of long-term exposure. Workplace Exposure Standard – Short-Term Exposure Limit (WESSTEL). The 15-minute average exposure standard. Applies to any 15- Minute period in the working day and is designed to protect the worker against adverse effects of irritation, chronic or irreversible tissue change, or narcosis that may increase the likelihood of accidents. The WES-STEL is not an alternative to the WES-TWA; both the short-term and time-weighted average exposures apply. Workplace Exposure Standards and Biological Exposure Indices NOV 2019 11TH EDITION.

ENGINEERING CONTROLS:

Use in well-ventilated area or outside.

Avoid sawing or sanding of timber that is wet (not dry) with the preservative treatment

PERSONAL PROTECTIVE EQUIPMENT:

Eyes	Wear goggles, full face shield, or safety glasses with side shields when using this product. If cutting or sanding with potential for dust generation, wear dust-proof goggles
Hands and Skin	Wear protective clothing such as overalls and shirt with sleeves, also closed in footwear and rubber gloves.
Respiratory	Use in well-ventilated area or outside. Wear Class P1 (particulate) or (AS1715-1982 Class L or Class M) dust mask if wood dust is generated.
General	Wash hands before eating, drinking, smoking, using the toilet and at the end of the shift.

Section 9 Physical and Chemical Properties

Appearance	Panels of Wood strands
Odour	Slight solvent
Odour Threshold	Not applicable
pH	Not applicable
Boiling Point	Not applicable
Melting Point	Not applicable
Freezing Point	Not available
Flash Point	Not applicable
Flammability	Combustible
Upper and Lower Explosive Limits	40-65 g wood dust / m^3
Vapour Pressure	Not applicable
Density at 20^0C	0.4 – 0.8 g/cm^3
Solubility in water	Insoluble
Partition Coefficient:	Not applicable
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available
Kinematic Viscosity	Not available
Particle Characteristics	Not available
% Volaties	Not applicable
Evaporation Rate	Not applicable

Section 10. Stability and Reactivity

Chemical Stability:	Stable under normal storage and use conditions.
Conditions to Avoid:	Avoid contact with heat and extreme cold.
Incompatibility:	Other combustible materials, Strong oxidising agents, acids, alkalis.
Hazardous Decomposition: Products	Carbon dioxide, carbon monoxide, oxides of nitrogen. May produce toxic decomposition products in fumes and smoke in fire.

Section 11 Toxicological Information

Acute Effects:

Swallowed	Not applicable.
Dermal	Not applicable.
Inhalation/Respiratory	May cause asthma-like symptoms.
Eye	May cause eye irritation.
Skin	May cause skin irritation. May cause skin sensitization.

Chronic Effects:

Carcinogenicity	May cause nasal/paranasal cancer through repeated exposure.
Reproductive Toxicity	Not applicable.
Germ Cell Mutagenicity	Not applicable.
STOT/SE	Not applicable.
STOT/RE	May cause damage to skin and lungs through repeated exposure.
Aspiration	Not applicable.

Long term exposure to wood dust or wood fumes from heat using power saws can cause chronic obstructive lung disease from wood terpenes and residual formaldehyde.

Section 12. Ecotoxicological Information

This product is not known to be a hazard to the environment. Treated wood may contain ecotoxic compounds, which may leech out into waterways over time. Remove from waterways as soon as possible.

Persistence/Degradeability: Expected to be biodegradable and non-persistent
Mobility in Soil: No data available
Bioaccumulative potential: No data available
Other Adverse effects: No data available

Section 13. Disposal Considerations

Dispose of treated off cuts to authorised landfill. Consult Regional Council for disposal options.
DO NOT use off cuts for heating or cooking fires or for barbecues or spit roasts. Avoid contact with ash; contains toxic compounds. Dispose of ash safely to an approved landfill.

Section 14 Transport Information

This substance is not classified as a dangerous good in New Zealand according to NZS5433: 2012
This substance is not classified as a dangerous good in Australia according to the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) (7th edition).

Section 15 Regulatory Information

This product is not hazardous in New Zealand according to the EPA Hazardous Substances (Classification) Notice 2017

This product is not classified as hazardous in Australia according to the Globally Harmonised System of Classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Section 16 Other Information

Glossary

EC_{50}	Median effective concentration.
EEL	Environmental Exposure Limit.
EPA	Environmental Protection Authority
HSNO	Hazardous Substances and New Organisms.
HSW	Health and Safety at Work.
LC_{50}	Lethal concentration that will kill 50% of the test organisms inhaling or ingesting it.
LD_{50}	Lethal dose to kill 50% of test animals/organisms.
LEL	Lower explosive level.
OSHA	American Occupational Safety and Health Administration.
TEL	Tolerable Exposure Limit.
TLV	Threshold Limit Value-an exposure limit set by responsible authority.
UEL	Upper Explosive Level
WES	Workplace Exposure Limit

References:
Australia:

1. Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice.
2. Standard for the Uniform Scheduling of Medicines and Poisons.
3. Australian Code for the Transport of Dangerous Goods by Road & Rail.
4. Model Work Health and Safety Regulations, Schedule 10: Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals.
5. Workplace exposure standards for airborne contaminants, Safe work Australia.
6. American Conference of Industrial Hygienists (ACGIH).
7. Globally Harmonised System of classification and labelling of chemicals.

New Zealand:

1. EPA Hazardous Substances (Safety Data Sheets) Notice 2017
2. Workplace Exposure Standards and Biological Exposure Indices Nov 2017 edition.
3. Assigning a hazardous substance to a HSNO Approval (Aug 2013).
4. Transport of Dangerous goods on land NZS 5433:2012
5. HSW (Hazardous Substances) Regulations 2017

Disclaimer

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The information herein is given in good faith, but no warranty, express or implied is made.

Please contact the New Zealand proprietor if further information is required.

Issue Date: 11 March 2020 Review Date: 11 March 2025

JUKEN NEW ZEALAND LTD

SAFETY DATA SHEET

Section 1. Identification of the material and the supplier

Product: Untreated Triboard (Spaceboard)
Product Code:
Product Use: Building and construction
Sheet flooring, wall and ceiling panels, general purpose panel use.

Contact Information:

New Zealand Contact

Juken New Zealand Ltd
Level 3 AMP Centre
29 Customs Street West
Auckland 1010

Telephone 64 9 373 3933

Emergency Telephone 24 hour:
New Zealand 0800 764 766 (NZ Poisons and Hazardous Chemicals)
Australia 13 11 26 (Poisons Information Centre)

Date of SDS Preparation: 11 March 2020

Section 2. Hazards Identification

This product is not hazardous in New Zealand according to the EPA Hazardous Substances (Classification) Notice 2017

This product is not classified as hazardous in Australia according to the Globally Harmonised System of Classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Skin contact: Skin contact with wood dust and the cured resin may cause discomfort and irritation. Some individuals may experience an allergic response leading to reddening of the infected area and dermatitis.

Eye contact: Wood dust and resin can cause discomfort and can be very irritating via mechanical irritation (e.g. splinter).

Inhalation: Inhalation of wood dust and resin may be irritating to the nose, throat and lungs. Wood dust and/or formaldehyde may cause nasal dryness. Exposure to wood dust can cause chronic obstructive lung disease. Exposure to saw fumes containing wood terpenes causes obstructive impairment to lung function.

Ingestion: Not considered to cause a problem in the unlikely event of this occurrence.

Section 3. Composition / Information on Ingredients

Ingredients	Wt%	CAS NUMBER.
Wood Strands and fibres	> 85%	None
Melamine urea formaldehyde resin	< 15%	25036-13-9
Polymeric diphenylmethane diisocyanate	< 8%	9016-87-9
Petroleum wax	< 2%	64742-61-6

Formaldehyde*	< 0.5mg/L	50-00-0

* Testing is in accordance with methods outlined in AS/NZS 4266.1:2017 Reconstituted wood-based panels section 17

Section 4. First Aid Measures (for construction uses)

Recommended on site emergency facilities: Comprehensive First Aid kit plus access to eye wash facilities.

Routes of Exposure:

If in Eyes	Hold eyelids open and immediately irrigate eye with copious amounts of water for a minimum of 15 minutes. Remove contact lenses if safe to do so. If irritation persists seek immediate medical advice
If on Skin	Some individuals may have a sensitization to the wood resins. Seek medical advice if a large area of redness or skin irritation develops.
If Inhaled	Wood dust must not be inhaled. Immediately remove patient to fresh air if breathing difficulties or asthma symptoms. Immediately seek medical advice if patient has a history of asthma and does not carry an inhaler.
If Ingested	Give at least 200mL of water. If any adverse reaction occurs, seek medical attention.

Section 5. Fire Fighting Measures

Hazard Type	Combustible timber
Hazards from decomposition products	Primarily carbon monoxide and smoke particulates from timber combustion.
Suitable Extinguishing media	Extinguish fires with water jet or water spray.
Precautions for firefighters and special protective clothing	Firefighters should wear self-contained breathing apparatus if there is a risk of exposure to smoke particulates and gaseous products from combustion. Unprotected personnel should be moved upwind from a fire that may spread to large stacks of treated timber.
HAZCHEM CODE	**None allocated**

Section 6. Accidental Release Measures

Dust Significant quantities of large surface area timber particles (sawdust, shavings, small off-cuts, machining dust) must not be left on a site where they can be washed away or buried in the subsoil.

Notify local pollution authority if large spill of timber particles occurs into a stream or waterway.
Dispose of treated off cuts to authorised landfill. Consult Regional Council for disposal options
Clean spillage area with detergent and water. Wash and dry any contaminated protective equipment before re-use.

Section 7. Handling and Storage

HANDLING:

- Wear protective clothing.
- Wash hands before smoking, eating, drinking or using the toilet
- Keep away from sparks, open flames, hot surfaces. No smoking.

STORAGE:

- Store in a dry, well-ventilated place, away from sources of heat or ignition
- Store away from incompatibilities listed in Section 10.

Section 8 Exposure Controls / Personal Protection

WORKPLACE EXPOSURE STANDARDS (provided for guidance only)

Substance		TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³
Wood dust (soft wood)			2		
Formaldehyde vapour	(8 hour shift)	0.5			
	(12 hour shift)	0.33			

Workplace Exposure Standard – Time Weighted Average (WES-TWA). The time-weighted average exposure standard designed to protect the worker from the effects of long-term exposure. Workplace Exposure Standard – Short-Term Exposure Limit (WESSTEL). The 15-minute average exposure standard. Applies to any 15- Minute period in the working day and is designed to protect the worker against adverse effects of irritation, chronic or irreversible tissue change, or narcosis that may increase the likelihood of accidents. The WES-STEL is not an alternative to the WES-TWA; both the short-term and time-weighted average exposures apply. Workplace Exposure Standards and Biological Exposure Indices NOV 2019 11TH EDITION.

ENGINEERING CONTROLS:
Use in well-ventilated area or outside.

PERSONAL PROTECTIVE EQUIPMENT:

Eyes	Wear goggles, full face shield, or safety glasses with side shields when using this product. If cutting or sanding with potential for dust generation, wear dust-proof goggles
Hands and Skin	Wear protective clothing such as overalls and shirt with sleeves, also closed in footwear and rubber gloves.
Respiratory	Use in well-ventilated area or outside. Wear Class P1 (particulate) or (AS1715-1982 Class L or Class M) dust mask if wood dust is generated.
General	Wash hands before eating, drinking, smoking, using the toilet and at the end of the shift.

Section 9 Physical and Chemical Properties

Appearance	Triple layered panels with wood strands mid layer
Odour	Slight pine
Odour Threshold	Not applicable
pH	Not applicable
Boiling Point	Not applicable
Melting Point	Not applicable
Freezing Point	Not available
Flash Point	Not applicable
Flammability	Combustible
Upper and Lower Explosive Limits	40-65 g wood dust / m^3
Vapour Pressure	Not applicable
Density at 20^0C	0.4 – 0.8 g/cm^3
Solubility in water	Insoluble
Partition Coefficient:	Not applicable
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available
Kinematic Viscosity	Not available
Particle Characteristics	Not available
% Volaties	Not applicable
Evaporation Rate	Not applicable

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