WPI™

forestry timber pulp

Renewal of Discharge Permit 103909

Assessment of Environmental Effects

Prepared for: Winstone Pulp International Limited

March 2025

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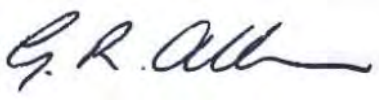
Author(s)		
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Reference: Viridis & Mitchell Daysh 2025. Renewal of Discharge Permit 103909 Assessment of Environmental Effects. A report prepared for Winstone Pulp International Limited by Viridis Limited and Mitchell Daysh Limited. March 2025.

Cover photo: The Whangaehu River, pictured facing downstream, at monitoring site 'US'. February 2024.

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1 APPLICATION

1.1 Background

Winstone Pulp International Limited (WPI) owns a pulp mill at Karioi, near Ohakune, in the central North Island ('the pulp mill'; Figure 1). WPI currently holds resource consent from Horizons Regional Council (Horizons) to discharge treated pulp mill wastewater, stormwater, and a foam inhibitor to the Whangaehu River (ATH-2010011593.01 or Discharge Permit 103909, 'the Permit'). The Permit, granted on 10 June 2010 and expiring on 1 July 2025, has been provided in Appendix A.

In September 2024, WPI confirmed the closure of the pulp mill (and the neighbouring Tangiwai sawmill, 'the sawmill'), citing uncertainty over future electricity costs and the relatively low current and forecasted market prices for pulp and timber. Before this decision, WPI had been investigating various wastewater treatment technologies, with the intention of upgrading its on-site wastewater treatment plant (WWTP). These upgrades were expected to improve the quality of the treated wastewater discharge to the Whangaehu River and support an application to renew the Permit for an extended period. However, actioning wastewater treatment improvements requires significant capital outlay, and given the recent mill closure, this is no longer feasible.

WPI wishes to maintain the site's appeal to prospective buyers, who may explore alternative operations that certain wastewater treatment upgrades may not support. Accordingly, WPI is seeking a short-term, five-year renewal of the Permit, which authorises discharges from an industrial activity under the existing conditions. This approach provides the necessary time to facilitate a potential sale, after which long-term site uses, and discharge upgrade options can be evaluated by the new owner. The current proposal is expected to greatly enhance the prospects of selling the site, which is required to create new jobs (offsetting those lost in the mill's closure) and revitalise the community.

1.2 Purpose and Scope

WPI has engaged Viridis Limited (Viridis) to prepare an assessment of environmental effects (AEE) which considers the impact of the proposal on the receiving environment. Viridis has subcontracted Mitchell Daysh to complete the planning and statutory assessment components of the AEE. This document demonstrates how WPI intends to comply with the objectives and policies of the Horizons' One Plan and the National Policy Statement for Freshwater Management 2020 (NPS-FM) (MfE 2024). The purpose of this report is to provide the information required under Section 88 of the Resource Management Act 1991 (RMA) for a consent application.

1.3 Record of Title

There are no limitations recorded on the Record of Title that influence the proposed changes. A copy of the Record of Title is attached (Appendix B) with this application.

Figure 1. Whangaehu River catchment.

Legend

- Karioi pulp mill
- Whangaehu River
- Whangaehu River catchment

PROJECT NO:	10001
CLIENT:	Winstone Pulp International Limited
DRAWN BY:	A.G
DATE:	18 March 2025
SCALE	**1:600,000 @ A4**

VIRIDIS Environmental Consultants

SOURCES
Google Earth (2024)

2 EXISTING ENVIRONMENT

2.1 Whangaehu Catchment

The Karioi pulp mill is located within the Whangaehu Freshwater Management Unit (FMU) in the Ruapehu District of New Zealand's central North Island (Figure 1). The Whangaehu FMU spans a diverse and dynamic landscape, encompassing the Whangaehu River and its major tributaries, the Mangawhero and Makotuku Rivers. This catchment extends from the alpine headwaters of Mount Ruapehu through hill country farmland and extensive native and plantation forests, ultimately draining to the Tasman Sea.

The region is characterised by a mix of land uses, including pastoral farming, commercial forestry, and conservation land, with urban centres such as Ohakune and Raetihi situated nearby. These towns serve as key service hubs for agriculture, tourism, and forestry industries, and are connected by State Highway 49 and the North Island Main Trunk railway, both of which facilitate transport and economic activity in the district.

The Whangaehu FMU also supports significant ecological and conservation values. A large portion of Tongariro National Park, a UNESCO World Heritage Site, lies within the catchment. This protected area is home to alpine tussock lands, subalpine scrub, indigenous forests, and unique volcanic landscapes. The park's snow and ice fields contribute to the headwaters of the Whangaehu River, which is notable for its often acidic and mineral-laden waters, influenced by geothermal activity from Mount Ruapehu's active crater (referred to as Crater Lake). This acidity made the river unsuitable for diversion in the Tongariro Power Scheme. Consequently, the scheme diverts water from other tributaries of the Whangaehu River, such as the Waihianoa and Makahikato Streams, while bypassing the main river channel.

To manage water quality and land stability within the catchment, Horizons has implemented extensive environmental initiatives under its Freshwater and Sustainable Land Use Initiative. To date, over 181 km of riparian fencing has been installed, more than 601,000 native plants have been planted, and 1,990 ha of land have been treated to reduce sediment and nutrient runoff (Horizons 2025). These efforts play a critical role in maintaining the ecological health of the Whangaehu FMU while balancing the region's land uses.

2.2 Whangaehu River

2.2.1 Overview

The Whangaehu River originates from Mt Ruapehu's Crater Lake and flows for approximately 160 km south-west, through the central North Island before discharging into the Tasman Sea near the town of Whanganui. Due to volcanic influences, the river's waters are naturally acidic and often rich in sulphuric compounds. The watercourse holds cultural significance to local iwi as a taonga, valued for its ancestral connections (refer Section 2.4).

A reach of the Whangaehu River, which is subject to the mill's discharges, flows southeast of the pulp mill (Figure 2). This section of the watercourse consists of a wide channel and cobbled streambed, bordered by pine forest plantations. The immediate riparian margins offer little shade, with namely shrubs and flaxes present along the stream banks (Figure 3a). Further downstream, near the Tangiwai Memorial, the river is narrower and fast flowing (Figure 3b).

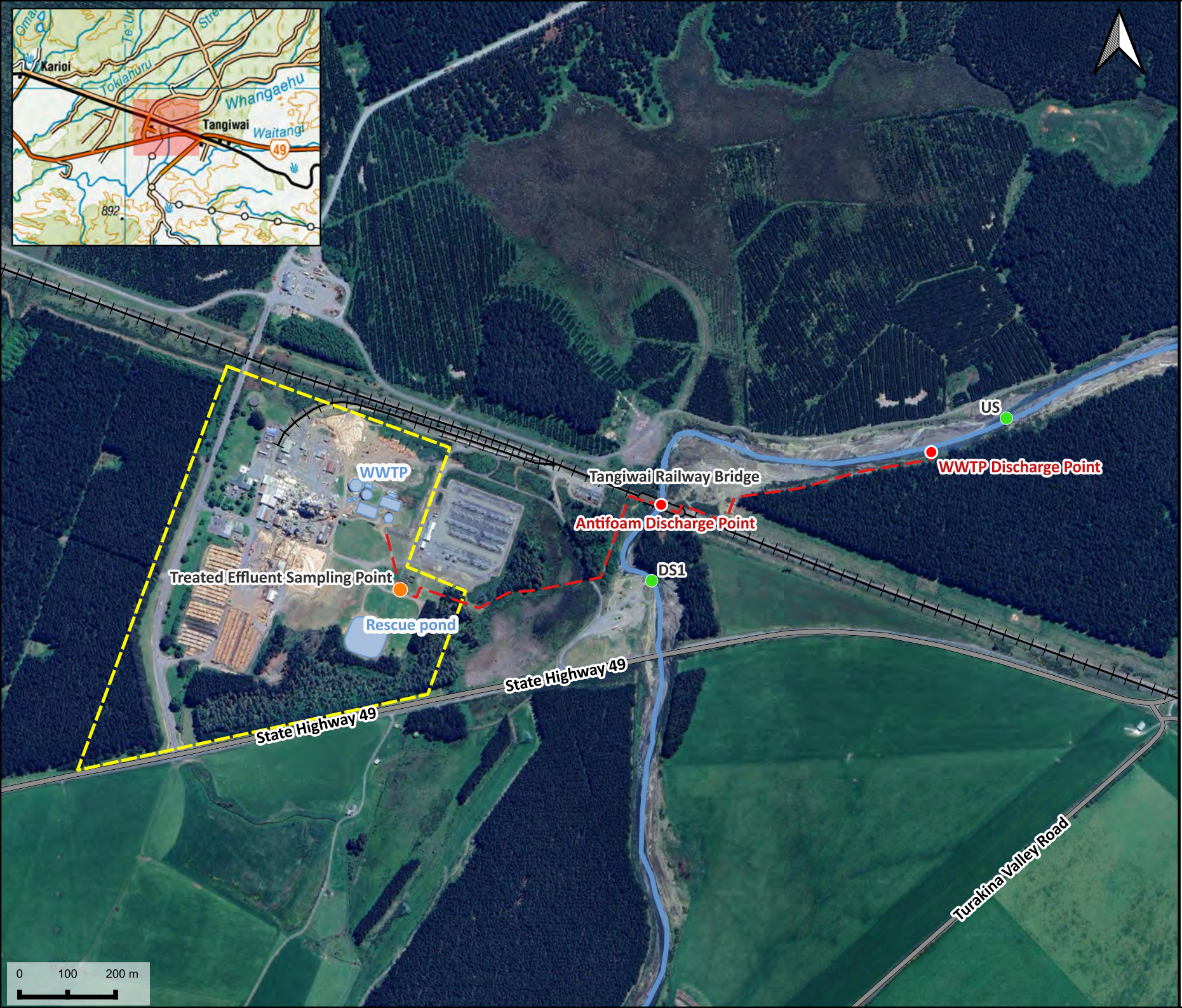

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Figure 2.
Site overview

Karioi Pulp Mill

Winstone Pulp International

Legend

- Site boundary
- WWTP Area
- WWTP Discharge Point
- WWTP Discharge Pipes
- Treated Effluent Monitoring Site
- River Monitoring Sites
- Tangiwai Railway Bridge
- Whangaehu River
- Railway
- Roads

SOURCES

Google Earth Satellite 2023

DISCLAIMER:
This map/plan is not an engineering draft.
This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE

1:10,000 **@ A4**

JOB NO. **10001**

Date: 14 October 2024 Drawn by: H.B.

a) b)

Figure 3. Whangaehu River, pictured a) upstream and b) downstream of the discharge in March 2025.

2.2.2 River flows

Mean daily Whangaehu River flows, as measured at the State Highway 49 bridge between 2014 and 2025, are presented in Figure 4. Flows were characterised by short duration high flow events, reflecting rainfall in the catchment. Higher flows in late summer are attributed to snow melt in the upper catchment. In 2024, the long-term mean daily flow and the 7-day mean annual low flow (MALF) reported for the Whangaehu River was 4,084 L/s and 2,313 L/s, respectively (Horizons 2024a).

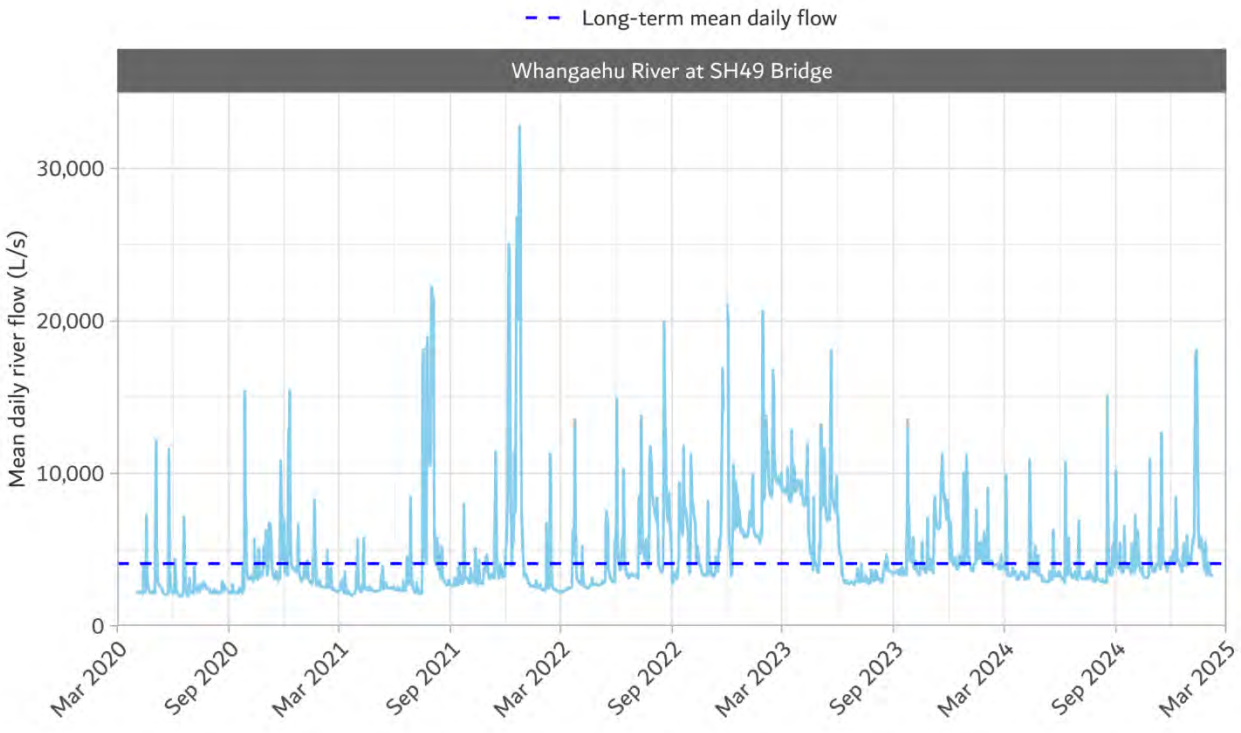

Figure 4. Mean daily flows in the Whangaehu River at SH49 bridge from 1 April 2020 to 1 April 2024.

2.2.3 Water quality

Volcanic influences impart distinct chemical characteristics to the Whangaehu River, including naturally high acidity and elevated phosphorus levels. These factors, combined with suspended sediments and

dissolved minerals, contribute to the river's variable clarity and colour. Understanding its natural condition is crucial for evaluating the river's capacity to support aquatic life.

In accordance with Condition 15 of the Permit, WPI has measured the quality of the Whangaehu River at sites situated upstream and downstream of the discharge (refer Figure 2) on a monthly basis. The water quality data, some of which has been collected since 2013, is presented graphically in Appendix C[1]. Where appropriate, compliance limits (e.g., for *Escherichia coli*) are shown. River physicochemistry, including dissolved oxygen (DO), water temperature, specific conductance (conductivity at 25 °C) and pH were also measured in-situ during ecological surveys undertaken between 2020 and 2024, to inform the renewal application (Virdis 2025; Appendix D). These results are included as Table C1 in Appendix C.

Based on the in-river data obtained since 2013, insights were drawn regarding the baseline (upstream) quality of the Whangaehu River. Where relevant, national water quality guidelines were considered in relation to the data, for context. The key findings were:

- Water temperature and DO levels were within recommended ranges to avoid stress on aquatic organisms. Temperatures stayed below the upper thermal threshold of 24°C for New Zealand aquatic species (Davies-Colley *et al.* 2013) while DO concentrations met the minimum 1-day threshold of ≥7.5 g/m^3, falling within Attribute Band A. Attribute bands are outlined in the NPS-FM ranging from A (good) to D (poor)[2].
- In-situ measurements of pH were consistently low (i.e., around 3), primarily due to inflows from Crater Lake, which contribute acidity to the river system. Long-term laboratory analysis of river water samples indicated that fluctuations in pH were influenced by variations in Crater Lake inflows, as well as rainfall events and surface runoff. While the river generally remained highly acidic during the monitoring period, pH levels fluctuated in response to these factors.
- Dissolved reactive phosphorus (DRP) concentrations, though variable, often fell within Attribute Band D (median > 0.018 g/m^3), indicating potential significant impacts on macroinvertebrate and fish species. Total phosphorus concentrations generally mirrored DRP levels, indicating the majority of the river's phosphorus content is dissolved, in a bioavailable form.
- Ammoniacal nitrogen concentrations occasionally dropped below the NPS-FM national bottom line (NBL) of 0.24 g/m^3 (as an annual median). At these elevated levels, toxic effects on sensitive species are expected (MfE 2024).
- Total nitrogen concentrations reflected the high levels of soluble inorganic nitrogen[3] in the river, indicating that nitrogen is predominantly present in dissolved, easily mobilised forms.
- Nitrate nitrogen concentrations, while exceeding the stringent ANZG (2018) default guideline value (DGV) for physical and chemical stressors (0.024 g/m^3, intended to limit eutrophication), fell within the NPS-FM Attribute Band A for toxicity (≤1 g/m^3).
- *Escherichia coli* (*E. coli*) counts were very low, and often below detection limits. As such, the Whangaehu River upstream environment was consistently within the 'excellent' NPS-FM Attribute Band as a primary contact site (based on risk of infection).

[1] These data are also summarised the Land Air Water Aotearoa (LAWA) website.

[2] Or 'excellent', 'good', 'fair' and 'poor' for *Escherichia coli*.

[3] Soluble inorganic nitrogen is the sum of ammoniacal nitrogen, nitrate nitrogen and nitrite nitrogen.

- Dissolved metal and metalloid[4] concentrations were, with the exception of manganese, elevated above the ANZG DGVs for 99% species protection[5]. These concentrations reflect the river's volcanic and geothermal influences.
- Horizontal visibility varied greatly within the river, with measurements ranging between 0 m and 0.76 m (refer to Figure C1 in Appendix C). Similarly, the river's colour, measured using the Munsell scale, varied from a glacial blue (e.g., a hue of 65) to a murkier yellow brown (hue lower than 30), sometimes shifting dramatically between monitoring occasions (refer to Figure C6 in Appendix C). Figure 12 illustrates the river's variability in colour and clarity over recent years.

2.2.4 Ecology

Sewage fungus

As specified in Condition 25 of the Permit, visual assessments of heterotrophic biofilm (sewage fungus) growth in the Whangaehu River, upstream and downstream of the discharge, have been conducted since February 2012. Surveys were undertaken on an annual basis until 2014, when the results of the previous three surveys demonstrated compliance with Condition 25a, leading to a shift to five yearly monitoring. Sewage fungus thrives in watercourses with elevated concentrations of readily degradable dissolved organic material; therefore, its presence indicates additional organic inputs. For this reason, sewage fungus has long been used as a qualitative biological monitoring tool and an indicator of gross organic pollution (Quinn & McFarlane 1985).

The results of each survey, as outlined in Golder (2012, 2013, 2014), Babbage (2019), and Viridis (2024a), indicate that sewage fungus growth has been absent from the Whangaehu River since the WWTP was upgraded in 2011. No visible evidence of streambed sewage fungus cover was observed at sites both upstream and downstream of the discharge, with each site assigned a heterotrophic abundance level (HAL) of 0, as per the macroscopic abundance scale defined by Quinn & McFarlane (1985). The absence of sewage fungus at all monitoring sites indicates that anthropogenic sources of organic pollution in the Whangaehu River are low.

Periphyton

Periphyton is a mix of algae, bacteria, and other microorganisms that grow on submerged surfaces in rivers and streams. They are a key part of stream ecosystems, serving as food for grazing invertebrates and helping to bind or remove contaminants. Their composition and abundance vary with nutrient levels, seasons, and flow events. While a natural component of streams, excessive periphyton growth caused by elevated nutrient concentrations can harm recreational, aesthetic, and ecological values by altering habitats and reducing oxygen levels. As indicators of water quality, periphyton respond to degradation (e.g., elevated nutrients) with increased biomass and species shifts, providing valuable insights into environmental change.

Visual estimates of periphyton coverage and sampling for biomass (i.e., ash free dry weight (AFDW) and chlorophyll-*a*) analysis were conducted as part of the sewage fungus surveys. Additionally, periphyton was monitored during the four Whangaehu River ecological surveys undertaken between 2020 and 2024 (refer Viridis (2025), which is attached as Appendix D).

[4] A short-term testing suite included aluminum, arsenic (III), boron, cadmium, chromium (hexavalent), copper, lead, manganese, nickel, zinc.

[5] The level of species protection of the ANZG DGV for aluminium is unknown.

a) 3 April 2014

b) 6 December 2018

c) 5 March 2019

d) 2 February 2020

e) 18 May 2021

f) 12 April 2022

g) 22 February 2024

h) 25 March 2025

Figure 5. Colour variation in the Whangaehu River at the upstream monitoring site.

The key findings from these surveys were as follows:

- Periphyton was generally sparse in the Whangaehu River, with cover limited to fine films and sludgy coatings. These results suggest the river's conditions do not support periphyton proliferation or algal blooms. Despite elevated nutrients (refer Section 2.2.3), the river's rapid waters and natural acidity discourages eutrophication.
- Across all survey sites, AFDW and chlorophyll-*a* concentrations were low, consistently below recommended guidelines for protecting aesthetics/recreation, benthic biodiversity, and trout habitat/angling (Biggs 2000) (i.e., AFDW <35 g/m³ and chlorophyll *a* <50 mg/m²)[6].
- When present, the periphyton community composition in the Whangaehu River demonstrated considerable variability across monitoring occasions, though recent years show a dominance of naviculoid species (diatoms with an elongated, boat-shaped form like *Navicula* but not restricted to that genus).

Macrophytes

Macrophytes are aquatic plants that grow in or near water, including submerged, floating, and emergent species. They provide habitat and food for aquatic life, help stabilize sediments and play a role in nutrient cycling. While essential to healthy ecosystems, excessive macrophyte growth, often driven by high nutrient levels, can choke waterways, reduce oxygen levels, and impact water flow.

Macrophytes were not observed in the Whangaehu River during any of the ecological surveys undertaken between 2020 and 2024 (Viridis 2025). The absence of macrophytes is likely influenced by the river's physical and chemical characteristics, such as brief high flow events, substrate composition, and water quality (i.e., frequent low pH), which may limit the establishment and growth of aquatic vegetation. The lack of macrophytes suggests that periphyton are the primary autotrophic components within the river's ecosystem.

Macroinvertebrates

The macroinvertebrate community in the Whangaehu River was surveyed between 2020 and 2024, during four ecological surveys (refer Appendix D). The invertebrates surveyed at sites upstream and downstream of the discharge exhibited low diversity and abundance, with pollution sensitive EPT taxa[7] appearing infrequently and in low numbers. Most of the community was comprised of pollution-tolerant species, such as chironomid midges.

Overall, invertebrate populations in the river were sparse, with few individuals recorded in the collected samples. This was reflected in low macroinvertebrate community index (MCI) and quantitative MCI (QMCI) scores, which were at or below their NPS-FM NBLs of 4.5 and 90, respectively, at both sites. These results suggest the river struggles to support a diverse range of sensitive species. The limited abundance and taxa richness indicate a stressed ecosystem, with conditions unsuitable for a thriving invertebrate community (Viridis 2025).

Fish

The presence of fish in the upper Whangaehu River is naturally limited by poor water quality, distance from the coast, and physical barriers to upstream migration (Kingett Mitchell 1999, 2006; Golder 2008,

[6] The guideline for chlorophyll-*a* has also been adopted in Horizons One Plan Schedule 5.

[7] EPT refers to taxa that belong to the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) taxonomic groups.

2009). Historical studies indicate that fish distribution in this section of the river is extremely restricted. In 2006, a single shortfin eel (*Anguilla australis*), approximately 200 mm in length, was recorded 92 km downstream of the WPI discharge (Kingett Mitchell 2006). The uppermost confirmed fish record is from approximately 6 km upstream of the Tokiahuru Stream confluence (and approx. 10 km downstream of the discharge), where a dead shortfin eel (795 mm, estimated to be 31 years old) was found among silt deposits (Chisnall & Keys 2002). This location marks the first point in the river where the acidic, volcano-fed waters are significantly diluted, creating less extreme conditions for aquatic life. However, the presence of this fish was speculated to be incidental, possibly displaced from a non-acidic tributary due to habitat degradation during freshes (Chisnall & Keys 2002).

While the upper Whangaehu River is unlikely to support resident fish populations, it may, at most, serve as a temporary migratory pathway to tributaries with more favourable conditions during periods of improved water quality. The New Zealand Freshwater Fish Database records rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) in the Tokiahuru Stream system, suggesting that tributaries beyond the acidic influence of the Whangaehu River provide a more suitable habitat.

2.2.5 Recreational use

The Whangaehu River has some potential for recreational activities such as rafting, fishing, and environmental exploration, though these opportunities are limited by water quality conditions. While the risk of *E. coli* infection is relatively low (refer to Section 2.2.3), the naturally acidic and mineral-laden waters can make prolonged skin contact uncomfortable and, in some cases, may pose health risks. Additionally, the strong current and rocky riverbed in many sections make swimming hazardous, particularly in the faster-moving areas.

Further downstream, where the influence of Crater Lake diminishes and freshwater tributaries help dilute some of these effects, the river becomes more suitable for kayaking and rafting. These sections, with moderate rapids, can offer a challenge for intermediate paddlers (Robertson 2020). Tributaries such as Tokiahuru Stream and the Mangawhero River are popular for fishing, particularly for brown and rainbow trout (Fish & Game 2018). However, the naturally acidic water of the Whangaehu limits fishing primarily to these tributaries.

Overall, while certain downstream sections and tributaries of the Whangaehu River may provide some recreational value, the stretch immediately upstream and downstream of the discharge is not considered ideal for contact recreation or fishing.

2.3 One Plan Management Values

The Freshwater Chapter (LF-FW-Freshwater) of the Horizons One Plan addresses the management for freshwater in the region. This includes the establishment of water management areas and sub-areas, associated water management values for each sub-area, and the establishment of water quality targets for rivers and lakes in order to give effect to those values.

The impact of discharges on water quality is noted as one of the four most critical issues addressed in the One Plan: "*Although there have been substantial improvements in the quality of point source discharges to water, improvement is still possible and is necessary*".[8]

[8] Horizons One Plan, LF – FW – Freshwater, Overview.

The One Plan notes "*there is significant variation in water quality across the region. Rivers (including streams) emerging from the mountains or areas that have retained their original vegetation cover tend to have very good water quality. The one noted exception to this is the Whangaehu River, which flows from the crater lake on Mt Ruapehu. It is naturally acidic and contains high levels of sulphur and heavy metals*".

As outlined in Table 1, the Whangaehu River has been categorised into three Water Management Areas: Upper (Whau_1), Middle (Whau_2), and Lower Whangaehu (Whau_3). The Upper Whangaehu Water Management Area has been further categorised into three sub-areas: Upper Whangaehu (Whau_1a) and two tributary sub-areas (Waitangi Stream and Tokiahuru Stream). The discharges to the Whangaehu River that are the subject of this application are located within the Whau_1a sub-area of the Whau_1 water management area.

Table 1. Values of the Whangaehu River: Upper, Middle, and Lower reaches. As identified in (and reproduced from) the Horizons One Plan (RP – SCHED2).

Water Management Area[a]	Sub-area[a]	Sub-area[a] Description[1]	Area-wide Values										Site/Reach-specific Values									
			LSC	AE	CR	Mau	IA[2]	[3]	SW	EI	CAP[4]	NS	SOS-A	SOS-R	IS	AM	WM	SOS-C	TF	TS	WS	DFS	FC/D
Upper Whangaehu (Whau_1)	Upper Whangaehu (Whau_1a)	Whangaehu River from Karioi at approx. NZMS 260 S21:218-864 to source	UVA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								✓	
	Waitangi (Whau_1b)	Waitangi Stream from Whangaehu River confluence at approx. NZMS 260 T21:316-888 to source	UVM	✓	✓	✓	✓	✓	✓	✓	✓								III	✓	✓	✓	
	Tokiahuru (Whau_1c)	Tokiahuru Stream from Whangaehu River confluence at approx. NZMS 260 S21:219-865 to source	UVA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					III	✓		✓	
Middle Whangaehu (Whau_2)	Middle Whangaehu (Whau_2)	Whangaehu River from Aranui at approx. NZMS 260 S21:175-627 to Karioi at approx. NZMS 260 S21:218-864	HSS	✓	✓	✓	✓	✓	✓	✓	✓											✓	
Lower Whangaehu (Whau_3)	Lower Whangaehu (Whau_3a)	Whangaehu River from Kauangaroa at approx. NZMS 260 S22:045-397 to Aranui NZMS 260 S21:175-627 (including the Mangawhero River from Whangaehu River confluence to Raupiu Road at approx. NZMS 260 S21:099-646)	HSS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						III			✓	✓
	Upper Makotuku (Whau_3b)	Makotuku River from water supply weir at approx. NZMS 260 S20:103-011 to source	UVA	✓	✓	✓	✓	✓	✓	✓	✓	✓							III	✓	✓	✓	
	Lower Makotuku (Whau_3c)	Makotuku River from Mangawhero River confluence at approx. NZMS 260 S20:080-903 to water supply weir at approx. NZMS 260 S20:103-011	UVA	✓	✓	✓	✓	✓	✓	✓	✓								III	✓		✓	
	Upper Mangawhero (Whau_3d)	Mangawhero River from Makotuku River confluence at approx. NZMS 260 S20:080-903 to source	UVA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓			III	✓	✓	✓	✓

The values ascribed to Whau_1a are:

Ecosystem values

- Natural state (NS): This value applies on public conservation land. The Whangaehu River originates within and passes through Tongariro National Park, however, WPI's discharges to the Whangaehu River are located some distance downstream and are not situated on public conservation land.
- Life-supporting capacity (LSC): This value applies to the capacity of the upper Whangaehu River and its bed to support healthy aquatic life, specifically an upland volcanic acidic (UVA) ecosystem.
- Sites of significance - aquatic (SOS-A): This value relates to the Whio (Blue duck) habitat present in tributaries to the Upper Whangaehu River. It is not relevant to the stretch of the Whangaehu River where the WPI discharges are located.
- Sites of significance - riparian (SOS-R): This value relates to gravel and sand (dotterel) riparian habitat along the Whangaehu River.

Recreational and cultural values

- Contact recreation (CR): This value indicates the suitability of the waterbody and its bed for recreational activities involving direct contact with the water. The acidic waters of the Whangaehu River are unsuitable for contact recreation.
- Mauri (Mau; or mouri): This value applies to all natural waterbodies and their beds. The life-supporting capacity of the river is to be maintained or enhanced.
- Aesthetics (AE): This value applies to all natural waterbodies and their beds. The aesthetic values of the river are to be maintained or enhanced.

Water use

- Industrial abstraction (IA): This value indicates the suitability of the water as a source for industrial abstraction or use. The cumulative core allocation limit for Whau_1a is 47,520 m^3/day, with 88% currently allocated. Water is abstracted from the Wahianoa River, a tributary of the Whangaehu River, for hydroelectricity generation, as part of the Tongariro Power Scheme. Direct abstraction from the Whangaehu River is avoided due to its naturally acidic waters.
- Irrigation (I): This value indicates the suitability of the water for use in irrigation. The acidic waters of the upper Whangaehu River are unsuitable for irrigation, and there are no registered users who abstract water for this purpose.
- Stock water (SW): This value indicates the suitability of the water for use as a drinking supply for livestock. The acidic waters of the upper Whangaehu River are unsuitable for this purpose.
- Domestic food supply (DFS): This value reflects the suitability of the water for vegetable production. The acidic waters of the upper Whangaehu River are unsuitable for this use.

Social / Economic values

- Capacity to assimilate pollution (CAP): This value ensures that the capacity of the upper Whangaehu River to assimilate pollution is not exceeded.
- Existing infrastructure (EI): This value ensures the integrity of existing infrastructure - such as roads, culverts, bridges, water intakes, discharge pipes, flow recording stations and gas pipelines - is not compromised. Key infrastructure near the WPI discharges to the Whangaehu River includes the Tangiwai railway bridge and the State Highway 49 road bridge (as shown in Figure 2).

Importantly, the following values are not ascribed to Whau_1a, and therefore have not been considered as part of this application:

Ecosystem values

- Inanga spawning (IS) and whitebait migration (WM): Inanga (whitebait) spawning and migration do not occur.

Recreational and cultural values

- Amenity (AM): There are no amenity values recognised.
- Sites of significance - cultural (SOS-C): There are no culturally significant sites recognised.
- Trout fishery (TF) and trout spawning (TS): Trout spawning and fishing do not occur.

Water use

- Water supply (WS): The water is not used as a drinking water supply for human consumption.

Social / Economic values

- Flood control and drainage (FC/D): Existing flood and riverbank erosion protection and drainage structures are not present.

2.4 Cultural Values

2.4.1 Te Waiū-o-te-Ika

The Whangaehu River is known to mana whenua as Te Waiū-o-te-Ika. Te Waiū-o-te-Ika is a living and indivisible whole from Te Wai ā-moe (Crater Lake, Mt Ruapehu) to the sea, comprising physical (including mineral) and metaphysical elements, giving life and healing to its surroundings and communities[9].

2.4.2 Ngāti Rangi

The pulp mill, and the discharges to the Whangaehu River that are the subject of this application, are located within the rohe of Ngāti Rangi (Figure 6). For the purposes of the RMA, the Ngāti Rangi Claims Settlement Act 2019 recognises that Ngā Iwi o Te Waiū-o-te-Ika have "*an interest in the Whangaehu River greater than, and separate from, any interest in common with the public generally*".

"*Ngāti Rangi is a founding iwi of the Whanganui confederation of tribes. Ngāti Rangi descends from the eponymous ancestor, Paerangi-i-te-Whare-Toka and has occupied the southern region of Te Kāhui Maunga since before the arrival of Aotea, Tainui and Te Arawa. There are approximately 8,000 uri and 10% are estimated to be living in the rohe with another 30% living in the Whanganui region. There are 16 marae in the Ngāti Rangi rohe, and most are affiliated to the Ngāti Rangi rūnanga. Some of these marae have dual affiliations to both Ngāti Rangi hapū and other hapū in the Whanganui confederation of tribes. The common founding ancestor of Ngāti Rangi is Paerangii-te-Whare-Toka (also known as Paerangi or Paerangio-te-Moungaroa), from where the name Rangi is taken (Paerangi). Paerangi's mana whenua passed down to Taiwiri (including her three principal children: Rangituhia, Rangiteauria and Uenukumanawawiri) and her two siblings Ururangi and Tāmuringa*."[10]

WPI acknowledges Ngāti Rangi as mana whenua of the locale of the pulp mill and has an established and ongoing engagement relationship with Ngāti Rangi. WPI has undertaken consultation with Ngāti Rangi in respect to this application (see Section 8).

Ngāti Rangi has recognised the socio-economic impact resulting from the closure of the pulp mill (see Section 8). Ngāti Rangi currently offers a redundancy support programme (enabled by the Ministry of Social Development / Te Manatū Whakahiato Ora) involving a Kaimahi Support Liaison that specifically seeks to engage with and provide wrap around support to all workers and their whānau made redundant through the recent closure of the pulp mill and sawmill: "*…mahi over the first half of 2025 is to support impacted whānau, making sure we understand and respond to immediate needs, whether it be emotional, financial, or social and fully understand the full impacts.*"[11].

[9] Ngāti Rangi Claims Settlement Act 2019, Part 3.

[10] Ngāti Rangi Taiao Management Plan 2014. Iwi description.

[11] https://ngatirangi.com/nga-mahi/redundancy-support-programme (Accessed 20 March 2025).

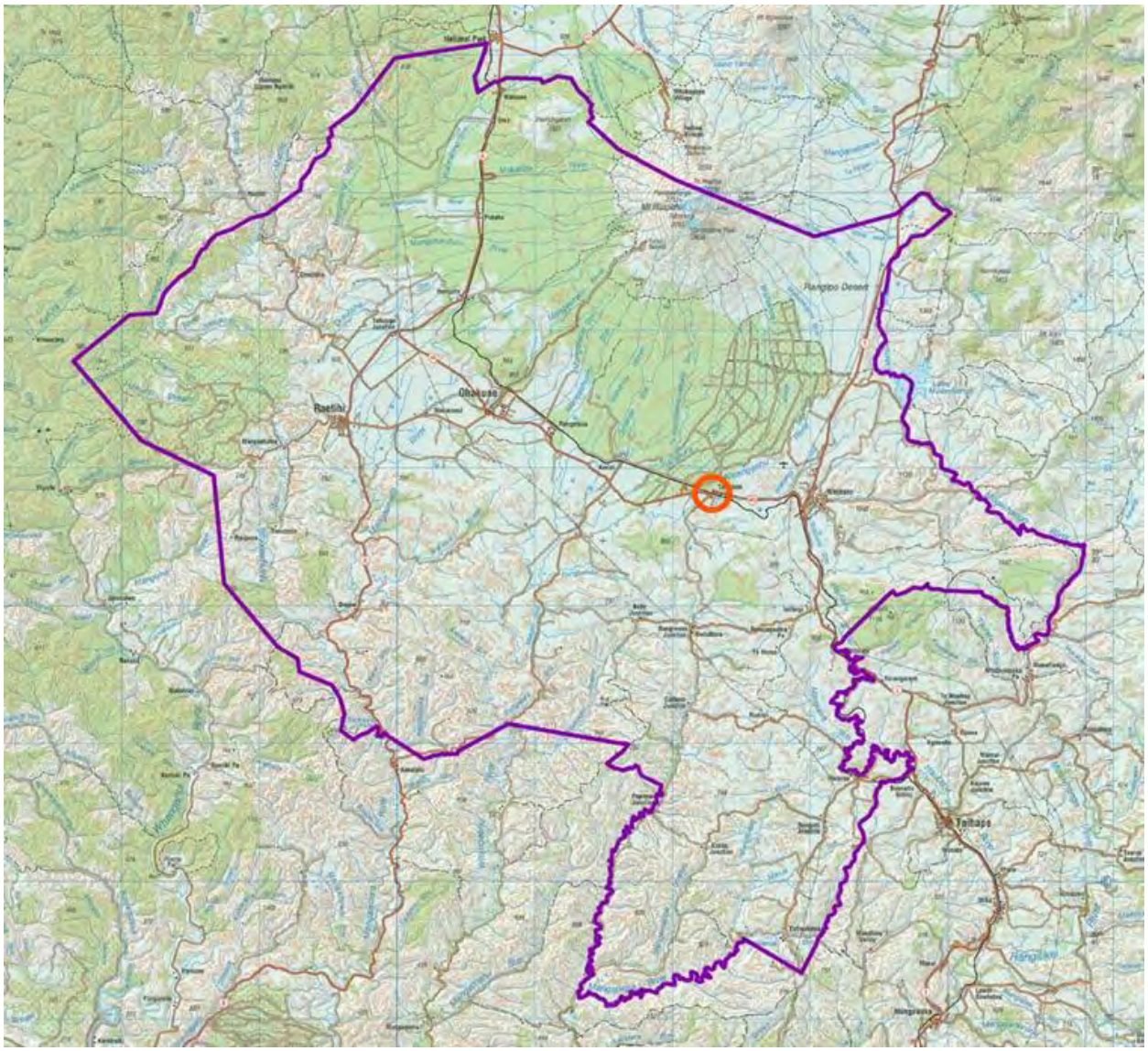

Figure 6. Te rohe o Ngāti Rangi: the Ngāti Rangi boundaries. Image reproduced from the Taiao Management Plan, edited to indicate the relative location of the pulp mill (orange circle).

Ngāti Rangi has developed a Ngāti Rangi Taiao Management Plan 2014 ('the Taiao Management Plan') - an iwi environmental management plan based on Ngāti Rangi values and principles. As stated in the Taiao Management Plan, its purpose *"is to provide clarity and structure to the Ngāti Rangi approach to environmental management. Ultimately it provides a framework by which Ngāti Rangi can actively fulfil our role as tāngata tiaki …*

The desired outcome resulting from the creation of this plan is to capture and detail some of the Ngāti Rangi whakaaro about and approaches to caring for our environment, so that these can then be properly taken into account during decision making processes such as resource consent applications and concession applications. It also provides a direction for where Ngāti Rangi would like to go in terms of improvements to practices relating to the environment and its management. Some kaupapa are aspirational, and will require time to be fulfilled."

Of specific relevance to this application are those values and issues identified in the Taiao Management Plan ascribed to Tangaroa-i-te-wai-māori:

"Tangaroa-i-te-wai-māori is the embodiment of freshwater within our region. He is present in the numerous waterways that run along the back of Papa-tū-ā-nuku; he is the lifeblood of Ngāti Rangi. Water is a fundamental element of all facets of life and is essential to our health and wellbeing. Our waterways provide us with a constant supply of mouri to replenish and revitalise our iwi. However, there are huge concerns over the state of our freshwater and its mouri, and how this impacts on Ngāti Rangi as an iwi".

Iwi concerns relating to freshwater include (among others) issues with:

- Water quality: "*Water quality is linked to the mouri of our rivers and streams*".
- Point and non-point source discharges: "*Protection of the mouri and the ecological values of individual waterways is a priority for Ngāti Rangi. Discharges can impact on the ability of the waterway to undertake its role in supporting the life contained within and around it… Coupled with specific treatment systems to remove contaminants, passing wastewater through Papa-tū-ā-nuku can be a culturally acceptable means to cleanse discharges*."
- Stormwater: "*Stormwater carries a large array of contaminants… This has negative impacts on native fish species, plants and bank stability*."

An assessment of this application against the objectives, policies and rules outlined in the Taiao Management Plan is detailed in Section 10.4.5.

Ngāti Rangi also acknowledges the importance of ensuring the mouri of the Whangaehu River for those neighbouring iwi and hapū downstream.

2.4.3 Ngāti Apa (North Island)

The Whangaehu River is also of historical, cultural, spiritual and traditional significance to Ngāti Apa (North Island) ("Ngāti Apa"), the river being in the northern area of the Ngāti Apa area of interest. This association has been recognised through a Statutory Acknowledgement under the Ngāti Apa (North Island) Claims Settlement Act 2010.

The extent of Ngāti Apa interest in the Whangaehu River goes from its mouth on the west coast to approximately 50 km upstream (Figure 7). While this area lies over 60 km downstream of the pulp mill and the discharges that are the subject of this application, from a mouri perspective, the value ascribed to this lower stretch of the Whangaehu River by Ngāti Apa acknowledges the river's volcanic origins and highlights the importance of its role in sustaining fish migration to upstream tributaries:

"*While the River was not abundant in fish life, it provided a passage way for fish life to access tributaries that were less affected by the acidic water, and swamps and lakes that were connected to the river. In more recent times, water quantity issues are becoming increasingly significant… As the Whangaehu River provides a drainage system for the crater lake at Mt Ruapehu, the River rates poorly in terms of contact recreation and its life supporting capacity… Ngāti Apa (North Island) will always seek to maintain the flows of the Whangaehu River in order to support tributary fisheries dependent upon those flows.*"[12]

[12] Ngāti Apa Statutory Acknowledgement, Horizons, 2 June 2020.

Figure 7. Whangaehu River Ngāti Apa Statutory Acknowledgement, area of interest: part of the Whangaehu River. Area referred to in the Deed of Settlement between Ngāti Apa (North Island) and the Crown. Image reproduced from Horizons Ngāti Apa Statutory Acknowledgement.

2.4.4 Te Korowai o Wainuiārua

The people of Te Korowai o Wainuiārua (Uenuku, Tamahaki, and Tamakana) belong to different iwi groups with shared whakapapa. This common ancestry forms the foundation of Te Korowai o Wainuiārua: "*a people united by our heritage, our land, and our enduring connection to the environment*"[13]. The pulp mill and the discharges that are the subject of this application are located within the area of interest of Te Korowai o Wainuiārua, in the central North Island, as shown in Figure 8.

The Uenuku Charitable Trust ("Uenuku") is currently transitioning to Te Korowai o Wainuiārua Trust, associated with ongoing Treaty Claims Settlement processes. Uenuku has advised WPI that as part of this transition Te Mano o Te Tupua (Pou) was established as a subsidiary entity to enable environmental protection:

"*Te Korowai o Wainuiārua associates significant cultural values with the land, waterways, and natural resources within their ancestral rohe. These values are deeply intertwined with the obligations set out in the Te Tiriti o Waitangi, the Treaty of Waitangi.*"[14]

WPI has engaged with Uenuku / Te Korowai o Wainuiārua / Te Mano o Te Tupua regarding the proposed approach to this application (see Section 8) and has received a resulting letter summarising the consideration of Te Mano o Te Tupua which states that "*…the proposed programme for consenting/management of the closure of the WPI pulp mill and sawmill are consistent with the values of Te Waiū o Te Ika.*" These values are considered further in Section 10.5.

[13] Te Korowai o Wainuiārua: Our Journey https://www.tekorowaiowainuiarua.nz/journey (Accessed 20 March 2025).

[14] Letter from Uenuku to Winstone Pulp International, 29 November 2024.

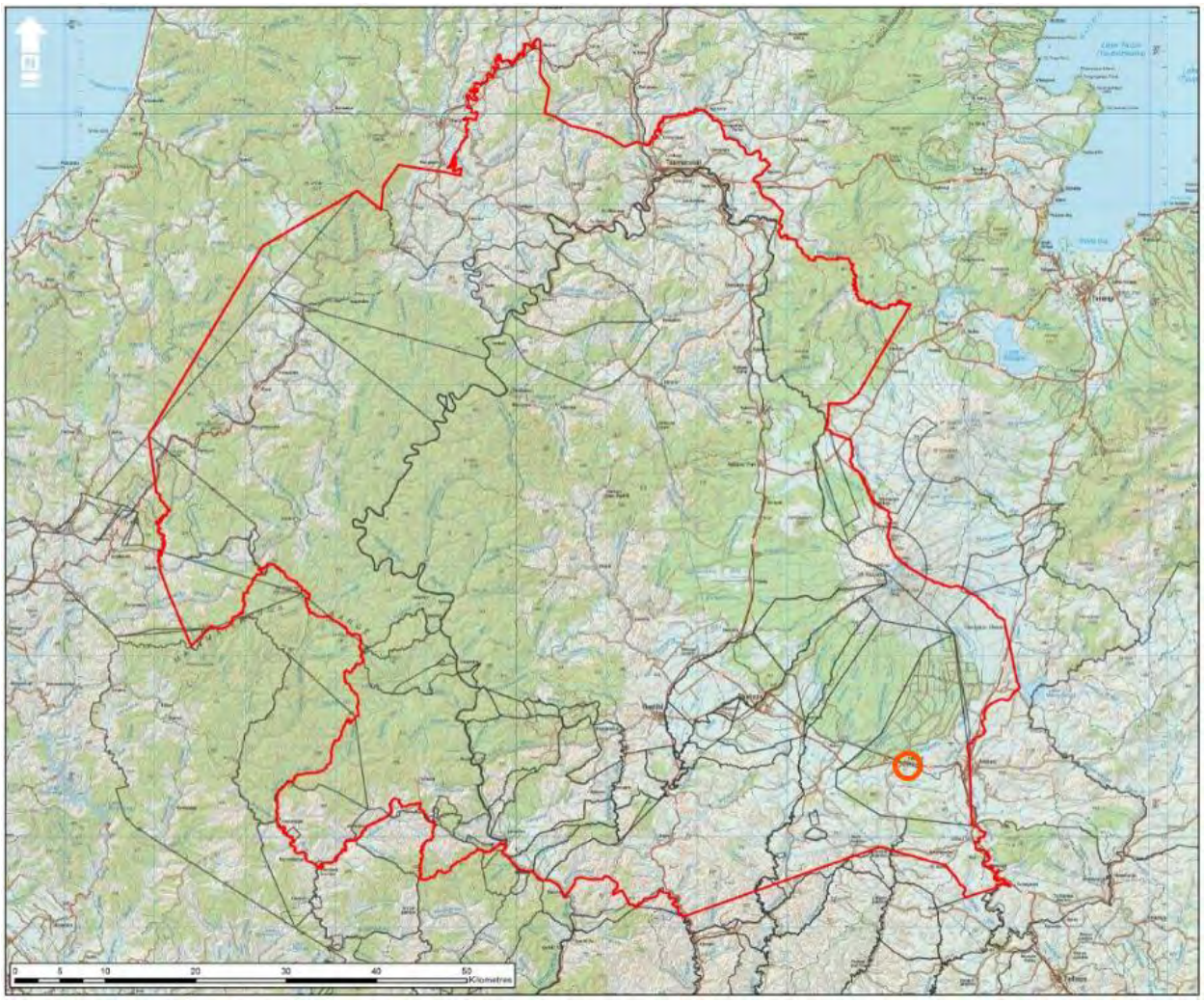

Figure 8. Te Korowai o Wainuiārua Area of Interest. Image, as provided by Te Korowai o Wainuiārua / Uenuku Charitable Trust, edited to indicate location of pulp mill (orange circle).

2.5 Karioi Pulp Mill

2.5.1 Background

The pulp mill is located on State Highway 49 in Karioi, about 9 km west of Waiouru. Its location was strategically chosen for its proximity to the Karioi Forest, a vast plantation of *Pinus radiata*, ensuring sustainable and consistent wood supply. Beyond its access to raw materials, the site is supported by extensive infrastructure, including a dedicated substation, its own water supply (i.e., the Tokiahuru Stream surface water take, authorised under consent ATH-2010011603.01), WWTP, and dedicated railway lines, enabling efficient distribution of product (Figure 2). The mill also benefits from the region's reliable energy supply, drawing from hydroelectric and geothermal sources, which are essential for the energy-intensive pulping process.

These factors – strategic location, self-sufficient infrastructure, and access to sustainable resources – made WPI a key player in New Zealand's forestry and export industry. Established in 1978, the mill produced approximately 200,000 tonne per annum of high-grade pulp for export (WPI 2020). Prior to the mill's closure in September 2024, WPI directly employed 250 personnel and provided significant employment opportunities for local contractors, with several stationed permanently on site.

Beyond direct employment, the mill's operations played a vital role in supporting the local economy of Ohakune, contributing to the town's housing market, retail, and local services, and attracting further investments in the region. Furthermore, the mill's supply chain, encompassing forestry, transport, and logistics, created a network of local suppliers, reinforcing the economic ties between the mill and the community. An economic assessment of the Karioi pulp mill and its significance to the region has been included as Appendix E.

2.5.2 Pulp production process

The production of high-grade pulp on site involved a process known as bleached chemi-thermo mechanical pulping (BCTMP). The process began with the debarking of pine logs, and the chipping and screening of chips. The chips were then broken down mechanically to pulp with the addition of heat and steam, before de-watering and bleaching. Several chemicals, including hydrogen peroxide, sodium hydroxide (caustic soda), silicate and diethylenetriaminepentaacetic acid (DTPA), were employed in the bleaching process[15]. Finally, the pulp was mixed with water, pressed and fluffed in a drier, before baling. The flash drying units were fed with recovered stream and air heated from hot thermal oil generated in the energy centre and supported by LPG burners. A process schematic is included in Appendix F.

The BCTMP process generated wastewater, which had a high chemical oxygen demand (COD) because of the organic compounds present (e.g., residual wood extractives). The untreated wastewater was also high in suspended and dissolved solids and tannins as a result of several stages of pulp washing.

While operational, the wastewater generated at Karioi was treated in an on-site multi-stage biological WWTP, before it was discharged to the Whangaehu River, along with stormwater generated in the WWTP footprint, about 700 m upstream of the Tangiwai railway bridge (Figure 2). The wastewater treatment process is described in more detail in Section 2.5.3.

When required, an antifoaming agent was added to the Whangaehu River, downstream of the wastewater discharge, at the Tangiwai railway bridge, to combat foaming caused by surfactants in the discharge and the turbulent mixing conditions of the river (Figure 2). The discharge of antifoam agents is also authorised under the Permit.

2.5.3 Wastewater treatment

Overview

The wastewater treatment system at the mill employed a combination of physical, chemical, and biological processes to remove solids, treat wastewater, and manage sludge. The system began with primary solids removal using screening and flotation techniques, followed by biological treatment to break down organic material and support microbial activity. Treated wastewater was clarified before discharge, while solid waste was dewatered and repurposed. Prior to closure, sludge and solids removed from primary screening and flotation were used as a feedstock by Mynoke at its worm farm.

Poor quality or untreated wastewater could be diverted to a large pond, referred to as the rescue pond, to be returned to the WWTP for further treatment. Wastewater could also be discharged to the rescue pond during periods of high flows, or to protect the biological component of the WWTP. The key features of the WWTP are shown in Figure 9 (aerial) and process schematic in Appendix F (drawings).

[15] Historically, the BCTMP process also involved the addition of sulphuric acid after bleaching, to neutralise higher levels of residual caustic soda. However, the use of this chemical at WPI's Karioi mill ceased by 2020.

Figure 9. Aerial view of the WWTP at Karioi pulp mill showing key features.

The following sections provide a detailed explanation of each stage in the treatment process.

Primary solids removal

Wet waste captured in the pulp mill's drainage system was first pumped through a rotating drum screen filter system (contrashear) to remove solids. Effluent from the contrashears (accepts) was then gravity fed through a grit pit and processed through a dissolved air flotation (DAF) system, where polyethylene oxide (PEO) and a polymer powder (polyacrylamide) was dosed to coagulate the solid material lifted by aeration. Lower density solids were removed from the surface by a scraper, with higher density solids allowed to settle out and removed from the base of the vessel.

Biological treatment

Urea and phosphoric acid were dosed into the wastewater from the DAF to adjust the carbon-nitrogen-phosphorus ratio to a range suitable for biological treatment. This dosed wastewater was then sprayed onto trickling filter media in the roughing tower (RT). Aeration stimulates microbial growth on the media and significantly cools the wastewater stream through evaporative cooling before further treatment.

The discharge from the RT was fed into the flow balance well, from which part of the flow was cycled through the RT for further treatment. The remainder was pumped to the pre-stage. The pre-stage consisted of two moving bed biofilm reactor (MBBR) stages, Bio1 and Bio2, and the selector. The MBBR stages contained plastic carrier media, kept in suspension by aeration, which provided a surface for biomass to grow on, reducing the potential for carryover of biomass during high flow or shock loads. Screens on the outlets of Bio1 and Bio2 prevented the carrier media from passing through into downstream stages.

Partially treated wastewater flowed from Bio2 to the selector, where a portion of the biological material captured in the final clarifier was added as return activated sludge (RAS) along with additional nutrients. Aeration in the selector kept the biomass suspended, promoting microbial action.

The discharge from the selector was directed, sequentially, through two activated sludge (AS) ponds, AS1 and AS2. Aeration in these ponds facilitated further breakdown of organic material and supported biomass growth. The conditions in the ponds were optimised to encourage the formation of flocs, which are aggregates of single cell and complex micro-organisms.

The discharge of AS2 flowed, under gravity, to the final clarifier, where biomass settled out and treated wastewater flowed over a weir. The treated wastewater was then gravity fed to the discharge pump station, where flows into the Whangaehu River were controlled. Sludge collected at the bottom of the clarifier was pumped, with a portion returned to the selector as RAS, and the remainder thickened on a belt screen, before being returned to the sludge pit as waste activated sludge (WAS).

Solids handling and dewatering

Coarse solids rejected from the contrashears, along with WAS, were dewatered through either the belt press or the pre thickener and screw press, before stockpiling and processing at the off-site Mynoke worm farm.

Odour

Given the aerobic nature of the wastewater treatment system, odour produced was minimal compared to anaerobic/anoxic systems, as there was no hydrogen sulphide production from aerobic treatment. Additionally, sulphur-based chemicals were no longer used in the pulp production process, which further limited the potential for hydrogen sulphide formation due to the absence sulphur species in the pulping process.

There was the potential for anoxic/anaerobic bacterial growth on material stored in the rescue pond. This was managed by limiting the time material remained in the rescue pond, before it was returned to the feed of the WWTP for treatment and discharge.

Foaming

Antifoam was applied at specific locations within the WWTP – pre-stage, AS1, and AS2 – to reduce foaming in the biological treatment processes.

Abnormal situations

In the case of abnormal feeds from the pulp mill, part or all of the flow to the wastewater plant could be diverted to the rescue pond from the retention trench or the DAF outlet, which allowed the treatment system to avoid the potential of overload or toxic shock. Temperature and pH sensors in the retention trench allowed for automatic bypass into the rescue system when the feed was outside of tolerance. Effluent could also be bypassed to the rescue pond by isolating the discharge pumps manually.

3 DISCHARGE CHARACTERISATION

3.1 Wastewater Discharge

3.1.1 Activity description

During operation, the discharge authorised under the Permit largely comprised treated wastewater from the site's WWTP, along with stormwater generated within the treatment plant area. Stormwater is collected via profiled impervious surfaces and directed to the beginning of the treatment train. The remainder (and most) of the site's stormwater is directed to a drain in the southwest corner of the site, and discharged to an unnamed tributary of the Whangaehu River, which is authorised under Discharge Permit 6724.

Treated wastewater was discharged from the true left bank of the Whangaehu River (Figure 10a), approximately 700 m upstream of the Tangiwai railway bridge, via a submerged outlet (Figure 10b) to minimise turbulence and foaming.

a) **b)**

Figure 10. The discharge structure, pictured a) along the true left bank of the river and b) close up.

3.1.2 Volumes

In accordance with Condition 8 of the Permit, daily volumes of treated wastewater discharged to the Whangaehu River were recorded by WPI, with an OPTIFLUX 2000 flow meter present at the outlet[16]. Figure 11 shows the daily discharge volumes recorded between 2014 and 2024. The proportion of the discharge that was comprised of stormwater is expected to have been very small (1-2%), due to the small footprint of the site's WWTP (approximately half a hectare) compared to the large volumes of effluent generated.

Since the Permit was granted, discharge volumes remained within the limit of 5,200 m^3/day. Typically, about 3,300 m^3/day was discharged to the Whangaehu River. Following the mill's closure, treated wastewater discharges to the Whangaehu River ceased on 28 September 2024.

[16] In accordance with Condition 9 of the Permit, this flow meter was calibrated on an annual basis, to certify that it was accurate, within +/- 5% or better. Calibration reports were appended to WPI's annual compliance reports each year.

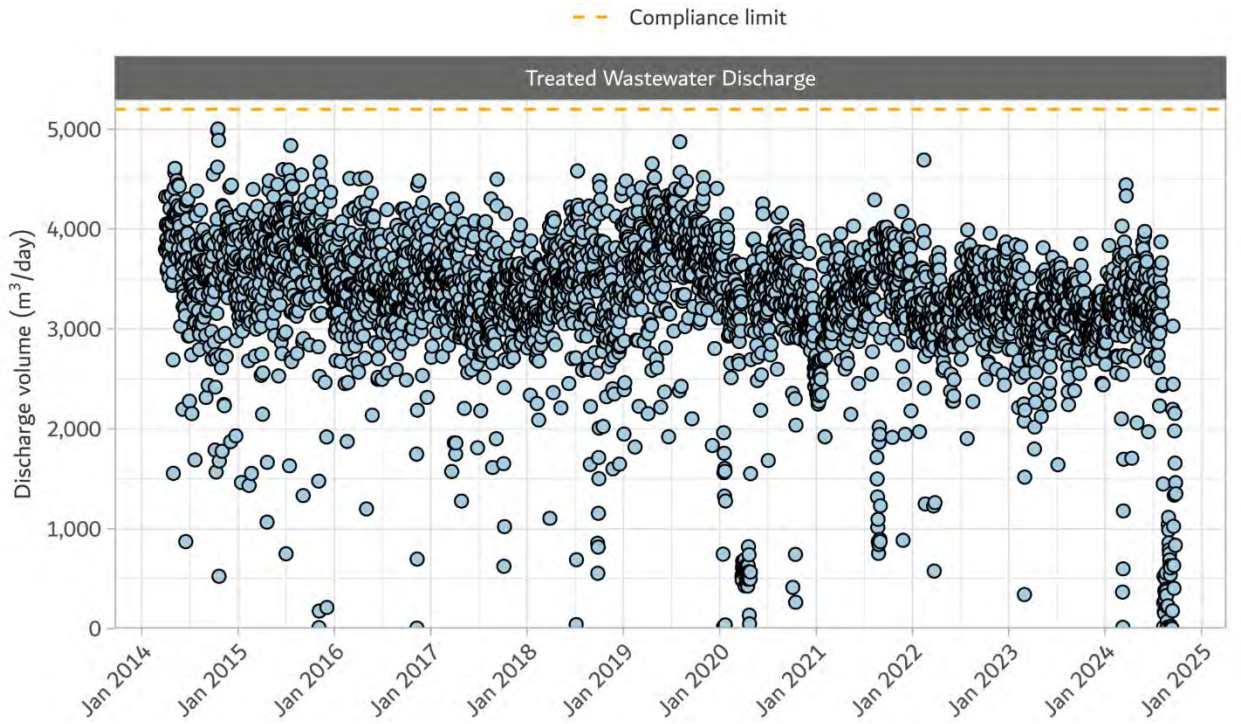

Figure 11. Daily discharge volumes of treated wastewater between 2014 and 2024[17].

3.1.3 Quality

Overview

The wastewater generated in the BCTMP process was typically high in dissolved and suspended organic matter. Dissolved organic matter includes tannins and lignin, while suspended organic matter consists of fine wood fibres and cellulose fragments. The wastewater also contained contaminants from the bleaching stages, such as residual sodium hydroxide. Wastewater strength varied depending on the grade of pulp manufactured, with bleached pulp typically producing a more concentrated wastewater.

Following treatment, the wastewater remained slightly alkaline, reflecting the presence of residual chemicals from the pulping and bleaching processes. The treated wastewater exhibited a brown hue, influenced by lignin degradation into soluble, coloured compounds and the leaching of tannins. Nutrient concentrations were occasionally elevated, primarily due to the addition of urea and phosphoric acid in the WWTP to promote biological activity. Dissolved zinc was also identified as a contaminant of concern, likely originating from the site's galvanized infrastructure.

In accordance with Condition 12 of the Permit, WPI measured the quality of its treated wastewater by collecting a 24-hour composite sample at the discharge pump station each month, using a continuous sampling device. The wastewater quality data, collected since 2013, is presented in Appendix G. Daily measurements of parameters such as total COD, total suspended solids (TSS) and pH were also taken, as per Condition 10[18] and are included in Appendix G. Data is presented alongside consent limits for daily loads, with an assessment of historical compliance provided in Appendix H.

[17] Erroneous data, caused by power failure on 30 December 2021 (5,728 m^3) and 17 November 2022 (5,751 m^3), were removed.

[18] Prior to a 2022 variation of the consent, soluble $cBOD_5$ was also measured daily. Since then, daily soluble $cBOD_5$ has been calculated based on an established total COD to soluble $cBOD_5$ ratio of 0.04.

Based on the monitoring data, the key findings were:

- TSS concentrations were variable, influenced by the pulp grade being produced (Figure G1). With volatile suspended solids (VSS) comprising a large proportion of TSS, most suspended solids were organic in nature, primarily residual wood fibres from the pulping process.
- The pH of the discharge was alkaline, ranging from a pH of 8 to 9 (refer Figure G3 in Appendix G).
- Soluble five-day carbonaceous biochemical oxygen demand ($cBOD_5$), which represents the portion of organic matter readily biodegradable by microorganisms, was low compared to the total $cBOD_5$ content (Figure G4), indicating that a significant proportion of the organic matter in the treated wastewater was either particulate or more resistant to microbial degradation. This was likely due to lignin and other refractory compounds from the pulp mill process, which are not readily broken down by microorganisms in the WWTP.
- A large proportion of the nitrogen in the treated wastewater was organic, as reflected in the ratio of total Kjeldahl nitrogen (TKN) to total nitrogen. TKN, which is the sum of organic and ammoniacal nitrogen, was high, while ammoniacal nitrogen concentrations were typically low, indicating that the elevated TKN was primarily due to organic nitrogen. These results align with expectations for wastewater exiting the WWTP, which doses urea.
- DRP occasionally spiked (Figure G5), often with increases in soluble inorganic nitrogen, likely due to overdosing of phosphoric acid and urea in the WWTP. Nutrient concentrations notably spiked during the COVID-19 pandemic, reflecting operational challenges during periods of suspended activities.
- Total sulphide concentrations were generally low (Figure G5), primarily due to the absence of sulphur species in the pulping process, with any remaining sulphide likely originating from the sulphur naturally present in the wood.
- Tannin concentrations, when measured, were elevated, contributing to the brown hue of the discharge. This reflects the presence of pigments removed during the pulp bleaching process.
- Except for zinc, the discharge was characterised by low metal and metalloid concentrations, which reflects the limited sources of these contaminants within BCTMP and WWTP processes. Zinc, mainly in the dissolved fraction, was likely from the site's galvanised piping.

3.2 Antifoam discharge

3.2.1 Activity description

Under the Permit, WPI is authorised to discharge up to 125 L of a pre-approved antifoam to the Whangaehu River each day to control foaming. Antifoam was applied using a spray boom suspended across the river (Figure 12) at the Tangiwai railway bridge. Dosing was generally applied during daylight hours, approximately 95% of the time, with dosage adjusted based on foaming levels. WPI has advised that the dosing process was a regular discussion point at the daily morning meetings, ensuring it was well monitored. An automated system, controlled dosing, turning it off after dark and resuming one hour before sunrise. The standard operating procedure for responding to foam in discharge to Whangaehu River is attached as Appendix F.

a)

b)

Figure 12. Antifoam spray boom viewed looking a) upstream and b) downstream.

3.2.2 Volumes

The volume of antifoam discharged to the Whangaehu River since 2014 is presented in Figure 13. The change in resolution observed since March 2024 is due to a difference in measurement methods, with discharge volumes recorded to the nearest litre, as opposed to rounding to the nearest 5 L. Following the closure of the mill, discharges of antifoam to the Whangaehu River ceased on 28 September 2024. Since the Permit was granted, antifoam discharge volumes did not exceed the daily limit specified in the Condition 2 (125 L/day). On the days that antifoam was required, an average of 31 L was discharged to the Whangaehu River.

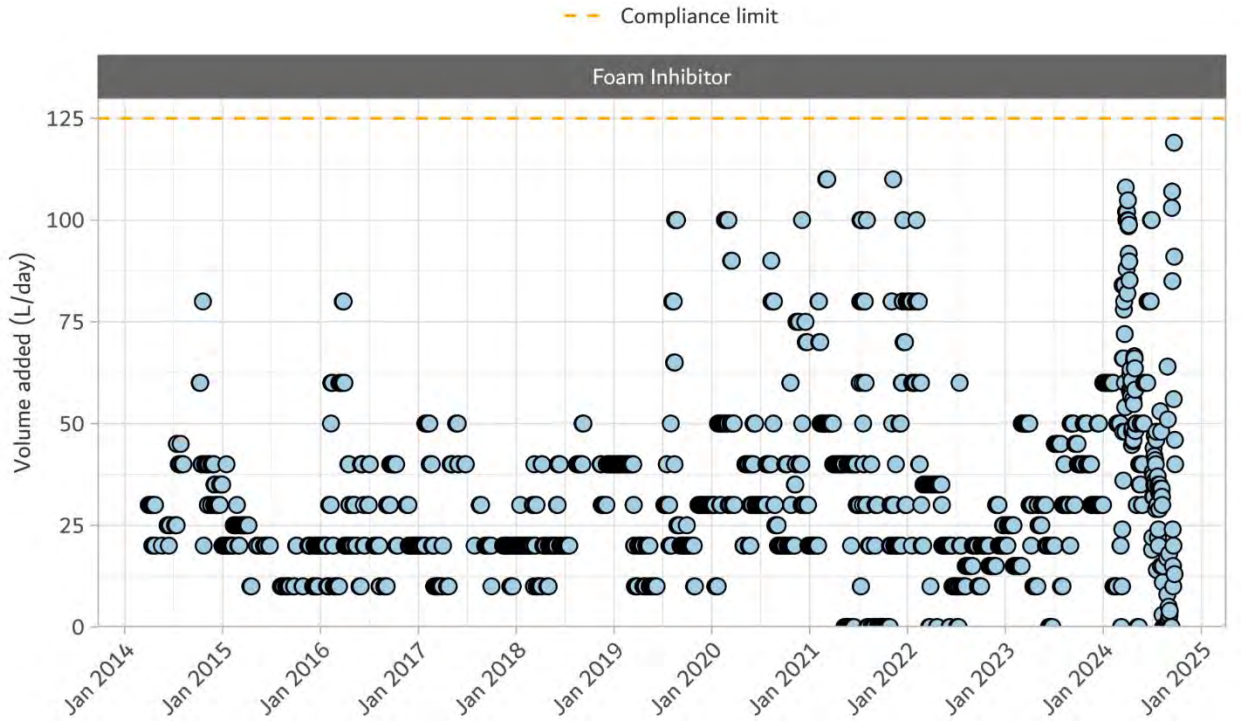

Figure 13. Antifoam discharge volumes between March 2014 and January 2025.

3.2.3 Antifoam agents

The antifoaming agent, NALCO F3610, was the sole product approved for discharge to the Whangaehu River until December 2018, when WPI sought and received confirmation from Horizons (2018) to trial replacement defoamers. This change was prompted by the manufacturer's decision to discontinue NALCO F3610 production in October 2018. Since August 2020, when the supply of NALCO F3610 was exhausted, WPI has trialled several antifoam agents. These agents are listed in Table 2, along with the products that are now permitted under a variation to the Permit granted in 2022. This variation allows for alternative antifoam agents provided a desktop assessment confirms their toxicity is equal to or less than the antifoam agent NALCO F3610.

Table 2. Antifoam agents used from 2008 to date

Antifoam agent	Base composition*	Period of application	Toxicity assessment	Approval
NALCO F3610	Paraffin oil	2008-2022	Golder (2010)	Allowed under Condition 4 of the Permit.
BuBreak 4390	Organosilicon	6 January 2017	N/A	Usually added to the WWTP to inhibit foaming but was inadvertently added to the river antifoam tank. See Appendix H.
IXOM Sixin X-130FT	Organosilicon	2022-2024	Babbage (2022)	Initially trialled as agreed with Horizons (2018) under Rule 14-26 of the One Plan. Its use was subsequently allowed under Condition 4 of the Permit.
NALCO PP01-3509	Paraffin oil	Aug 2022 to Sep 2022	N/A	Trialled as agreed with Horizons (2018) under Rule 14-26 of the One Plan.
Azelis CHEMAF 492	Tall oil fatty acid and polypropylene glycol	Aug 2022 to Sep 2022	N/A	Trialled as agreed with Horizons (2018) under Rule 14-26 of the One Plan.
CS-53M	Polyether and silicone	Not employed	Viridis (2024b)	Allowed under Condition 4 of the Permit.

Notes: *The remainder of which is comprised water and other non-hazardous ingredients.

3.3 Compliance

An assessment of the site's historical compliance with Conditions of the Permit have been provided in Appendix H. The key compliance challenges faced by WPI stemmed from a variety of factors. Most incidents were isolated and promptly addressed with corrective measures (Conditions 2, 4, 8, 12, 15, 26), while others required further investigation, operational changes, and re-testing to confirm effectiveness (Conditions 11, 19, 22, 25). WPI acknowledges that during the pulp mill's operation, compliance with Condition 20, particularly regarding colour, visibility, and foaming limits, was a persistent challenge. Prior to closure, in preparation for this renewal application, WPI explored several options to improve its wastewater treatment (refer to Section 4), demonstrating its commitment to continuous improvement and its goal of achieving compliance going forward. However, due to the unfortunate but necessary closure, a new proposal was developed to ensure compliance going forward.

4 PROPOSAL DEVELOPMENT

4.1 Options Assessment

Prior to the mill's closure, WPI considered a range of options to address ongoing environmental compliance challenges, evolving environmental and cultural requirements and a commitment to operational improvements. The preferred option was to proceed with a WWTP upgrade and a change in discharge method, including options that involved passing the wastewater through Papa-tū-ā-nuku and options that involved internal reuse. However, due to the mill's closure and the potential for changes at the site with new ownership, the associated costs are no longer justifiable.

The closure of the mill means that no discharge is now occurring (except for small volumes of stormwater). However, the continuation of the existing consent, for a short period, would allow a future owner to operate in a manner that complies with the existing conditions. This could be achieved by reduced production or process changes, among other things. Given the uncertainty of future operations, and to the need to maximise the value of significant existing investment and potential of the site, it is proposed to simply "roll over" the existing consent conditions for a short term, which would provide sufficient time for longer term decisions to be made.

4.2 Proposal

4.2.1 Overview

WPI is proposing to renew its Permit for a short duration of five years, to provide an opportunity for a new owner to use the site for industrial activities. Under the existing Permit, which is proposed to be renewed, WPI is authorised to:

- Discharge up to 5,200 m^3/day of treated wastewater and stormwater to the Whangaehu River.
- Discharge up to 125 L per day of a pre-approved foam inhibitor on a periodic basis to control foam in the Whangaehu River.

The discharge locations are shown in Figure 2. WPI is not proposing to alter the details of these activities but instead seeks to roll over the Permit conditions. However, the following key points differentiate the proposal from the existing Permit:

Consent duration
WPI is proposing a relatively limited five-year consent period. This duration acknowledges that further improvements or changes must be considered for any long-term discharge approval.

Discharge inactivity
Since the pulp mill will not operate for the foreseeable future, discharges during this interim consent period are expected to be minimal. However, an assessment of environmental effects has been undertaken (Section 6) on the basis that any future discharges from an industrial activity on site would adhere to the maximum volumes and quality permitted under the existing conditions of the Permit.

Notification requirement
Given the uncertainty regarding the site's future use, WPI proposes a provision to ensure that Horizons is notified at least one month prior to the commencement of any discharges. The following advice note is proposed:

At least one month prior to discharges recommencing to the Whangaehu River, the consent holder shall notify Horizons Regional Council, in writing, of this recommencement.

Additionally, any specific reference to 'treated pulp mill effluent' in the Permit should be replaced with 'treated industrial effluent' to align with the proposal.

Compliance mechanism for future operations

To assist in ensuring future operations meet consent limits, in particular those which WPI had difficulty meeting, an advice note, appended to Conditions 19 and 20, is proposed to be included in the Permit:

Upgrades or changes to the WWTP, depending on the activity operated on site, may be required to ensure the consent holder complies with the existing limits.

4.2.2 Discharges

Treated wastewater and stormwater

WPI proposes that the consent renewal authorises discharges of treated industrial effluent and stormwater generated in the WWTP footprint, at volumes and quality that meet existing Permit conditions.

Antifoam agent

WPI proposes that the consent renewal authorises discharges of an antifoaming agent, contingent upon a desktop assessment confirming its toxicity is equal to or less than that of the NALCO F3610 antifoam agent, in accordance with existing permit conditions. While it is unlikely that the discharge will be fully operational during the proposed five-year term, retaining this provision in the new consent will enable effective foam management, should it be necessary.

5 ACTIVITY STATUS ASSESSMENT

5.1 Introduction

The proposed continued discharges to the Whangaehu River are subject to rules in the One Plan, with an analysis provided in Section 5.2.

5.2 Horizons Regional Council One Plan - Regional Plan

5.2.1 Overview

The Regional Plan, found in Part 3 of the One Plan, includes the Land and Freshwater Chapter (RP-LF-Land and Freshwater) outlining rules for discharges of water, stormwater and contaminants to water.

5.2.2 Stormwater

Rule LF-LW-R27 provides for the discharge of stormwater into surface water which does not comply with the permitted activity conditions (Rule LF-LW-R26) as a restricted discretionary activity provided that there is no discharge to a) any rare, threatened or at-risk habitat, or b) any reach of a river or its bed with natural state values set out in Schedule 2 of the One Plan.

The Whangaehu River is not a rare, threatened or at-risk habitat and the reach affected by the proposed discharge lacks natural state values. Only the headwaters of the Whangaehu River, 20 km upstream, have these values. Therefore, the discharge of stormwater from the pulp mill (via the WWTP) will require consent as a **restricted discretionary activity** under Rule LF-LW-R27 of the Horizons One Plan.

The matters of which the Horizons reserves its discretion over are set out in full as follows:

1. Measures to control flooding and erosion.
2. Contaminant concentrations and loading rates.
3. Measures to avoid, remedy or mitigate adverse effects on groundwater quality.
4. Measures to manage the level of soil contamination.
5. Measures required to comply with s107(1) RMA.
6. Measures to assist with maintaining or achieving the Schedule 5 water quality targets for the relevant Water Management Sub-Areas.
7. Management of odours arising from the stormwater discharge.
8. Stormwater system maintenance requirements.
9. Contingency requirements.
10. Monitoring and information requirements.
11. Duration of consent.
12. Review of consent conditions.
13. The matters in RP-LF-LW-P12.[19]

[19] Policy RP-LF-LW-P12 relates to consent decision making requirements from the NPS-FM and only applies to new discharges or a change or increase in any discharge.

5.2.3 Discharges of Water or Contaminants

Rule LF-LW-R38 is a default discharge rule that provides for the discharge of water or contaminants into surface water which are not regulated by other rules in the One Plan, or which do not comply with the permitted activity, controlled activity or restricted discretionary activity rules in the Land and Freshwater Chapter as discretionary activities.

The proposed discharges will not comply with the permitted activity conditions, and as such, the proposed discharge of treated wastewater and antifoam to the Whangaehu River will require consent as a **discretionary activity** under Rule LF-LW-R38 of the One Plan.

5.2.4 Summary

WPI is seeking the necessary resource consents from Horizons to authorise the proposed continued discharge of treated wastewater, stormwater and antifoam to the Whangaehu River. Without limiting the general scope of the application, it is considered that the following resource consents are required:

- A discharge permit as a **restricted discretionary activity** for the discharge of stormwater from the site (via the onsite WWTP) to the Whangaehu River.
- A discharge permit as a **discretionary activity** for the discharge of treated wastewater (via the onsite WWTP) and the discharge of antifoam from the site to the Whangaehu River.

It is considered that the overall activity status of the application is a **discretionary activity**.

6 ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 Introduction

When considering an application for resource consent, the consent authority must, subject to part 2 of the RMA, have regard to any actual and potential effects on the environment of allowing the activity. In the RMA, the term effect includes both adverse and positive effects.

The actual and potential effects of the proposal, as described in Section 4.2, include socio-economic effects, as well as effects on stream flows, erosion and scouring, in-river water quality and ecology, contact recreation, aesthetics and mana whenua values. Sections 6.2 to 6.8 outline the effects of the proposal on these values, with a summary provided in Section 6.9.

6.2 Socio-Economic Effects

Savvy Consulting Limited (SCL) was engaged by WPI to assess the economic and social effects of the pulp mill's operation before its closure. In its report, SCL (2025) conclude WPI's operations were significant to the district and wider region. The assessment focused on the pulp mill's operation for the year ending June 2024, its last full financial year. Given its economic links to the adjacent sawmill, both mills were examined together with the broader pulp and paper manufacturing industry in New Zealand. The full assessment is provided in Appendix E, with key findings summarised below:

- The pulp mill produced high-quality wood pulp, all of which was exported to Asia.
- The pulp mill's distance from the nearest port in Napier meant it had a synergistic relationship with the local forestry sector, where commercial farm forestry in Ruapehu and neighbouring central North Island districts relied on the pulp mill (and sawmill) for commercial viability.
- The pulp mill had a diverse upstream supply chain, with forestry products and electricity being the largest inputs.
- The rise in wholesale electricity prices, including the acute spike in August 2024 and year-on-year increases leading to the pulp mill's closure (and the sawmill), were driven by a complex mix of environmental, economic, and regulatory factors.
- The pulp mill (and sawmill) was estimated to directly sustain at least $40 million of gross domestic product ('GDP').
- Overall, 250 jobs were spread across the pulp mill and sawmill, estimated to be made up of 229 jobs in the Ruapehu District as well as a few remote roles not based in the district.
- The mills accounted for 5% of employment in the Ruapehu District and 68% of total manufacturing employment, making them the district's second largest employer.
- Including indirect and induced impacts, WPI sustained $92 million of GDP per annum in the Manawatu-Wanganui Region, supporting 583 jobs. This impact extended to a national GDP contribution of $279 million, with 1,883 associated jobs.
- The pulp mill and sawmill were integral to the social and economic fabric of the district, which has a significant Māori population. Over their 50 years of operation, the mills provided skilled, high-paid jobs, raising the district's socio-economic status and, at times, supporting three generations of the same family.

SCL considered that granting the wastewater discharge consent for a limited period of five years would increase the likelihood of attracting a buyer for the pulp mill and supports this outcome from an economic perspective. This support is on the basis that the significant social and economic benefits generated by the mills in the year ending June 2024 are a strong indication of the likely scale and significance of the benefits that a new owner of the site(s) may be able to generate for the district and wider region over the long-term.

6.3 Effects on Flow, Erosion and Scouring

The proposal would allow up to 5,200 m^3 of treated wastewater and up to 125 L of antifoam to be discharged into the Whangaehu River each day. Assuming the maximum permitted discharge, the discharges would comprise less than 3% of the 7-day MALF (2,313 L/s as reported in Section 2.2.2) for the Whangaehu River and, as such, are unlikely to impact the hydrology of the river.

Long-term monitoring, undertaken by WPI under Condition 25 and as part of its preparation for this application (Viridis 2025), has found no evidence of bank erosion, major channel changes, or substrate displacement. The presence of filter media at the wastewater outlet, which directs discharges into the river's coarse streambed substrate, further dissipates energy, as well as the use of nozzle spray dispersion for antifoam application, minimising potential scouring/flow effects. For these reasons, the proposal is not expected to adversely affect river flows, or cause erosion or scouring.

6.4 Effects on Water Quality

6.4.1 Key contaminants

To assess the impact of the proposal on river water quality, downstream concentrations of parameters with load limits (e.g., TSS) were modelled and compared to the following guidance:

- One Plan Schedule 5 (RP-SCHED5) surface water quality targets for Whau_1a.
- NPS-FM Attribute Bands A though D (MfE 2024).
- ANZG (2018) DGVs for toxicants (at 99% protection) or physicochemical stressors (based on 80th percentile of minimally impacted reference site data)[20].

A maximum discharge volume of 5,200 m^3/day was assumed, along with maximum allowable loads (as specified in Condition 19). The assessment incorporated median[21] upstream water quality (serving as a baseline) and low-flow conditions (i.e., a 7-day MALF of 2.313 m^3/s, as reported in Horizons 2024a).

For some parameters, such as copper and zinc, the existing Permit does not specify load limits. The median concentrations of these parameters, measured between April 2013 and September 2024, while the pulp mill was operating, were also compared to available guidance.

The results of the assessment are provided in Table 3. Compliance with the downstream water quality limit for *E. coli* under low-flow conditions (Condition 11a) was also assessed. Although discharges are unlikely to be fully operational during the proposed consent period, the comparison in Table 3 provides a reasonable assessment of potential effects on the receiving environment.

[20] Based on the river environmental classification of 'Cool Wet Mountain', as per MfE (2010).

[21] As monitored between April 2013 and September 2024.

Table 3. Assessment of Whangaehu River water quality: Monitoring data and modelled scenario (2013 through 2024).

Parameter	Upstream water quality*	Downstream water quality		Water quality guidelines					
				One Plan	ANZG DGVs	NPS-FM Attribute Bands ^			
		Measured *	Modelled			A	B	C	D
pH (unitless)	2.8	2.9	-	7-8.2 and Δ 0.5	7.8 [A]				
Un-ionised hydrogen sulphide**	0.013	-	2.1		0.001 [B]				
Volatile suspended solids	<3	8	-						
Total suspended solids	18	-	27		11.8 [A]				
Soluble $cBOD_5$ (g O_2/m^3)	<2	-	3.4	1.5					
Total $cBOD_5$ (g O_2/m^3)	<2	-	4.6						
Ammoniacal nitrogen	0.073	0.086	-	0.32	0.32 [B]	≤0.03	>0.03 & ≤0.24	>**0.24** & ≤1.3	>1.3
Nitrate nitrogen	0.043	0.047	-		0.024 [A]	≤1	>1 & ≤2.4	>**2.4** & ≤6.9	>6.9
Soluble inorganic nitrogen	0.11	-	0.30	0.07					
Total nitrogen	0.2	0.4	-		0.085 [A]				
Dissolved reactive phosphorus	0.044	-	0.12	0.006	0.004 [A]	≤0.006	>0.006 & ≤0.01	>0.01 & ≤0.018	>0.018
Total phosphorus	0.059	0.11	-		0.017 [A]				
Escherichia coli (cfu/100 mL)	<1	-	≤260			≤130 [G]	>130 & ≤260 [G]	>260 & ≤540 [G]	>**540** [G]
Aluminium	26	25	-		0.0008 [C]				
Arsenic***	0.007	0.0062	-		0.001 [B]				
Boron	0.4	0.4	-		0.34 [B, D]				
Cadmium	0.0005	0.0005	-		0.00006 [B, E]				
Chromium****	0.02	0.019	-		0.00001 [B]				
Copper	0.02	0.019	-		0.001 [B]				
Lead	0.003	0.003	-		0.001 [B, E]				
Manganese	0.40	0.43	-		1.2 [B, F]				
Nickel	0.013	0.012	-		0.008 [B, E]				
Zinc	0.057	0.061	-		0.0024 [B, E, F]				

Notes: Units in g/m^3 unless stated; metal and metalloid concentrations are in the dissolved fraction; NPS-FM Attribute Band A is shaded light green, Attribute Band B is shaded light blue, Attribute Band C is shaded light orange, Attribute Band D is shaded light red; **bolded** values are NBLs; exceedances of a One Plan value or an ANZG DGV (or both) are shown in red text; ^as an annual median, unless stated otherwise; *median; **un-ionised hydrogen sulphide, measured as [S];*** as arsenic (III); **** hexavalent; [A] physical and chemical stressor for 80th percentile; [B] 99% species level protection for toxicants; [C] toxicant value with level of species protection unknown, applicable to watercourses with pH < 6.5; [D] based on data from toxicity tests conducted for a pH of 6.8-10 and a hardness - of 9.3-250 g $CaCO_3/m^3$; [E] should be adjusted for site-specific hardness as per Warne *et al.* (2018); [F] DGV may not protect key test species from chronic toxicity; [G] NPS-FM Attribute Bands for excellent, good, fair and poor quality, based on campylobacter infection risk for primary contact sites.

The key findings were:

- The baseline water quality of the Whangaehu River is generally poor, with upstream water quality exceeding of most guidelines (see also Section 2.2.3). However, median concentrations of ammoniacal nitrogen and dissolved manganese remained below the relevant guidelines at the upstream site. The median concentration of soluble $cBOD_5$ upstream was below the limit of detection (2 g/m^3). As such, an assessment against the target (1.5 g/m^3) was not possible. Downstream concentrations of ammoniacal nitrogen and dissolved manganese remained below the relevant target.
- For parameters with a load limit (e.g., TSS), at the maximum permitted discharge volume and load, downstream concentrations increased compared to upstream. However, except for soluble $cBOD_5$, for which compliance cannot be assessed upstream, the river's status with respect to guidance remained unchanged.
- For parameters without a load limit, downstream concentrations were, generally, comparable to those upstream. Some nutrients concentrations increased downstream, likely due to WPI's discharges. Effective management of nutrient inputs will reduce the likelihood of this occurring. Despite the increase in concentrations downstream, as discussed in Section 2.2.4, aquatic flora remained sparse, with macrophytes absent, in the Whangaehu River. This suggests that elevated nutrient levels have not led to eutrophication in the river (refer Section 6.5.1).
- Median *E. coli* counts at the upstream site were below detection limits. Under the modelled scenario, the discharge meets the Permit's *E. coli* limit for low-flow periods (Condition 11a); however, this still represents an increase in *E. coli* levels, falling into the NPS-FM Attribute B for primary contact sites. This guideline has limited applicability, as it is intended for watercourses frequently used for recreation, unlike the Whangaehu River, with its naturally low acidity making it unsuitable as a primary contact site.

Overall, the most notable differences in water quality between upstream and downstream sites were observed for nutrients. While the proposal may impact these parameters, the effect is expected to be limited due to several factors: the poor baseline water quality of the river, the sparse aquatic community, and the low likelihood of full discharge utilisation during the short-term of the proposed consent. Given these factors, in addition to the proposed compliance mechanism for future operations (refer Section 4.2.1), the overall magnitude and duration of potential effects are considered to be low.

6.4.2 Colour

The colour of the Whangaehu River is a notable aesthetic feature, influenced by its geothermal and volcanic origins. While it is sometimes referred to as 'glacial blue' by locals or iwi, this colour is not consistently observed (refer Figure 12). During a recent site visit by Council and Ngāti Rangi on 26 March 2025, when the river was particularly discoloured, Ngāti Rangi acknowledged the decolouration occurred in the absence of any discharge.

To evaluate the potential impacts of the proposal on the river's colour, both the hue and tannin content of the downstream site during the mill's operational period were considered. Hue was evaluated using the Munsell scale. Figures C2 and C6 in Appendix C present the measurements of tannins and hue, respectively, at sites upstream and downstream of the discharge.

The key findings from these data were:

- Tannin concentrations fluctuated significantly during the monitoring period at both sites, ranging from less than 1 g/m³ to as high as 77 g/m³. In most cases, concentrations downstream were higher than those upstream.
- Munsell hue values varied considerably, particularly at the upstream site, where hues ranged from 15 (yellow-brown) to 65 (blue). Colour variation downstream was less pronounced, with hues generally remaining within a narrower band of values around 35 (yellow-red). On several occasions, this resulted in exceedances of Condition 20 Parameter 1 (refer Appendix H).

The pulp mill effluent has, on occasion, contributed to conspicuous changes in the Whangaehu River's colour beyond a reasonable mixing zone (as per non-compliance events detailed in Appendix H). However, these variations did not exceed the colour variations observed upstream of the discharge (refer Figure C6 of Appendix C and Figure 12). Such natural fluctuations in river colour can occur due to factors such as sediment content, algae, soil conditions, weather and runoff contributions.

It is important to note that discharges during this interim consent period are expected to be minimal, and, if they occur, will not necessarily be influenced by a pulp-related process. As a result, the colour attributes of future discharges may differ, making it less likely to affect river colour to the same extent. Additionally, WPI has proposed the inclusion of an advice note in the Permit (refer to Section 4.2.1), to ensure compliance with Permit conditions (particularly for colour and other challenging limits). Given these factors, any potential impact on river colour is expected to be limited.

While colour can affect factors such as light penetration, plant growth and temperature fluctuations, quantifying these impacts downstream is challenging. Given the limited plant growth and biota (refer Section 2.2.4) in the river, the ecological impact of these colour changes, with respect to ecology, is expected to be minimal. Impacts in relation to aesthetic value and cultural views are discussed in Sections 6.7 and 6.8.

6.4.3 Horizontal visibility

The Whangaehu River's horizontal visibility is naturally variable due to its volcanic and geothermal influences, which introduce fine suspended sediments, dissolved minerals, and natural organic matter. Seasonal changes in flow, weather conditions, and catchment inputs further contribute to fluctuations in water clarity. While the pulp mill's discharge has, at times, reduced visibility, upstream measurements show that significant variation occurs naturally (Figure C1 in Appendix C). While changes in horizontal visibility can affect aesthetics and light penetration, potential ecological impacts are expected to be minor, particularly given the river's naturally low productivity and limited aquatic life (Section 2.2.4).

Discharges during the interim consent period are expected to be minimal and may not originate from a pulp-related process, meaning their clarity is likely to differ. Under the proposed provisional advice note (refer Section 4.2.1), the Consent Holder will be required to implement on-site measures to ensure compliance with permit conditions, including visibility limits in the river. As a result, any reduction in visibility is expected to be less pronounced.

6.4.4 Foaming

Visual monitoring of the Whangaehu River undertaken to date indicates that the pulp mill's discharge has contributed to the amount of visible foam present downstream. However, foaming has also been observed upstream on multiple occasions (Table H1 in Appendix H), often accompanied by a strong

sulphurous odour, indicating that it is not solely related to the discharge. The river's volcanic origin contributes to its unique geothermal characteristics, which, along with its turbulent nature in places, can lead to foaming by introducing iron-sulphur chemistry, geothermal gases, fine particulates, and potential microbial biosurfactants, all of which can stabilise foam and influence its persistence.

In terms of ecological impacts, increased foaming could reduce oxygen levels, hinder light penetration, and alter habitat suitability. However, as DO levels have remained within healthy ranges for aquatic organisms (refer Section 2.2.3), and the foams observed downstream were typically often patchy and temporary, the expected adverse effects are minimal, particularly given the river's limited aquatic life.

The extent of foaming during this interim consent period remains uncertain, as discharges are expected to be minimal and may not originate from a pulp-related process. As a result, the characteristics of any discharge could differ, making it less likely to contribute to foaming in the same manner. To address any foaming that may occur, an antifoam agent will be applied downstream, provided its toxicity is equal to or lower than previously used (refer Section 4.2.2). This approach, in line with the roll-over of Permit conditions, will ensure the agent effectively controls foam while minimising environmental impact.

6.5 Effects on Ecology

6.5.1 Aquatic flora

Factors such as flow disturbance, temperature fluctuations, nutrient supply, and invertebrate grazing can all influence algal and plant growth within a river. By examining the periphyton and macrophyte data collected from the Whangaehu River, the potential impact of the proposal on ecological values, particularly in terms of habitat alteration and food sources for sensitive invertebrates, can be assessed.

Sewage fungus and periphyton surveys conducted between 2012 and 2024 show that periphyton cover in the Whangaehu River has remained consistently low both upstream and downstream of the discharge (refer to Section 2.2.4). Additionally, periphyton biomass concentrations (i.e., AFDW and chlorophyll-*a*) have consistently complied with guidelines for protecting aesthetics, recreation, benthic biodiversity, and trout habitat (Biggs 2000). These findings suggest that, despite elevated concentrations of some nutrients in WPI's discharge, it has not contributed to excessive periphyton growth or algal blooms in the downstream environment.

The observed variability in periphyton community composition across monitoring occasions, with a recent dominance of naviculoid diatoms at all sites, further supports the conclusion that periphyton growth in the river remains within natural fluctuations, rather than responding to excess nutrient loading. Given the proposal will not significantly alter the nutrient levels in the river beyond which is already consented (as modelled in Section 6.4.1), it is unlikely to create conditions conducive to the proliferation of periphyton.

Moreover, macrophyte growth has been absent throughout the duration of the discharge operation, both upstream and downstream of the discharge point. Given these consistent findings, it is reasonable to expect that the renewal of the discharge will not lead to adverse effects on aquatic flora.

6.5.2 Aquatic fauna

The natural conditions of the Whangaehu River present a challenging environment for aquatic life, as evidenced by the limited fish records and the poor abundance and diversity of macroinvertebrates in the river (refer Section 2.2.4). The invertebrate species that do inhabit the river are predominantly pollution tolerant. At the upstream site, many contaminant concentrations exceed guidelines which aim

to protect sensitive species (Section 2.2.3 and 6.4.1). As a baseline, the life-supporting capacity of the Whangaehu River, particularly in the reaches relevant to this proposal, has been assessed as very low.

Invertebrate samples collected at sites upstream and downstream of the discharge between 2020 and 2024 indicate that, while operational, the pulp mill discharge, which was elevated in some parameters, did not cause any deterioration in community indices. In fact, the community structure at the upstream site has remained consistently comparable to that downstream (Viridis 2025). Regardless of discharges, the Whangaehu River's invertebrate community demonstrates a degraded state of water quality.

As outlined in Section 6.3, the proposal will not significantly alter the river's flow regime and, as such, impacts on biota from flow increases will be minimal. The discharges will not disrupt invertebrate populations or significantly affect habitat conditions.

Th proposal will require that any antifoam agent used has a toxicity equal to or less than that of the NALCO F3610 antifoam agent. Golder (2010) found that the "*application of* [up to 4 mL/s of] *antifoam does not appear to be having an adverse effect on the ecology of the* [Whangaehu] *River*". Therefore, the use of a less (or equally) ecotoxic antifoam will have no greater adverse effect than NALCO F3610.

Overall, the effects of future discharges from site, involving wastewater and antifoam of a quality like that which is consented under the existing Permit, was found to be minimal, with no deterioration in aquatic community health or life-supporting capacity anticipated downstream of the discharge.

6.5.3 Sewage fungus

As outlined in Section 2.2.4, sewage fungus has been absent from the Whangaehu River since the WWTP upgrade in 2011, which significantly reduced organic loads. This indicates that the discharge has not contributed to conditions conducive to the growth of sewage fungus, a known indicator of poor water quality. With the proposal to continue current practices and no changes to organic loads, the return of sewage fungus is not anticipated.

6.6 Recreational Values

As noted in Section 2.2.5, the Whangaehu River offers some recreational opportunities, particularly in its tributaries and downstream reaches where the influence of Crater Lake diminishes, and water quality improves with groundwater and tributary inflows. However, the upper river's naturally acidic and mineral-rich waters, strong currents, and rocky riverbed limit its suitability for contact recreation, particularly in the area where the discharges are proposed.

The proposed discharge, along with measures such as the use of an antifoam agent and compliance with Permit conditions, is expected to prevent significant changes in the river's clarity, *E. coli* content or other factors that could further affect contact recreation beyond the already poor river conditions. Therefore, any impact on recreational use, particularly near the discharge, is expected to be negligible.

6.7 One Plan Management Values

6.7.1 Exclusions

Contact recreation, stock water, irrigation, industrial abstraction, and domestic food supply have been excluded from this assessment. While these values are ascribed to the Whau_1a sub-area (refer Section 2.3), the naturally acidic waters of the upper Whangaehu River mean they are not present. Although there is a recorded industrial abstraction within the Whau_1a sub-area, this water is sourced from the

Wahianoa River, a tributary of the Whangaehu, for hydroelectric generation. Direct abstraction from the Whangaehu River is avoided due to its acidity.

The value 'Sites of significance - aquatic' has not been considered, as it pertains to Whio habitat in tributaries of the upper Whangaehu River rather than the section where WPI discharges occur. Similarly, the location of the discharges renders the value 'Natural state' irrelevant, as it pertains to public conservation land situated further upstream (refer Section 2.3).

The value of 'Life-support capacity' is significantly reduced, also due to the natural acidity and volcanic influence of the river. The impact of the proposal on this value are discussed in Section 6.5. In short, due to the absence of fish, aquatic plants and limited presence of tolerant invertebrate species in the river, the impact of the proposal on life-supporting capacity is negligible.

The values relevant to Whau_1a are discussed in Sections 6.7.2 through 6.7.5. Impacts on the value 'mouri' are assessed in Section 6.8.

6.7.2 Sites of significance - riparian

The One Plan identifies the Whau_1a as a riparian site of significance, in reference to its gravel and sand banks that could support threatened species such as dotterel. The riparian environment near the pulp mill, where the discharge occurs, consists of exposed riverbanks adjacent to public land (e.g., Tangiwai Memorial) and industrial roads (Figure 2).

The proposal is not expected to alter or degrade this habitat beyond existing conditions. As outlined in Section 6.3, the discharge volume and flow characteristics will not lead to substantial channel expansion, erosion, or sediment deposition that could negatively impact riparian vegetation or nesting sites. Furthermore, no additional land disturbance or construction is associated with the proposal, meaning there will be no direct disruption to riparian species.

Given these factors, the proposal is unlikely to pose any risks to the ecological values associated with riparian sites of significance along the Whangaehu River.

6.7.3 Aesthetics

The river's volcanic and geothermal characteristics, including its naturally variable colour, horizontal visibility, and occasional foaming, contribute to its distinct aesthetic appeal. While the discharge affects these attributes, the proposal is unlikely to significantly alter the river's aesthetic value. As outlined in Section 4.2.1, an advice note is proposed for Conditions 19 and 20, which may require the consent holder to upgrade or modify the WWTP to ensure compliance with existing limits. Therefore, the discharge is not expected to substantially impact the aesthetic value of the river.

6.7.4 Capacity to assimilate pollution

The value 'capacity to assimilate pollution' ensures that the upper Whangaehu River can naturally process contaminants without being overwhelmed by the proposed discharge. The water quality effects assessment took a cumulative approach, modelling the discharge's impact at maximum consented volume and loads, while considering the river's background water quality (Section 6.4.1). The assessment found that, with the possible exception of soluble $cBOD_5$, the discharge would not cause any parameters to exceed previously met guidelines. As noted in Section 6.4.2, it was not possible to assess whether the median soluble $cBOD_5$ concentration exceeded the guideline (1.5 g O_2/m^3) as it was below the detection limit (2 g O_2/m^3). Nonetheless, while the modelled downstream soluble $cBOD_5$ concentration (3.4 g O_2/m^3) exceeded the guideline (1.5 g O_2/m^3), it remained within the range of

natural variability observed upstream (refer Figure C2, Appendix C). This exceedance, though measurable, does not surpass the river's ability to assimilate pollution and is therefore not considered a significant concern.

6.7.5 Existing infrastructure

The existing infrastructure value ensures the integrity of nearby infrastructure is not compromised by the proposed discharges. Key infrastructure near the WPI discharge includes the Tangiwai railway bridge and the State Highway 49 road bridge (Figure 2).

With the minimal increase in river flow (less than 3% of the 7-day MALF, see Section 6.3), the proposal is not expected to significantly affect these structures. Antifoam is applied to the river from a spray boom suspended below, but independent of, the Tangiwai railway bridge (Figure 12). Regular maintenance will be carried out to address any functionality issues. Additionally, due to the considerable distance (more than 1 km) separating the discharge from the road bridge, any impacts on this structure are expected to be negligible.

6.8 Cultural Impact

The cultural impact of the proposed short-term continuation of the WPI discharge of stormwater and wastewater, and the discharge of antifoam, to the Whangaehu River (Te Waiū-o-te-Ika) is best described by mana whenua.

Engagement has been undertaken by WPI in relation to the approach to this application with both Uenuku and Ngāti Rangi (see Section 8), however a cultural impact assessment has not been undertaken to date. Uenuku (2024) have advised that "*…the proposed programme for consenting/management of the closure of the WPI pulp mill and sawmill are consistent with the values of Te Waiū o Te Ika.*"

Feedback from engagement with mana whenua, alongside a review of the Taiao Management Plan and the One Plan, has indicated that the aspects of particular interest and concern to mana whenua regarding the proposal relate to:

- Water quality, and the mouri of the river.
- All point and non-point source discharges, including those from industry.
- Contaminants from stormwater.
- Maintaining fish passage to upstream tributaries.
- The socio-economic impact of the site closure on whānau.

These aspects are considered from a western science and economics perspective throughout this assessment of environmental effects section. The proposal has also been considered in relation to the issues, objectives, policies and rules developed by Ngāti Rangi as part of their Taiao Management Plan (see Section 8).

Of note, the One Plan does not ascribe the Sites of significance - cultural value to the Whangaehu River, i.e., there are no publicly identified culturally significant sites in the vicinity recognised as requiring consideration.

6.9 Summary

The potential environmental effects of renewing the discharge permit for a limited five-year period are expected to be minor, as the previous pulp mill operation has now ceased and that the proposed

discharge differs from the previous operation, which sometimes failed to comply with consent limits, Provisions for notification and potential treatment upgrades are now proposed that will ensure any future industrial activities remain within established environmental limits.

Hydrological impacts will be negligible, with full authorised discharges contributing less than 3% of the Whangaehu River's 7-day MALF, and long-term monitoring showing no evidence of erosion or channel instability. Water quality effects are also anticipated to be limited, as baseline conditions in the river are already poor, and the likelihood of full discharge volumes being utilised is low. While some changes in nutrient levels may occur, these are not expected to significantly affect aquatic life or ecological health. Similarly, recreational impacts are expected to be minimal, with compliance measures in place to prevent any noticeable decline in water clarity or safety.

Cultural and socio-economic considerations have also been considered. Engagement with Uenuku and Ngāti Rangi has identified key concerns, including water quality, fish passage, and the broader impacts of the site closure on local communities. While a formal cultural impact assessment has not been completed, initial feedback suggests that the proposed management approach aligns with iwi values for Te Waiū-o-te-Ika. The short-term renewal provides an opportunity to facilitate the sale of the site while ensuring any future industrial operations remain within existing consented limits and are subject to appropriate compliance measures.

7 PROPOSED MANAGEMENT OF EFFECTS

To ensure the continued protection of the Whangaehu River and compliance with environmental standards, the following measures have been proposed to manage the effects of discharges. These actions are designed to minimise potential adverse impacts and ensure the ongoing integrity of the river ecosystem.

- Notification: At least one month prior to recommencing discharges, the consent holder will notify Horizons in writing of the intended recommencement (refer to Section 4.2).
- Foam control: A pre-approved antifoaming agent will be applied downstream of the discharge, as needed, to control foaming in the river.
- Ecotoxicity assessments: In line with Condition 4a, an ecotoxicity assessment of all new antifoams will be conducted prior to application to ensure that adverse ecological effects are mitigated.
- Maintenance: Discharge structures will be regularly inspected and maintained to ensure even application of antifoam and controlled release of effluent into the river. This includes checking filter media and monitoring for signs of erosion. The effluent flow meter will continue to be calibrated annually, as required under Condition 9.
- Monitoring: In accordance with roll over Permit conditions 10, 12, 14, 15, 16, and 25, monitoring of both the effluent and the river will continue on a regular basis to help identify any issues before they manifest as adverse effects.
- Reporting: An annual report will continue to be prepared in accordance with Condition 30.

These proposed management measures will ensure that discharges to the Whangaehu River remain within consented limits, proactively address potential adverse effects, and contribute to the ongoing sustainability of the river's ecological health.

8 CONSULTATION

8.1 Overview

Section 36A of the RMA clarifies that there is no legal obligation for applicants to consult any party when seeking resource consent. However, while not mandatory, consultation is considered good practice and recommended to identify potential concerns, provide transparency, and facilitate a smoother application process. In line with this approach, engagement has been undertaken with mana whenua, the relevant regulatory authorities and adjoining landowners where necessary. The following sections provide an overview of the consultation and engagement efforts that have informed this AEE and the proposed discharge activities. Key consultation documentation is provided in Appendix I.

8.2 Mana Whenua

WPI and Ngāti Rangi share a longstanding relationship, formalised in a 7 July 2009 agreement, that established an environmental forum to support shared goals on environmental matters, resource consenting, and Whangaehu River management. Over the years, it has fostered open dialogue and collaboration, leading to outcomes such as the joint development of the cultural health index monitoring regime for the Whangaehu River (Appendix I).

Engagement on the discharge renewal process, initially related to a variation (Babbage 2021) sought to the Permit in 2021 and granted in September 2022, was undertaken with the Uenuku Charitable Trust (Uenuku) and Ngāti Rangi through meetings, site visits and information sharing, dating back to 2020. Details of this engagement are summarised in Table 4, excluding the variation-related discussions, with relevant documentation corresponding to key engagement events included in Appendix I.

Due to the pulp mill closure and subsequent change in proposal, the nature of feedback from mana whenua evolved over the course of the consultation period. Prior to closure, the focus of consultation with Uenuku centred on proposed upgrades to the WWTP and associated improvements to water quality. Following closure of the pulp mill, an in-person hui and an information memorandum provided by WPI, Uenuku acknowledged that '*the proposed programme for consenting/management of the closure of WPI pulp mill and sawmill are consistent with the values of Te Waiū of Te Ika*' (Uenuku 2024).

Ngāti Rangi's feedback also evolved as the proposal changed. As mentioned in Section 6.4.2, during a recent site visit by Council and Ngāti Rangi on 26 March 2025, when the river was particularly discoloured, Ngāti Rangi acknowledged the decolouration occurred in the absence of any discharge. During this hui, Ngāti Rangi expressed general support for the new application approach.

Both Ngāti Rangi and Uenuku were notified of the proposal upon lodgement of the application and provided with the documentation for review and comment.

8.3 Local Community

Prior to the pulp mill's closure, an information memorandum detailing WPI's trial of technologies for the WWTP upgrade, including membranes and chemical coagulation techniques, was distributed to local community members and surrounding property owners in April 2024. The memorandum included contact information for WPI, inviting feedback from the community (Viridis 2024c).

Feedback from the local community was minimal. However, those who engaged expressed general support for the continuation of the pulp mill discharge with an improved discharge quality. With the subsequent closure of the pulp mill, there is some community support for options that would provide for the opportunity for industrial activities on the site to recommence.

Table 4. Summary of mana whenua consultation.

Date	Engagement	Reference
25 October 2023	Ngāti Rangi was invited by WPI to visit the site on 25 October 2023 to view the wetland pilot trial, which was a pivotal part of the consent renewal process at that time. Although the wetland trial is no longer relevant due to the pulp mill's closure, it played a significant role in the consent renewal discussions.	Freear (2023)
14 Nov 2023	In-person hui with Ngāti Rangi to discuss proposed upgrade to WWTP	-
23 Jan 2024	In-person hui with Uenuku to discuss proposed upgrade to WWTP	-
24 Oct 2024	In-person hui (environmental forum meeting) between Ngāti Rangi and WPI to discuss mill closure and proposed changes to application.	WPI (2024)
7 Nov 2024	In-person hui with Uenuku to discuss mill closure and proposed changes to application	-
	Information memo for consent proposal issued to Uenuku and Ngāti Rangi	Viridis (2024d, e)
29 Nov 2024	Feedback letter from Uenuku expressing support for the proposed consenting and management programme, which has evolved following the closure of the mills. They confirmed that the programme aligns with the values of Te Waiū of Te Ika.	Uenuku (2024)
7 Dec 2024	In-person hui (environmental forum meeting) between Ngāti Rangi and WPI during which the discharge renewal process was discussed, among other things.	-
13 March 2025	In-person hui (environmental forum meeting) between Ngāti Rangi and WPI during which the discharge renewal process was discussed, among other things.	-
26 Mar 2025	Site visit with Ngāti Rangi and Horizons.	-

8.4 Ruapehu District Council

Ruapehu District Council was notified of the proposal upon lodgement of this application and provided with application documents for review.

8.5 Horizons Regional Council

Consultation with Horizons has been ongoing, with several key meetings held to discuss the evolving nature of the application. The first in-person meeting took place on 1 March 2024, with WPI, Viridis, and Mitchell Daysh in attendance. This meeting focused on a discussion on the preferred WWTP upgrade technologies at the time (i.e., filtration treatment coupled with wetland discharge), as well as information of the application process, provided by Horizons. Following the closure of the mill, another meeting was held on 25 September 2024, during which the new approach to the application was discussed (i.e., proceeding with the status quo).

In November 2024, Horizons (2024b) authorised a Section 124 (2) request under the RMA to lodge the consent application within the three to six month timeframe prior to expiry, and allow WPI to retain existing rights while a decision is determined on a replacement consent. This approval has been included in Appendix I.

9 CONSIDERATION OF ALTERNATIVES AND THE BEST PRACTICABLE OPTION

Under the RMA, a consideration of alternative locations and methods is relevant in certain respects:

- Schedule 4 requires an AEE to include a description of any possible alternative locations or methods for undertaking the activity where it is likely that the activity will have a significant adverse effect on the environment.
- Where an activity includes the discharge of a contaminant, Schedule 4 imposes an obligation on an applicant to provide a description of any possible alternative methods of discharge, including discharge into any other receiving environment.
- Similarly, section 105 of the RMA requires decision makers to have regard to various matters including “any possible alternative methods of discharge, including discharge into any other receiving environment”.
- Section 108 of the RMA also sets out that a condition may be imposed on a discharge permit requiring the consent holder to adopt the best practicable option (“BPO”) to prevent or minimise any actual or likely adverse effects on the environment of the discharge.

The One Plan also includes policies that require an assessment of the BPO and consideration of alternative discharge options for the purpose of mitigating effects.

As defined in section 2 of the RMA, the BPO in relation to a discharge of a contaminant means:

> *The best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—*
>
> *(a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and*
>
> *(b) the financial implications, and the effects on the environment, of that option when compared with other options; and*
>
> *(c) the current state of technical knowledge and the likelihood that the option can be successfully applied.*

Determining what the BPO is in a given circumstance requires a decision maker to weigh competing considerations, including the nature of the discharge, sensitivity of the environment and practicalities of that and any other option. The use of the words "*among other things*" clearly signals that other factors can also be taken into consideration.

The words ‘BPO’ do not mean the best option, the best technical option, the best economic option, or the best environmental option. Nor do they require adherence to what might be considered “best practice”. A judgement needs to be made as to what is practicable and proportionate to the risks likely from a contaminant to be discharged. The key word is ‘practicable’, and this means not granting consents that require adherence to an option that would be prohibitively expensive or involve procedures that are unnecessarily onerous or impractical.

As part of its resource consent investigations, WPI has undertaken an extensive assessment of the availability and practicalities of alternative methods and technologies to minimise any actual or potential adverse effects arising from the proposed discharges to the Whangaehu River.

After considering the discharge of treated wastewater and stormwater through the lens of the BPO test described above, it was assessed that authorising the continued discharge of treated wastewater and stormwater to the Whangaehu River for a limited period of five years represents the BPO. This is due to unlikely continuation of the previous pulp mill operation in the short-term and the potential for other site uses to maximise the value of the existing investment in the site. Because there are potential effects from foaming in the Whangaehu River from the proposed discharge, as discussed in Section 4, it is also necessary to discharge antifoam into Whangaehu River to manage those effects.

The proposed discharges are considered the BPO for the following reasons:

- As discussed in Section 2.4, it is recognised that the Whangaehu River has significant value to iwi, however many of the remaining values of the river are more limited due to the natural characteristics of the river which are discussed in Section 2.2.
- The existing wastewater treatment technology and discharge method has limitations resulting in impacts on cultural values, visual amenity and clarity that cannot continue for an extended period. For this reason, significant upgrades to the treatment of the wastewater and how it is discharged are required to minimise these effects if processing activities recommence consistent with what has occurred at the site until recently.
- As discussed in Section 4.2, a significant amount of investigative work has been undertaken to determine how the effects of the discharges as they occurred previously can be addressed and it has been determined that the capital cost of implementing those improvements is significant. For the reasons set out in Sections 1.1 and 4, it is not necessary to commit to these improvements now.
- Due to commercial sensitivities surrounding a pending sale, the actual value of the site is not disclosed. However, WPI has significant investment in the site, and securing a new short-term consent is appropriate to protect this investment while a new owner is determined. Without a consent to discharge treated wastewater and stormwater, the value of the site to potential purchasers or future users could be significantly reduced, as securing a future discharge consent would likely be difficult if the current consent lapses.
- As discussed in Section 6.2, until recently, the site has played a significant economic role in the district and wider region. Considering direct, indirect and induced impacts, the pulp mill and sawmill sustained a significant $92 million of GDP per annum in the Manawatu-Wanganui Region, including 583 jobs. This impact increases to a national GDP contribution of $279 million (and 1,883 jobs). A consent to discharge treatment wastewater from the site is likely to be a critical component of recreating that level of economic activity.

Because of the uncertain future of the site's operations, only a relatively short-term consent is appropriate while decisions are made on the long-term future of the site, including how any discharges of treated wastewater and stormwater should be managed. Due to the historical compliance issues associated with the existing consent, a new condition is proposed that requires the consent holder to notify Horizons before the discharge recommences. A new advice note to conditions 19 and 20 is also proposed to advise the consent holder, and to ensure Council as well as any potential purchaser of the site is aware, that upgrades or changes to the wastewater treatment plant may be required to ensure compliance with the existing discharge limits, depending on the nature of the activities that recommence at the site.

10 STATUTORY ASSESSMENT

10.1 Introduction

The RMA is the principal statutory document governing the use of land, air and water, with the purpose of promoting "*the sustainable management of natural and physical resources*". This section of the AEE outlines the statutory framework under the RMA that apply to the consents being sought from Horizons.

As noted in Section 5, the overall activity status of the resource consent applications required for the application is discretionary. As such, it is necessary to consider the resource consent application under the decision-making framework of Section 104 of the RMA.

10.2 Section 104 Assessment

Section 104 of the RMA lists the various matters that a consent authority must have regard to in considering the resource consent applications for the proposal. In particular, and subject to Part 2 of the RMA, it states that:

(1) *When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–*

(a) any actual and potential effects on the environment of allowing the activity; and

(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and

(b) any relevant provisions of—

(i) a national environmental standard:

(ii) other regulations:

(iii) a national policy statement:

(iv) a New Zealand coastal policy statement:

(v) a regional policy statement or proposed regional policy statement:

(vi) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

(2) When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.

(2A) When considering an application affected by section 124 or 165ZH(1)(c), the consent authority must have regard to the value of the investment of the existing consent holder.

(3) A consent authority must not, -

(a) When considering an application, have regard to –

(i) Trade competition or the effects of trade competition; or

(ii) Any effect on a person who has given written approval to the application.

Section 104 of the RMA does not give primacy to any of the matters to which a consent authority is required to have regard. All the relevant matters are to be given such weight as the relevant statutory planning documents may direct, and all provisions are subject to Part 2 of the RMA, although it is understood that a consent authority is not required to consider Part 2 of the RMA unless there is uncertainty or invalidity in the relevant statutory planning documents.

The matters for consideration under section 104(1)(a), (ab), (b) and (c) of the RMA are assessed in the sub-sections below.

10.3 Actual and Potential Effects

With respect to section 104(1)(a) of the RMA, the actual and potential effects on the environment associated with the proposal are summarised in Section 6. It is concluded that any adverse effects from the continued discharge of treated wastewater, stormwater and antifoam can be appropriately avoided, remedied or mitigated, particularly as the existing discharge and receiving environment limits will be retained. Additionally, it is important to note that the previous pulp mill operation has ceased, and the proposed discharge differs from past operations that occasionally did not comply with consent limits or caused adverse water quality effects. Provisions for notification and potential treatment upgrades are now proposed that will ensure any future activities remain within established environmental limits.

Furthermore, and based on the conclusions reached with respect to the actual and potential environmental effects of the proposed discharges, no additional compensatory or offsetting measures are proposed or considered necessary by WPI in the context of Section 104(1)(ab) of the RMA.

10.4 Relevant Statutory Planning Documents

10.4.1 Overview

In terms of Section 104(1)(b) of the RMA, the following sub-sections provide an assessment of the application against the:

- NPS-FM
- One Plan

With regards to Section 104(1)(c), the Taiao Management Plan is considered relevant to this application, and an analysis as to how the proposed discharges relate to the iwi management plan has been undertaken accordingly.

10.4.2 National Policy Statement for Freshwater Management 2020

The NPS-FM came into effect on 3 September 2020, and it provides direction on how freshwater should be managed under the RMA. The discharges that are the subject of this application occur within a freshwater environment, and it is therefore appropriate to consider the NPS-FM as most recently amended in October 2024.

It should be noted that the RMA[22] was amended in October 2024 meaning that when considering an application and any submissions received, a consent authority must not have regard to clause 1.3(5) or 2.1 of the NPS-FM (which relates to the hierarchy of obligations in the NPS-FM).

[22] RMA s104(2F) and RMA schedule 4 s2(2A).

The policies of the NPS-FM of potential relevance to this application relate to:

- Policy 1: The management of freshwater in a way that gives effect to Te Mana o te Wai.
- Policy 2: Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.
- Policy 3: The implementation of an integrated freshwater management approach.
- Policy 5: Management of freshwater to ensure that the health and well-being of degraded waterbodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is at least maintained.
- Policy 7: The loss of river extent and values is avoided to the extent practicable.
- Policy 9: The protection of habitats of indigenous freshwater species.
- Policy 13: The improvement of water bodies and freshwater ecosystems where freshwater is degraded to reverse deteriorating trends.
- Policy 15: Enabling communities to provide for their social, economic, and cultural wellbeing in a way that is consistent with the NPS-FM.

With respect to these matters, the following points are noted regarding the proposed discharges:

- WPI has a lengthy established relationship with Ngāti Rangi that is formalised via a Relationship Agreement between the two parties: "*The parties agreed to develop an Environmental Forum to further their goals, aims and aspirations in relation to environmental matters, resource consenting matters, and in particular the Whangaehu River*"[23].
- WPI has engaged with tangata whenua representatives throughout the preparation of the AEE for the proposed discharges, specifically Ngāti Rangi and Uenuku (see Section 8), and this engagement is anticipated to continue following the lodging of the resource consent applications via korero in relation to the potential sale of the pulp mill site and any associated resumption of industrial activity that may involve discharges to the Whangaehu River.
- The management of actual and potential effects of the discharges to the upper Whangaehu River has been considered in light of the fact that this river is naturally degraded in terms of water quality and habitat due to its volcanic source, limiting the values that are present.
- There will be no loss of the limited existing values because the discharges that are the subject of this application will replace those that are already occurring, acknowledging that the discharges have currently ceased and WPI do not intend to resume operation of the pulp mill (however a future alternative landowner may seek to).
- Granting permit renewal for the discharge of stormwater, wastewater and antifoam to the Whangaehu River for a short term will support the potential sale of the site. With the current discharge permit in place, a new landowner would be able to develop and undertake future industrial activity, contributing to the regions socio-economic well-being, potentially to the degree offered by recently ceased operations. This supports the community's ability to provide for their social, economic, and cultural well-being.

[23] Environmental Agreement between Ngāti Rangi Trust and WPI, 7 July 2009; and Agreement to amend such, 9 July 2021.

Overall, it is considered that the discharge of stormwater, wastewater and antifoam to the Whangaehu River (in their current form and for a short term) will be consistent with the relevant objective and policies of the NPS-FM and will protect the health and wellbeing of freshwater and the wider environment.

10.4.3 Horizons Regional Council One Plan

The One Plan is administered by Horizons and became operative on 19 December 2014. The One Plan was last amended (and made partially operative) in December 2024 to give effect to the National Policy Statement on Urban Development 2020. The One Plan combines the Regional Policy Statement ("RPS"), Regional Plan and Regional Coastal Plan for the Horizons region.

The One Plan defines how the natural and physical resources of the Horizons region, including freshwater, air, productive land and natural resources, will be managed.

10.4.4 Regional Policy Statement

Overview

Part 2 is the RPS section of the One Plan. It sets out the regionally significant resource management issues and outlines the objectives, policies and methods that will be used to address these issues.

When considering the proposed continued discharge of treated wastewater stormwater and antifoam to the Whangaehu River, the most relevant provisions are contained in the Resource Management Overview and Land and Freshwater Chapters. The key conclusions from each of these topics are addressed in the sections below.

Resource Management Overview Chapter

The Resource Management Overview Chapter sets out the key environmental issues for the region, however it also identifies the resource management issues of significance to hapū and iwi; and sets out the objectives, policies and methods to address these issues.

The key provisions that are relevant to the proposed discharges to the Whangaehu River seek to:

- Have regard to the mouri of natural and physical resources to enable hapū and iwi to provide for their social, economic and cultural wellbeing (One Plan RPS - Objective RMIA-O1).
- Have particular regard to kaitiakitanga and recognise and provide for the relationship of hapū and iwi with their ancestral lands, water, sites, wāhi tapu and other taonga through resource management processes (One Plan RPS - Objective RMIA-O1).
- Recognise existing arrangements and agreements between resource users, local authorities and hapu or iwi (One Plan RPS - Policy RMIA-P1(2)).
- Protect identified wāhi tapu, wāhi tupuna and other sites of significance to Māori from inappropriate use and development that would cause adverse effects on the qualities and features which contribute to the values of these sites (One Plan RPS - Policy RMIA-P2).

WPI has engaged with both Ngāti Rangi and Uenuku regarding the approach to this application and the assessment of effects (see Section 8). An ongoing collaborative approach has been encouraged.

The existing lengthy relationship agreement and environmental forum between Ngāti Rangi and WPI should be recognised.

In addition, as set out in Section 10.4.5, this application has assessed the proposed discharges against the relevant provisions of the Taiao Management Plan.

Land and Freshwater Chapter

The Land and Freshwater Chapter addresses issues associated with the effects of human activities on land, and the management of freshwater, in the Horizons region. In particular, the freshwater part of the chapter covers water management areas and sub-areas and values, surface water quality and discharges affecting water quality, and sets out the objectives, policies and methods to address issues with water quality.

The key provisions relevant to the proposed continued discharges of treated wastewater, stormwater and anti-foam to the Whangaehu River seek to:

- Safeguard the life supporting capacity of rivers and their beds and recognise and provide for the values in Schedule 2 of the One Plan (One Plan RPS - Objective LF-FW-O3 and Policy LF-FW-P4).
- Maintain water quality in rivers where the existing water quality is sufficient to support the identified surface water management values in Schedule 2 of the One Plan (One Plan RPS - Objective LF-FW-O4.).
- Enhance water quality in rivers where existing water quality is not sufficient to support the identified surface water management values in Schedule 2 of the One Plan (One Plan RPS – Objective LF-FW-O4.).

Policy LF-FW-P12 relates to point source discharges to water and seeks to ensure that any discharge has regard to the surface water quality management strategies set out above. However, the policy notes that regard must be had to:

- The degree to which the activity will adversely affect the Schedule 2 values for the relevant water management sub-area.
- Whether the discharge will result in the breaching of the Schedule 5 water quality targets.
- The extent to which the activity is consistent with contaminant treatment and discharge best management practices.
- The need to allow reasonable time to achieve any required improvements to the quality of the discharge.
- Whether the discharge is of temporary nature (or associated with necessary maintenance or upgrade works) and cannot practicably be avoided.
- Whether adverse effects resulting from the discharge can be offset by way of financial contributions.
- Whether it is appropriate to adopt the BPO.

With respect to the proposed discharges the following points are noted:

- The values listed in Schedule 2 for the Whau_1a sub-area (see Section 2.3), and the actual and potential effects of the proposed discharges (see Section 6), have been considered as part of this application. Notably, several of the values ascribed to Whau_1a are either absent (contact recreation, irrigation, stock water, industrial abstraction and domestic food supply) or limited (sites of significance - aquatic and life-support capacity).

- Baseline water quality of the upper Whangaehu River is generally poor due to its volcanic origins. WPI monitoring results for the Whangaehu River upstream and downstream of the wastewater and stormwater discharge have been considered in relation to the water quality targets specified in Schedule 5 for the upper Whangaehu River (see Section 6.4).
- WPI acknowledges that the proposed discharges do not represent best management practices for pulp mill operation previously undertaken on the site. Due to resource constraints, WPI is unable to substantially improve the discharge now that the pulp mill has ceased operations. This application seeks to retain the ability to discharge treated wastewater, stormwater and antifoam to the Whangaehu River on a short-term basis, supporting the property sale process. The expectation is that a future landowner will implement improved treatment practices more closely aligned with best practises for any future (as yet undetermined) industrial processes at the site (see Section 4).
- A prospective owner could undertake activities on the site with discharges that comply with the existing consent conditions (as proposed for the new consent sought) with such discharges not having adverse effects on the Whangaehu River as identified in Section 6 of this assessment.

Regional Plan

Part 3 is the Regional Plan section of the One Plan. It specifies the controls on natural and physical resource use, and includes objectives, policies and rules for how resources can be used and developed in the region.

When considering the proposed discharges to the Whangaehu River, the most relevant provisions are found in the Land and Freshwater Chapter. The key conclusions from this chapter are outlined below.

Land and Freshwater Chapter

The objectives and policies that are relevant to the proposed continued discharge of treated wastewater, stormwater and antifoam to the Whangaehu River are set out below.

Objective LF-LW-O2 seeks that discharges directly into water are managed to:

- Safeguard the life supporting capacity of water.
- Recognise and provide for the surface water management values and management objectives in Schedule 2 of the One Plan.

Policy LF-LW-P4 sets out a range of matters the Horizons must have regard to when making decisions on resource consent applications or setting consent conditions for discharges of water or contaminants to water. These matters include:

- The objectives and policies in the RPS relating to freshwater and the objectives and policies in various other chapters of the RPS that relate to the discharge.
- Avoiding discharges which contain persistent contaminants that are likely to accumulate in a waterbody or its bed.
- The appropriateness of adopting the BPO to prevent or minimise adverse effects in circumstances where a) it is difficult to establish discharge parameters for a particular discharge that give effect to the management approaches for water quality and discharges set out in the RPS freshwater chapter, or b) the potential adverse effects are likely to be minor and the costs associated with adopting the BPO are small in comparison to the costs of investigating the likely effects on water.

The assessment of the freshwater provisions under the One Plan RPS is considered to equally apply to the consideration of the Regional Plan provisions above.

Policy LF-LW-P7 seeks that alternative discharge options, or a mix of discharge regimes, must be considered for the purpose of mitigating adverse effects and applying the BPO. These options must include, but are not limited to:

- Discharging contaminants onto or into land as an alternative to discharging contaminants into water.
- Withholding from discharging contaminants into surface water during low flows.
- Adopting different treatment and discharge options for different receiving environments or at different times (including different flow regimes or levels in surface waterbodies).

Prior to the closure of the pulp mill, WPI was in the process of considering alternative treatment and discharge options including land-based disposal options. However, these alternatives are no longer practicable due to the lack of resources available to WPI (see Section 4).

As noted above, a prospective landowner could undertake activities on the site with discharges that comply with the existing consent conditions (as proposed for the new consents sought) with such discharges not having adverse effects on the Whangaehu River as identified in Section 6 of this assessment.

10.4.5 Clause 1(c) – Other Relevant Matters

Ngāti Rangi Taiao Management Plan 2014

The Taiao Management Plan outlines the issues, objectives, policies and rules that have been developed to provide clarity and structure to the Ngāti Rangi approach to environmental management. Ultimately it provides a framework by which Ngāti Rangi can actively fulfil their role as tāngata tiaki, providing Ngāti Rangi with an avenue for continued participation in the resource consent process and involvement in the wider environmental policy and planning arena. It has been endorsed by the Ngāti Rangi Trust (the iwi authority) and Te Kāhui o Paerangi (the iwi rūnanga).

Of specific relevance to this application are those matters identified in the Taiao Management Plan ascribed to Tangaroa-i-te-wai-māori - the embodiment of freshwater within the region - specifically water quality, point and non-point source discharges and stormwater. These matters are reproduced in Tables 5, 6 and 7, respectively, along with a corresponding response to each.

Table 5. Taiao Management Plan water quality issues, objectives, policies and rules.

Category	Ngāti Rangi concerns and expectations	Response to concerns
Issues	Water quality is impacted by point source discharges and leaching and run-off from urban areas and rural sources. Parameters affecting water quality include phosphorus and nitrogen (and the resulting increase in algal growth), sediment, effluent, heavy metals, bacteria, organic inputs and hydrocarbons. Abstractions also impact on water quality through loss of dilution factors. Water quality is linked to the mouri of our rivers and streams.	Each parameter identified by Ngāti Rangi as affecting water quality (excluding hydrocarbons) has been monitored as part of WPI's monitoring programme, with results summarised in terms of compliance (Section 3.3) and effects (Section 6). Ngāti Rangi has been involved in WPI's water quality monitoring and the results via the terms of the Environmental Agreement between these parties.
Objective	Water flowing out of our region will be clean and healthy, to ensure Ngāti Rangi's obligations to our downstream whānau are met.	

Category	Ngāti Rangi concerns and expectations	Response to concerns
Policies	4.1.1. Water quality in the Ngāti Rangi rohe must be swimmable and fishable at all times, unless it is naturally unswimmable. 4.1.2. Ngāti Rangi aims to be involved in all water quality monitoring in our region.	Because of its volcanic origin, the upper Whangaehu River is naturally unswimmable and does not support fish life due to its acidity. The effects assessment for this application has taken a cumulative, or 'add to background' approach.
Rules	4.1.1.1. No resource consent shall be granted that renders a water body unswimmable or unfishable, including resource consents that contribute to cumulative effects on swimming quality or fishability, or takes that impact on water quality.	

Table 6. Taiao Management Plan point, non-point source discharge issues, objectives, policies, rules.

Category	Ngāti Rangi concerns and expectations	Response to concerns
Issues	Protection of the mouri and the ecological values of individual waterways is a priority for Ngāti Rangi. Discharges can impact on the ability of the waterway to undertake its role in supporting the life contained within and around it. In the Ngāti Rangi rohe, discharges include agricultural and horticultural run-off, vegetable washing, storm water, industrial discharges, hydro-generation discharges and effluent discharges. Some of these are treated; others are not. Coupled with specific treatment systems to remove contaminants, passing wastewater through Papa-tū-ā-nuku can be a culturally acceptable means to cleanse discharges.	On face-value, the continuation of the WPI discharges that are the subject of this application are inconsistent with the Ngāti Rangi objectives, policies and rules regarding point and non-point source discharges. However, Ngāti Rangi acknowledge that "*some kaupapa are aspirational, and will require time to be fulfilled*". Prior to the exceptional circumstances that resulted in the closure of the pulp mill, WPI had been actively investigating alternative treatment and discharge options for the WWTP discharge, including options that involved passing the wastewater through Papa-tū-ā-nuku and options that involved internal reuse (see Section 4). With the pulp mill now closed, any investment in treatment upgrades or alternatives is no longer financially viable in the short term. WPI is applying for a short-term permit for these discharges in their current state to reflect the longer-term aspiration for improvement.
Objective	There are no discharges (either point source or non-point source) that impact on water quality. Land is utilised throughout the region as an added measure of purification for wastewater prior to any discharge into waterways.	
Policies	4.2.1. Ngāti Rangi does not support dis-charge to water. 4.2.2. However, some discharges may be considered in exceptional circumstances. Any discharges agreed to by Ngāti Rangi will: a. Pass through land or a wetland prior to release to water; and b. Be high quality, free from contaminants, not contribute to cumulative impacts nor have any effect on the waterbody and its mouri. 4.2.3. There should be no impact on the mouri and ecology resulting from point or non-point source discharges to water. Neither should there be any stress to aquatic species through algal blooms, temperature increases, or contaminants contributed by discharges.	
Rules	4.2.1.1. In general, discharge consents to water should not be granted.	

Category	Ngāti Rangi concerns and expectations	Response to concerns
	4.2.2.1. Any discharge consents that are granted must: a. Not impact upon the mouri of the waterbody; b. Have no impact on the receiving waterbody (as opposed to less than minor effects); c. Not contribute to cumulative effects; and d. Pass through Papa-tū-ā-nuku.	

Table 7. Taiao Management Plan stormwater issues, objectives, policies, rules.

Category	Ngāti Rangi concerns and expectations	Response to concerns
Issues	Storm water carries a large array of con-taminants. These include fertilisers, detergents, heavy metals, bacteria, hydrocarbons and sediment. Contaminants originate from roads, carparks, industrial sites and domestic properties. In most cases, storm water is not treated before it enters waterbodies. Further-more, during high rainfall events current storm water systems transport large volumes of water quickly to streams and rivers, causing rapid increases in water levels. This has negative effects on native fish species, plants and bank stability. When not separated from sewage lines, storm water also impacts the ability of treatment plants to process sewage	While the stormwater component of the proposed WPI discharge is not utilised as a resource, it is otherwise generally consistent with the Ngāti Rangi objectives, policies and rules relating to stormwater: the stormwater is captured (retained at source) and combined with the site wastewater in the WWTP - this enables the stormwater to be treated for contaminants and attenuates the stormwater flow. As noted above, alternative options including internal reuse were under investigation by WPI prior to the pulp mill closure.
Objective	Stormwater is captured and treated, and where possible utilised as a resource. When released to streams, it is released in a manner aligned with natural flow regimes.	
Policies	4.3.1. The management of storm water in the region needs to be such that: a. rainwater is collected and utilised (eg for irrigation of city and town gardens, use for private gardens, toilet flushing and clothes washing etc.) b. storm water is able to be retained at source so that the rate of discharge is attenuated c. storm water treatment areas are created (eg constructed wetlands in urban streets, pooling areas in parks and on farms, etc) d. any storm water dis-charged to waterbodies is of a high quality and not contaminated with sediment, heavy metals, bacteria or other pollutants.	
Rules	4.3.1.1. Resource consents for storm water will ensure that storm water: a. Is captured, treated and, where possible, utilised; b. Discharges are high in water quality; and c. Releases mimic natural flow regimes.	

Value of the investment of the consent holder

When considering this application, the consent authority must have regard to the value of the investment of WPI, which includes the previous discharges to the Whangaehu River.

The economics assessment included as Appendix E states that what exists at the site today represents a significant capital investment by WPI, but the actual value is commercially sensitive. As an example of the significance of the existing investment in the site, there has been over $10 million spent on equipment upgrades in the last five years. This includes $5 million for a new drum debarker and $5 million for a new bale forming press. Securing a consent for ongoing discharges for the site, albeit for a relatively short duration and with the conditions that the previous pulp mill operation may have had difficulty complying with, would protect some of that investment (at least in the short-term).

10.5 Sections 105 and 107 Assessments - Matters Relevant to Discharge Applications

In addition to the matters which a consent authority must have regard to under section 104, section 105 of the RMA sets out additional matters which must be considered when considering discharge applications. Section 105 states:

> *(1) If an application is for a discharge permit or coastal permit to something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to-*
>
> *(a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
>
> *(b) The applicant's reasons for the proposed choice; and*
>
> *(c) Any possible alternative methods of discharge, including discharge into any other receiving environment.*

With regard to clause 1(a) above, Section 3 describes the natures of the discharges and Section 2 describes the values of the Whangaehu River which are sensitive to adverse effects. In particular, the river is sensitive to point-source discharges which can impact on the mouri of the river. The river is also sensitive to changes in colour as the colour of the river is a notable aesthetic feature as discussed in Section 6.4.2. Due to the natural characteristics of the river, its sensitivity to other impacts (e.g., impacts on aquatic ecology) is limited.

As discussed in Section 4, WPI was working towards a closed loop system, where no water take or discharge was required. As an interim step towards that, the preferred option was to implement significant upgrades to the wastewater treatment quality. These improvements would have gone some way to addressing impacts on the mouri and colour of the river. The upgrades would have also addressed issues with foaming and reduced nutrient loads to the river. Because these upgrades are no longer feasible or necessary because of closure of the pulp mill, these impacts will continue for short term (i.e., five years), with the proposed consent conditions (if a discharge occurs), while a new owner is found for the site.

With regard to clause 1(c), Section 4 includes an assessment of alternative methods to discharge the treated wastewater and stormwater. For the reasons noted in this section and in Section 9, providing for proposed discharges to the current receiving environment is the only feasible option available to WPI in the short-term while a new owner is found for the site.

Section 107(1) of the RMA specifies certain circumstances in which the consent authority shall not grant a discharge permit:

> *If after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*
>
> *(c) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials*
>
> *(d) any conspicuous change in the colour or visual clarity*
>
> *(e) any emission of objectional odour*
>
> *(f) the rendering of fresh water unsuitable for consumption by farm animals*
>
> *(g) any significant adverse effects on aquatic life*

However, section 107(2) of the RMA further states that:

> *A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A that may allow any of the effects described in subsection (1) if it is satisfied—*
>
> *(a) that exceptional circumstances justify the granting of the permit; or*
>
> *(b) that the discharge is of a temporary nature; or*
>
> *(c) that the discharge is associated with necessary maintenance work—*
>
> *and that it is consistent with the purpose of this Act to do so.*

The proposed discharges will not give rise to the effects listed in clauses (e), (f) and (g) of section 107(1) of the RMA after reasonable mixing.

As discussed in Sections 6.4.2 and 6.4.3, there have been occasions when there was a change in colour and visibility between sites upstream and downstream of the discharge. At times, i the change was likely conspicuous, however, not outside t the range naturally observed upstream of the river, reducing the potential impacts on visual amenity. The impact of any changes in colour or clarity on the river's ecological function is assessed as being minimal because of the natural characteristics of the river.

As discussed in Section 6.4.4, foam naturally occurs in the river above the discharge, but at times there has been an increase in foam below the discharge compared to that upstream. Foam downstream of the site is patchy and temporary. The existence of foam naturally in the river, and the use of antifoam reduces the impacts of foam caused by the discharge.

As discussed in Section 4, these effects can only be addressed through significant and costly upgrades to the WWTP if operations recommence similar to those that have occurred at the site until recently. For financial and practical reasons (i.e. because the pulp mill is not operating), these improvements cannot be implemented in the short-term. However, WPI propose to retain and comply with the existing limits in the consent conditions for colour, visibility and foaming, noting that any purchaser of the site would need to comply with those conditions should a discharge from the site occur. Compliance will be achieved by ensuring the WWTP can compliantly treat any wastewater, either by changing production practices and or changing the treatment applied. Compliance with the existing consent conditions mean the discharge will also meet clauses (c) and (d) of section 107(1) of the RMA after reasonable mixing.

Despite the above, and out of abundance of caution, it is considered the temporary discharge of treated wastewater and stormwater would meet the requirements of section 107(2) clause (a) and clause (b).

The proposed discharges are temporary in that they are proposed to occur for a relatively short period of five years while a new owner is found for the site.

The RMA does not provide any definition or further guidance as to what may constitute exceptional circumstances that trigger section 107(2)(a) of the RMA. However, case law[24] has determined that "*As circumstances and technology change so will the application of what constitutes 'exceptional circumstances' in any given case*". In that case, the court found that there were several factors, when taken together, amounted to exceptional circumstances.

Similarly, in this case, a combination of factors creates exceptional circumstances justifying consent for the discharge of treated wastewater, stormwater and antifoam into the Whangaehu River, should any effects identified in section 107(1) be considered likely. These factors include:

- The naturally low water quality of the upper reaches of the Whangaehu River (as a result of Crater Lake discharges), and consequentially low ecological and recreational values of the river.
- The cost of treatment technology to address key compliance issues (i.e., colour, visibility and foaming) was significant. This was a commitment that WPI was prepared to make until September 2024 when a decision was made to close the mill.
- The investment of WPI in the site is substantial. While the actual value of the site is not documented in this application due to commercial sensitivities, the relatively recent investment of $10 million in capital upgrades provides an indication of the value of the site. The provision of a short-term discharge consent maximises the ability of WPI or a future owner to fully utilise the value of that investment.
- The pulp mill's closure was driven, in part, by a sharp rise in wholesale electricity prices, which increased from $200/MWh in March 2024 to nearly $450/MWh by August, before spiking to $800/MWh. Sustained high prices throughout August 2024 made continued operation uneconomic, reflecting exceptional circumstances caused by environmental, economic, and regulatory factors.
- While central government is working to address the long-term drivers of high wholesale electricity prices, normalisation of energy costs is expected to take two to four years[25].
- Before its recent closure, the site played a significant economic role locally and nationally, contributing $92 million in regional GDP per annum and supporting 583 jobs, with a broader national impact of $279 million and 1,883 jobs. A discharge consent is likely essential to restoring these socio-economic benefits.
- Uenuku has advised that "*the proposed programme for consenting/management of the closure of the WPI pulp mill and sawmill are consistent with the values of Te Waiū o Te Ika.*"

For completeness, as discussed further below, on balance it is considered that granting WPI's application for a short-term of five years would be consistent with the sustainable management purpose of the RMA, particularly having regard to the positive social and economic benefits that will arise from enabling the continued operation of the WPI pulp mill.

[24] Marr v Bay of Plenty RC [2010] NZEnvC 347

[25] Government Briefing Paper, 28 August 2024, prepared by OjiFS, Pan Pac and WPI.

10.6 Part 2 of the RMA

It is understood that a consent authority is generally no longer required to consider Part 2 of the RMA beyond its expression in the relevant statutory planning documents, unless it is appropriate to do so. However, for completeness and in accordance with schedule 4(2)(1)(f) of the RMA, Part 2 of the RMA is considered below.

The purpose of the RMA is to provide the sustainable management of natural and physical resources. In this regard, allowing the discharge of treated wastewater, stormwater and antifoam, to the Whangaehu River in their existing form for a short-term will support the sale process for the site, providing for future sustainable use of the existing infrastructure associated with the existing site (e.g. rail line, substation).

Overall, it is considered that the proposed discharges to the Whangaehu River will promote the sustainable management of natural and physical resources in accordance with Part 2 of the RMA as it will support the potential for future positive socio-economic effects for the region that would result from the sale of the site and re-establishment of (as yet to be determined) industrial activities on site.

The proposed discharges to the Whangaehu River will also adequately avoid, remedy or mitigate any potential effects such that the sustainable management purpose of the RMA is achieved.

10.7 Summary

Overall, it is considered that the granting of the resource consent, subject to the imposition of appropriate conditions, would promote the sustainable management of natural and physical resources and ensure that adverse effects on the environment are adequately avoided, remedied or mitigated.

11 NOTIFICATION ASSESSMENT

11.1 Introduction

The consent authority is required to consider whether the application should be subject to public, limited or non-notification in accordance with sections 95A-E of the RMA. An assessment of this is set out in the sections below.

11.2 Section 95A Public Notification

Whether the application should be publicly notified has been assessed as follows, according to section 95A of the RMA:

Step 1 – Mandatory Public Notification:

- WPI does not request public notification of the application (s95A(3)(a)); and
- Public notification is not required under section 95C (95A(3)(b));
- The application does not include an application for the exchange of recreation reserve land (s95A(3)(c)).

The application is not subject to mandatory public notification (95A(2)).

Step 2 – Public Notification Precluded:

- The application is not subject to a rule or national environment standard that precludes public notification (95A(5)(a)); and
- The application is not for an activity listed in section 95A(5)(b).

Public notification is not precluded under section 95A(4).

Step 3 – Public Notification in Certain Circumstances:

- The application is not subject to a rule or national environmental standard that requires public notification (95A(8)(a)); and
- The activity will not have adverse effects on the environment that are more than minor (95A(8)(b)).

Public notification of the application is not required under section 95A(7).

Step 4 – Public Notification in Special Circumstances:

- No special circumstances requiring public notification apply to the application in regard to section 95A(9).

Given the above, public notification is not required. The need or otherwise for limited notification must be considered under 95B. That consideration is below.

11.3 Section 95B Limited Notification

Section 95B(1) of the RMA requires a consent authority to determine whether to give limited notification of a resource consent application if an application is not publicly notified under Section 95A. This has been considered according to Section 95B of the RMA as follows:

Step 1 – Certain Affected Groups and Affected Persons Must Be Notified:

- Ngāti Apa hold a statutory acknowledgement for the Whangaehu River. However, the upstream extent of it lies about 60 km below the site. Given the distance to the Statutory Acknowledgment Area downstream, and less than minor effects on their value, they are not considered an affected party. In addition, they have not historically been an interested party in the site.

Step 2 – If Not Required by Step 1, Limited Notification Precluded in Certain Circumstances:

- The application is not precluded from limited notification (s95B(6)).

Step 3 – If Not Precluded by Step 2, Certain Other Affected Persons Must Be Notified:

- The proposal is not a boundary activity.

The application therefore falls into the 'any other activity' category and the effects of the proposed discharge of treated wastewater, stormwater and antifoam to the Whangaehu River on any persons are assessed in accordance with section 95E of the RMA below.

Step 4 – Further Notification in Special Circumstances

- No special circumstances exist that warrant notification of the application to any other persons (s95B(10)).

11.4 Assessment of Effects on Persons

According to Section 95E of the RMA, a person is an affected person if the activity's adverse effects on the person are minor or more than minor (but are not less than minor).

As discussed in section 2 Ngāti Rangi and Uenuku both have an interest in the Whangaehu River and both are best placed to advise whether the potential impacts on their values are less than minor, minor or more than minor. For this reason, it is appropriate that the application be limited notified to both of these parties.

11.5 Notification Conclusion

In accordance with the assessments under s95A and s95B of the RMA above, the application should be limited notified to Ngāti Rangi and Uenuku.

12 CONCLUSION

The proposed five-year renewal of Discharge Permit 103909 reflects a pragmatic approach to managing site operations following the closure of WPI's Karioi pulp mill. By maintaining existing Permit conditions while introducing provisions for notification and potential treatment upgrades, the proposal ensures that any future industrial activities remain within established environmental limits.

An assessment of environmental effects has determined that potential effects on water quality, hydrology, and ecological health are expected to be minor. Furthermore, the proposal is not expected to adversely impact the relevant One Plan management values ascribed to the Whangaehu River. From a cultural and socio-economic perspective, the proposal acknowledges the concerns of mana whenua, such as Uenuku and Ngāti Rangi, while supporting the transition to new industrial uses that may generate employment and economic benefits for the region. The short-term nature of the consent allows for flexibility in determining long-term wastewater management solutions, ensuring that any future site operations meet regulatory requirements and align with community expectations.

Overall, this renewal facilitates responsible site stewardship while providing an opportunity for economic revitalization through potential new ownership and industrial activity.

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Appendix A
Discharge Permit 2010011593.01

Consent Conditions for Discharge Permit, Water (Change of Consent Conditions) - APP-2006012018.01
Winstone Pulp International Limited (Ohakune)

Condition Schedule

Descriptive Specification – ATH-2010011593.01

1. The Consent Holder shall undertake the activity in general accordance with the consent application, including all accompanying plans and documents first lodged with the Manawatū-Whanganui Regional Council being:

    a. the original application and Assessment of Environmental Effects, prepared by Kingett Mitchell Ltd, dated November 2006;

    b. a response to section 92 request dated 11 August 2009, prepared by Golder Associates (NZ) Limited on behalf of Winstone Pulp International (WPI), and attached documents;

    c. letters / technical memorandums, prepared by Golder Associates (NZ) Limited on behalf of WPI, dated 1 September 2009, 9 November 2009 and 26 February 2010;

    d. addendum to the Assessment of Environmental Effects, prepared by Golder Associates (NZ) Limited, dated December 2009 (Addendum);

    e. the application for a variation of consent conditions lodged on 18 June 2021;

    f. further information provided on 3 September 2021 being in response to a s92 request for additional information; and

    g. further information provided on 2 November 2021 being withdrawing the application amendment to condition 20 and clarifying amendments regarding $scBOD_5$.

    Where there may be inconsistencies between information provided by the Applicant and conditions of the resource consent, the conditions of the resource consent apply.

    ADVICE NOTE: Any variance from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991.

    [Condition 1 amended as per decision APP-2006012018.01 dated [13 September 2022]]

2. The activities authorised by this discharge permit shall be limited to the discharge of:

    a. Treated pulp mill effluent not exceeding a rate of 5,200 m^3/day.

    b. Antifoam inhibitor not exceeding a rate of 125 L/day (at a maximum rate of 3 mL/second).

    This consent does not authorise the discharge of treated or untreated human wastewater.

Treated Pulpmill Wastewater Discharge

3. The discharge of treated pulp mill effluent to the Whangaehu River, shall occur at or about map reference NZMS260 T20:323-903 (NZTopo50 BJ34:223-286; NZTM 1822233E, 5628706N) as shown on **Plan A**.

Antifoam Inhibitor Discharge

4. The antifoam utilised will be an antifoam agent that has a toxicity that is equal to or less than the antifoam agent NALCO F3610. The discharge of antifoam inhibitor shall occur at about map reference NZMS260 T20:317-902 (NZTopo50 BJ34:217-286; NZTM 1821677E, 5628545N) as shown on **Plan A**.

[Condition 4 amended as per decision APP-2006012018.01 dated [13 September 2022]]

4A. **Within three months** of commencement of APP-200612018.01, the Consent Holder must undertake and provide a desktop assessment of the toxicity of the antifoam agent used. The assessment must be completed by a suitably qualified and experienced independent party and provided to the Consents Monitoring Team and the Ngā Waihua o Paerangi Trust.

ADVICE NOTE: The Consent Monitoring Team can be contacted on 0508 800 800 or consents.monitoring@horizons.govt.nz. Please specify the reference **ATH-2010011593.01/APP-2006012018.01** in any correspondence.

ADVICE NOTE: The Ngā Waihua o Paerangi Trust can be contacted on 0800 672 644.

[Condition 4A amended as per decision APP-2006012018.01 dated [13 September 2022]]

4B. Any change to the antifoam agent used under condition 4, requires the Consent Holder to repeat the requirements of condition 4A.

[Condition 4B amended as per decision APP-2006012018.01 dated [13 September 2022]]

5. The Consent Holder shall record the date, time and duration the antifoam is discharged and the volume of antifoam inhibitor used during each discharge period. The records shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Protection Manager on a monthly basis.

Treatment Plant Upgrade

6. The Consent Holder shall upgrade its wastewater treatment plant in general accordance with sections 4 and 5 of the Addendum to the Assessment of Environmental Effects to improve the level of treatment of its effluent. The following sets out the timeframes for installation and commissioning:

    a. The Consent Holder shall construct its upgraded wastewater treatment plant within 14 months of the granting of the consent. The commissioning of the new plant shall be completed within three months of construction being complete.

Cultural Health Indicators

7. The Consent Holder shall develop a monitoring regime using Ngati Rangi cultural health indicators for the Whangaehu River. This monitoring regime shall be implemented within 24 months of the

granting of this consent. A copy of the monitoring regime shall be provided to the Environmental Protection Manager - Manawatū-Whanganui Regional Council.

Advice Note: The Consent Holder should collaborate with Ngati Rangi Trust to develop and implement the monitoring regime.

Monitoring of Effluent

8. The Consent Holder shall measure and record the daily wastewater volume discharged to the Whangaehu River. The flow meter(s) used to measure and record the wastewater volume shall be calibrated to an accuracy of +/- 5% or better. The wastewater volume records shall be transferred daily to the Manawatū-Whanganui Regional Council via telemetry in a format compatible with the Regional Council's telemetry system.

9. The Consent Holder shall have the effluent flow meter calibrated annually by an authorised and certified contractor which confirms that the flow meter is accurate to within +/- 5% or better. This calibration shall be completed with the meter in-situ to ensure that the calibration takes into account any variability due to its location and installation. The calibration certificate shall be provided to the Manawatū-Whanganui Regional Council's Environmental Compliance Manager by **30 June** each year commencing in **30 June 2010**.

10. For the duration of the consent, the Consent Holder shall collect a daily 24 hour composite sample of the discharge (using a continuous sampling device). Five of the seven samples collected weekly shall be analysed for:

    a. ~~soluble carbonaceous biochemical oxygen demand (5 days) (soluble cBOD5~~);
    b. total Chemical Oxygen Demand;
    c. total Suspended Solids (TSS); and
    d. pH.

    The results shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Protection Manager on a monthly basis.

    [Condition 10 amended as per decision APP-2006012018.01 dated [13 September 2022]]

11. Within one year of the upgraded wastewater treatment plant's completed commissioning the discharge shall not cause at or downstream of the Tangiwai Rail Bridge the Escherichia coli (E.coli) concentration in the Whangaehu River to exceed the following:

    a. The concentration of E.coli when the River flow is at or below median flow shall not exceed 260 per 100 millilitres during the period 1st November to 30th April inclusive; and

    b. The concentration of E.coli when the river is at or below three times median flow shall not exceed 550 per 100 millilitres. This standard applies year round.

12. Post upgrade of the wastewater treatment plant, the Consent Holder shall implement on a monthly basis a monitoring programme for the effluent. The programme shall include the collection of one 24 hour composite sample of the daily discharge (using a continuous sampling device) and analysis to provide the following parameters:

a. Total carbonaceous biochemical oxygen demand (5 days) ($TcBOD_5$);
b. Soluble $cBOD_5$;
c. TSS;
d. Volatile Suspended Solids (VSS);
e. Total Ammoniacal Nitrogen (NH4-N);
f. Soluble Inorganic Nitrogen (SIN);
g. Total Phosphorus (TP);
h. Total Nitrogen (TN);
i. Dissolved Reactive Phosphorus (DRP);
j. pH;
k. Total sulphide;
l. Turbidity; and
m. E. coli.

Monthly samples must be analysed by an International Accreditation New Zealand (IANZ) accredited laboratory.

The results shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Protection Manager on a monthly basis.

13. Within 12 months of the upgraded wastewater treatment plant's completed commissioning the Consent Holder shall undertake an assessment of the toxic effects of total tannins in the effluent discharge on the Whangaehu River's aquatic life. This assessment shall be provided to the Manawatū-Whanganui Regional Council's Environmental Protection Manager.

Monitoring of Receiving Water

14. Prior to the upgrade of the wastewater treatment plant, the Consent Holder shall monitor the following parameters once per month in the Whangaehu River approximately 50 metres upstream of the discharge and at the Tangiwai Memorial, downstream of the discharge (as per attached **Plan A**):

a. Horizontal visibility;
b. TSS;
c. Soluble $cBOD_5$; and
d. pH.

Monthly samples must be analysed by an IANZ accredited laboratory.

The results shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Compliance Manager on a monthly basis.

Advice Note: When horizontal visibility is below 0.5 m a clarity tube from a SHMAK kit should be used to measure horizontal visibility.

15. Post upgrade of the wastewater treatment plant the Consent Holder shall monitor to provide the following parameters once per month in the River approximately 50 metres upstream of the discharge and at the Tangiwai Memorial downstream of the discharge (as per attached Plan A):

a. $TcBOD_5$;
b. Soluble $cBOD_5$;
c. TSS;
d. VSS;
e. TNH4-N;
f. SIN;
g. TP;
h. TN;
i. DRP;
j. pH;
k. Total sulphide;
l. Temperature;
m. Total tannins;
n. Turbidity;
o. *E. coli*; and
p. Horizontal visibility.

Monthly samples must be analysed by an IANZ accredited laboratory.

The results shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Protection Manager on a monthly basis.

Advice Note: When horizontal visibility is below 0.5 m a clarity tube from a SHMAK kit should be used to measure horizontal visibility.

16. On each sampling occasion, undertaken under **Conditions 14 or 15**, the Consent Holder shall record the following:

    a. Presence and Heterotrophic Abundance Level (HAL) of bacterial and/or fungal slime growths visible to the naked eye as plumose growths or mats as viewed from the River bank.

    b. Presence and percentage cover of conspicuous scums, foams, floatable or suspended material of the water surface at any point.

    c. Objectionable odour.

    d. Hue, measured on the Munsell scale.

    Advice Note: An odour will only be considered objectionable, after a Manawatū-Whanganui Regional Council officer has considered the Frequency, Intensity Duration, Offensive and Location of the odour (i.e. the FIDOL Factors).

Discharge Loads Prior to the Upgrade of the Wastewater Treatment Plant

17. Prior to commissioning of the upgraded wastewater treatment plant, in accordance with Condition 6, the daily contaminant loads of the effluent as specified in Table A shall not be exceeded in more than 1 out of 20 consecutive samples

Table A: Discharge loads prior to upgrade.

Parameter	Load (kg/day) 7 day rolling average
Total $cBOD_5$	9,500
Soluble $cBOD_5$	5,000
TSS	2,000

Receiving Water Standards Prior to the Upgrade of the Wastewater Treatment Plant

18. Prior to the commissioning of the upgraded wastewater treatment plant, in accordance with **Condition 6**, the discharge shall not cause the following at or downstream of the Tangiwai Railway Bridge:

    a. A reduction in horizontal visibility by more than 50 %.
    b. A change in hue no greater than 10 points on the Munsell scale.

Effluent Quality Post Upgrade

19. Post upgrade treated wastewater shall meet the following standards:

    a. The daily load of $TcBOD_5$ shall not exceed 850 kg/day.
    b. The daily load of soluble $cBOD_5$ shall not exceed 570 kg/day.
    c. The daily load of TSS shall not exceed 2,200 kg/day.
    d. The daily load of DRP shall not exceed 18 kg/day.
    e. The daily load of SIN shall not exceed 44 kg/day.
    f. The daily load of total sulphide shall not exceed 485 g/day.

    ADVICE NOTE: Soluble $cBOD_5$ loads shall be calculated by Soluble $cBOD_5$ load (kg/day) = 0.04*TCOD (g/m^3)*Flow (m^3/day)/1000 g/kg

[Condition 19 amended as per decision APP-2006012018.01 dated [13 September 2022]]

Receiving Water Limits Post Upgrade of the Wastewater Treatment Plant

20. Post commissioning of the upgraded wastewater treatment plant, in accordance with **Condition 6**, the following water quality limits in Table B shall apply as a result of the exercise of this consent, in the Whangaehu River at any point at or downstream of the Tangiwai Railway Bridge. The Consent Holder shall comply with these limits 100 % of the time over the monitoring year.

Table B: Receiving water limits post upgrade to be complied with 100% of the time.

	Parameter	Limit (g/m^3)
1	Horizontal visibility (m)	Horizontal visibility shall not be reduced below 20 % of the value at the upstream site.

2	Hue	A change in hue between the upstream monitoring site and at or downstream of the Tangiwai Rail Bridge of greater than 15 points on the Munsell scale.
3	Bacterial and / or fungal slime growths visible to the naked eye as plumose growths or mats	Growths to the naked eye shall be less than a HAL of 4.
4	Presence and percentage cover of conspicuous scums, foams, floatable or suspended material	No presence of conspicuous scums, foams, floatable or suspended material.
5	Odours	No emission of objectionable odour from the wastewater.
6	Periphyton cover as filamentous algae more than 2cm long	The maximum cover of visible stream or riverbed shall not exceed 30%.
7	Periphyton as diatoms or cynobacteria more than 0.3cm thick	The maximum cover of visible periphyton as diatoms or cynobacteria more than 0.3cm thick shall not exceed 60%.

ADVICE NOTE: HAL scale is derived from Quinn and McFarlane (1985) as per the following table:

Observation	**Heterotrophic Abundance Level (HAL)**
Not visible on hand held stones.	0
Visible on hand held stones, but not visible on the bed.	1
Strands visible on bed, no frond units (= 1cm length of growth).	2
Isolated fronds visible.	3
Growths common.	4
Growths abundant.	5
Growths covering all surfaces.	6

ADVICE NOTE: It is considered that compliance with the above parameters in Table B will ensure that no significant adverse effects on aquatic life in the Whangaehu River will occur, while also taking into account the unique characteristics of the Whangaehu River resulting from volcanic activity from Mt Ruapehu's Crater Lake.

21. The Consent Holder shall prepare a HAL monitoring manual which clearly describes the visual state of heterotrophic growths in the River for each HAL level (1 to 6). This shall be provided to the

Manawatū-Whanganui Regional Council's Environmental Protection Manager for review on completion of commissioning of the upgraded treatment plant, no later than 31 December 2011.

22. In the event of an analytical result for any sample taken in accordance with Conditions 10, 12, 14, 15 and 16 that does not comply with the limits specified in Conditions 17, 18, 19 and 20 then the following action shall be taken:

    a. The Consent Holder shall upon receipt of the results, investigate the possible cause of the exceedence and within one week of the result, the Consent Holder shall notify the Manawatū-Whanganui Regional Council's Environmental Protection Manager of the exceedence, with a written comment outlining mitigation measures taken and if required, further proposed measures to remedy the problem and comment whether this exceedence will affect the Consent Holder's ability to achieve 100 % compliance over the period specified in Condition 20; and

    b. Within one week of the exceedence result, the Consent Holder shall resample the effluent and/or River water in accordance with Conditions 10, 12, 14, 15 and 16 (whichever the exceedence applied to) and shall forward the analysis result to the Manawatū-Whanganui Regional Council's Environmental Protection Manager within one week of its receipt.

Monitoring

23. The Consent Holder shall ensure that the monitoring required under this consent be undertaken by suitably qualified people.

24. All wastewater and river water quality analysis shall be undertaken by an appropriately accredited laboratory and all methodologies adopted shall be appropriate for either wastewater or river water analysis and the soluble cBOD5 shall be GF/C filtered.

25. Post commissioning of the upgraded wastewater treatment plant, in accordance with **Condition 6**, the Consent Holder shall engage a suitably qualified ecologist to undertake the following monitoring:

    a. Visual monitoring of sewage fungus and filamentous algae cover at established transects four times per year following an accrual period of no less than 20 days. Two monitoring events must be separated by a minimum of 2 weeks. An accrual is defined as no river flow in exceedence of three times the calculated median flow at the Tangiwai recorder occurring during this period. A minimum of four transects shall be established at each monitoring site and monitored on each monitoring occasion. Three monitoring sites shall be established 50 m to 500 m upstream of the discharge point, at or near the Tangiwai Memorial and at a point located approximately 15 km downstream of the discharge point (site D3 as per Plan A). The visual monitoring methods shall follow the protocols outlined in Appendix 2 of "A periphyton monitoring plan for the Manawatū-Whanganui Region" (Kilroy et al. 2008). Reported estimates shall include:

        i. Percentage cover of visible river bed by bacterial and/or fungal growths (sewage fungus) visible to the naked eye;

        ii. HAL on visible river bed;

iii. Percentage cover of visible river bed by filamentous algae more than 2 cm long;

iv. Percentage cover of visible river bed by diatoms or cyanobacteria mats more than 0.3 cm thick; and

v. Mean daily flow records from the Tangiwai flow recorder site for the 20 days period preceding the survey".

b. Collection of a periphyton sample on one occasion during February to May each year, at the same established monitoring sites and transects as defined in Condition 25(i), following an accrual period of no less than 20 days. An accrual period is defined as no river flow in exceedence of 3* the calculated median flow at the Tangiwai recorder occurring during this period. The collection of periphyton samples shall follow the protocols outlined in Appendix 3 of "A periphyton monitoring plan for the Manawatū-Whanganui Region" (Kilroy et al. 2008). Reported estimates shall include:

i. Mean periphyton biomass as Ash-free dry mass (AFDM, g/m2);

ii. Mean periphyton biomass as Chlorophyll a (mg Chlorophyll a/m2);

iii. Heterotrophic Index; and

iv. Mean daily flow records from the Tangiwai flow recorder site for the 20 days period preceding the survey.

The Consent Holder shall forward a comprehensive report on these surveys to the Manawatū-Whanganui Regional Council's Environmental Protection Manager by 30 June each year.

25a. Visual monitoring and periphyton sampling required under Condition 25 shall continue until such time as 3 years of continuous compliance with parameters 3, 6 and 7 in Table B Condition 20 is achieved. At that time monitoring frequency will then reduce to once every 5 years for the duration of the consent. However, should non-compliance occur, the monitoring frequency specified under Condition 25 (yearly monitoring) shall recommence until 3 years of continuous compliance is achieved.

26. The Permit Holder shall notify the Manawatū-Whanganui Regional Council's Environmental Compliance Manager within two working days of any non-compliance occurring or when it becomes certain that a breach of Permit Conditions is about to occur. For conditions requiring compliance with a particular Water Quality Standard, notification is required within two working days of receipt of the water quality analysis from the Laboratory.

27. The Consent Holder shall keep a complaint's register to record complaints relating to all discharges of contaminants authorised by this Permit.

The register shall include:

a. the details of the Complainant if given;

b. the location of where the contaminant, e.g. odour, was detected;

c. a description of wind speed and direction when the Complainant detected the alleged adverse environmental effect;

d. the date and time of the detection;

e. the most likely cause of the discharge detected; and

f. any corrective action undertaken by the Consent Holder to avoid, remedy or mitigate the adverse environmental effect detected by the Complainant.

A copy of details in the register shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Compliance Manager by **30 June** of each year for the term of this Discharge Permit, commencing 31 July 2010, or as otherwise requested by the Manawatū-Whanganui Regional Council's Environmental Compliance Monitoring staff.

River Flow Monitoring

28. Within three months of the granting of this permit, and every 12 months thereafter, the Consent Holder shall provide an estimate of basic flow statistics (including minimum flow, seven days mean annual low flow (MALF), mean flow, and median flow) for the Tangiwai flow recorder, based on the information available at the time.

    The flow statistics shall be provided to the Manawatū-Whanganui Regional Council's Environmental Compliance Manager by 30 June each year commencing in 30 June 2010.

29. The Consent Holder shall continuously (15 minute intervals) monitor flow in the Whangaehu River at or near the existing Tangiwai recorder site NZMS260 T20:317-901 (NZTopo50 BJ34:217-284; NZTM 1821652E, 5628416N). A minimum of 6 instantaneous gaugings shall be completed annually and gaugings shall be undertaken under a range of flow conditions to establish a valid rating curve. Monitoring is to continue for a minimum period of 5 years to provide a better understanding of low flow events in the River at the vicinity of the discharge.

    The River flow monitoring information shall be provided to the Manawatū-Whanganui Regional Council's Environmental Compliance Manager by 30 June each year commencing in 30 June 2010.

Annual Reporting

30. The Consent Holder shall prepare a comprehensive report summarising the monitoring undertaken from April to March each year in accordance with Conditions 7 to 29 of this consent. This report shall include:

    a. methods;

    b. summary monitoring data;

    c. analysis of compliance;

    d. actions taken for non-compliance;

    e. identification of downstream effects on the River and recommendations for avoiding or mitigating any adverse effects; and

f. summary of complaints received.

The Consent Holder shall forward a copy of the annual report to the Manawatū-Whanganui Regional Council's Environmental Protection Manager by 30 June each year and to the River Group.

Advice Note: Minimum participants in the River Group include: Andrew Sherratt, Ross Wallis and Christine Wallis and Ngati Rangi representatives.

Review

31. The Manawatū-Whanganui Regional Council may, under section 128 of the Act, initiate a review of all conditions of this consent in the month of July each year. The review shall be for the purpose of reviewing the effectiveness of the conditions in avoiding, remedying or mitigating any adverse effects on the environment, which may arise as a result of the exercise of this consent.

    The review may be necessary to:

    a. assess the adequacy of monitoring outlined in Conditions 10 to 29 of this consent; and

    b. assess the effectiveness of Conditions 10, 12, 14, 15 and 16 of this consent,

    in avoiding, remedying or mitigating adverse effects on the Whangaehu River.

    The review of conditions shall allow for the:

    a. modification of monitoring outlined in Conditions 10 to 29 of this consent;

    b. deletion or amendments to any conditions of this resource consent to ensure adverse effects are appropriately mitigated; or

    c. matters raised in an iwi management plan or in an Upper Whangaehu Catchment Management Strategy and/or Plan to be taken into account; and

    d. addition of new conditions as necessary, to avoid, remedy or mitigate any unforeseen adverse effects on the environment; or

    e. if necessary and reasonable the adoption of the best practicable options to avoid, remedy or mitigate any adverse effects on the environment.

    ADVICE NOTE: The review shall take account of any feedback provided to Council by the River Group.

Appendix B
Record of Title

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **WN17A/1248**
Land Registration District **Wellington**
Date Issued 08 February 1977

Prior References
PROC 218044.1

Estate Fee Simple
Area 40.6483 hectares more or less
Legal Description Section 3 Block XI Karioi Survey District
Registered Owners
Winstone Pulp International Limited

Interests

Appurtenant hereto are rights of way and telephone and airfield rights created by Transfer 676891.1 - 14.3.1985 at 9.27 am

Appurtenant hereto is a right to drain stormwater created by Transfer 676891.3 - 14.3.1985 at 9.27 am

Subject to a right of way (in gross) over part marked right of way and shown A on DP 57267 in favour of Her Majesty the Queen created by Transfer 719788.1 - 4.10.1985 at 1.43 pm

Appurtenant hereto are fresh water conveyance and contaminted effluent conveyance rights created by Transfer 719788.2 - 4.10.1985 at 1.43 pm

719788.3 Encumbrance to Her Majesty the Queen - 4.10.1985 at 1.43 pm

Appurtenant hereto is a right to convey water from Tokiahuru Stream and maintenance and electricity rights created by Transfer 997021.4 - 24.4.1989 at 2.14 pm

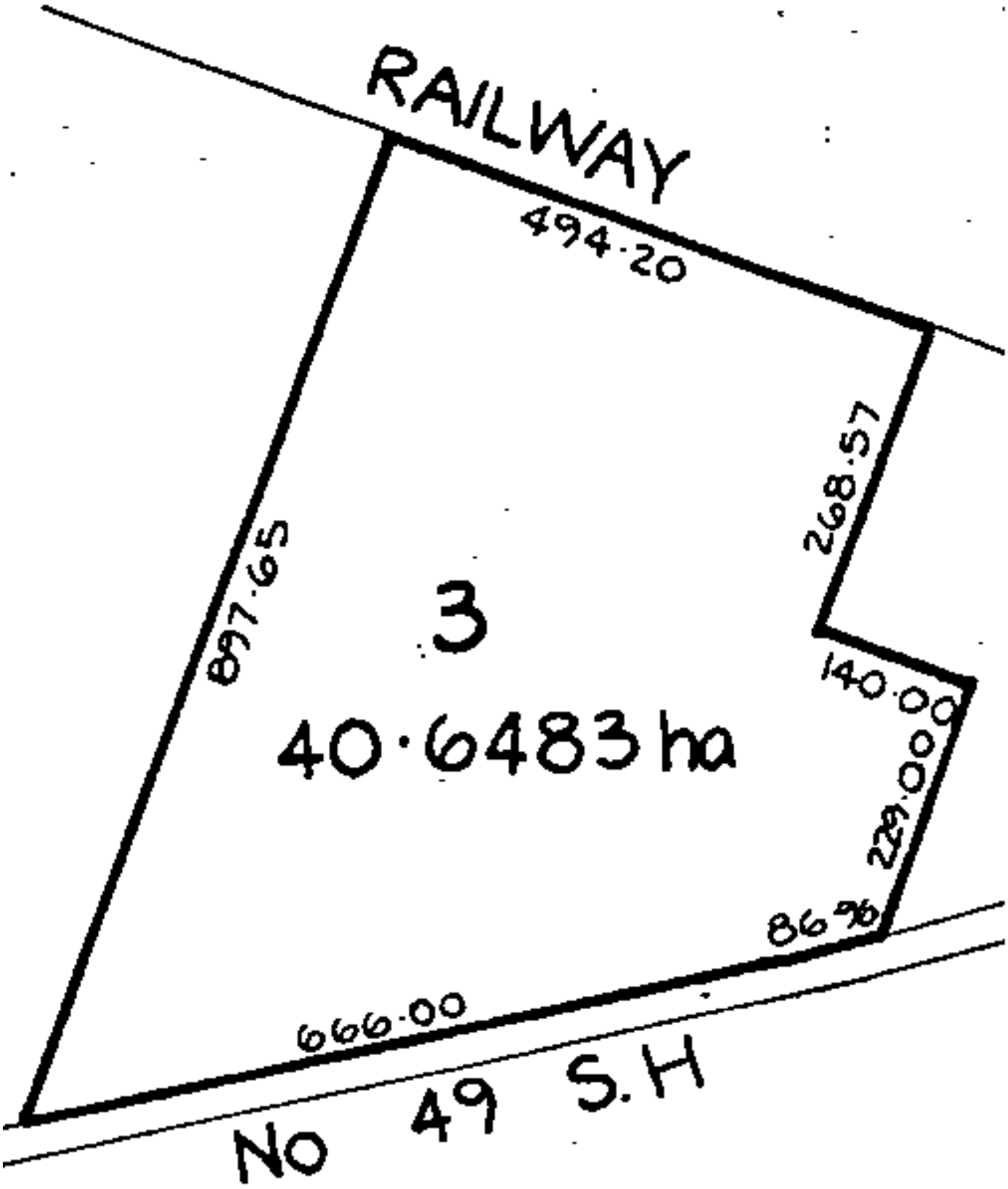
Subject to a telecommunication right (in gross) over part marked G on DP 82590 in favour of Telecom New Zealand Limited created by Transfer 5901534.1 - 17.2.2004 at 9:00 am

8972385.1 Variation of Encumbrance 719788.3 - 1.2.2012 at 7:00 am

9252345.1 Encumbrance to (now) Pioneer Energy Renewables Limited Partnership - 28.11.2012 at 5:00 pm

10269252.24 Mortgage to Bank of New Zealand - 15.12.2015 at 4:39 pm

9941557.1 Variation of Encumbrance 9252345.1 - 18.7.2019 at 4:28 pm


RAILWAY
494·20
268·57
897·65
3
40·6483 ha
140·00
289·000
86·36
666·00
No 49 S.H

Appendix C
Whangaehu River Water Quality Data

Background

Values below their respective detection limits have been assigned the value of half the detection limit, as is accepted practice. Where relevant, river water quality has been compared with consent limits. Raw data is available upon request.

In-situ Measurements

Table C1. Summary of in-situ water quality measured between 2020 and 2024.

Site	Temperature (°C)	pH (unitless)	SPC (µS/cm)	DO (g/m^3)	DO (%)
US	14.1 (7.7-16.9)	2.5 (2.1-2.9)	2,913 (1,060-4,980)	9.3 (8-11.2)	90 (84-94)
DS	16.4 (15.1-18.3)	2.8 (2.2-3.2)	2,557 (730-4,520)	8.9 (7.9-9.5)	91 (84-95)

Notes: Data shown as a mean, with min-max range shown in brackets; DO = dissolved oxygen; SPC = specific conductance, which is equivalent to the conductivity at 25°C. Reproduced from Viridis (2025).

Monthly Monitoring Data

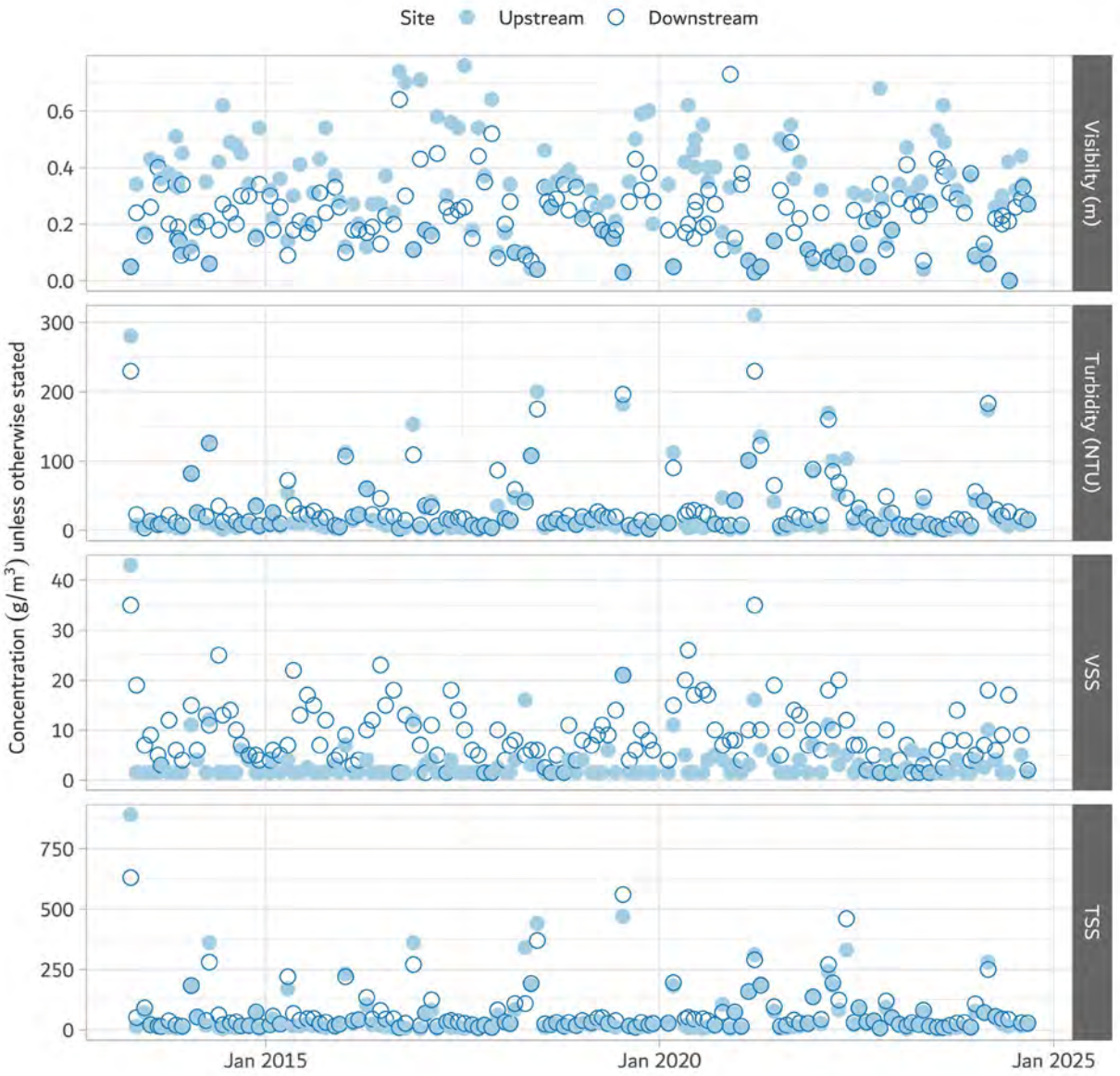


Figure C1. Whangaehu River clarity from April 2013 to September 2024.Note: graph excludes outlier measurements at both the upstream and downstream site on 12 May 2021.

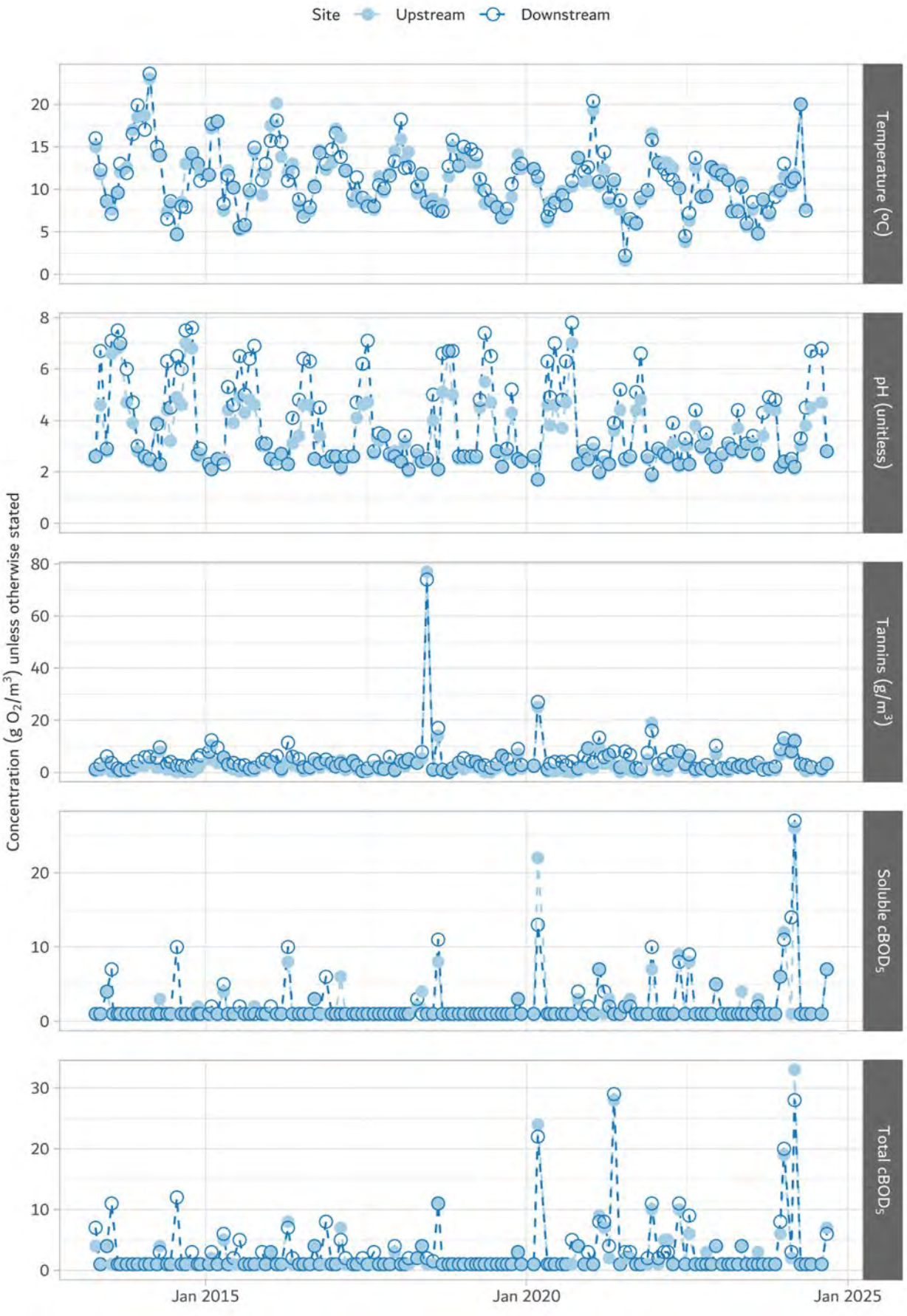


Figure C2. Whangaehu River water quality from April 2013 to September 2024.

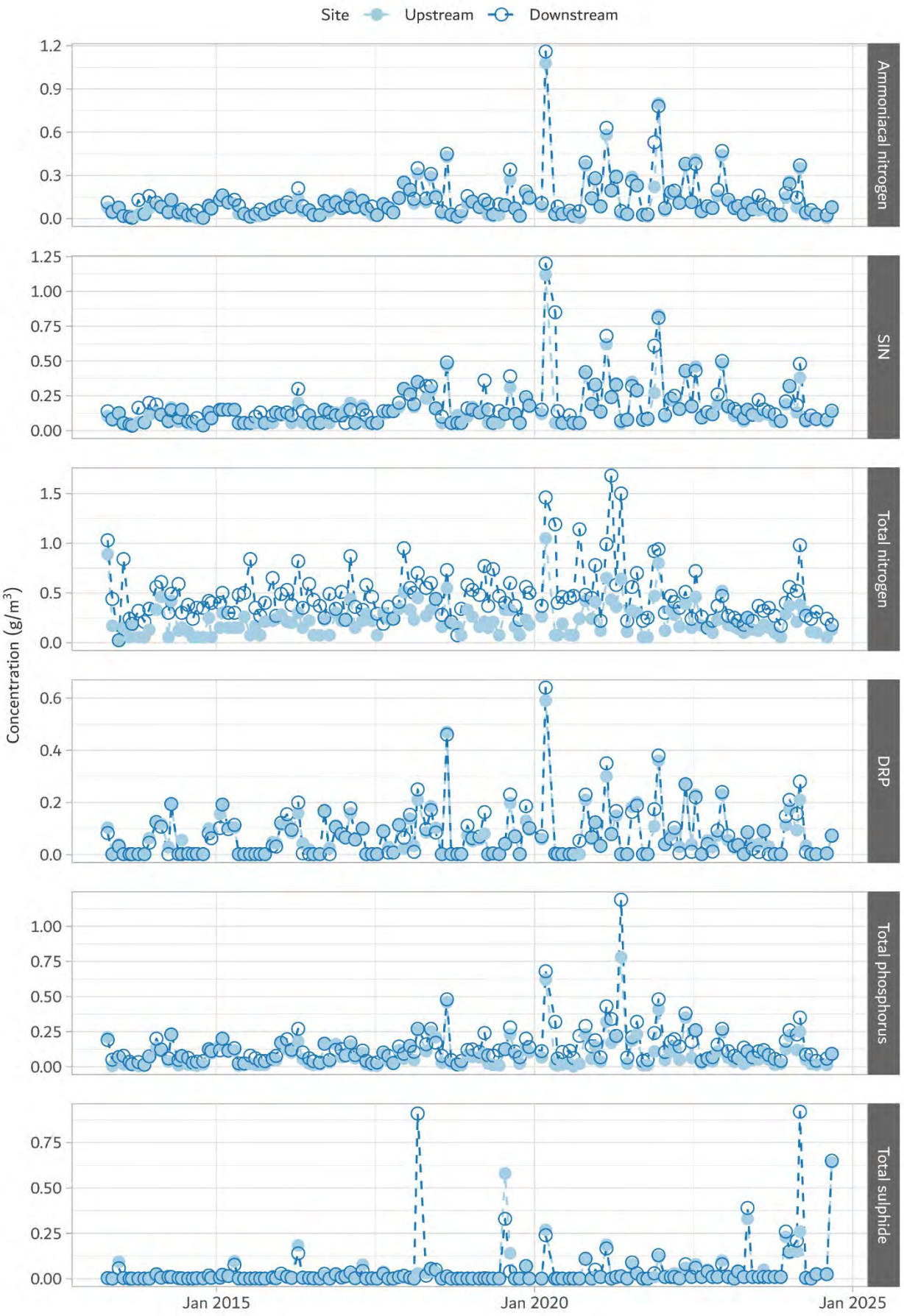


Figure C3. Whangaehu River nutrient concentrations from April 2013 to September 2024.

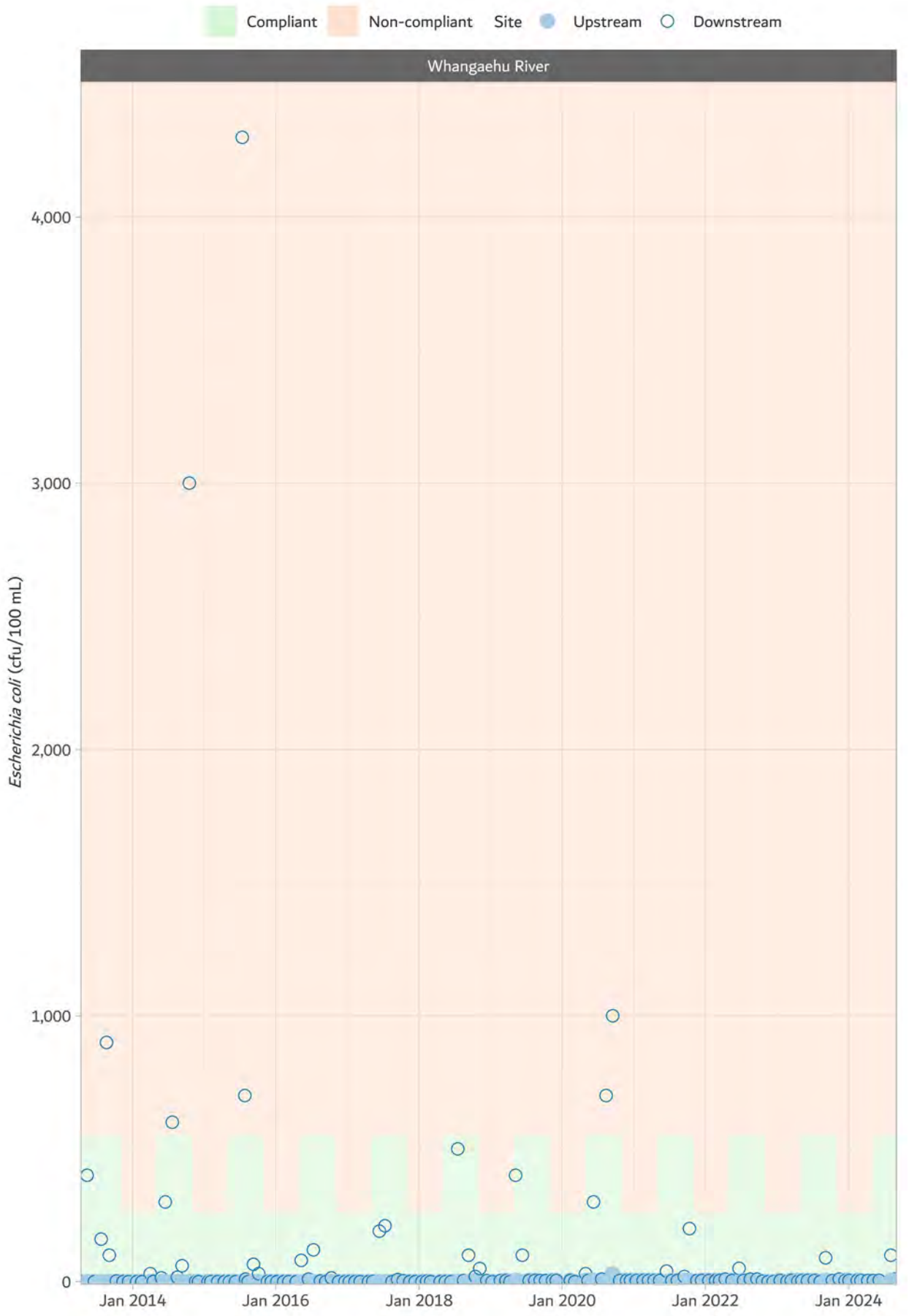


Figure C4. Whangaehu River E.coli concentrations from April 2013 to September 2024.

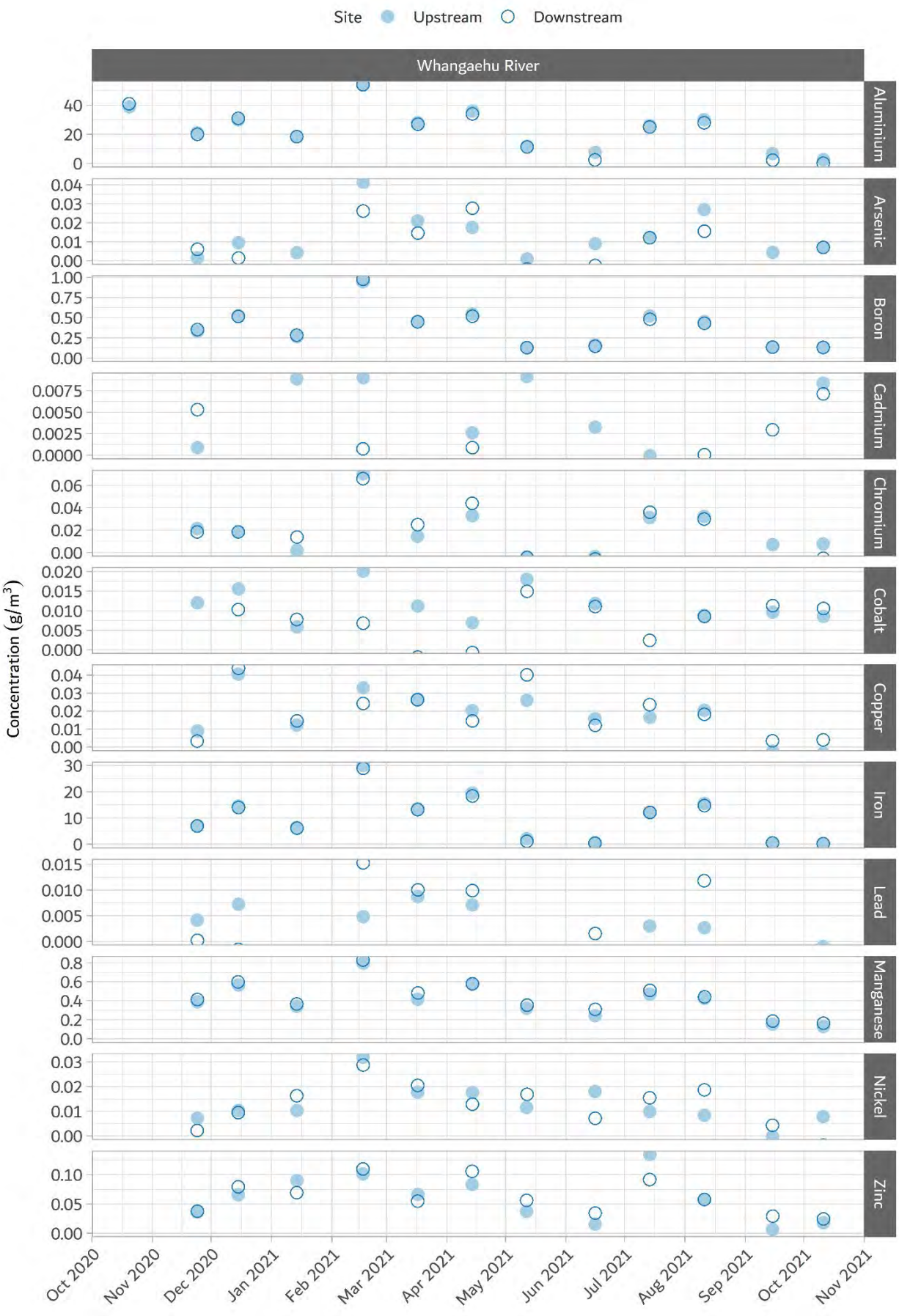


Figure C5. Whangaehu River dissolved metal and metalloid concentrations from October 2020 to October 2021.

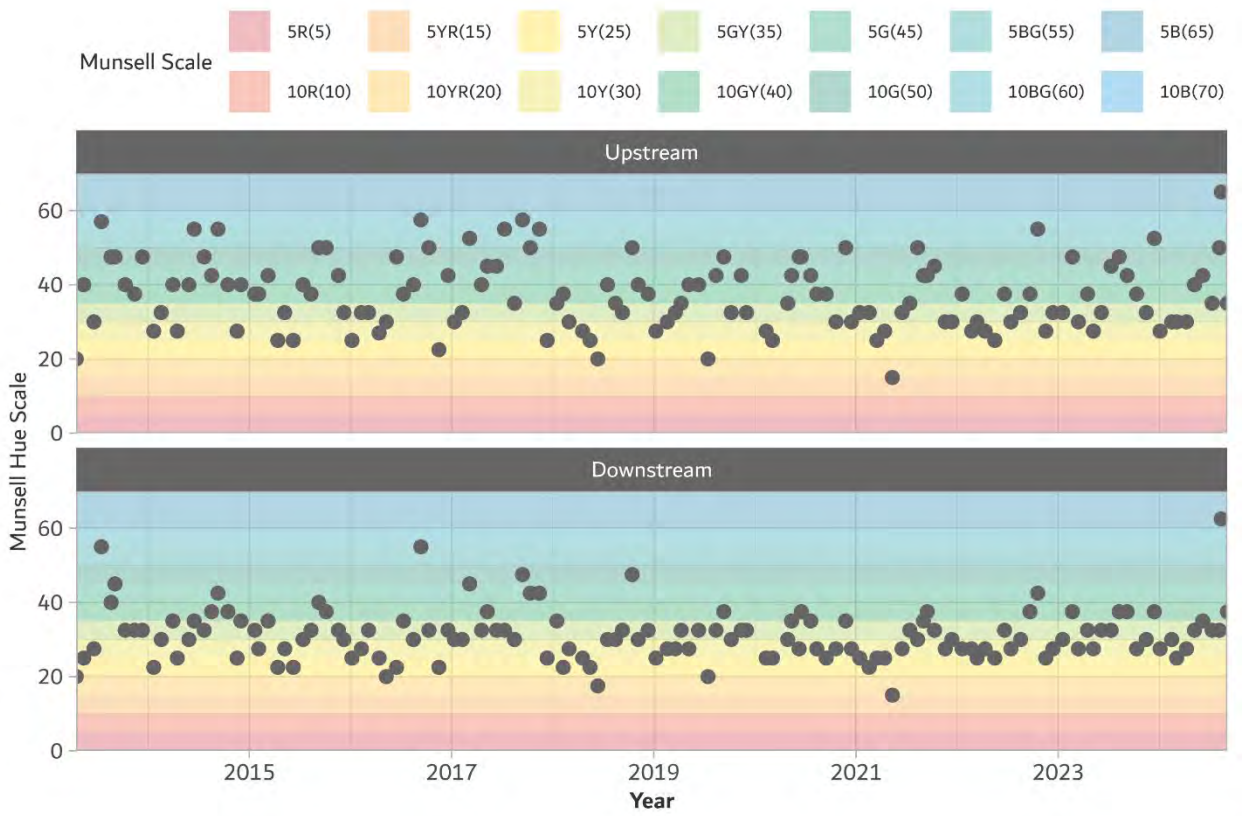


Figure C6. Whangaehu River colour upstream and downstream of the effluent discharge from April 2013 to September 2024.

Appendix D
Whangaehu River Ecology Report

VIRIDIS
Environmental Consultants

Karioi Pulp Mill

Whangaehu River Ecological Assessment

Prepared for: Winstone Pulp International

March 2025

DOCUMENT CONTROL AND REVISION HISTORY

Document title	Karioi Pulp Mill
	Whangaehu River Ecological Assessment
Prepared for	Winstone Pulp International
Version	Final 1
Date	31 March 2025
Document number	10001-044-1

Version	Issue date	Document number
Final 1	31 March 2025	10001-044-1

Author(s)	
	Amanda Good
	Environmental Scientist
Reviewer(s)	
	Dr Grant Allen
	Director | Lead Environmental Scientist

Reference: Viridis 2025. Karioi Pulp Mill Whangaehu River Ecological Assessment. A report prepared for Winstone Pulp International by Viridis Limited. March 2025.

Cover photo: The Whangaehu River viewed looking downstream at monitoring site DS towards the Whangaehu Valley Road bridge, dated 22 February 2024.

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1 INTRODUCTION

Winstone Pulp International Ltd (WPI) operated a pulp mill at Karioi in the central North Island until September 2024. Although operations have ceased, WPI is renewing its existing discharge permit (ATH-2010011593.011; 'the Permit') to continue discharging treated pulp mill effluent (5,200 m^3/day) and antifoam inhibitor (125 L/day) to the Whangaehu River. The Permit is due to expire on 1 July 2025.

To support the renewal application, four voluntary ecological surveys of the Whangaehu River have been conducted since 2020. This report presents the findings from these surveys and, where relevant, compares these to the results from ongoing sewage fungus and periphyton monitoring, carried out under Conditions 21 and 25 of the Permit.

2 SURVEY METHODS

2.1 Monitoring Sites

The ecological surveys were conducted at three sites along the Whangaehu River: one upstream of the treated wastewater discharge (US) and two downstream (DS and DS2). The locations of all sites are shown in Figure 1 and detailed in Table 1.

Table 1. Location and site description for each monitoring site.

Site	Type	Location description
US	Control	Approximately 50 m upstream of the WWTP discharge.
DS	Impact	Approximately 900 m downstream from the WWTP discharge point, adjacent to the Tangiwai Memorial site.
DS2	Impact	Approximately 2.5 km downstream from the WWTP discharge, just upstream of the confluence with Waitangi Stream.

2.2 Timing and Frequency

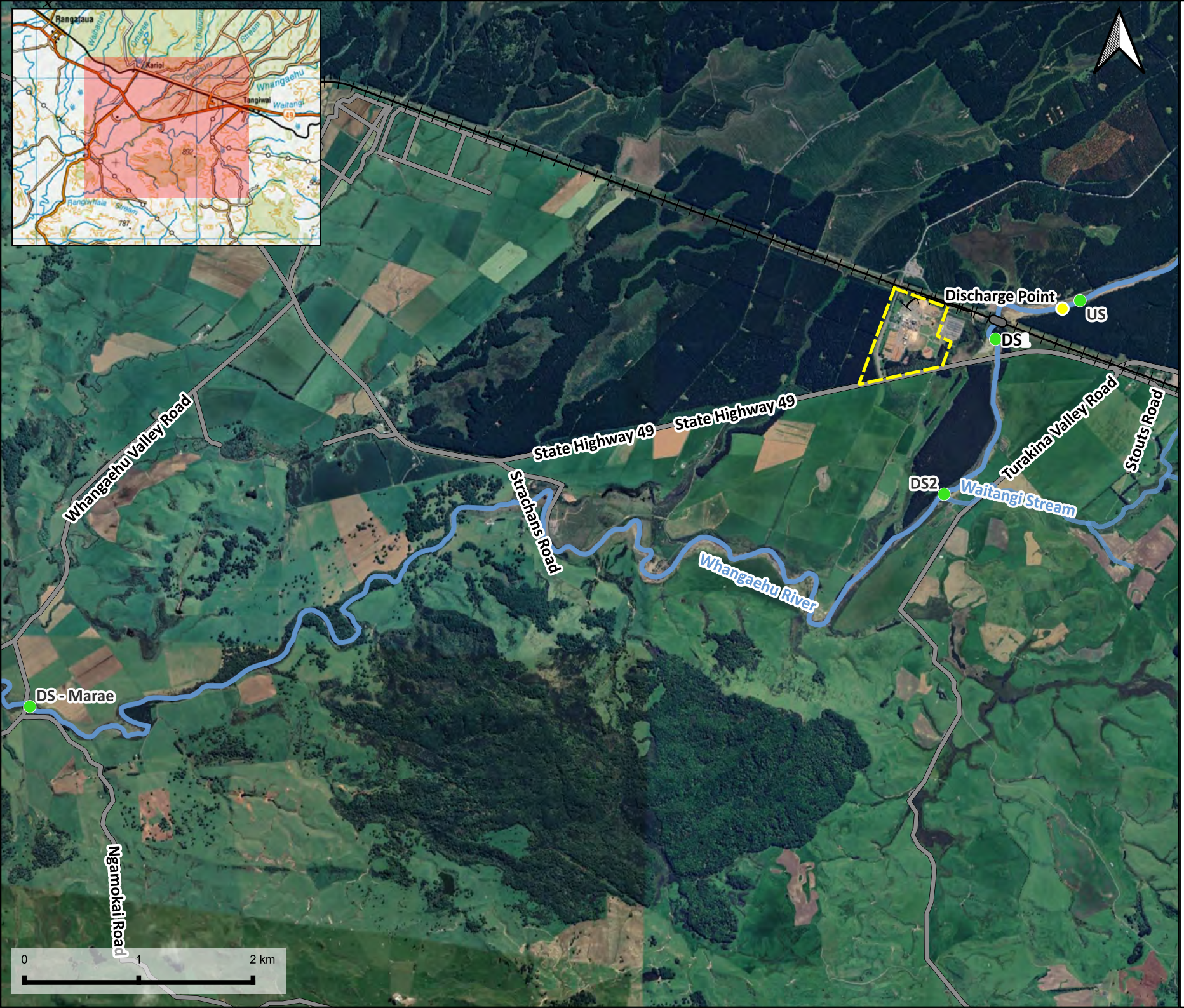
The four surveys were undertaken in summer or autumn periods, on the following dates:

- 2 December 2020
- 11 and 12 April 2022
- 15 March 2023
- 22 and 23 February 2024

The surveys involved:

- Measuring in-situ water quality.
- Undertaking a visual assessment of in-stream and riparian habitat.
- Estimating periphyton and macrophyte cover and composition.
- Estimating heterotrophic biofilm (sewage fungus) cover, if any.
- Collecting macroinvertebrate samples for subsequent identification and enumeration.

Fish populations were not monitored during these surveys, as their presence in the upper Whangaehu River is naturally limited by poor water quality, distance from the coast and physical barriers to upstream migration, as reported in Kingett Mitchell (1999, 2006) and Golder (2008, 2009).



VIRIDIS
Environmental Consultants

Figure 1.
Site overview

Karioi Pulp Mill

Winstone Pulp International

Legend

- Ecological Monitoring Sites
- WTP discharge
- Tangiwai Railway Bridge
- Pulp Mill site boundary

SOURCES

Google Earth Satellite 2023

DISCLAIMER:
This map/plan is not an engineering draft.
This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE

1:42,000 **@ A4**

JOB NO. **10001**

Date: 04 September 2024 Drawn by: H.B.

2.3 In-situ Receiving Water Quality

Spot measurements of dissolved oxygen (DO), water temperature, specific conductance (conductivity at 25 °C) and pH were recorded using a calibrated hand-held meter. These data were used to aid in the interpretation of the biological data.

2.4 In-stream and Riparian Habitat

Visual estimates of in-stream habitat characteristics (e.g., mean water depth and width, % streambed substrate composition, stream shading and hydrologic heterogeneity) were recorded. The same methods were used in each survey, to allow for comparisons to be made over time.

2.5 Sewage Fungus Coverage

Sewage fungus coverage was qualitatively assessed within three observation quadrats (2 m x 2 m) at each site following the procedure outlined in the heterotrophic abundance level (HAL) manual (Golder 2012a). In each quadrat, the HAL was estimated using the abundance scale for heterotrophs in Quinn & McFarlane (1985) (Table 2) where abundance ranges from 0 (not visible) to 6 (growths covering all surfaces).

Table 2. Macroscopic abundance scale for heterotrophs (from Quinn & McFarlane 1985).

Observation	Heterotrophic abundance level
Not visible on handheld stones	0
Visible on handheld stones, but not visible on bed	1
Strands visible on bed, no front units (0.01 m length of growth)	2
Isolated fronds visible	3
Growths common	4
Growths abundant	5
Growths covering all surfaces	6

2.6 Periphyton and Macrophytes

2.6.1 Overview

Algae cover was assessed along four transects at each site following, in large part, the protocols outlined in Appendix 2 of Kilroy *et al.* (2008). These protocols recommend transects are established within 40 m to 50 m river sections that are wadeable, run habitat (smooth unbroken water) and unshaded.

Due to poor visibility through the water column, five cobbles, equally spaced along each transect, were selected, and inspected for periphyton growth. Using categories in Kilroy *et al.* (2008), the proportion of fine films, slimy sludgy coatings, cohesive mats (greater than 3 mm thick), fine green filaments and long coarse filaments (greater than 20 mm long) on each cobble were estimated. Maximum cover limits for long filamentous algae and cohesive mats (visible diatoms or cyanobacteria greater than 3 mm thick), reproduced from Biggs (2000), are given in Table 3 and are equivalent to the limits in Condition 20 of the Permit.

Table 3. Recommended periphyton cover guideline for gravels/cobble bed streams (Biggs 2000).

Value to protect	Item	Diatoms	Filamentous algae
Aesthetic/recreation*	Maximum cover of visible stream bed	60% > 3 mm thick	30% > 20 mm long
	Maximum AFDW (g/m^2)	-	35
	Maximum chlorophyll *a* (mg/m^2)	-	120
Benthic biodiversity	Maximum chlorophyll *a* (mg/m^2)	50	50
Trout habitat and angling	Maximum cover of whole stream bed	-	30% > 20 mm long
	Maximum AFDW (g/m^2)	35	35
	Maximum chlorophyll *a* (mg/m^2)	200	120

Notes: *Refers to the period between 1 November and 30 April; and AFDW is ash free dry weight.

2.6.2 Biomass

Sample collection

Following the visual assessment of periphyton coverage at each site, periphyton samples were collected for subsequent analysis. Four periphyton samples were collected from each site following the method outlined in Appendix 3 of Kilroy *et al.* (2008)[1]. Each replicate was obtained by scrubbing the periphyton off a 0.002 m^2 area from five cobbles collected along each transect. Samples were stored on ice before being frozen and sent to the laboratory for AFDW and chlorophyll *a* analysis.

Ash free dry weight analysis

Ash free dry weight (AFDW) analysis followed Biggs & Kilroy (2000). A 10 mL subsample of each replicate was filtered on to a pre-weighed and pre-washed GF/C filter. The filter and sample were dried for 48 hours at 60°C and then weighed. The filters were ashed (heated at 500°C for two hours) then re-weighed. Values were scaled up to calculate AFDW per m^2 of streambed area. AFDW results were then compared to recommended New Zealand periphyton guidelines in Biggs (2000) (reproduced in Table 3).

Chlorophyll *a* analysis

A 10 mL subsample of each sample was filtered on to a GF/C filter. Chlorophyll was extracted from the filter residue with ethanol (for 5 minutes at 78°C followed by 24 hours at 25°C). The concentration of chlorophyll *a* in each extract was determined spectrophotometrically and then scaled to chlorophyll *a* per m^2 of streambed area. Chlorophyll *a* concentrations were compared with recommended New Zealand periphyton guidelines (Biggs 2000) (Table 3).

2.6.3 Community Composition

The samples collected as part of the biomass analysis (i.e., AFDW and chlorophyll *a*) were processed for species presence and abundance. This information provided an indication of what the dominant algal species was and whether heterotrophic bacteria (i.e., sewage fungus) were present.

Following AFDW and chlorophyll *a* analysis, the four periphyton replicates from each site were pooled for viewing on an inverted microscope. Random fields of view were selected to identify the dominant algal species. Total counts per subsample of at least 200 cells and at least 10 fields of view (up to 30, if necessary) were made. Cells were counted as individuals, with counts factored up to the number of cells per sample.

[1] Equivalent to the 'Quantitative Method 1b (QM-1b)' in Biggs & Kilroy (2000) and fixed-area sampling in NEMS (2022a).

2.7 Benthic Macroinvertebrates

At each survey site, five macroinvertebrate replicates were collected from riffle habitats using a Surber sampler (0.1 m^2; 500 µm mesh) following the "*Quantitative sampling of hard-bottomed streams using a Surber or Hess sampler*" method in NEMS (2022b). Each successive Surber sample was collected upstream of the previous sample to eliminate disturbance-related effects. Samples were preserved in ethanol for later identification and enumeration.

Benthic macroinvertebrates were identified and counted to a level suitable for calculating taxa richness, abundance, EPT taxa richness and % EPT abundance, macroinvertebrate community index (MCI) and quantitative MCI (QMCI) following the protocols outlined in NEMS (2022b). EPT refers to taxa that belong to the sensitive Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) taxonomic groups.

Taxa richness is a measure of the number of invertebrate taxa in a sample. In general, streams supporting a high number of invertebrate taxa are more likely to be of a higher environmental quality than streams with few taxa present. However, interpretation of taxa number data as an environmental indicator is dependent on the pollution sensitivity or tolerance of taxa present.

Abundance is a measure of the total number of invertebrates in a sample. Abundance tends to increase in the presence of organic or nutrient enrichment and decreases in the presence of toxic contaminants. Abundance is a useful measure for comparison between sites but can be highly variable.

EPT taxa are generally sensitive to changes in water and habitat quality. %EPT abundance is the proportion of EPT individuals making up the community. EPT and %EPT abundance[2] can provide a good indication of stream health, with high values indicating good water/habitat quality and low values indicating poor water/habitat quality.

The MCI and QMCI are biological indices that are based on indicator scores between 1 and 10, which are assigned to each taxon based on their sensitivity to organic enrichment1 being least sensitive and 10 being most sensitive). Although developed to assess nutrient enrichment, these scores are now used to assess the general health of New Zealand streams. MCI scores are based on presence/absence data, while the QMCI incorporates abundance data. Higher MCI and QMCI indicate better habitat quality (and, as such, better water quality) with scores compared to the attribute bands and national bottom lines (NBL) defined in the National Policy Statement for Freshwater Management 2020 (NPS-FM). These are reproduced in Table 4.

Table 4. Estimates of stream health using MCI and QMCI indices (from NPS-FM 2020).

Attribute band	Description	Numeric attribute states	
		MCI	QMCI
A	Pristine conditions	>130	≥6.5
B	Mild pollution	≥110 and <130	≥5.5 and <6.5
C	Moderate pollution	≥90 and <110	≥4.5 and <5.5
National bottom line		**90**	**4.5**
D	Severe pollution	<90	<4.5

[2] The caddisflies *Oxyethira* and *Paroxyethira* are not sensitive to nutrient enrichment so are excluded from EPT calculations.

3 SURVEY AND DISCHARGE CONDITIONS

3.1 Rainfall and River Flow

Total daily rainfall (mm) at Karioi and mean daily flow (m^3/s) within the Whangaehu River, as recorded between 1 November 2020 and 30 March 2024, is presented Figure 2 and Figure 3, respectively. The ecological survey dates have been denoted by a red circle on each figure.

As a general guideline, each survey was scheduled to occur at least 20 days after a significant flood event. While time and weather constraints occasionally made this impractical (Figure 2), all surveys were conducted when the Whangaehu River's flow remained below three times the median flow (median: 3,212 L/s; threshold: 9,636 L/s (Horizons 2024).

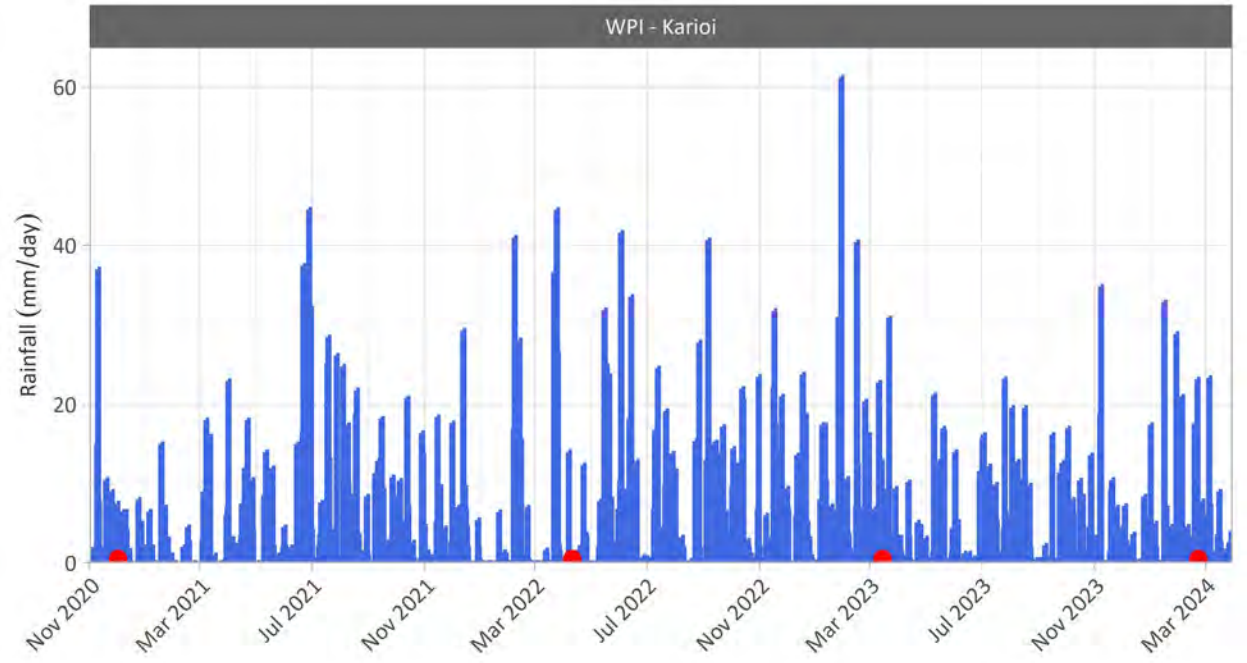


Figure 2. Daily rainfall (mm) at the Karioi site between November 2020 and March 2024, with the survey dates denoted in red.

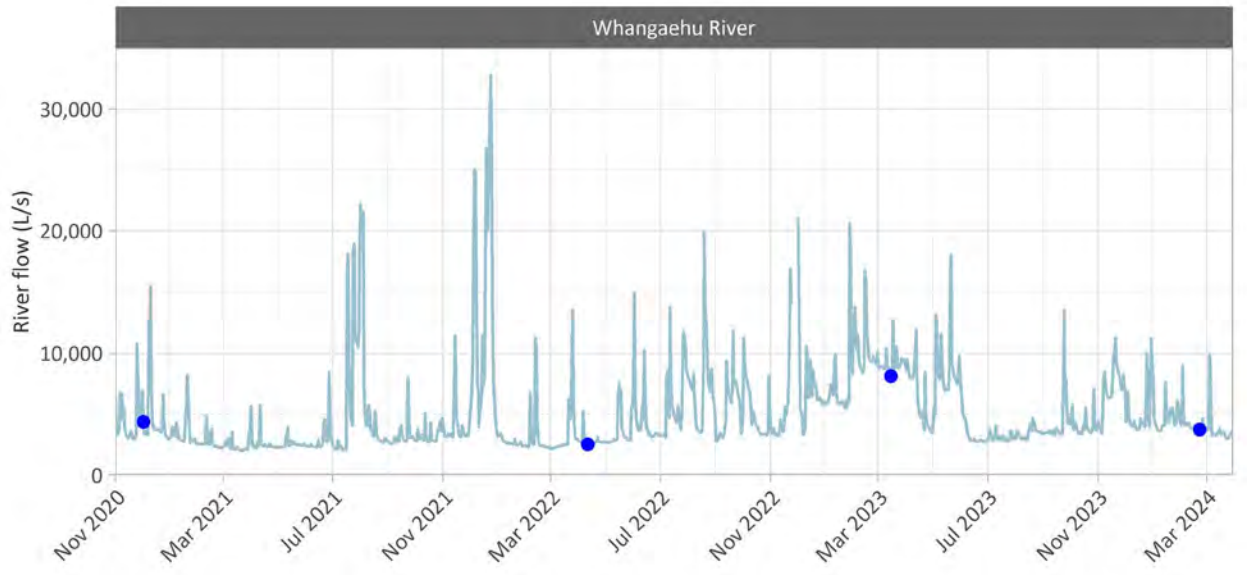


Figure 3. Whangaehu River mean flows and survey dates, between November 2020 and March 2024.

3.2 Discharge Operation

The daily volumes of treated pulp mill effluent recorded as being discharged to the Whangaehu River between 1 November 2020 and 30 March 2024 are shown on Figure 4. The daily discharge compliance limit of 5,200 m^3/day is identified by a dashed orange line.

During the monitoring period, an average volume of 3,164 m^3 of effluent was discharged per day to the Whangaehu River. Discharge volumes did not exceed the limit specified in the Permit (5,200 m^3/day).

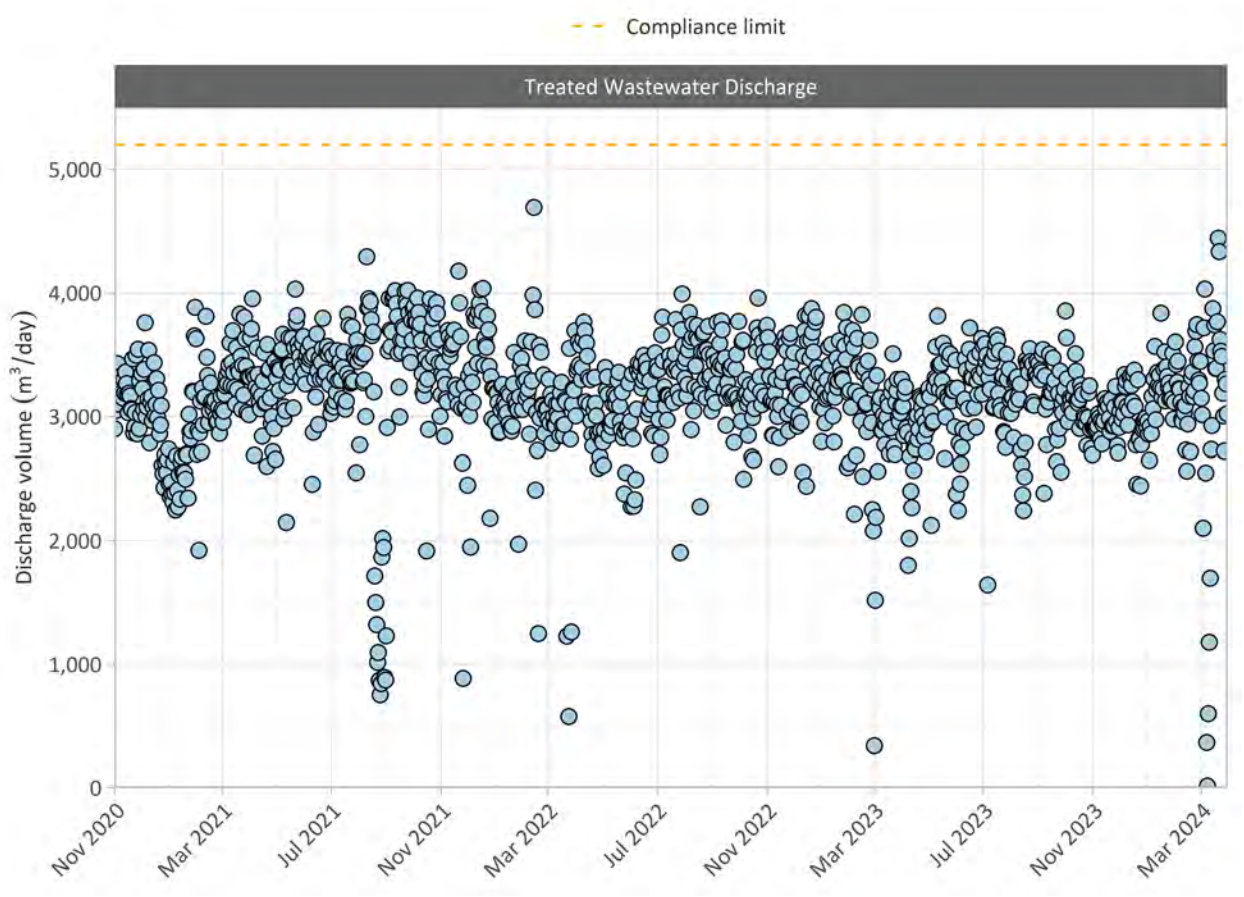


Figure 4. Daily volumes of treated effluent discharged to the Whangaehu River between November 2020 and March 2024[3].

[3] Erroneous values on 30 December 2021 (5,728 m^3) and 17 November 2022 (5,751 m^3), caused by a power failure, removed.

4 RECEIVING WATER QUALITY

Spot water quality measurements were taken at all sites on each monitoring occasion. These data are summarised in Table 5.

Table 5. Summary of water quality measured between 2020 and 2024

Site	Temperature (°C)	pH (unitless)	Specific conductance (µS/cm)	DO (g/m^3)	DO (%)
US	14.1 (7.7-16.9)*	2.5 (2.1-2.9)	2,913 (1,060-4,980)	9.3 (8-11.2)	90 (84-94)
DS	16.4 (15.1-18.3)	2.8 (2.2-3.2)	2,557 (730-4,520)	8.9 (7.9-9.5)	91 (84-95)
DS2	13.4 (11.4-15.8)	2.7 (2.2-3.1)	2,645 (1,055-4,450)	9.6 (9.3-10)	92 (87-94)

Notes: Data shown as mean (minimum-maximum); DO is dissolved oxygen; specific conductance is conductivity at 25°C; *the minimum temperature at US (7.7 °C) was recorded early in the morning on 12 April 2022, the day after sampling DS and DS2.

The key findings from the water quality data collected between 2020 and 2024 were:

- Stream temperatures generally mirrored the prevailing climatic conditions, with the highest temperatures recorded in summer. Water temperatures remained below the upper thermal threshold of 24 °C for New Zealand aquatic species, as outlined by Davies-Colley *et al.* (2013).
- The pH of the Whangaehu River was very acidic at each site, reflecting the volcanic influences within its upper catchment.
- Specific conductance remained comparable between sites, but varied between surveys, likely influenced by crater lake outflows. Measurements were generally high, reflecting the river's naturally elevated salt and mineral content due to its geological setting.
- Throughout the monitoring period, DO concentrations consistently met the criteria for Attribute State A, as defined by the NPS-FM 2020 (i.e., 1-day minimum concentrations ≥ 7.5 g/m^3). At these levels, DO is not expected to cause stress to aquatic organisms.

5 HABITAT CHARACTERISTICS

5.1 Overview

The Whangaehu River originates from Mt Ruapehu's crater lake, flowing 160 km southwest before reaching the Tasman Sea near Whanganui. Volcanic influences make it naturally acidic. Upstream of the discharge (US), the river is wide, shallow and bordered by pine plantations (Figure 5). Downstream (DS), near the Tangiwai Memorial, it becomes narrower and fast-flowing (Figure 6). DS2 is like US, although an island bisects the river at this location (Figure 7).

a) **b)**

Figure 5. Site US viewed facing a) upstream and b) downstream.

a) **b)**

Figure 6. Site DS viewed facing a) upstream and b) downstream.

a) **b)**

Figure 7. Site DS2 viewed facing a) upstream and b) downstream.

5.2 In-stream and Riparian Habitat

The channel morphology and habitat characteristics of each survey site are summarised in Table 6. The key findings from the physical habitat data were:

- The average wetted width and depth of US and DS2 were comparable, with DS being narrower.
- Each site's habitat was limited to run and riffle habitat, with pools and chutes absent.
- There was limited shading at all sites, with riparian vegetation limited to shrubs or pine trees set back from the stream banks.
- Habitat characteristics remained largely consistent across surveys, with changes in channel width and depth driven by rainfall events.

Table 6. Summary of habitat characteristics recorded between 2020 and 2024

Parameter	Depth (m)	Width (m)	Habitat				Shade*
			Run (%)	Riffle (%)	Pool (%)	Chute (%)	
US	16.0 (11.3-21.9)	0.30 (0.27-0.34)	51	49	0	0	Open
DS	11.5 (6.9-16.7)	0.38 (0.32-0.45)	55	45	0	0	Open
DS2	18.5 (15.5-20.2)	0.33 (0.26-0.42)	70	33	0	0	Open

Notes: Wetted widths and depths shown as mean (range); habitat shown as average of four surveys; *shading is open (<20 % shade), partial (21-79 %), and shaded (80-100%).

5.3 Streambed Substrate Characteristics

Streambed substrate composition at each site during the surveys undertaken between 2020 and 2024 is presented in Figure 8. Gravel and cobble dominated all sites, offering stable surfaces for algal growth and habitat for invertebrate communities. The proportions of silt and sand at each site were notably higher in 2022 and 2024, likely due to a combination of preceding flows, inflows from the crater lake, and other environmental factors. DS had the highest proportion of larger substrates, such as boulders, which are typical of fast-flowing reaches.

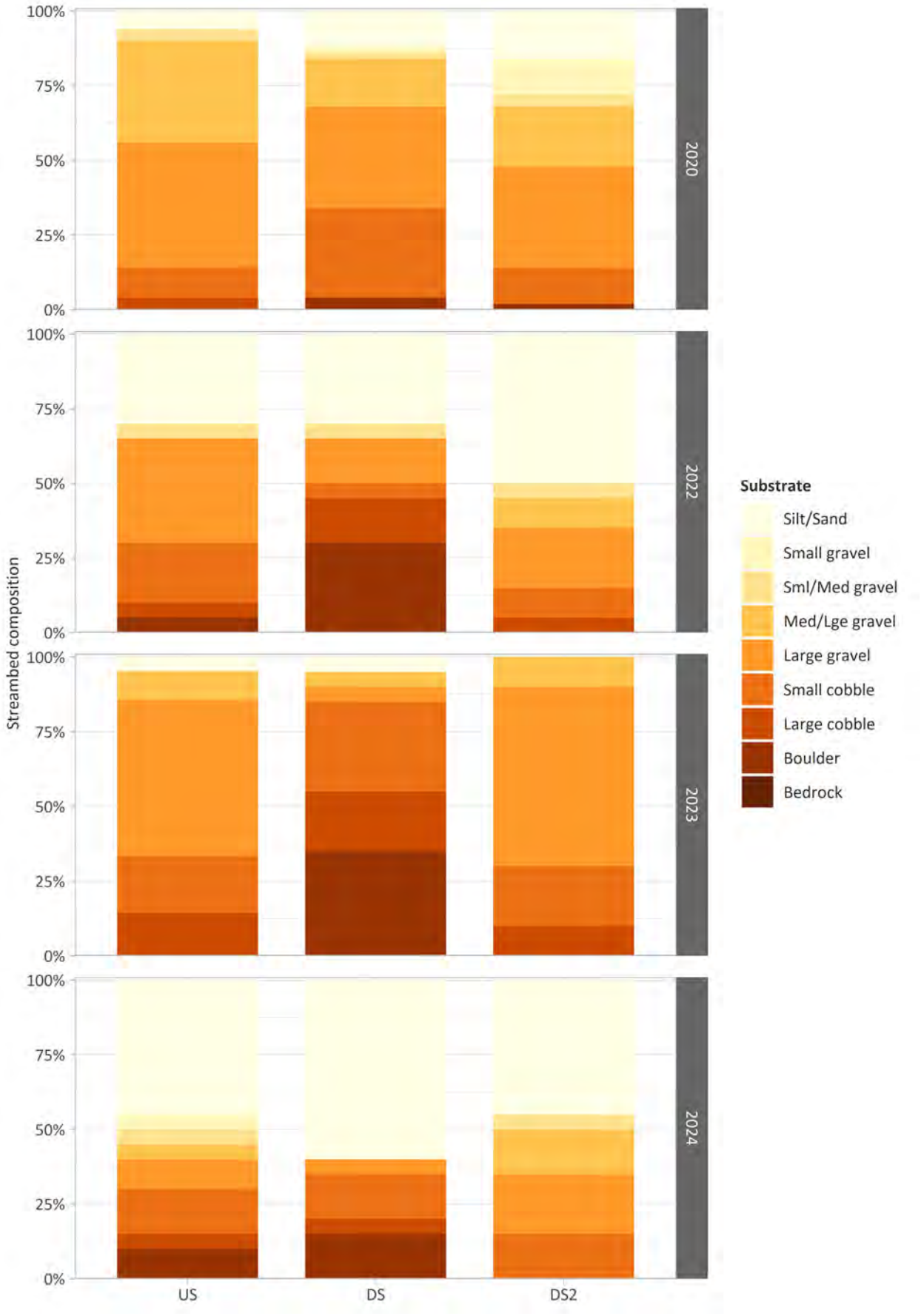


Figure 8. Streambed substrate composition (%) at each site during each survey.

6 SEWAGE FUNGUS

6.1 Overview

A typical sign of high organic pollution in a stream is the dominance of a matrix of heterotrophic filamentous organisms, commonly known as sewage fungus. Sewage fungus thrives in conditions with elevated concentrations of readily degradable dissolved organic material. Its growth indicates the presence of additional inputs within the stream, making it a useful qualitative biological monitoring tool. Sewage fungus has long been used as an indicator of gross organic pollution (Quinn & McFarlane 1985).

6.2 Streambed Cover

Evidence of sewage fungus was absent from each site during the four ecological surveys. This result aligns with findings from ongoing sewage fungus monitoring required under Conditions 21 and 25 of the Permit (Golder 2012b, 2013, 2014; Babbage 2019; Viridis 2024).

6.3 Heterotrophic Abundance Level

With no evidence of heterotrophic biofilms (sewage fungus), all monitoring sites were assigned a HAL of 0 (not visible on handheld stones) in accordance with the classifications presented in Table 2, indicating low organic pollution in the Whangaehu River.

7 AQUATIC FLORA

7.1 Periphyton

7.1.1 Overview

Periphyton are a fundamental component of stream ecosystems, as they are important food resources for grazing invertebrates and can help to remove or bind to contaminants in water. Healthy streambed periphyton communities can take many forms and can comprise different combinations of taxa.

Periphyton communities vary in composition and abundance in response to changes in nutrient levels, light availability (which is influenced by season), flow events and other environmental factors. Excessive periphyton biomass can have detrimental impacts on the recreational, aesthetic and ecological values of streams (e.g., loss of sensitive invertebrate taxa through habitat alteration). In addition to being a natural component of stream ecosystems, periphyton are an important indicator of changes in water quality. They are very responsive to water quality degradation (e.g., elevated nutrients concentrations), often increasing in biomass and changing in species composition. As such, periphyton are considered an appropriate biological measure of environmental change.

7.1.2 Streambed cover

The periphyton cover and community composition at each site, as visually assessed during the four ecological surveys, are presented in Figure 9. The key findings were:

- Periphyton cover was generally low at all sites, with little to no cover observed in the earliest surveys. In 2023 and 2024, periphyton cover was greatest at DS and DS2, while US continued to exhibit low cover.
- The periphyton community was limited to fine films, slimy coatings, and fine green filaments (less than 20 mm in length). Observations of fine green filaments were restricted to a single occasion at DS and DS2 in 2024, accounting for less than 2% of the total cover at each site. No cohesive mat cover was observed.
- Condition 20 of the Permit sets a limit of 30% for long filamentous algae (greater than 20 mm in length) (Parameter 6) and 60% for visible diatoms or cyanobacteria (greater than 3 mm thick, classified as ‘cohesive mats’) (Parameter 7). Since neither cohesive mats nor long filamentous algae were present in any of the surveys, neither of these limits was exceeded.
- No clear spatial or temporal trends in periphyton cover were observed, consistent with ongoing periphyton monitoring survey results (Babbage 2019; Viridis 2024). Overall, the periphyton cover in the Whangaehu River is relatively stable, with inconsistent, low to moderate coverage indicating conditions that do not promote proliferation or algal blooms.

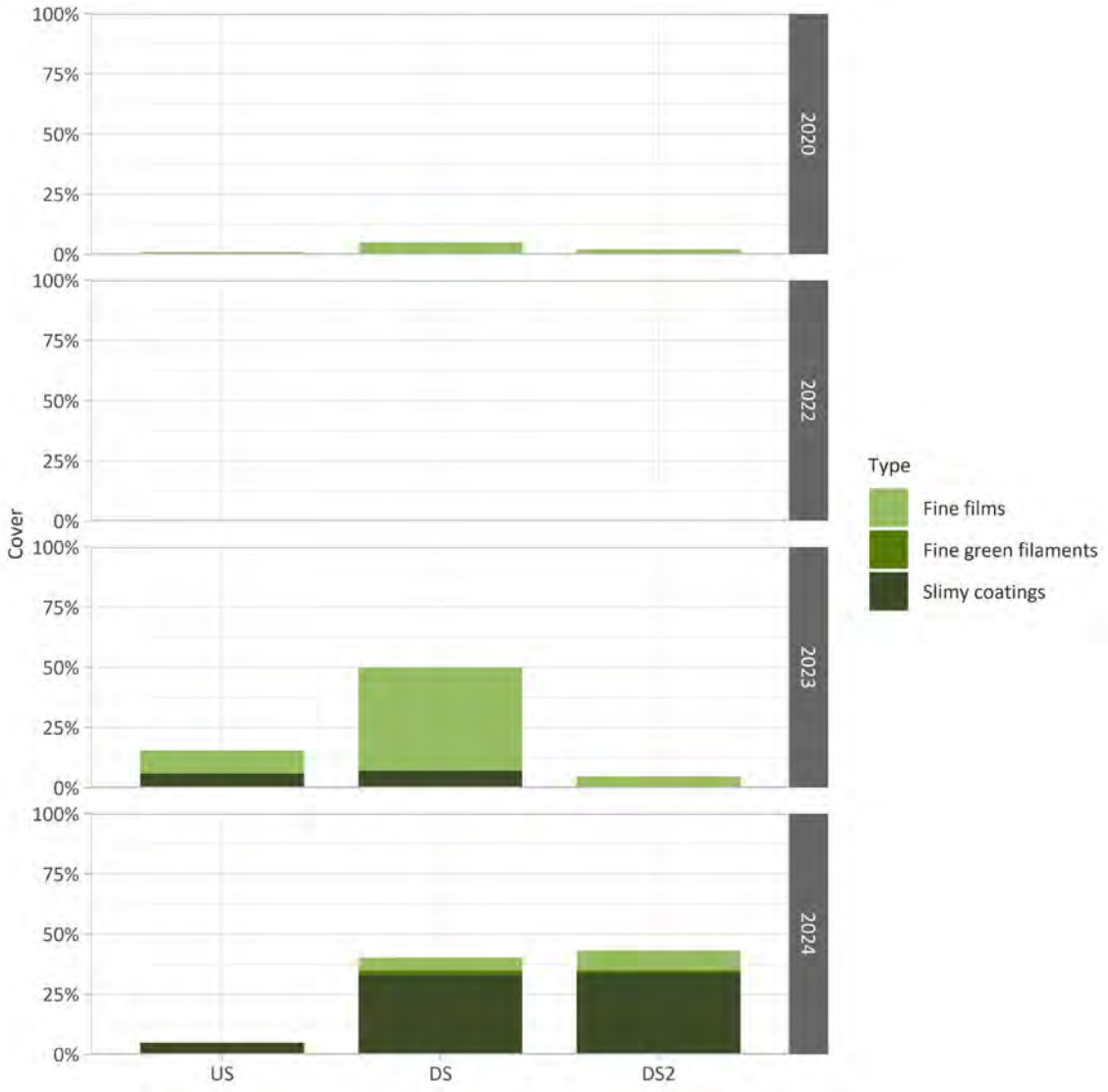


Figure 9. Periphyton cover at each site, as visually assessed between 2020 and 2024.

7.1.3 Periphyton biomass

Stream enrichment is normally manifested as high amounts of organic matter (e.g., periphyton biomass). As such, enrichment of streams can be measured by determining the amount of biomass present. The two most common and easily used methods for estimating biomass are AFDW, which measures total organic matter, and chlorophyll *a*. The results for AFDW and chlorophyll *a* during the monitoring period are shown on Figure 10. Raw data are presented in Appendix A.

The key findings from the periphyton biomass data were:

- Mean AFDW and chlorophyll *a* concentrations were comparable across sites in a given survey. Low concentrations were recorded in the 2000 and 2022 surveys, consistent with the low estimates of periphyton cover on the streambed (refer Section 7.1.2).
- In 2024, mean AFDW concentrations were higher than in earlier surveys, particularly at DS2, reflecting the higher coverage recorded that year..
- Mean chlorophyll a concentrations, although consistently low (≤20 mg/m^2), were slightly higher at the downstream sites.
- Consistent with previous survey results (Babbage 2019; Viridis 2024), AFDW and chlorophyll *a* concentrations remained below the Biggs (2000) guideline of 35 g/m^2 and 50 mg/m^{2,} respectively.
- The consistently low AFDW and chlorophyll a concentrations suggest minimal organic enrichment in the Whangaehu River, supporting healthy water quality throughout the monitoring period.

Figure 10. Periphyton biomass in the Whangaehu River between 2012 and 2024.

7.1.4 Community composition

Different periphyton taxa are associated with varying environmental conditions and respond differently to changes in nutrients. As such, community composition can offer insights into water quality. Variations in community composition can also explain some of the variability in biomass observed at similar levels of enrichment (Kilroy *et al.* 2008). Results for the community composition analysis between 2020 and 2024 are shown on Figure 11.

The key findings were:

- Consistent with the ongoing sewage fungus and periphyton surveys (Viridis 2024), periphyton community composition varied over time but showed little difference between sites. In 2023, for example, *Navicula* spp. and *Rhoicosphenia* sp. were the most prevalent taxa, while in 2024, Naviculoid became the dominant group.

- Although very little periphyton was recorded in 2020 (see Section 7.1.2), a significant proportion of what was present at US (and, to a lesser extent, DS2) that year was cyanobacteria, or 'blue-green algae', (specifically *Leptolyngbya* sp.). Since then, cyanobacteria have not been detected in periphyton samples.

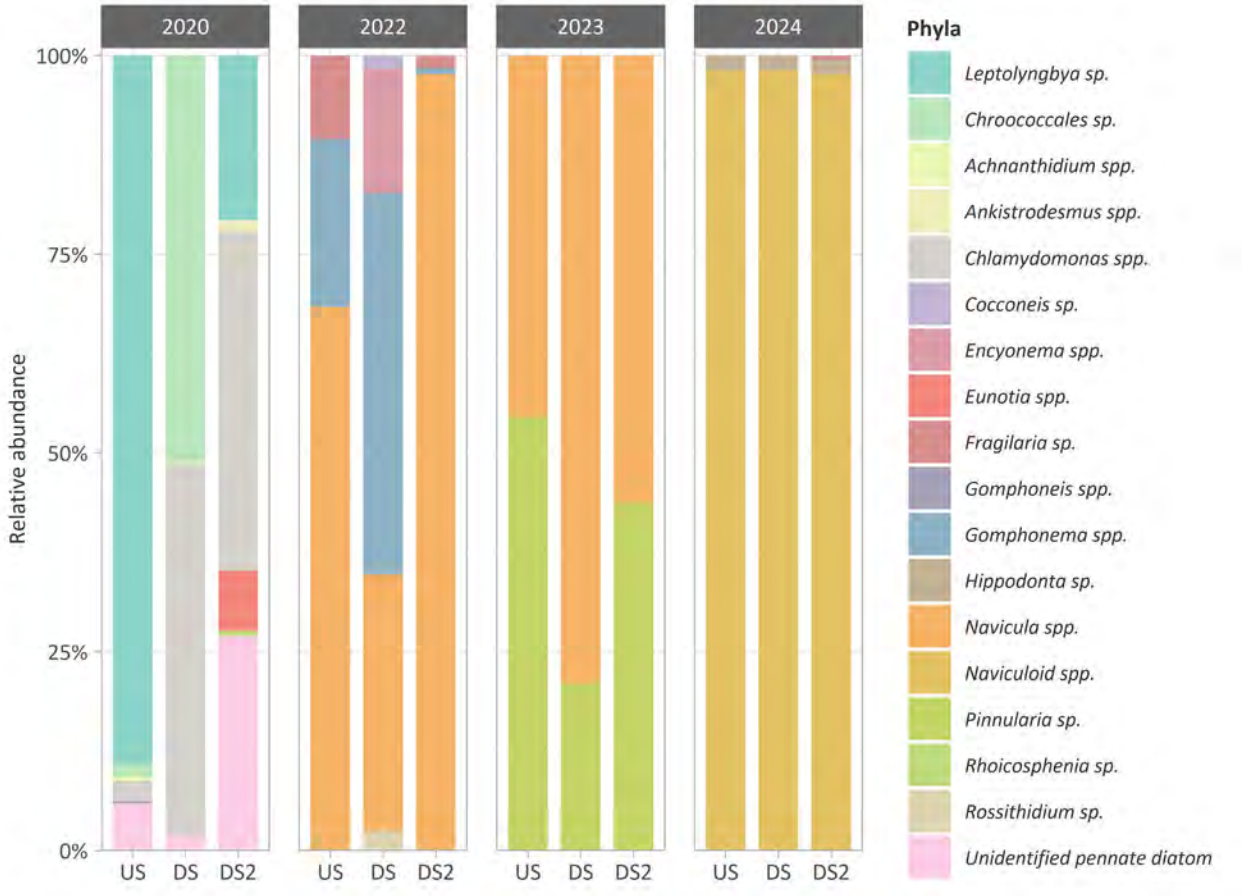


Figure 11. Periphyton community composition in the Whangaehu River between 2020 and 2024.

7.2 Macrophytes

No macrophyte cover was recorded during any of the four ecological surveys conducted. This finding is consistent with the results from ongoing sewage fungus and periphyton monitoring required under the Permit (refer Viridis 2024).

8 BENTHIC INVERTEBRATES

8.1 Relative Abundance

Macroinvertebrate community composition (%) of samples collected at each site between 2020 and 2024 is presented by key taxonomic groups in Figure 12. The data range is denoted by an error bar. Raw data are presented in Appendix B. The key findings were:

- The relative abundance of EPT taxa was low and highly variable, with their occurrence sporadic across sites and survey events. Overall, few sensitive taxa were observed.
- During the monitoring period, Diptera (flies) were generally the most dominant taxa, primarily represented by chironomid midges (i.e., *Orthocladiinae* sp. and *Maoridiamesa* sp.).
- Coleoptera (beetles) and Arachnids (spiders, mites, ticks) were also occasionally present, though their occurrence was inconsistent. The Coleoptera recorded were predominantly from the Elmidae family (riffle beetles), while most Arachnids belonged to the order Acarina (mites and ticks).
- Other taxonomic groups observed in the Whangaehu River included Hemiptera (true bugs), Megaloptera orders, Collembola (springtails), Crustacea, Oligocheata (worms) and Nematoda (roundworms), though these were recorded infrequently and in low relative abundances.
- Overall, the macroinvertebrate community of the Whangaehu River exhibited low diversity and abundance, with the number of individuals varying greatly between samples (refer Section 8.2).

8.2 Abundance

Macroinvertebrate abundance (per 0.1 m^2) at each site from 2020 to 2024 is shown in Figure 13, with other key metrics. Open circles represent the replicate value, while filled circles represent the mean. The key findings from the macroinvertebrate abundance data were:

- Abundances were notably low at each site, with the highest number of individuals recorded in a single replicate being only five. This suggests a sparse invertebrate community within the Whangaehu River.
- When compared to the much higher abundance observed in the nearby Tokiahuru Stream, which was reported as highly productive and abundant (Kingett Mitchell 2006), the Whangaehu River's numbers show a significant contrast, indicating poorer conditions for invertebrate populations.
- Abundance levels remained consistently low over the monitoring period, with no significant variations observed between sites, and several replicates showing no individuals at all. This suggests a stable but persistently limited invertebrate presence.

8.3 Taxa Richness

Taxa richness from each site is shown in Figure 13. The key findings were:

- Mean taxa richness was comparable across all sites, with differences in taxa richness often due to the presence of a single additional species.
- The number of distinct taxa recorded in the Whangaehu River was consistently low, with five or fewer unique species observed in a single replicate, in stark contrast to the more diverse community in the Tokiahuru Stream, where up to 32 benthic macroinvertebrate taxa were recorded (Kingett Mitchell, 2006).

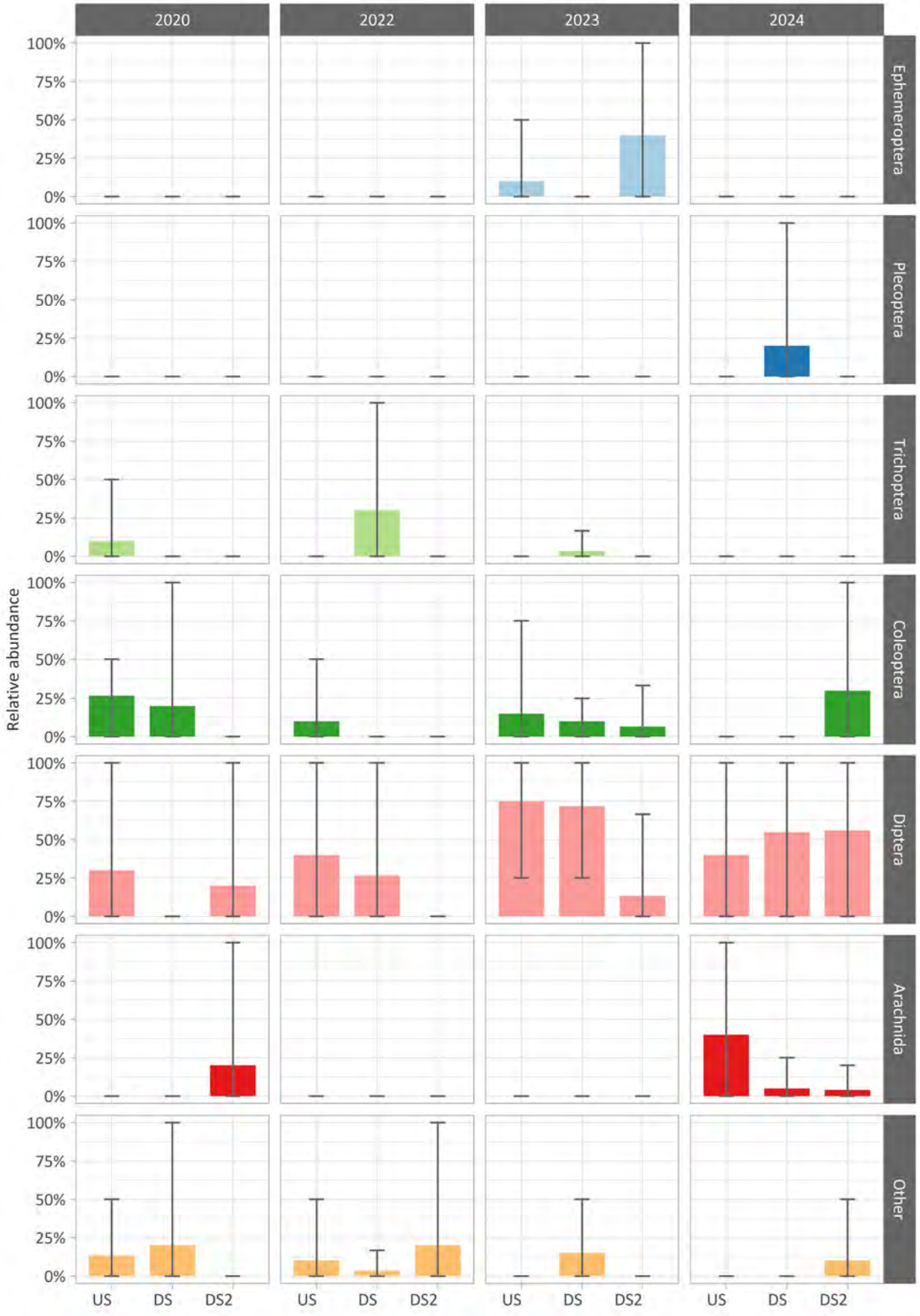


Figure 12. Macroinvertebrate community composition (%) at each site during the four surveys undertaken between 2020 and 2024.

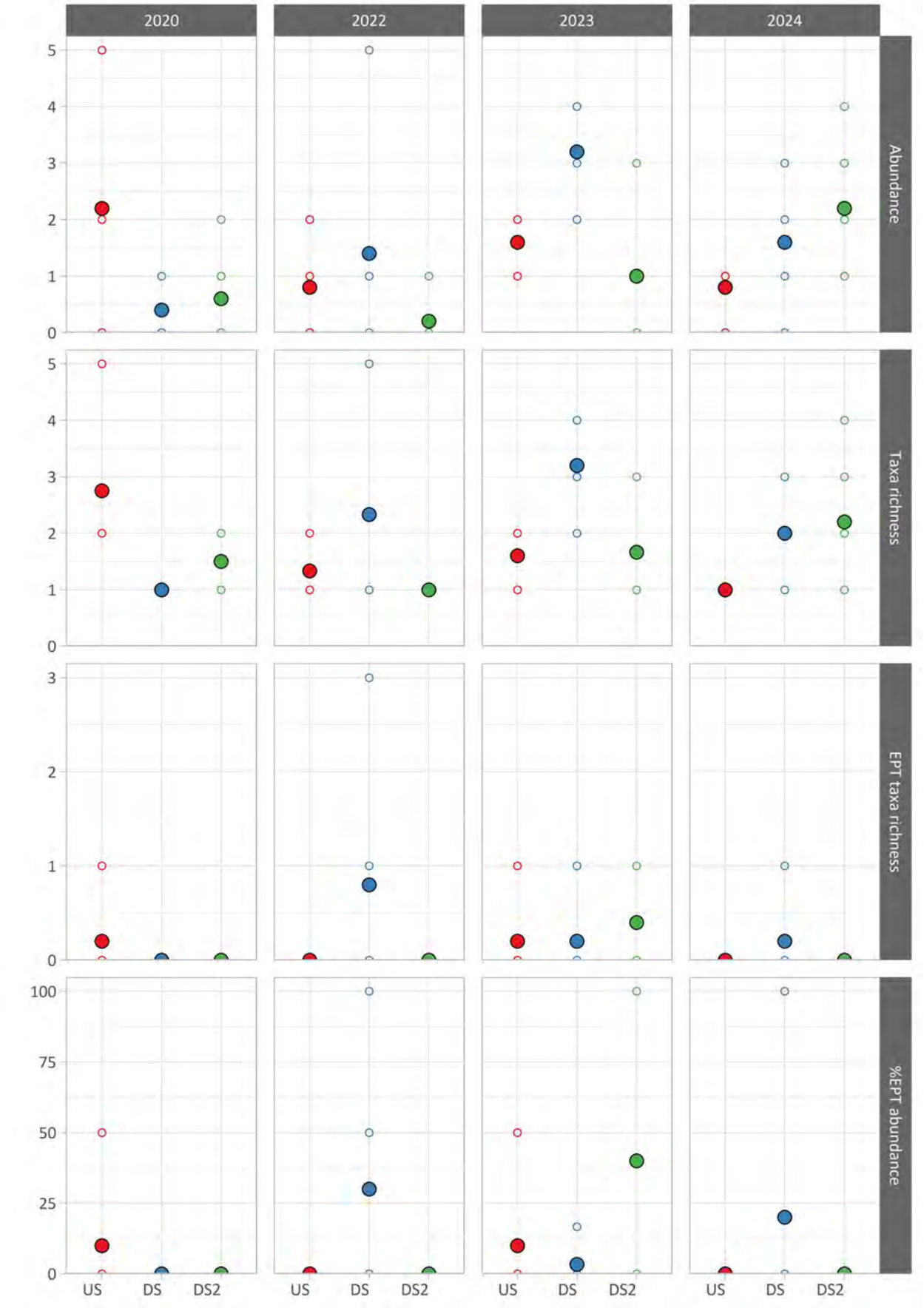


Figure 13. Abundance, taxa richness, EPT taxa richness and %EPT abundance of macroinvertebrate samples collected at each site between 2020 and 2024.

8.4 EPT Taxa

EPT taxa richness and %EPT abundance from each site are shown in Figure 13. The key findings were:

- EPT taxa richness in the Whangaehu River was consistently low across all sites, with many samples showing no EPT taxa present.
- %EPT abundance varied greatly (0% to 100%) due to the small sample sizes. On average, EPT taxa made up less than 50%, contrasting with the higher proportions (84-93%) in the Tokiahuru Stream (Kingett Mitchell 2006). This highlights the difference in habitat quality for sensitive taxa within the often acidic Whangaehu River.

8.5 Macroinvertebrate Community Index

The MCI and QMCI of samples collected at each site between 2020 and 2024 are provided in Figure 14. Open circles represent the score of each replicate, while filled circles represent the survey mean score. MCI and QMCI scores are compared to attribute bands and NBLs defined in the NPS-FM 2020 (refer Section 2.7). The key findings were:

- During the monitoring period, mean MCI scores at all sites consistently fell below the NBL of 90, in Attribute D, which the NPS-FM classifies as an indicator of severe organic pollution or nutrient enrichment. However, given the absence of sewage fungus (refer Section 6) and low periphyton coverage and biomass (refer Section 7.1), these low scores are considered a reflection of the river's naturally acidic and unfavourable condition, rather than anthropogenic impacts.
- Mean MCI scores fluctuated between sites, with no clear spatial trends. At times, the upstream site exhibited the highest MCI score (e.g., US: 67 in 2020), while at other times, the downstream sites showed the highest scores (e.g., DS2: 87 in 2024).
- QMCI scores remained low, often just below the NBL of 4.5 within Attribute D. These scores indicate poor water quality in the Whangaehu River, which is unable to support a diverse range of sensitive species. This result is consistent with the low presence of such taxa in the samples collected (refer Sections 8.1 through 8.4).
- The variability in MCI and QMCI scores likely reflects the small sample sizes in the Whangaehu River, where few or no individuals were sometimes present. As a result, even minor changes in the presence or absence of sensitive or pollution-tolerant taxa can cause significant shifts in MCI scores, while QMCI scores are further influenced by the relative abundance of these taxa.

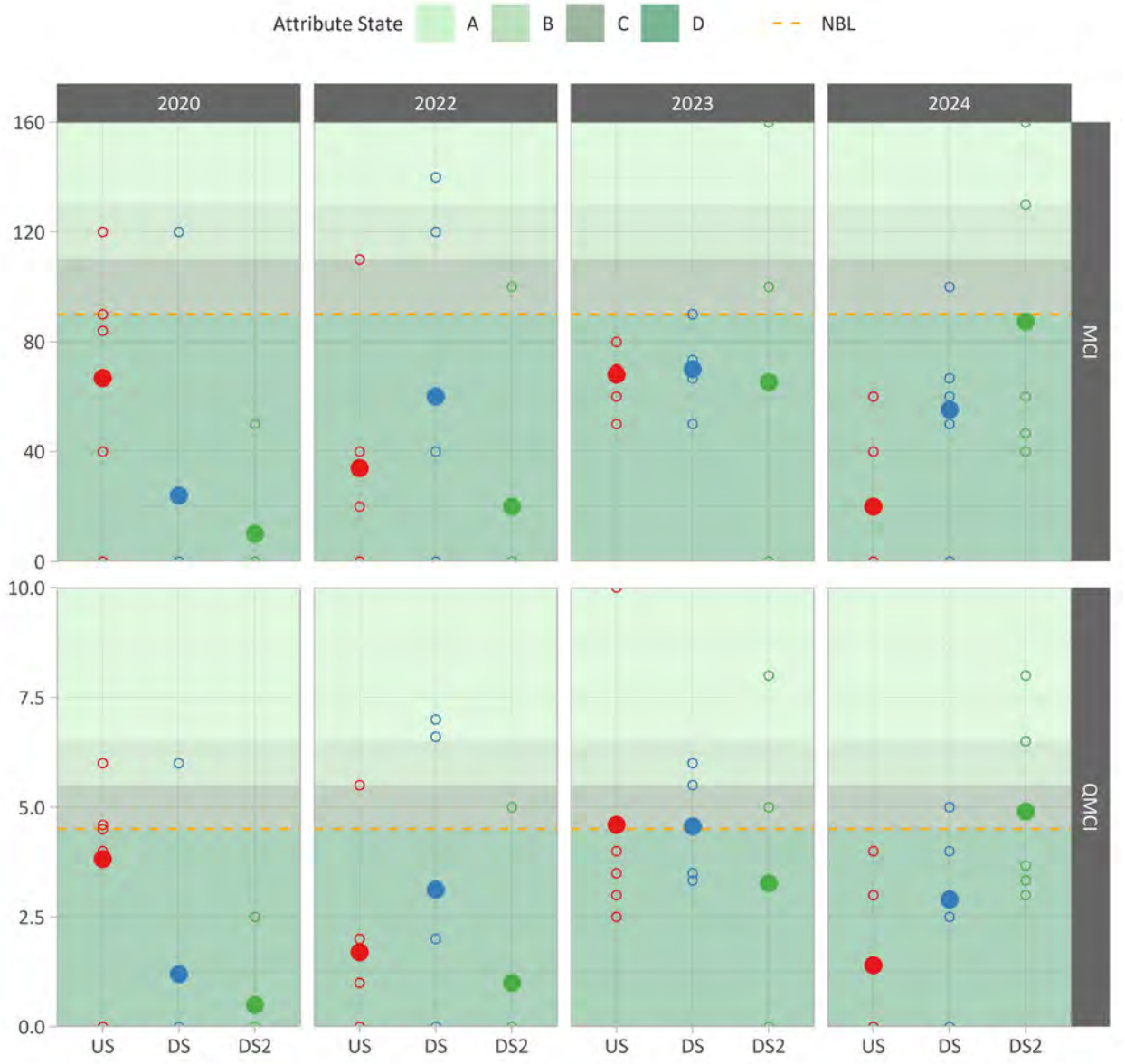


Figure 14. MCI and QMCI scores of samples collected at each site during the surveys undertaken between 2020 and 2024.

9 SUMMARY

Overview

The ecological surveys conducted between 2020 and 2024 in the Whangaehu River indicate that, in relation to ecology and river health indicators, no clear changes were observed between sites upstream and downstream of the pulp mill's discharge.

Water Quality

Spot water quality measurements reflected the Whangaehu River's volcanic origins, with consistently low pH and high specific conductance across all sites. In terms of temperature and dissolved oxygen, the river's water quality remained within the recommended thresholds for aquatic health.

Habitat Characteristics

The physical habitat characteristics of each site were largely consistent, with all sites dominated by run and riffle habitats, open and unshaded conditions, and streambed substrates primarily consisting of gravel and cobble. These similarities suggest that the sites offer comparable habitat conditions for invertebrates, with minimal factors that would make the survey results incomparable between sites.

Sewage Fungus

The absence of sewage fungus, a common indicator of high organic pollution, at all sites during the ecological surveys suggests that anthropic sources of organic pollution in the Whangaehu River are low.

Aquatic Flora

Periphyton cover and biomass were consistently low, with no exceedances of consent limits or signs of organic enrichment. Community composition varied over time but remained similar across sites, with no recent detections of cyanobacteria.

Benthic Invertebrates

The macroinvertebrate community exhibited low diversity and abundance, with EPT taxa appearing infrequently and in low numbers. The community was dominated by Diptera, particularly chironomid midges. Overall, the river's invertebrate populations were sparse, with few individuals recorded in samples, indicating poorer conditions compared to nearby streams. This was reflected in consistently low MCI and QMCI scores at both upstream and downstream sites, suggesting the river struggles to support a diverse range of sensitive species. The limited abundance and taxa richness point to a stressed ecosystem, with conditions unsuitable for a thriving invertebrate community.

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Appendix A
Periphyton Biomass Data

Table A1. Chlorophyll a and ash free dry weight data between 2012 and 2024.

Site	Replicate	Date	Dry weight mg/sample	Sample area m^2	AFDW		Chlorophyll *a*		Autotrophic Index
					mg/sample	mg/m^2	mg/sample	mg/m^2	
US	A	8/03/2012	20.1	0.001963	3.7	1884	0.002	1	1850
US	B	8/03/2012	193.6	0.001963	14.9	7589	0.01	5.1	1490
US	C	8/03/2012	154.4	0.001963	10.1	5144	0.004	2	2525
US	D	8/03/2012	109.5	0.001963	11.4	5806	0.005	2.5	2280
DS	A	8/03/2012	111.2	0.001963	35.8	18233	0.036	18.3	994
DS	B	8/03/2012	139.1	0.001963	31.5	16043	0.053	27	594
DS	C	8/03/2012	195.1	0.001963	64.5	32850	0.053	27	1217
DS	D	8/03/2012	69.3	0.001963	22	11205	0.041	20.9	537
US	A	28/02/2013	120	0.001963	13.3	1749	0.026	3.4	512
US	B	28/02/2013	190	0.001963	15.8	2078	0.054	7.1	293
US	C	28/02/2013	246.7	0.001963	18.3	2407	0.03	3.9	610
US	D	28/02/2013	52.5	0.001963	6.7	881	0.021	2.8	319
DS	A	28/02/2013	135.8	0.001963	38.3	5038	0.054	7.1	709
DS	B	28/02/2013	550	0.001963	45	5919	0.188	24.7	239
DS	C	28/02/2013	158.3	0.001963	45.8	6024	0.137	18	334
DS	D	28/02/2013	94.2	0.001963	34.2	4498	0.119	15.7	287
US	A	5/03/2014	286.2	0.001963	9.3	1033	0.008	0.9	1163
US	B	5/03/2014	147	0.001963	10.9	1211	0.005	0.6	2180
US	C	5/03/2014	354.6	0.001963	15	1667	0.009	1	1667
US	D	5/03/2014	407.3	0.001963	15	1667	0.005	0.6	3000
DS	A	5/03/2014	147.4	0.001963	19.8	2200	0.021	2.3	943
DS	B	5/03/2014	259	0.001963	39.6	4400	0.024	2.7	1650
DS	C	5/03/2014	496.6	0.001963	29.5	3278	0.016	1.8	1844
DS	D	5/03/2014	379.5	0.001963	56.6	6288	0.059	6.6	959
US	A	3/05/2019	58.7	0.001963	10.7	1090	0.041	4.2	261

Site	Replicate	Date	Dry weight mg/sample	Sample area m^2	AFDW		Chlorophyll *a*		Autotrophic Index
					mg/sample	mg/m^2	mg/sample	mg/m^2	
US	B	3/05/2019	81.3	0.001963	12	1222	0.048	4.9	250
US	C	3/05/2019	80	0.001963	14.7	1497	0.041	4.2	359
US	D	3/05/2019	55.3	0.001963	6.7	682	0.002	0.2	3350
DS	A	3/05/2019	101.3	0.001963	53.3	5429	0.428	43.6	125
DS	B	3/05/2019	64	0.001963	21.3	2170	0.086	8.8	248
DS	C	3/05/2019	134.7	0.001963	52	5297	0.48	48.9	108
DS	D	3/05/2019	34.7	0.001963	20	2037	0.134	13.6	149
US	A	2/12/2020	66	0.001963	4.5	458.3662361	0	0	*
US	B	2/12/2020	32.4	0.001963	3.2	325.9493235	0	0	*
US	C	2/12/2020	38	0.001963	4.8	488.9239852	0	0	*
US	D	2/12/2020	49.6	0.001963	4.8	488.9239852	0.0022336	0.227512628	2149
DS	A	2/12/2020	57	0.001963	8	814.8733086	0.001396	0.142195392	5731
DS	B	2/12/2020	42	0.001963	7.5	763.9437268	0	0	*
DS	C	2/12/2020	34.8	0.001963	3.2	325.9493235	0	0	*
DS	D	2/12/2020	63.2	0.001963	24	2444.619926	0.033504	3.412689417	716
DS2	A	2/12/2020	42.7	0.001963	9.1	926.9183886	0.0039088	0.398147099	2328
DS2	B	2/12/2020	41.3	0.001963	9.1	926.9183886	0.0039088	0.398147099	2328
DS2	C	2/12/2020	46.9	0.001963	12.6	1283.425461	0.0078176	0.796294197	1612
DS2	D	2/12/2020	39.66666667	0.001963	8.666666667	882.7794177	0.0022336	0.227512628	3880
US	A	11/04/2022	56.8	0.001963	1.6	162.9746617	0	0	*
US	B	11/04/2022	38.4	0.001963	2.4	244.4619926	0	0	*
US	C	11/04/2022	106.5	0.001963	3.5	356.5070725	0	0	*
US	D	11/04/2022	61.2	0.001963	1.6	162.9746617	0	0	*
DS	A	11/04/2022	40.8	0.001963	3.6	366.6929889	0	0	*
DS	B	11/04/2022	119.4	0.001963	3.6	366.6929889	0	0	*
DS	C	11/04/2022	100	0.001963	4	407.4366543	0	0	*

Site	Replicate	Date	Dry weight mg/sample	Sample area m^2	AFDW		Chlorophyll *a*		Autotrophic Index
					mg/sample	mg/m^2	mg/sample	mg/m^2	
DS	D	11/04/2022	93.33333333	0.001963	4.666666667	475.3427634	0	0	*
DS2	A	11/04/2022	95	0.001963	4	407.4366543	0	0	*
DS2	B	11/04/2022	154.5	0.001963	11.25	1145.91559	0	0	*
DS2	C	11/04/2022	253.6666667	0.001963	22.66666667	2308.807708	0	0	*
DS2	D	11/04/2022	59.5	0.001963	3.5	356.5070725	0.001396	0.142195392	2507
US	A	15/03/2023	266.85	0.001963	21.4375	2183.605819	0.01745	1.777442404	1229
US	B	15/03/2023	165.16	0.001963	25.37	2584.16698	0.072592	7.394160403	349
US	C	15/03/2023	110.768	0.001963	16.544	1685.158002	0.0201024	2.04761365	823
US	D	15/03/2023	97.344	0.001963	11.104	1131.044152	0.0089344	0.910050511	1243
DS	A	15/03/2023	53.296	0.001963	16.032	1633.00611	0.0089344	0.910050511	1794
DS	B	15/03/2023	345.64	0.001963	69.84	7113.843984	0.161936	16.49466551	431
DS	C	15/03/2023	163.2533333	0.001963	52.25333333	5322.480828	0.122848	12.51319453	425
DS	D	15/03/2023	167.265	0.001963	43.68	4449.208265	0.075384	7.678551187	579
DS2	A	15/03/2023	90.072	0.001963	11.656	1187.270411	0.0022336	0.227512628	5218
DS2	B	15/03/2023	34.68571429	0.001963	6.565714286	668.7781654	0.003190857	0.32501804	2058
DS2	C	15/03/2023	77.424	0.001963	12.952	1319.279887	0.0089344	0.910050511	1450
DS2	D	15/03/2023	41.92857143	0.001963	8.028571429	817.7835704	0.009971429	1.015681374	805
US	A	22/02/2024	89.6	0.001963	24.8	2526.107257	0.0022336	0.227512628	11103
US	B	22/02/2024	96	0.001963	28.8	2933.543911	0.0022336	0.227512628	12894
US	C	22/02/2024	146	0.001963	40	4074.366543	0	0	*
US	D	22/02/2024	90	0.001963	28	2852.05658	0.002792	0.284390785	10029
DS	A	22/02/2024	241.5	0.001963	61.5	6264.33856	0.037692	3.839275594	1632
DS	B	22/02/2024	384	0.001963	88	8963.606395	0.011168	1.137563139	7880
DS	C	22/02/2024	205.5	0.001963	34.5	3514.141143	0.016752	1.706344708	2059
DS	D	22/02/2024	96	0.001963	34.5	3514.141143	0.012564	1.279758531	2746
DS2	A	23/02/2024	518	0.001963	90	9167.324722	0.050256	5.119034125	1791

Site	Replicate	Date	Dry weight mg/sample	Sample area m^2	AFDW		Chlorophyll *a*		Autotrophic Index
					mg/sample	mg/m^2	mg/sample	mg/m^2	
DS2	B	23/02/2024	874	0.001963	88	8963.606395	0.067008	6.825378833	1313
DS2	C	23/02/2024	438.6666667	0.001963	58	5907.831488	0.020474667	2.085532421	2833
DS2	D	23/02/2024	250.5	0.001963	40.5	4125.296125	0.008376	0.853172354	4835

Notes: *No chlorophyll *a* was found in sample, and therefore the Autotrophic Index could not be calculated

Appendix B
Macroinvertebrate Data

Table B1. Raw macroinvertebrate data from each site during the ecological survey between 2020 and 2024.

Date	Taxonomic Group	Taxa	MCI	US-A	US-B	US-C	US-D	US-E	DS1-A	DS1-B	DS1-C	DS1-D	DS1-E	DS2-A	DS2-B	DS2-C	DS2-D	DS2-E
2/12/2020	Trichoptera	*Aoteapsyche*	4					1										
2/12/2020	Coleoptera	*Elmidae*	6		1	1						1						
2/12/2020	Coleoptera	*Hydrophilidae*	5			1												
2/12/2020	Coleoptera	*Staphylinidae*	5					1										
2/12/2020	Diptera	*Corynoneura*	2				1											
2/12/2020	Diptera	*Maoridiamesa*	3											1				
2/12/2020	Diptera	*Molophilus*	5			1												
2/12/2020	Diptera	*Orthocladiinae*	2			2	3							1				
2/12/2020	COLLEMBOLA		6							1								
2/12/2020	Crustacea	*Ostracoda*	3			1												
2/12/2020	ACARINA		5															1
2/12/2020	OLIGOCHAETA		1		1													
11/04/2022	Trichoptera	*Aoteapsyche*	4								1							
11/04/2022	Trichoptera	*Orthopsyche*	9								1							
11/04/2022	Trichoptera	*Pycnocentria*	7						1		1							
11/04/2022	Hemiptera	*Microvelia*	5	1														
11/04/2022	Hemiptera	*Saldidae*	5															1
11/04/2022	Megaloptera	*Archichauliodes*	7								1							
11/04/2022	Coleoptera	*Elmidae*	6	1														
11/04/2022	Diptera	*Austrosimulium*	3								2							
11/04/2022	Diptera	*Chironomidae*	2							1								
11/04/2022	Diptera	*Orthocladiinae*	2					1										
11/04/2022	Diptera	*Psychodidae*	1				1											
15/03/2023	Ephemeroptera	*Deleatidium*	8												1			
15/03/2023	Ephemeroptera	*Mauiulus*	5				1											1
15/03/2023	Trichoptera	*Hudsonema*	6									1						
15/03/2023	Coleoptera	*Elmidae*	6			3				1	1					1		

Date	Taxonomic Group	Taxa	MCI	US-A	US-B	US-C	US-D	US-E	DS1-A	DS1-B	DS1-C	DS1-D	DS1-E	DS2-A	DS2-B	DS2-C	DS2-D	DS2-E
15/03/2023	Diptera	*Austrosimulium*	3						1		1							
15/03/2023	Diptera	*Ephydridae*	4						1									
15/03/2023	Diptera	*Maoridiamesa*	3	1	1				1	1	1		3			1		
15/03/2023	Diptera	*Orthocladiinae*	2		1	1	1				1	3	1					
15/03/2023	Diptera	*Paradixa*	4					1										
15/03/2023	Diptera	*Psychodidae*	1													1		
15/03/2023	Diptera	*Tanytarsini*	3									2						
15/03/2023	OLIGOCHAETA		1							2								
15/03/2023	NEMATODA		3						1									
22/02/2024	Plecoptera	*Zelandobius*	5								1							
22/02/2024	Megaloptera	*Archichauliodes*	7														1	
22/02/2024	Coleoptera	*Elmidae*	6														1	
22/02/2024	Coleoptera	*Scirtidae*	8															1
22/02/2024	Diptera	*Austrosimulium*	3										1					
22/02/2024	Diptera	*Chironomus*	1											1				
22/02/2024	Diptera	*Corynoneura*	2												1			
22/02/2024	Diptera	*Maoridiamesa*	3				1					1	1	2	2	1		
22/02/2024	Diptera	*Orthocladiinae*	2			2			1			2		2	1			
22/02/2024	Diptera	*Tanytarsini*	3						1									
22/02/2024	ACARINA		5	1				1							1			
22/02/2024	ARACHNIDA	*Dolomedes*	5									1						

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Appendix E
Economics Assessment

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Economic Significance of the Karioi Pulpmill

Water Discharge Consent Application

Prepared for: Viridis Limited - March 2025 – Final

Formative

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Economic Significance of the Karioi Pulpmill

Water Discharge Consent Application

Project Reference: VIR001.24

Author: Natalie Hampson (Director)

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Executive Summary

This report by Savvy Consulting and Formative Limited provides an assessment of the economic benefits provided by the operation of the Karioi Pulpmill, owned by Winstone Pulp International ("WPI") who have closed the site and are planning to sell it.

The approach of this assessment has been to analyse the economic and social benefits that were delivered by WPI through its operations of the Pulpmill, and by association, the adjacent Tangiwai Sawmill in the year ending June 2024. This being the last full financial year of operation for the two mills (which are economically linked).

The analysis has examined the wider Pulp and Paper Manufacturing Industry in New Zealand and the Karioi Pulpmill in that context. Pulpmills have a unique combination of locational attributes that must be met in order to run efficiently and profitably, and these are especially critical to the Karioi Pulpmill given the distance of the Ruapehu District to the Napier Port for exporting. This distance constraint is the same reason that commercial and farm forestry in Ruapehu and neighbouring central North Island districts relied on the Pulpmill (and Tangiwai Sawmill) to be commercially viable. The mills had a synergistic relationship with the local forestry sector which adds to the strength of their combined economic role.

Examination of the operations of the Karioi Pulpmill revealed a diverse and wide-spread up-stream supply chain. This ranged from chemical suppliers in Morrinsville to heavy construction services in Tauranga to logistics services in Napier and trucking services in Ruapehu District and a lot in between. The biggest inputs to production for the mills were forestry products and electricity. All 210,000 metric tonnes of final high-quality wood pulp produced per annum by the 250 staff spread across the Pulpmill and Sawmill (and a few remote roles) was exported to Asia.

Applying an Input-Output based methodology to model the total direct, indirect and induced economic impact of the Karioi Pulpmill (and by association the Tangiwai Sawmill), it was estimated that it directly sustained a minimum of $40 million of GDP and 229 jobs in the Ruapehu District. Total employment at the mills accounted for 5% of all employment in the district and 68% of total manufacturing employment in Ruapehu. The mills combined were the second largest employer in the district (after the Defence Force).

Considering direct, indirect and induced impacts, the Pulpmill sustained a significant $92 million of GDP per annum in the Manawatu-Wanganui Region (including 583 jobs). This impact increases to a national GDP contribution of $279 million (and 1,883 jobs).[1]

These economic effects are considered significant in absolute and relative terms. The social benefits generated by the mills are also considered to be significant.

In a community with an above average share of residents of Māori descent, the mills provided a large number of highly skilled, high-paid jobs for the local community, lifting the socio-economic status of the district over 50 years' of operation and at times, three generations of staff in the same family. WPI encouraged local school leavers to pursue tertiary education (through the provision of scholarships) and provided apprenticeships and work opportunities for local tertiary students each year. The Karioi Pulpmill and Tangiwai Sawmill were an integral part of the social and economic fabric of Ruapehu District.

Based on our assessment, we conclude that WPI's operations played a significant role in the district and wider region. The wholesale electricity price rises (the acute spike of August 2024 and the preceding year on year increases) that contributed to the closure of the Pulpmill (and therefore Sawmill) were equally unique circumstances driven by a complex combination of environmental, economic and regulatory factors.

To the extent that granting the wastewater discharge consent for a limited period of 5 years increases the likelihood of attracting a buyer for the Karioi Pulpmill (which we consider it would), we would support that outcome from an economic perspective. This is on the basis that the significant social and economic benefits generated by the mills in the year ending June 2024 are a strong indication of the likely scale and significance of the benefits that a new owner of the site(s) may be able to generate for the district and wider region over the long-term.

[1] Based on the year ending June 2024 but expressed in $2023.

1 Introduction

Viridis Limited has contracted Savvy Consulting and Formative Limited to assess the economic contribution of the Winstone Pulp International (WPI) Karioi Pulpmill ("the Pulpmill") to the Manawatu-Wanganui Region and local Ruapehu District. In addition, an assessment of the exceptional electricity prices that led to the closure of the Pulpmill in late 2024 is discussed. This report has been prepared to support WPI's resource consent application to Horizons Regional Council to discharge treated effluent, stormwater and antifoam into the Whangaehu River for a limited 5 year period (noting that the existing consent expires on the 1st of July 2025).

1.1 Background

The Pulpmill has operated in the Ruapehu District next to the Karioi Forest since 1978. It is a significant and multi-faceted manufacturing operation that produces around 210,000 metric tonnes of pulp fibre for export, where it is then used to produce paperboard for packaging in China, Indonesia, India, Pakistan and elsewhere. The plant and associated facilities have evolved over the years as production and demand has shifted. Investments on the site in the last five years includes a new drum de-barker (costing $5 million plus) and a new bale forming press (costing $5 million plus), What exists on the site today represents a significant capital investment.[2] Further detail on the operation of the Pulpmill is discussed in Section 2. Understanding the basics of the Pulpmill's operation aids in articulating the Pulpmill's upstream supply chain and therefore its direct and flow-on economic impacts.

Following a period of rapidly rising electricity costs, WPI made the very difficult decision to close the Pulpmill in September 2024. The focus of this report is not on the closure of the Pulpmill (although the role of electricity price rises in that closure is covered and considered relevant to the consent application), but rather, it focusses on the significant economic contribution that the Pulpmill made when fully operational.

The reason for this, is that WPI are looking to sell the site (and related assets) so that a new manufacturing business can establish on the site. A current discharge consent is considered essential to attract a buyer and therefore makes a valuable contribution to the sale process.

While the purchaser of the site may not necessarily be another pulpmill, based on the scale of the site and value of the plant/assets, any new business is likely to be a large scale, high-output operation. The economic impact of the WPI Pulpmill operation is therefore an indication of the economic impact a future operator of the site may generate. It is that future

[2] The total improvement value is commercially sensitive.

operator that will potentially make use of the resource consent being sought. Therefore, the positive economic effects facilitated by the resource consent are considered relevant to the overall assessment of effects for the consent application.

1.2 Approach

This report starts with a brief overview of the Pulp and Paper Manufacturing industry in New Zealand and the Karioi Pulpmill in that context. Key economic relationships between the Pulp and Paper Manufacturing industry and other industries are discussed. This is covered in Section 2 and explains a lot of the relevant economic linkages relevant to the Karioi Pulpmill.

Section 3 of the report summarises more specifically the operation of the Karioi Pulpmill. Key suppliers are identified and their role in the Pulpmill's supply chain is examined (including the critical link with the Tangiwai Sawmill). The socio-economic role of the Pulpmill within Ruapehu District is analysed, drawing on quantitative and qualitative data gained from communication/interviews with WPI. Brief analysis is provided on the contribution the Pulpmill makes to the manufacturing sector (and total economy) in Ruapehu District.

Section 4 contains the results of a more detailed economic impact assessment. This part of the report has been carried out using Formative's proprietary Economic Linkages Model (ELM). A detailed explanation of the ELM is contained in Appendix 1. The model uses actual data on New Zealand-based expenditure by WPI by sector and location across New Zealand for the financial year ending June 2024 (i.e. the Pulpmill's most recent financial year). This direct expenditure data is used to estimate not only the direct economic contribution of the Pulpmill in GDP and employment terms, but the indirect and induced economic impact. Combined, this total economic impact is expressed in GDP and employment terms.

Section 5 explores the rapid rise in electricity prices experienced by the Pulpmill. Consideration is given to electricity price trends over time, the cause of the price rises preceding the closure of the Pulpmill, and the significance of those price increases for the Pulpmill's financial viability.

Section 6 briefly summaries the significance of both the Pulpmill's socio-economic contribution when operational and the electricity price rises experienced in 2024. Conclusions are drawn on the indicative positive economic (and social) effects a new manufacturing operator on the Pulpmill site may bring to the Ruapehu District and wider Manawatu-Wanganui Region going forward.

2 Pulp & Paper Manufacturing Industry

2.1 New Zealand's Pulp & Paper Manufacturing Industry

The Pulp & Paper Manufacturing industry incorporates the manufacturing of wood fibres for use in a wide range of paper products and fibre-based building materials (like MDF) using raw materials, such as wood pulp, recycled paper, and other fibres. The New Zealand Pulp and Paper Manufacturing industry is a dynamic sector with a rich history and significant economic impact.

Many of the mills were developed around 50 years ago. Despite facing various challenges, including competition from manufacturers elsewhere in the world who benefit from lower production costs, the industry continues to adapt and evolve, contributing to both the domestic and international (export) markets. New Zealand's high quality pulp and paper products are in demand internationally, with strong export markets in Asia.

New Zealand's Pulp and Paper Manufacturing Industry has always comprised of a small number of big players with WPI, Pan Pac,[3] and Oji Fibre Solutions (OjiFS) representing most of pulp and paper processing capacity in 2024. Some mills like WPI's Karioi Pulpmill produce just pulp, while other mills produce pulp and paper products. Historically more paper was manufactured in New Zealand, but more recently the paper manufacturing side of the industry has become more concentrated.

2.2 Industry Scale and Location

Table 2.1 contains statistics on the Pulp and Paper Manufacturing industry in New Zealand from the StatisticsNZ Business Demography dataset. It captures the 2023 year, and the changes in employment between 2018 and 2023. According to StatisticsNZ, there were a total of 26 businesses classified in the Pulp and Paper Manufacturing industry (spread over 15 territorial authorities), although the industry is dominated by 5 major mills that account for 84%

[3] Pan Pac is owned by the Oji Group.

of total industry employment in 2023 (1,671 workers). Those major producers have average employment of 334 each.

It is important to note that this employment data may not include all employment on the mill sites as there may be other entities within the wider operations that are classified to other industries such as Sawmilling. This will differ for each business, depending on how their operations are structured and registered with the IRD. As the employment data does not include the February 2024 snapshot, there may have been further changes in employment since 2023 that have not been captured in Table 2.1.

Relevant to this report, the employment data for Ruapehu District in Table 2.1 (which relates to WPI's operations), excludes the Tangiwai Sawmill, which is classified separately, but effectively tied to the operation of the Karioi Pulpmill. This is discussed further in Section 3.

Table 2.1 – Pulp and Paper Manufacturing Industry in New Zealand, 2023

Territorial Authority	Business Count 2023	Employee Count 2023	Average Business Size 2023	2018-2023 Employee Count
Hastings District *	1	526	526	123
Kawerau District **	1	455	455	- 253
South Waikato District ***	1	403	403	- 25
Whakatane District ##	1	165	165	- 38
Ruapehu District****	1	123	123	- 38
Sub-Total Major Producers	*5*	*1,671*	*334*	- *231*
Auckland #	6	226	38	123
Christchurch City	5	76	15	72
Other	10	27	3	27
Sub-Total Minor Producers	21	329	16	284
Total Industry	**26**	**2,000**	**77**	**53**

Pulp, Paper and Paperboard Manufacting (ANZSIC C151000) includes the following primary activities: paper, newsprint, paperboard, paper pulp and wood pulp manufacturing.
** Pan Pac. ** Tasman (OjiFS). *** Kinleith (OjiFS). **** Karioi (WPI). # Includes OjiFS's Penrose paper recylcing mill. ## WML Paperboard*
Source: StatisticsNZ Business Demography Dataset

Between 2018 and 2023, there has been a minor increase in total employment across the industry (53 additional employees). However, the major producers experienced a decrease in employment while the minor producers experienced an increase in employment. Of the major producers, only the PanPac mill in Hastings District increased employment over that period. The other major producers decreased employment by between 38-253 jobs. Although unable to be confirmed, some of those job losses are expected to be the result of increased efficiency/automation in the major mills while others may relate to economic stresses including global competition.

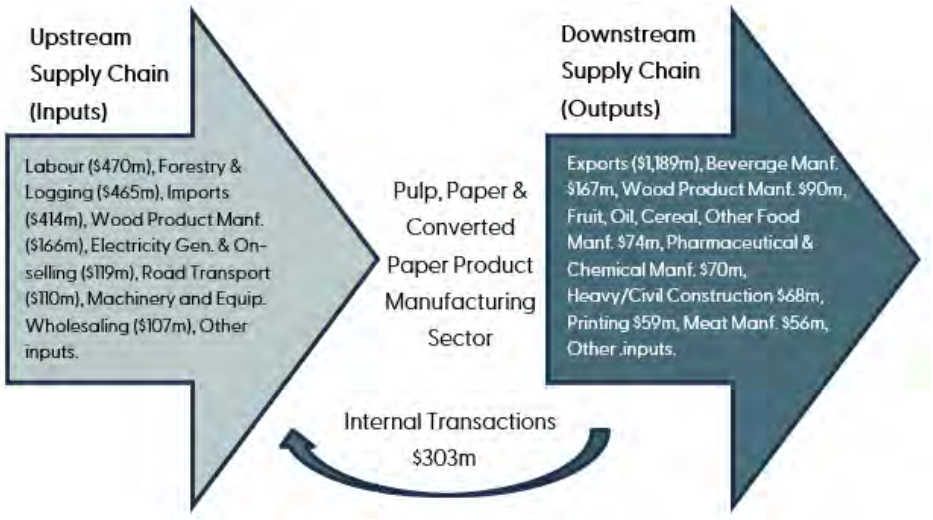
The five major producers in the Pulp and Paper Manufacturing industry are all based in the North Island. It is not a coincidence that 75% of New Zealand's *Pinus radiata* forestry estate is also in the North Island.[4] The importance of proximity to forestry for pulpmills is discussed further below. The three main players in pulp fibre production (WPI, OjiFS and PanPac located in Ruapehu District, Kawerau and South Waikato districts, and Hastings District respectively) combined had total employment of just over 1,500 workers (75% of the total Pulp and Paper Manufacturing industry).[5] The combined gross output of just the WPI operations, Kinleith Mill and Pan Pac Mill was circa $960 million (2023/2024).[6]

According the StatisticsNZ National Accounts (year ending March 2020), the total Pulp, Paper and Converted Paper Product Manufacturing sector produced $1.6 billion worth of pulp, paper and paperboard, $1.3 billion worth of other paperboard products, and $230 million worth of wood.[7]

2.3 Sectoral Relationships

Figure 2.1 provides an overview of the key purchase and sale patterns of the total Pulp, Paper & Converted Paper Product Manufacturing sector in New Zealand based on the StatisticsNZ National Accounts Inter-Industry Transaction Table (YE March 2020).[8]

Figure 2.1 – Key Upstream and Downstream Supply Chains YE March 2020 – Total New Zealand Sector



[4] Source: National Exotic Forestry Description 2022.
[5] Excludes the Tangiwai Sawmill employment.
[6] Government Briefing Paper, 28 August 2024, prepared by OjiFS, Pan Pac and WPI.
[7] Basic prices.
[8] Noting this is broader than just the Pulpmill industry.

When looking at the downstream supply chain (i.e. who the sector sells to), 58% of the outputs were purchased by a wide range of New Zealand-based sectors. These are related to demand for product packaging, construction, food and beverage services, printing, and more. Many of New Zealand's key export sectors are highly dependent on the outputs of the Pulp, Paper and Converted Paper Products Manufacturing sector.

Approximately $303 million of total sector output is purchased by the sector itself – this reflects (mainly) the pulpmills selling pulp to the paper product mills (with both captured in the same sector). A significant 36% of annual output from the sector was sold directly overseas as exports. In the year ending March 2020, the export value was $1.19 billion - the 17th highest export sector by value (out of 109 sectors).

The upstream supply chain (inputs to production) includes $470 million paid in wages and salaries across New Zealand, followed by $465 million purchased directly from the Forestry and Logging sector, and a further $166 million purchased from the Wood Product Manufacturing sector (includes sawmilling and wood chipping). A further $119 million was purchased from the Electricity Generation and On-selling sector (the 5th highest cost for the industry as a whole in 2020, and at that time, making up an average of 4.4% of total costs on goods and services (including imports) that year).[9] Being an average, the major producers are expect to have had a higher share of total costs being from the Electricity Generation sector and vice versa for the smaller producers. Total energy costs (including LPG) for the major players in the pulp and paper industry were estimated at around 13-20% of total production costs in 2019. This is discussed further in Section 5. Transport services and machinery are also big expenses for the sector.

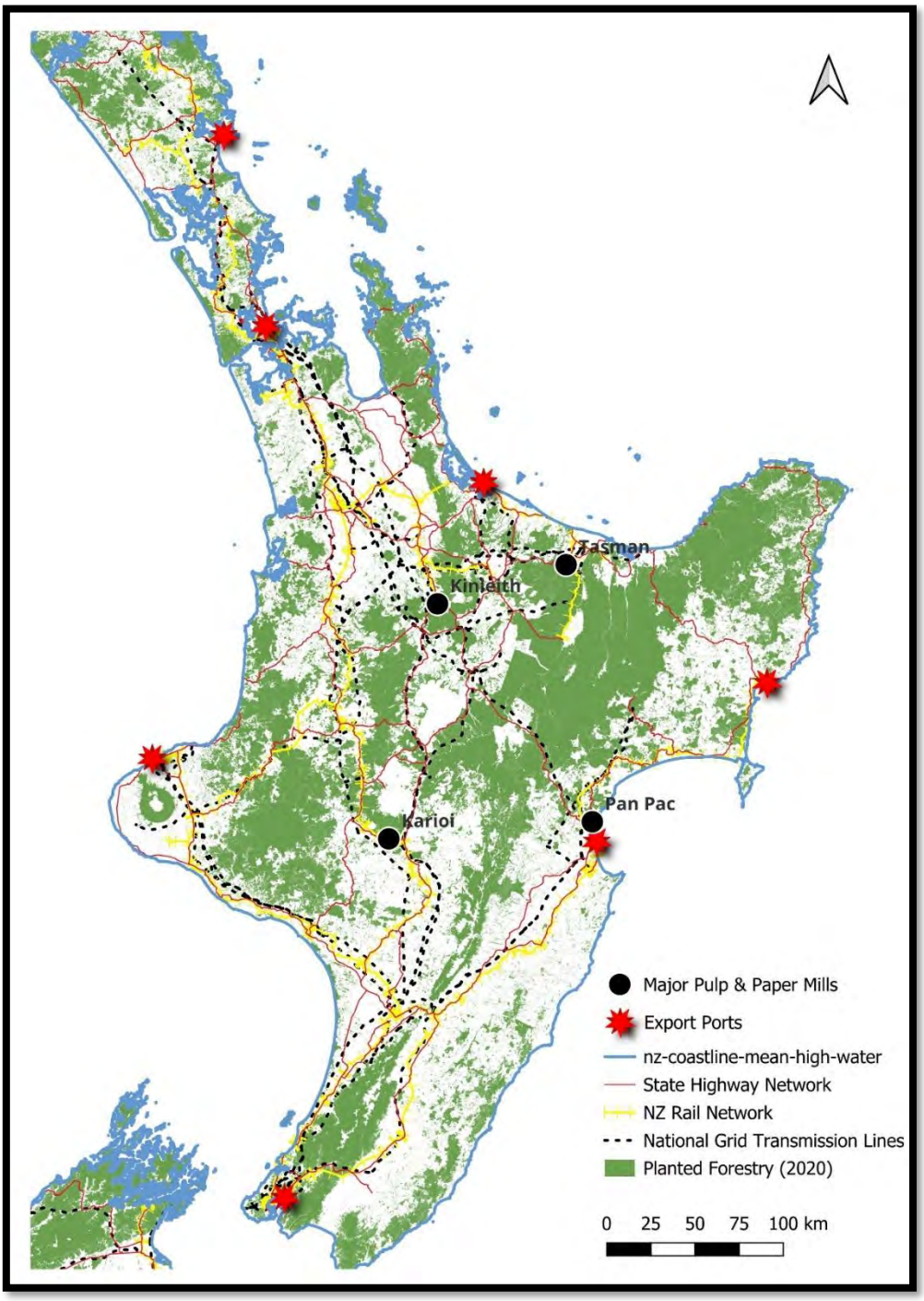
With large amounts of forestry wood and electricity needed in the production of wood pulp/fibre, and substantial volumes going to export, the location of pulpmills is strongly governed by proximity to commercial forests, National Grid infrastructure, the rail network (sidings) and export container ports. Being too far from any of these sectors would impact on the viability of the Pulpmill industry.

Figure 2.2 shows the location of the main Pulpmill players in the North Island – Karioi, Kinleith, Tasman and Pan Pac. All but the Pan Pac mill in Whirinaki are serviced by rail (Pan Pac has a location close to its export port so has a relatively short distance for truck freight). All are located on the State Highway network, and all are close to significant commercial forestry areas. Pan Pac, Tasman and Kinleith are relatively closer to a major export port (Napier and Tauranga) than the Karioi mill (which uses Napier Port), meaning that transport (rail) costs are

[9] A further $40m was paid to the Electricity Transmission and Distribution industry, bringing total electricity costs to 6% on average in 2020, and a further $48m was paid to the Gas and Water Supply industry (contributing to total energy costs).

likely to make up a relatively higher share of total production costs compared to the other mills (per tonne). WPI and Pan Pac together represent around 65,000-75,000 TEU[10] or roughly 35% of Napier Port's container volumes. OjiFS's Kinleith and Tasman mills export 600,000 tonnes through the port at Tauranga each year.

Figure 2.2 – Major Pulpmills in the North Island Including Forestry Resource and Infrastructure

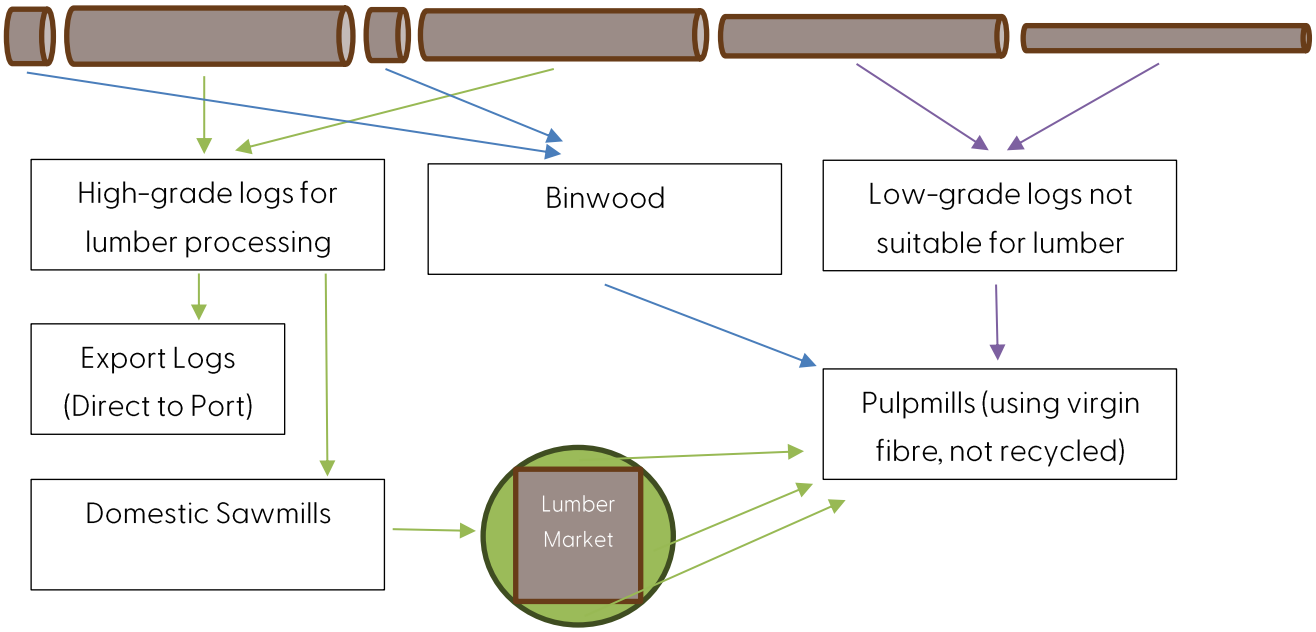


[10] Twenty Food Equivalent shipping containers.

2.3.1 Co-Location of Forests, Pulpmills and Sawmills

Pulpmills play an important role of consuming forestry products that would otherwise be wasted (in the current market at least).[11] By purchasing wood that is not suitable for lumber (as well as the by-product of lumber processing), the pulp industry provides critical financial support for the commercial forestry industry in New Zealand. It provides a stream of revenue from harvested trees that is needed to help make the growing and harvesting of commercial forests economically viable. This is summarised in Figure 2.3.

Figure 2.3 – Maximum Utilisation (Revenue Stream) of a Harvested Pine Tree



When pine trees are harvested, the bottom half of the tree is cut into high-grade logs - ideally cut into two logs (with the length depending on the final market). That leaves the top half of each harvested tree (low-grade log wood) needing to find a market (Figure 2.3). As freighting bulk forestry products is costly, distance to market is a critical factor. When the price of low-grade log wood is relatively low but the freight costs are still high, buyers of low-grade log wood, and binwood[12], need to be nearby – else it is uneconomic to transport. If the distance is too far, it's not cost effective, and foresters would be better off leaving it in the forest.

The location drivers of sawmills are very similar to pulpmills - with proximity to forests, state highways, rail infrastructure, national grid infrastructure (particularly if kiln drying) and ports (if

[11] As the wood pellet market develops in New Zealand (as an alternative and renewable fuel source of process heat), this may increase the demand for forestry waste following harvest and high grade log production.
[12] Binwood is a residue of the logging process – it includes salvageable wood from skid sites in harvested forests and includes any wastage from trimming logs to the desired export or sawmill length.

processing for export) all critical. As a third of any log is wasted in lumber processing (Figure 2.3), there is significant wastage of purchased logs if a use cannot be found for this residue. Without a market for this, sawmills would be uneconomic to operate. Pulpmills can use the wastage of sawmills if the transport costs are low. It is for this reason that pulpmills and sawmills are often co-located (and often co-owned). In 2024, 16 sawmills across the country relied on pulpmills to support their economic viability.

The forestry, sawmilling, and pulp and paper sectors are therefore inter-connected through supply chains. Pulpmills underpin the economic viability of the forestry and sawmilling sectors. The major pulpmills process millions of tonnes of logs and other fibre every year, including creating a value stream for sawmill chips and binwood (forestry offcuts) that would otherwise likely remain on the sawmill or forest floor. For example, in a typical year:[13]

- OjiFS's Kinleith site processes 1.3 million tonnes of pulp logs and over 500,000 tonnes of sawmill chip and binwood (forestry offcuts)
- Pan Pac's pulp mill processed 300,000 tonnes of pulp logs, 300,000 tonnes of sawmill chip, and 50,000 tonnes of binwood (forestry offcuts), and
- WPI's Karioi pulp mill processed 600,000 tonnes of logs and 65,000-70,000 tonnes of binwood (forestry offcuts).

[13] Government Briefing Paper, 28 August 2024, prepared by OjiFS, Pan Pac and WPI.

3 Karioi Pulpmill and Tangiwai Sawmill Operations

3.1 Overview of Operations

The Karioi Pulpmill is located on 40.6 hectares of freehold land, adjacent to the Karioi Forest on State Highway 49 between the towns of Waiouru and Ohakune (Figure 3.1). The Pulpmill has been progressively upgraded and expanded since its original commissioning in late 1978. It produces short fibre pulp (specifically Advanced Board pulp for use in the Asian paperboard market). The mill has capacity to produce 210,000-230,000 metric tonnes of pulp fibre a year.

Apart from the main Pulpmill, Woodroom and Administration buildings, the site has several outbuildings including, a production consumables warehouse, roll shop, motor bulk store, training room, staff gym, forestry office, forestry fire station, stores building, contractor lunchroom, wastewater treatment plant (WWTP) laboratory, electrical and mechanical workshops, hydraulic workshop and a fabrication shop. The Pulpmill is designed to operate 24/7.

Like the other major players in the pulp and paper industry, the Karioi Pulpmill is co-located (by a short distance) with the Tangiwai Sawmill. Both are owned by WPI and operate synergistically. Tangiwai Sawmill is the fourth largest Sawmill in New Zealand. The Pulpmill generates 53% of the revenue of the Sawmill by taking residue (waste) from the lumber processing operations. Without that revenue, the Sawmill would not be able to generate sufficient income to be viable.[14]

As Ruapehu District is a long distance by rail or road to an export log port or the next nearest sawmill, the Pulpmill (which purchases bin wood and low-grade log wood) and the Sawmill (which purchases high-grade log wood) is vital to the local commercial and small scale (woodlot) forestry sector in and near the district. This is because the cost of transport to Napier Port or another more distant sawmill (i.e. Taupo is 140km away) would make harvesting those forests/woodlots uneconomic for many smaller forestry growers. Together the mills provide a local market for the harvested resource, thereby sustaining plantation forestry in the region and allowing foresters to maximise the value from their land. Only for larger commercial foresters in the area is it economic to export their high-grade logs.

[14] It is for this reason that the Tangiwai Sawmill closed when the Karioi Pulpmill closed.

Figure 3.1 – Aerial View of Karioi Pulpmill and Tangiwai Sawmill

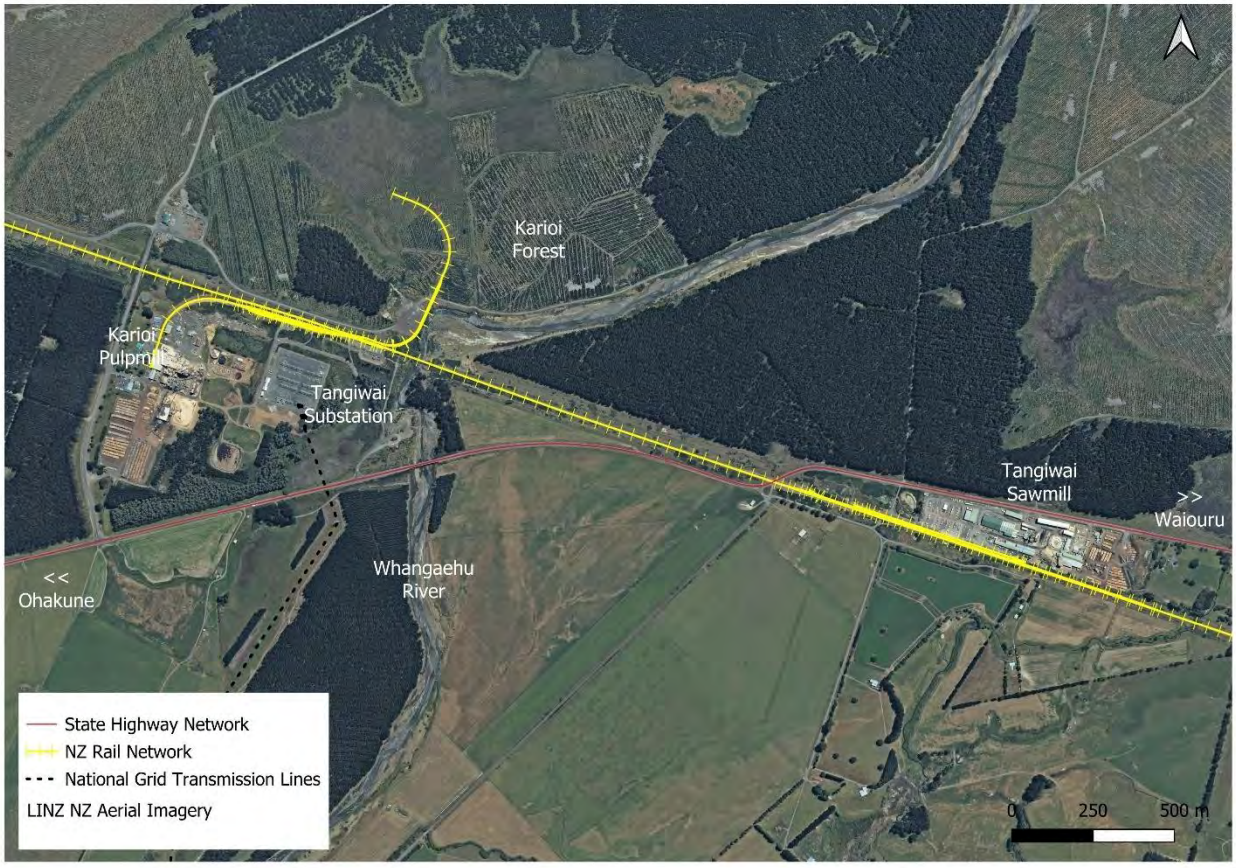
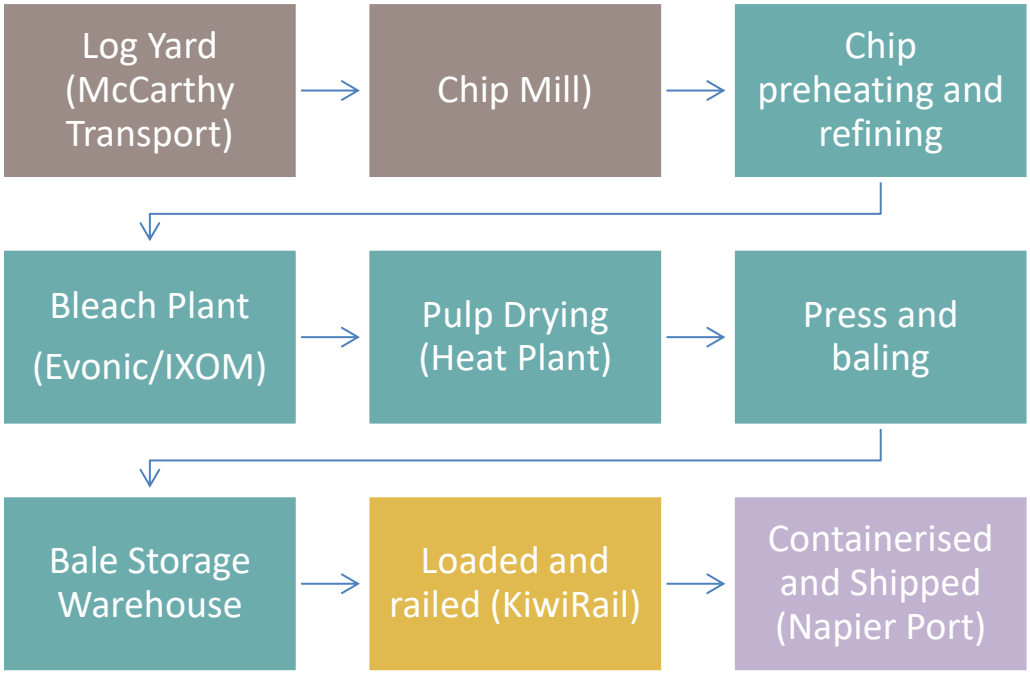


Figure 3.2 provides a very simple summary of the manufacturing process at the Karioi Pulpmill. Where relevant, external suppliers that are integral to production and contracted by WPI are identified (in brackets).

The Pulpmill includes a log yard where low-grade logs and binwood are brought from surrounding harvested forests by McCarthy Transport. McCarthy Transport is a large trucking operation not wholly dependent on WPI for its revenue. They did however invest in specialist binwood trucks as part of their contract with WPI. McCarthy Transport also bring the waste wood from the Tangiwai Sawmill to the Pulpmill.

The wood is then turned into chips. McCarthy Transport are also contracted to operate the logyard at the pulpmill site. In total, the Pulpmill & Sawmill sites sustained 15 workers from McCarthy Transport. The wood chip then enters the Pulpmill proper where it undergoes a heating and refining stage. The product moves to the bleach plant where it is treated with a number of chemicals (including hydrogen peroxide). The bleached pulp then moves through the drying process before being compressed and baled. Baled product is stored in an onsite warehouse from which it is loaded onto curtain-sider rail carriages, five days a week.

Figure 3.2 - Simple Summary of Key Steps in the Karioi Pulpmill Production Process



KiwiRail deliver the baled product (via Palmerston North) to Napier Port. WPI is responsible for one of only two scheduled trains per day on the East Coast rail line from Palmerston North to Napier, meaning that they play an important role in generating a return on KiwiRail's investment in this part of the rail network.

In their role as a third party logistics service provider, Napier Port pack the bales of pulp fibre into containers, sort out any customs requirements, and move the containers to the port's container terminal to await shipping.

3.1.1 Energy and Water Supply and Waste Management

The wood pulp production process is particularly energy intensive. The demands are so high, that electricity to the site is via the National Grid – with the exit point being the Tangiwai Substation adjoining the Pulpmill (Figure 3.1). WPI is one of the few direct industrial participants in the electricity market. 11KV power is distributed to the Pulpmill water intake and the Tangiwai Sawmill via overhead transmission conductors. These and some additional transformers are owned and maintained by The Lines Company.

Waste energy is recovered throughout the manufacturing process to minimise energy costs. The Pulpmill includes a bio-waste heat plant. The plant also relies on LPG to power the burners for the dryers (the site includes a 50 tonne LPG storage tank).

The Pulpmill takes water from a bore on site and from a stream 4km away (by consent). It discharges stormwater and treated wastewater via consents (the discharge to the Whangaehu River being the subject of this current consent application).

Ash waste from the site and sludge from the WWTP are blended and transported to a nearby worm farm run by MyNoke.[15] There, worms reduce the volume by about 65% to create a valuable soil conditioner – vermicast – sold to garden centres and the agricultural sector.

3.1.2 Staffing

When operational, the Pulpmill runs a 5 shift, 10 person/shift roster and the Wood Room runs a 2 shift, 3 person/shift roster. A small team handles the weekday train loading and general cleaning tasks. Production trainees are in place to supplement as required. A production management team (including shift supervisors) provide oversight. Other roles within the Pulpmill include jobs at the mechanical workshop, electrical workshop, warehouse and in the planning and scheduling team. There are also area manager roles and a range of jobs for specialist engineers. The Pulpmill includes an onsite laboratory for quality management (which has a team of 5 staff).

Table 3.1 – Direct Annual Employment by Location

Location Rank	Location (District, Region, Part Region)	Direct Employment (YE June 2024)	Share of Employment
1	Ruapehu District	229	91.6%
2	Auckland	6	2.4%
3	Manawatu-Wanganui (Rest of Region) *	4	1.6%
4	Taupo District	3	1.2%
5	Western Bay of Plenty District	3	1.2%
6	Rotorua District	2	0.8%
7	Hawkes Bay (Region)	1	0.4%
8	Tauranga City	1	0.4%
9	Christchurch City	1	0.4%
Total Direct Employment (Jobs)		250	100.0%

Source: WPINZ (YE June 2024). Out of a possible 40 locations (regions) in the ELM.

** Region excluding Ruapehu District and Palmerston North City.*

Table 3.1 puts the combined direct employment of the Kariori Pulpmill and Tangiwai Sawmill 'on the ground' by place of residence. The employment is significant. Out of a total 250 employed in the year ending June 2024, 229 or 91.6% of those lived 'locally' to the mills in Ruapehu District. The significance of these jobs within the district is discussed below in Section 3.2. A further 4 employees (1.6%) reside in the Rest of Manawatu-Wanganui Region (excluding

[15] https://www.mynoke.co.nz/

Ruapehu and Palmerston North). These jobs are assumed to be based at the mills (but requiring a longer commute). The remaining 17 jobs (6.8%) are not based at the mills. They are spread between Auckland and the central North Island, with one role supported in Christchurch City (these could be considered remote workers).

WPI have supplied their total expenditure on wages and salaries for the two mills for the year ending June 2024. Dividing the wages and salaries expenditure[16] by a total of 250 staff indicates an average annual income paid by the mills of $112,700 (gross). Actual annual wages and salaries will be spread above and below this average based on staff members occupation and experience. However, to put that into perspective, the average personal income in the Ruapehu District in the year ending March 2024 was $67,607 and the average for total New Zealand was $78,731.

3.1.3 Upstream Supply Chain Summary

WPI directly supports a range of local and non-local goods and services providers through their operations at the Karioi Pulpmill and Tangiwai Sawmill. Key supply agreements are in place with:

- Local forestry companies/growers,
- McCarthy Transport (log yard and chip mill operations),
- Enel X (interruptible load),[17]
- Mercury (electricity hedges),
- The Lines Co (ancillary electricity infrastructure),
- IXOM (all chemicals apart from Peroxide),
- Evonic (Peroxide). WPI and Pan Pac are the two largest customers of Evonik, a Morrinsville-based manufacturer of hydrogen peroxide, together taking around 45% each of their product.
- Ongas (LPG supply), and

[16] Excluding employer KiwiSaver contributions.

[17] Enel X is a leading provider of demand response solutions, using loads in ancillary services to maintain grid stability and security. Enel X automatically reduces capacity across one hundred industrial sites (including the Karioi Pulpmill) when there is an under-frequency event on the national grid. Participating companies earn money by helping the grid manage these events. At times, WPI is asked to shut down some of the plant to help reduce demand on the National Grid.

— KiwiRail (pulp Transport).

The dollar value of these up-stream purchases is discussed further in Section 4.

3.2 Economic Role in Ruapehu District

3.2.1 Contribution to Employment

In 2023, Ruapehu District had an estimated 5,404 employees working in 1,867 businesses according to the StatisticsNZ Business Demography dataset. Including estimated working proprietors, total employment that year was approximately 6,451. Table 3.2 shows the breakdown of Ruapehu District's employee count by broad industry. It shows that employment in the district grew by 170 jobs (3%) since 2018.

Table 3.2 – Employee Count in Ruapehu District by 1 Digit ANZSIC Industry

	Employee Count 2023	Share of Total Employee Count	Growth in Employee Count 2018-2023 (n)	Growth in Employee Count 2018-2023 (%)
Agriculture, Forestry and Fishing	932	17%	-71	-7%
Mining	3	0%	-8	-72%
Manufacturing	**369**	**7%**	**62**	**20%**
Electricity, Gas, Water and Waste Services	37	1%	-17	-31%
Construction	550	10%	164	43%
Wholesale Trade	76	1%	-5	-6%
Retail Trade	481	9%	29	7%
Accommodation and Food Services	600	11%	-59	-9%
Transport, Postal and Warehousing	82	2%	-38	-32%
Information Media and Telecommunications	13	0%	-1	-5%
Financial and Insurance Services	26	0%	-4	-12%
Rental, Hiring and Real Estate Services	62	1%	0	0%
Professional, Scientific and Technical Services	153	3%	14	10%
Administrative and Support Services	97	2%	5	6%
Public Administration and Safety	715	13%	21	3%
Education and Training	513	9%	27	5%
Health Care and Social Assistance	339	6%	28	9%
Arts and Recreation Services	197	4%	-6	-3%
Other Services	158	3%	28	21%
Total Industries	**5,404**	**100%**	**170**	**3%**

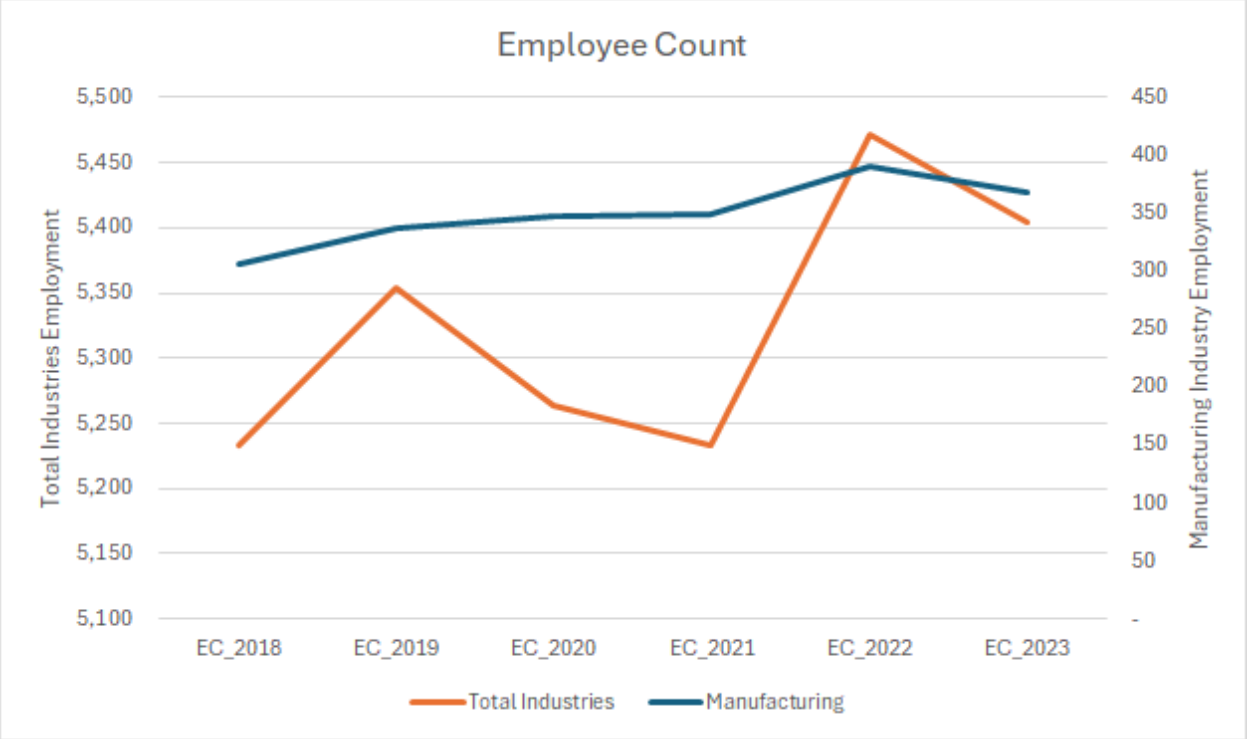
Source: Statistics NZ Business Demography Dataset.

The largest employment sector is Agriculture and Forestry (17%). This is followed by Public Administration and Safety (13%), which includes the Defence Force activity. Accommodation and Food Services, Construction, Retail, and Education are other key employment industries for the district. Manufacturing (which is the industry containing the Karioi Pulpmill and

Tangiwai Sawmill) makes up 7% of total employment in the district (369 total employed in 2023). It grew by an above average 20% since 2018 (growth of 62 additional jobs).

Figure 3.3 shows the annual trend in the employee count for the district, showing total employment over all industries combined and in just the Manufacturing Industry (separate axes). As noted above, the data is based on a snapshot of employment in February each year. In February 2020, total employment had a moderate drop, with Covid-19 causing a further decline in 2021. Employment significantly improved in 2022 (to a new peak since 2018) but had a slight decline again in 2023. Unlike the wider economy, the Manufacturing industry has been a constant and steady employer for the district.

Figure 3.3 – Ruapehu District Employment – Total vs Manufacturing Industry



As discussed above, the Karioi Pulpmill and Tangiwai Sawmill had combined employment of 250 staff in 2024.[18] Assuming that this same number of people were employed in 2023, this means that WPI employed a significant 68% of those working in the Manufacturing industry in the Ruapehu District. Compared with total district employment in 2023, the combined mills accounted for 5% of all employees.

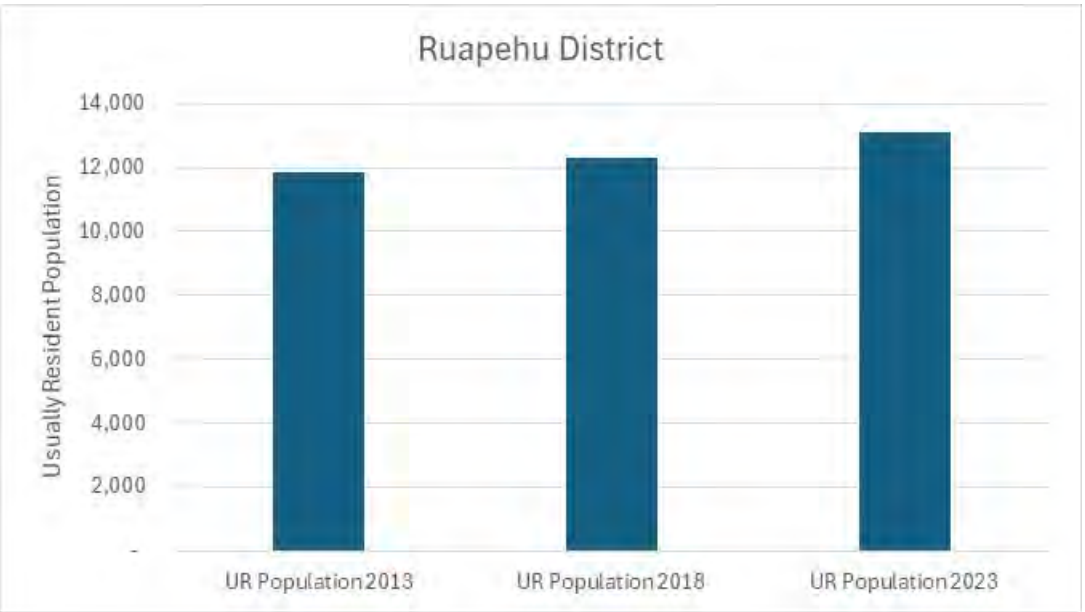
[18] While 233 of the total staff of 250 is physically based at the mills, it is appropriate to use the full 250 employee count when comparing against Business Demography data. This is because the data ties employment to the address of the registered business. As such, remote workers are included in the territorial authority (or other statistics unit) of the business entity.

WPI was the second largest employer in Ruapehu District after the Defence Force. The only other large employers were the hospital, supermarkets and secondary school and these employed significantly less than WPI.

3.2.2 Socio-Economic Contribution

The total usually resident population of Ruapehu District was 13,095 at the time of the 2023 Census. This was an increase of 786 people or 6.4% since the 2018 census. This growth rate was above the average regional population growth rate (5.3%) but similar to the national average population growth rate (6.3%) based on the same Census data.

Figure 3.4 – Ruapehu District Usually Resident Population by Census Year



Of the total population in the district, 5,979 identified themselves within the Māori ethnic group. This was 45.7% of the total population (although noting that individuals completing census forms are able identify with one or more ethnic groups and are counted in each group). However, when comparing the ethnic profile of the total Manawatu-Wanganui Region (25.1% identify as Māori), the share identifying as Māori in Ruapehu District is significant.

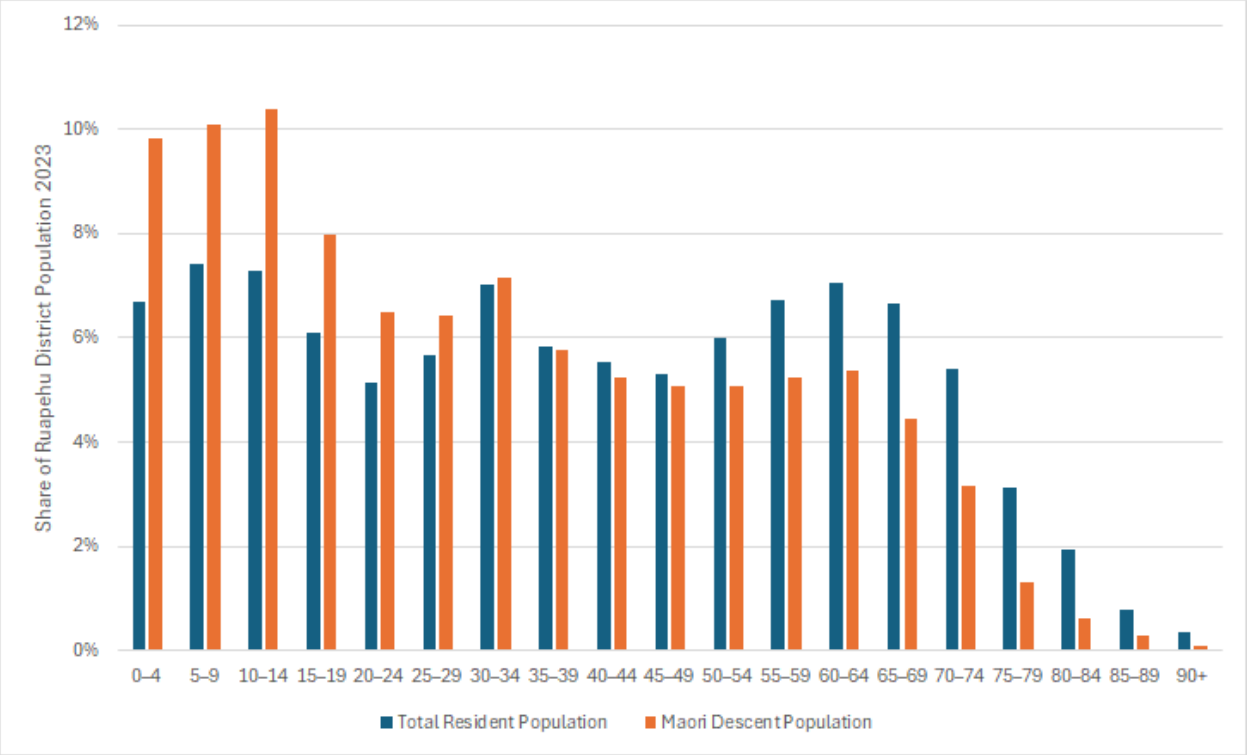
In the year ending March 2023, 8.5% of those Ruapehu District residents that identified as Māori, and that were employed, were working in the Manufacturing Industry. That was a total of 189 workers. While this data does not confirm whether those jobs are also located within Ruapehu District, and while not everyone employed in the Manufacturing Industry in Ruapehu District (discussed above) is necessarily a resident of the district, if both outcomes applied, then residents that identified as Māori would account for around half of the Manufacturing Industry workforce in the district in 2023.

While WPI are unable to provide an ethnic breakdown of their staff, based on statistical probability, it follows that a significant share of those employed by the mills are likely of Māori ethnicity.

The census also captured data on whether residents were of Māori descent. This data does not double count residents. In Ruapehu District, 47.4% of the usually resident population were known to be of Māori descent (a total of 6,204 residents).[19]

Figure 3.5 shows the age profile of the population at the time of the Census 2023. It compares the total population and the population with Māori descent. Ruapehu District has an above average share of its population aged 0-14 years (compared to the national average) and a below average share of its population aged 65+. These shares are 21% and 18% respectively. These relativities (against the national average) are consistent with districts that have a higher share of Māori and/or Polynesian ethnicities. That leaves the 'working age' population (15-65 years) at 60% of the total population in 2023 (slightly below the national average).

Figure 3.5 – Age Profile of the Ruapehu District Population and Population with Māori Descent 2023 (Percentage)



[19] Based on census 2023 data, 3,471 people in New Zealand are affiliated with Ngāti Rangi, and 11.3% of them (392) live in Ruapehu District. This indicates that Ngāti Rangi account for 6% of the total population with Māori descent living in Ruapehu District at the time of the census. https://tewhata.io/

Figure 3.5 also compares the age profile of district residents with Māori descent. Compared to a total share of 47% of the total population, this part of the community accounts for a disproportionately high share of the population that is 0-14 years (67% of the total population in that age group) and a lower share of the population aged 65+ (26% of that age group). However, the share that is working age is consistent with the share of the population overall (and equates to 3,708 residents). This means that of the total resident population that is aged 15-64 years (working age), those with Māori descent accounted for nearly half (47%) in 2023.

This census data shows that in Ruapehu district, Māori make up a significant share of the total community and the local workforce (including the Manufacturing workforce). While the availability and security of jobs in the district is important for the social wellbeing of the total district workforce, it is also of key importance to the Māori community, particularly with a large cohort of young Māori coming through.

The role of the Karioi Pulpmill and Tangiwai Sawmill in the district's employment goes beyond just providing skilled jobs in the manufacturing industry and above average incomes. Before the mills came along, there were few employment options in the district – with most jobs either for the Railway Corporation or in farming. The establishment of the mills back in 1978 provided a significant number of new jobs opportunities for what was otherwise a low-skilled local workforce.

Those workers were trained and got to work with a range of higher-skilled workers (engineers, electricians, managers etc). Based on feedback from WPI, this opportunity and exposure meant that those first generation workers at the mills encouraged their children to pursue higher education training. Overtime, the local community has taken on more and more of the higher-skilled jobs at the mills, with many of the workers employed in 2024 the 3rd generation in their families employed at the mills. The mills have therefore had a significant intergenerational impact on the social fabric and wellbeing of Ruapehu District.[20]

WPI has (as a good corporate citizen) facilitated the improved socio-economic status of the local community through a number of other initiatives. These have included around $15,000 per annum in tertiary education scholarships in fields relevant to the mills. These have been provided to local secondary schools. They have also provided work experience placements and holiday jobs each year to tertiary students (with around $60,000 of wages paid per annum to tertiary students). WPI have also provided apprenticeship opportunities to the local community.

[20] The significance of the mills to the local community is evident in the multitude of media articles that came out after the mills closed.

In summary, the presence of the Karioi Pulpmill and Tangiwai Sawmill supported 5% of all jobs in the district in 2023 and 68% of all manufacturing industry jobs. WPI was the second biggest employer in the district. Out of a total staff count of 250, it employs an estimated 229 residents of Ruapehu District and a small number within commuting distance outside the district. Indicatively around half of the jobs at the mills may have been for workers with Māori ethnicity or descent. The mills have made a significant contribution to the social capital of the Ruapehu District over the course of five decades of operation.

4 Economic Contribution

This section provides a summary of the annual direct expenditure of the Karioi Pulpmill and Tangiwai Sawmill in the local and wider economy for the financial year ending June 2024. As the two mills are explicably linked, it is relevant to treat them as a combined economic unit. WPI have kindly supplied detailed data of their expenditure that year (covering both mills), which has allowed for an accurate and fine-grained insight to the direct operational footprint of the mills (when fully operational).

The direct expenditure data, combined with the data on direct employment of the Karioi Pulpmill and Tangiwai Sawmill discussed in Section 3, forms the inputs to the Economic Linkages Model (ELM) relied on for this report. The ELM is based on a sub-national, multi-regional input-output (MRIO) table that allows the direct and flow-on (indirect and induced) economic contribution of the combined mills to be quantified (by sector and location across the country).

The ELM has been developed to quantify and measure the economic activity of the mills, and the flows of money and goods within the New Zealand economy at a sector and sub-national level. The ELM records the interactions and relationships between actors in the economy, including businesses, households, government, exporters, and importers. At its essence, the interactions in the model describe how each sector responds to changes in the economy, which ripple out to influence a range of other outcomes (e.g. household decisions).

The ELM measures the economy using a range of standard economic metrics, which includes gross output, GDP, value added, employment, incomes, consumption, tax, and trade. Economic contributions for this report are focussed on GDP and employment contributions sustained by that direct expenditure. Appendix 1 provides further technical information about the ELM, including the definitions for direct, indirect and induced economic impacts discussed further below.

4.1 Direct Expenditure

WPI have supplied a breakdown of the actual combined operational and capital expenditure of the Karioi Pulpmill and Tangiwai Sawmill for the year ending June 2024. Many of key suppliers of the mills have been discussed above in Section 3.1. This annual snapshot is considered representative of recent trading years, albeit that capital expenditure tends to fluctuate more than operational expenditure year on year.[21] Data has been supplied in

[21] It is also noted that in the YE June 2024, electricity prices were already higher than previous years.

accordance with a matrix of 109 possible sectors and 40 possible locations that make up total New Zealand. This matrix aligns with the framework of the ELM (i.e. is the format necessary to run data through the ELM).

As discussed in Section 3, the Karioi Pulpmill and Tangiwai Sawmill are (when combined) the second largest employer in Ruapehu District and are expected to still constitute a very large scale business in the context of the Manawatu-Wanganui Region economy.[22] The direct annual expenditure of the mills included:

- $195.6 million on goods and services (intermediate inputs to production) from New Zealand based businesses (excluding GST);
- just over $10.5 million on imported goods.;[23] and
- just under $30 million in wages, salaries and KiwiSaver contributions.

Table 4.1 provides a summary of the mills' direct expenditure in New Zealand based businesses by sector. In total, the mills' direct expenditure is spread across 54 of the possible 109 sectors that make up the New Zealand economy (according to the level of detail contained in the ELM). They are therefore supporting a diverse range of businesses. The top 12 sectors receiving expenditure from the mills are listed, with the remaining sectors combined. The top 12 sectors account for 94% of the total annual expenditure.

The industry accounting for the greatest direct expenditure (cost) is, unsurprisingly, the Forestry and Logging sector which is the source of the wood/fibre needed for paper and converted paper product manufacturing (in addition to the residual wood waste from the Sawmill).[24] This industry captures 30% of the mills' annual expenditure (nearly $60 million).

[22] Not measured in the scope of this report.
[23] It is noted that imports represent a loss of expenditure from the New Zealand economy (leakage) and so are disregarded from economic impact modelling and are not discussed further here.
[24] As this section considers the direct expenditure of the mills combined, transactions between the two entities are excluded.

Table 4.1 – Direct Annual Expenditure on NZ Goods and Services by Industry ($m, Excluding GST)

Industry Rank	Industry Name	Expenditure Excluding GST (YE June 2024)	Share of Expenditure
1	Forestry and logging	$ 59.2	30%
2	Electricity generation and on-selling	$ 39.0	20%
3	Basic chemical and basic polymer manufacturing	$ 21.7	11%
4	Water transport	$ 16.1	8%
5	Road transport	$ 10.4	5%
6	Rail transport	$ 10.4	5%
7	Heavy and civil engineering construction	$ 9.0	5%
8	Health and general insurance	$ 4.2	2%
9	Electricity transmission and distribution	$ 3.9	2%
10	Transport support services	$ 3.4	2%
11	Auxiliary finance and insurance services	$ 3.3	2%
12	Basic material wholesaling	$ 3.2	2%
13-54	All Other Industries Combined	$ 11.8	6%
Total New Zealand Based Industries		$ 195.6	100%

Source: WPINZ. Dollars of the day (YE June 2024). Out of a possible 109 industries in the ELM.

Electricity Generation and On-selling is the second biggest expense at 20% of the total spend on New Zealand based goods and services or $39 million in the year ending June 2024. When expenditure with the Electricity Transmission and Distribution industry (ranked 9th) is included, total electricity costs reach just under $43 million for the year (22% of the total). The third ranked industry by expenditure is Basic Chemical and Basic Polymer Manufacturing (the other key ingredient to the production of paper and converted paper products discussed previously). Transport industries account for a combined 19% of annual expenditure to move raw goods to the mills, operate the chipmill, and move manufactured products around New Zealand, including to the main export seaport (Napier). When Transport Support Services are included, this increases to 21% of total expenditure on New Zealand based goods and services ($40.3 million).

Figure 4.1 shows that 98% of all expenditure on New Zealand goods and services occurs with businesses based in the North Island (at nearly $192 million). South Island expenditure (around $4 million) is primarily related to Electricity Generation and On-Selling (where one of the generators selling wholesale electricity to the mills is registered).

Figure 4.1 – Direct Annual Expenditure on NZ Goods and Services by North/South Island ($m, Excluding GST)

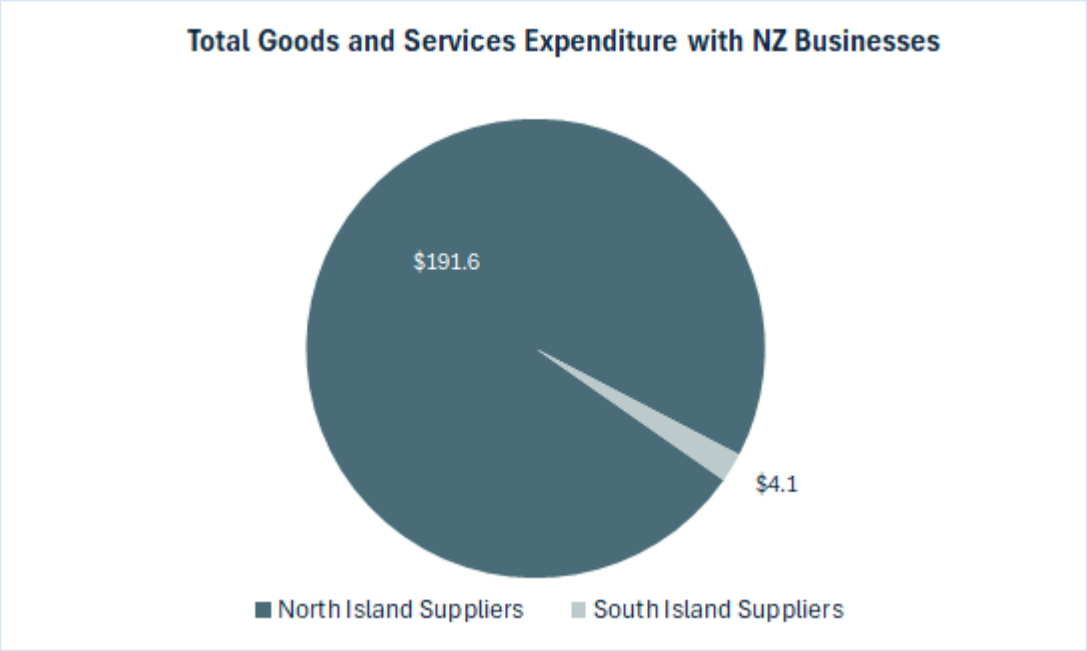


Table 4.2 shows the breakdown of direct expenditure on New Zealand goods and services by location. As noted, and explained further in Appendix 1, the locations are a combination of districts, regions or part regions (i.e. when one or more economically significant districts are able to be isolated,[25] the 'rest of region' is aggregated). In total, there are 40 possible locations across the county and the mills' direct expenditure is spread across 25 of those.

Key metropolitan cities (particularly Auckland and Wellington) feature strongly in the expenditure profile because some large companies that operate across multiple regions are registered to addresses in those cities. Auckland based businesses capture 27% of the mills' annual expenditure (just over $52 million) and Wellington based businesses capture 21% (just over $40 million). However, a significant $50.2 million (26% of the total) is spent with businesses operating in Ruapehu District.

A further 7% of expenditure occurs in the Rest of Manawatu-Wanganui Region (excluding Palmerston North), and 2% is directed at businesses in Palmerston North. In total, 35% of the mills' expenditure on goods and services in New Zealand occurs within the Manawatu-Wanganui Region (just under $69 million per annum).

[25] Ruapehu District is not a location in the ELM and is combined with Rest of Manawatu-Wanganui Region (with Palmerston North separated and making up the remainder of the region). Ruapehu District has been isolated for the purposes of the Direct Expenditure sub-section only.

Table 4.2 – Direct Annual Expenditure on NZ Goods and Services by Location ($m, Excluding GST)

Location Rank	Location (District, Region, Part Region)	Expenditure Excluding GST (YE June 2024)	Share of Expenditure
1	Auckland	$ 52.5	27%
2	Ruapehu District	$ 50.2	26%
3	Wellington City	$ 40.1	21%
4	Manawatu-Wanganui (Rest of Region) *	$ 13.8	7%
5	Rest of Waikato (Rest of Region) **	$ 10.9	6%
6	Hawkes Bay (Region)	$ 9.3	5%
7	Palmerston North City	$ 4.8	2%
8	South Canterbury	$ 3.6	2%
9	Taupo District	$ 2.6	1%
10	Wairarapa	$ 2.3	1%
11	Rotorua District	$ 1.2	1%
12	Tauranga City	$ 1.1	1%
13-25	All Other Locations Combined	$ 3.3	2%
Total New Zealand Based Expenditure on Goods and Services		$ 195.6	100%

Source: WPINZ. Dollars of the day (YE June 2024). Out of a possible 40 locations (regions) in the ELM.

** Region excluding Ruapehu District and Palmerston North City.*

*** Region excluding Hamilton City, Waikato District, Waipa District, Matamata-Piako District, Taupo District.*

The supply of forestry products largely (but not entirely) explains why Hawke's Bay, Taupo, and Wairarapa are in the top 12 locations of the mill's expenditure. Goods and services provided to the mills from Tauranga City are varied, but include Heavy and Civil Construction Services, some Fabricated Metal Manufacturing and Water Transport services. In total, the mills' direct expenditure is widespread across (mostly) the North Island. The top 12 locations account for 98% of the total, although the top three locations account for 73% of total spend.

4.2 Total Economic Contribution

The combined direct expenditure that is generated by the Karioi Pulpmill and Tangiwai Sawmill, including wages and salaries paid directly to 250 workers, flows through upstream supply chains, which results in additional economic activity (gross output) in supporting sectors,[26] and additional employment. These are the indirect and induced impacts of the mills.

Direct expenditure discussed above must be deflated to match the base year of the ELM (year ending June 2023) before the direct, indirect and induced impacts can be calculated. This is done using the Producers Price Index at a sector level. The resulting economic impacts are

[26] And the supporting sectors of those sectors etc.

expressed in year ending June 2023 dollars and employment equivalents.[27] The results are not re-inflated in accordance with best practice. Appendix 1 sets out the full detail of key steps applied in the ELM.

Table 4.4 summarises the total direct, indirect and induced annual GDP and employment economic impacts sustained throughout the New Zealand economy by the mills. For clarity, the ELM is unable to distinguish Ruapehu District due to its overall small economic output, and it is grouped with the 'Rest of Manawatu-Wanganui Region' for the purposes of Table 4.4.

The mills directly contributed an estimated $_{2023}$40 million in GDP in its last full financial year of trading which, while recorded as being in the Rest of Manawatu-Wanganui Region, is attributed to the Ruapehu District on account of the location of the mills. As discussed above, the mills also directly sustained 250 jobs in the wider economy (but mainly in the Ruapehu District).

Table 4.3 – Direct, Indirect and Induced GDP and Employment Impacts by Location ($m)

	Direct	Indirect	Induced	Total Impact
Gross Domestic Product (GDP) $2023 millions				
Palmerston North City	$ -	$ 5	$ 4	$ 9
Rest of Manawatu-Wanganui Region	$ 40	$ 35	$ 8	$ 83
Total Manawatu-Wanganui Region	*$ 40*	*$ 40*	*$ 12*	*$ 92*
Rest of North Island	$ -	$ 108	$ 57	$ 165
South Island	$ -	$ 11	$ 11	$ 22
Total New Zealand	**$ 40**	**$ 159**	**$ 80**	**$ 279**
Total Employment (Jobs) 2023 Equivalents				
Palmerston North City	-	38	33	71
Rest of Manawatu-Wanganui Region	233	205	74	512
Total Manawatu-Wanganui Region	*233*	*243*	*108*	*583*
Rest of North Island	16	731	407	1,155
South Island	1	59	85	145
Total New Zealand	**250**	**1,033**	**600**	**1,883**

Source: WPINZ, Savvy, Formative.

The indirect economic impacts reflect the sum of GDP and employment sustained across all businesses that helped meet the demand generated by the mills' expenditure – as that demand flowed through upstream supply chains. These include the suppliers like McCarthy's Transport, Evonic and IXOM, KiwiRail, Napier Port etc discussed in Section 3. In total, the mills indirectly contributed to $_{2023}$159 million in GDP across a broad range of sectors and sustained a further 1,033 annual jobs in the economy (Table 4.4). The wages, salaries and dividends paid out to those 1,033 indirectly sustained jobs, and the 250 directly employed staff, stimulated an additional $80 million in GDP (and a further 600 annual jobs) through household spending in

[27] Employment equates to employment year equivalents.

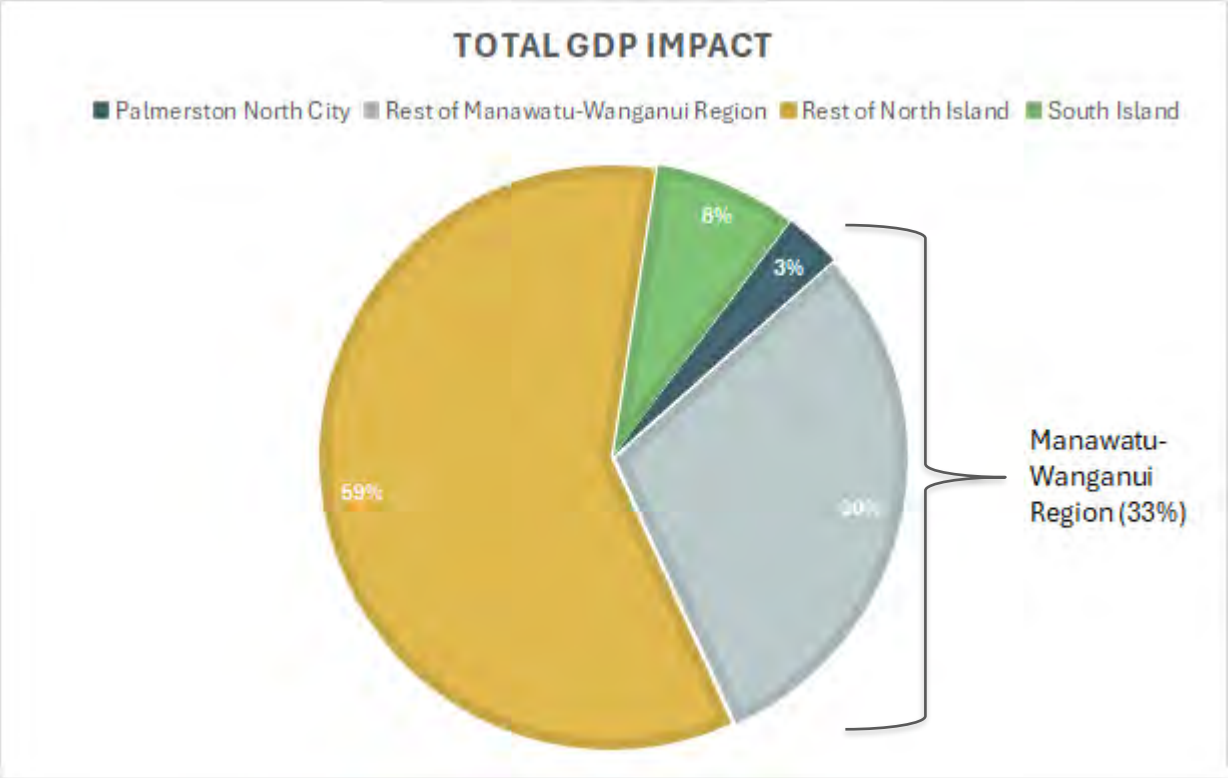
the economy (also known as the induced effect, Table 4.4). This too is across a broad range of sectors and locations (with households spending locally and throughout New Zealand when they shop and travel domestically).

When direct, indirect and induced economic impacts are combined, the mills' annual contribution to GDP and employment in New Zealand totals an estimated $_{2023}$279 million and 1,883 jobs. Figures 4.2 and 4.3 show that in total, only a minor amount of GDP sustained by the mills accrues to Palmerston North City ($_{2023}$9 million or 3% of the total), but a substantial share (30% or $_{2023}$83 million) accrues to the Rest of Manawatu-Wanganui Region (and namely the Ruapehu District in so far as direct and induced GDP is concerned). Combined, 33% of total GDP ($_{2023}$92 million) and 31% of total employment (583 jobs) sustained by the mills occurs in the Manawatu-Wanganui Region.

Figure 4.2 - Direct, Indirect and Induced GDP Impacts by Location ($m)

The largest economic contribution sustained by the mills accrues to the Rest of North Island. This area accounts for 59% of total GDP ($_{2023}$165 million) and 61% of total employment (1,155 jobs). The South Island economy is also impacted by the mills, with 8% of the total GDP and employment contribution of the mills once indirect and induced effects are accounted for.

Figure 4.3 – Share of Total GDP Economic Impact by Location



A total GDP impact of $_{2023}$279 million for the combined Karioi Pulpmill and Tangiwai Sawmill is broadly consistent with similar research that was carried out on the economic impact of the larger Pan Pac mill in Hastings District. That study (by Berl) estimated a total GDP impact of $541 million in 2020.[28]

To put the WPI mills' total economic impact in context (including close to $80 million in GDP likely to be concentrated in the Ruapehu District), the total GDP of the Ruapehu District in 2023 was $897 million[29] and the total GDP of the Manawatu-Wanganui Region in 2023 was $15.29 billion. This suggests that the mills supported around 9% of Ruapehu District's annual GDP and 1.8% of regional GDP.

[28] As quoted on Pan Pac's Website https://www.panpac.co.nz/about/ - actual report is not a public document. Pan Pac's operations at that site are much larger than WPI's (with the study recording 833 full time equivalent staff, compared to 250 at the Ruapehu mills).

[29] Source: Infometrics Regional Economic Profile – Ruapehu District 2024 Regional Economic Profile | Ruapehu District | Economic growth

5 Electricity Prices

5.1 Energy Supply to the Mills

Pulp and paper processing is very energy intensive. Though energy is used throughout the process of manufacturing pulp and paper, some operations can be self-sufficient for thermal (heat) and electrical energy. These are mainly the chemical pulp mills, where one of the by-products of circular manufacturing and the recovery of chemicals, is abundant energy. Other facilities are however less self-sufficient, but still energy intensive. This is the case for the WPI Pulpmill, which uses energy to produce a 'mechanical' pulp and has limited thermal and even less electrical energy outputs.[30]

Facilities like the Karioi Pulpmill are essentially stand-alone energy-sinks and are far more vulnerable to energy price rises than other pulp and paper mills. Couple that with the vulnerabilities created from selling into global commodity markets where 'the price is the price', there is also no opportunity to pass on higher energy costs to customers.

According to WPI, tens of millions of dollars' worth of capital expenditure has been invested over the years to improve production and energy efficiency at the Pulpmill. "The team's hard work has seen us significantly improve production capacity, while at the same time reducing our energy use by 20-30% for every tonne produced" (Mike Ryan, CEO of WPI). This is typical of all the major players as consumption of electricity by the total Wood, Pulp, Paper and Printing sector had been decreasing steadily according to data collected by the Ministry of Business, Innovation and Employment (MBIE), including a 28.3% reduction between 2022 and 2023.[31]

Despite that, the Karioi Pulpmill (and to a much lesser extent the Tangiwai Sawmill) is still a big consumer of whole electricity. As noted, this has required a direct connection to the National Grid (via the Tangiwai Substation). For the YE June 2024, WPI's energy costs are broken down in Table 5.1. The $3.9 million spent on Electricity Transmission and Distribution is the lines charge per annum and is effectively a fixed cost. This accounts for 9% of total energy costs.

LPG is purchased at wholesale rates and based on the quantum required (and the lower costs per MWh), this makes up a negligible share of total energy costs. The biggest component is the wholesale electricity purchased from the Electricity Generation and On-selling Sector. At

[30] https://industryedge.com.au/how-is-nzs-energy-crisis-impacting-the-pulp-paper-and-packaging-industry/
[31] Source: MBIE, Annual electricity generation and consumption by industry (GWh). Consumption based on actual sales.

$39 million in the YE June 2024, this variable cost accounted for 91% of WPI's total annual energy costs.

Table 5.1 – WPI Energy Costs YE June 2024 by Sector

Sector	Cost Type	Total Spend in Financial Year ($m) Excluding GST	Share Total Energy Costs
Electricity transmission and distribution	Fixed	$ 3.9	9%
Electricity generation and on-selling	Variable	$ 39.0	91%
Gas supply	Variable	$ 0.1	0.3%
Total Energy Costs		$ 43.0	100%

Source: WPI (YE June 2024)

WPI purchase their electricity from the wholesale electricity market. The company has always had a historic policy of maintaining a high level of energy price hedging. The hedge market provides transparent and robust forward (future) price signals and enables participants in that market to help manage the risk of increases and volatility in wholesale electricity spot prices.[32] WPI were 50% hedged against price volatility in late 2024, meaning that 50% of electricity consumption was exposed to the whole spot prices and 50% was negotiated at lower rate, but still changing over time depending on the nature of the contracts entered.

5.2 Recent Trends in Electricity Wholesale Prices

The key then is the wholesale electricity prices as this impacts WPI directly and indirectly through their market futures (hedging) contracts. Figure 5.1 shows annual average whole electricity prices paid by the Wood, Pulp, Paper and Printing Sector since 1998 through to March 2024. Between 1998 and 2017, the price per Mega Watt Hour (MWh) has hovered around $80. WPI have stated that at this price point and below, operating the Pulpmill is economical, but above this price, it becomes increasingly difficult for WPI to absorb the additional costs. Figure 5.1 shows a steady trend in rising wholesale prices since 2017 to reach an annual average of $192/MWh in the year ending March 2024.

Figure 5.2 shows a more detailed picture of wholesale electricity prices from the 1st of March 2024 onwards (i.e. from where data in Figure 5.1 ends).[33] This graph shows daily volatility. Between March and the beginning of August 2024, the price per MWh had steadily increased from $200 (approximately) to close to $450 (an increase of $250/MWh or 125% in just five months). What happened next was exceptional. The wholesale price spiked to over $800/MWh, with these exceptionally high prices sustained for a portion of August. When

[32] Hedge market | Electricity Authority

[33] Source: Electricity Authority.

averaged over the whole of August, the cost was around $500/MWh – still well above the price for which it is economic to operate the Pulpmill.

Figure 5.1 – Annual Average Wholesale Energy Prices (Actual Sales YE March), Wood, Pulp, Paper and Printing Sector

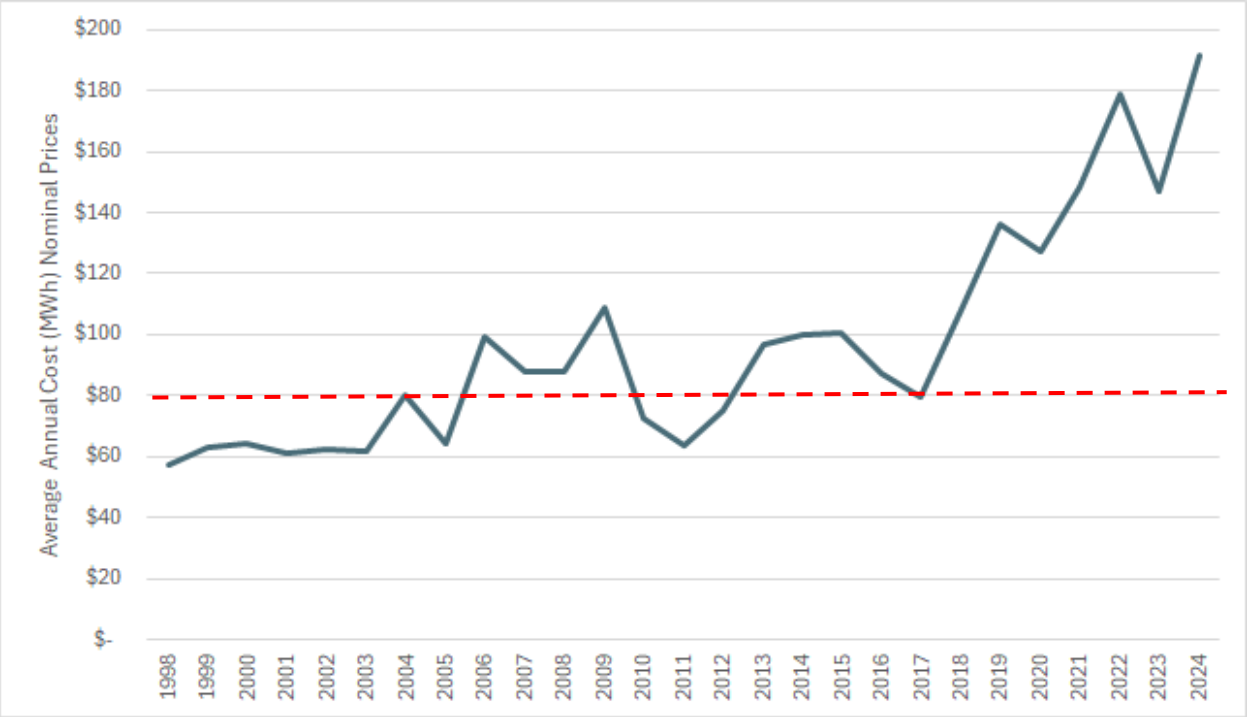


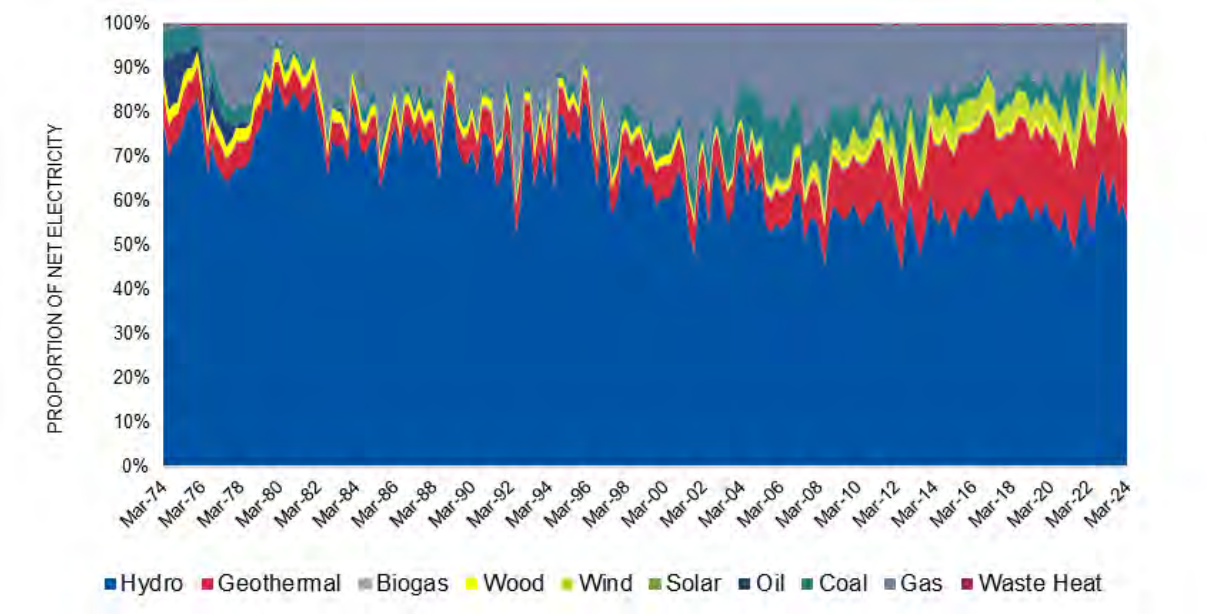
Figure 5.2 – Wholesale Electricity Prices (as Measured at the Tangiwai Substation) Since 1st March 2024 ($/MWh)

The acute spike in wholesale energy prices in August 2024 was caused by low lake levels at South Island hydro dams. Hydro generation (measured in GWh) was 16.6% down in September 2024 compared to September 2023.

While the energy sector has diversified (particularly since the droughts of 2008), the continued reliance on hydro has left the whole market vulnerable (Figure 5.3). Despite the drought

leading up to August 2024, hydro generation still contributed more than 55% of New Zealand's electricity in the March quarter. To balance supply when renewable electricity generation drops off for various reasons (droughts, for instance), a shift to gas would be one way to moderate price peaks and help replace capacity according to IndustryEdge. That can no longer occur in New Zealand because it does not have sufficient gas (the gas contribution to electricity production decreased significantly since 2008 while renewable sources grew) and its fields are reportedly expected to halve again over the next few years.[34]

Figure 5.3 – New Zealand Electricity Production by Type: March Quarter 1974-2024



As the South Island hydro lake levels recovered in late August, the wholesale prices dropped (Figure 5.2). However, according to a range of market commentators, the general trend in rising wholesale electricity prices in New Zealand (Figure 5.1) has been driven by a combination of reliance on hydro power, low natural gas supply, insufficient supply-side investment over the preceding years, and rising electricity demand. These issues were significantly exacerbated by the government's anti-investment policy settings (that significantly undermined investment in fuel supply) and market failure (potential issues with barriers to entry and electricity market structure incentives slowing delivery of consented new generation build).[35]

These factors have converged to create an extraordinary and sustained energy price situation that is putting immense pressure on New Zealand's industrial sector.

[34] Ibid.

[35] Source: How is NZ's energy crisis impacting the pulp, paper and packaging industry? - IndustryEdge

The Government has moved with urgency to address the long-term drivers of the problem, including unwinding a suite of anti-investment policy setting, enabling gas imports, and investigating regulatory settings. However, the main players of the pulpmill industry consider that these solutions will take 2-4 years to normalise energy costs.[36]

5.3 Implications for the Mills

While the acute spike in prices was over by September 2024, and low prices prevailed until December (now rising again), the spike in prices was the final tipping point for WPI after a prolonged period of exposure to rising wholesale electricity costs. As a trade-exposed sector, WPI could not increase export prices (to recover the additional energy costs) and remain competitive in the global market. Across the main pulpmill players, energy costs as a percentage of the cost of goods sold increased from 13-20% in 2019 to well over 30%[37].

In the absence of any short-term 'bridging' solutions for industry offered by central government (which were requested), the Karioi Pulpmill and Tangiwai Sawmill was forced to close.

Even with hedging (with suppliers carefully monitoring wholesale energy prices that are updated every 30 minutes to try and purchase bulk volumes of electricity during any dips in price), the steady increase in the wholesale spot prices means that hedging prices also rise over time. Since 2021 hedging products for gas and electricity have risen considerably in price to reflect the new expected averages, meaning they only serve to lock in uncommercial energy costs. WPI have stated that as these arrangements have come up for renewal, the cost of replacing them has been unaffordable.

[36] Government Briefing Paper, 28 August 2024, prepared by OjiFS, Pan Pac and WPI.
[37] https://www.nzherald.co.nz/whanganui-chronicle/news/operations-paused-at-ruapehus-karioi-pulpmill-and-tangiwai-sawmill-as-energy-costs-bite/5HN24F6VPNFPJHCT43EC3JQWMY/

6 Conclusions

6.1 Significant Socio-Economic Contribution

The Karioi Pulpmill's demand for fibre underpinned the economic viability of commercial and farm scale forestry in the surrounding area by providing a revenue stream for low-grade logs and binwood to help offset harvest and other forestry costs. It also underpinned the economic viability of the Tangiwai Sawmill by providing a revenue stream for the lumber processing residues. The dependencies between the Pulpmill and Sawmill makes them effectively a single economic entity.

The mills were, individually and in combination, significant employers in the Ruapehu District and directly sustained significant economic activity locally, regionally and at the national level. A broad range of businesses – local and non-local - supplied goods and services to the mills. They in turn demanded goods and services from their suppliers (to meet WPI's demand) and so forth up the supply chain. Those flows of economic activity sustained employment, as did the spending by those wage and salary earners that was attributable to WPI's direct expenditure. In total, the mills directly contributed $40 million in GDP in the Ruapehu District, increasing to $92 million in the Manawatu-Wanganui Region and $279 million across total New Zealand when direct, indirect and induced economic impacts are included.

The mills played a significant social role in Ruapehu District. It provided a large number of highly-skilled and well paid jobs to the local workforce – lifting the socio-economic status of the local community (including the large Māori community) over several generations. The scale of the businesses enabled WPI to fund tertiary education scholarships to local high schools and facilitate work experience opportunities for tertiary students as well as apprenticeships.

6.2 Exceptional Electricity Prices

The Karioi Pulpmill is an energy-intensive operation that is vulnerable to the volatility of the wholesale electricity market. While trading in the electricity futures market – hedging the risks of spot price rises, wholesale electricity prices have been steadily rising (notably since 2017) which has put significant pressure on the large scale manufacturing industry.

Electricity Generation and On-selling was the mill's second biggest expense in the year ending June 2024 – accounting for 20% of the total spend on New Zealand based goods and services or $39 million. The prolonged price rises, combined with the exceptional increases in the

wholesale electricity price in August 2024 (which saw the cost rise to nearly $800/MWh) and the inability to recover costs from pulp customers and remain competitive in the global market meant that operations were no longer commercially feasible.

A notable consequence of the rising electricity costs at the Pulpmill leading up to its closure in September 2024 was that WPI's planned capital expenditure to improve wastewater treatment on-site became unaffordable. As further diversification and competition in the electricity generation market unfolds in the next 2-4 years, it is anticipated that sustained lower wholesale electricity prices might be possible in New Zealand. Therefore, the opportunity to invest in further wastewater treatment at the Pulpmill may be commercially feasible for a new owner of the site. The limited duration of the discharge consent sought for renewal reflects that potential outcome.

6.3 The Facilitated Economic Benefits of the Discharge Consent

The significant economic and social benefits generated by the Karioi Pulpmill and Tangiwai Pulpmill are indicative of the scale and significance of economic and social benefits that the next owner and operator of the site(s) may bring to Ruapehu District and the Manawatu-Wanganui Region. Like the WPI operations, those significant socio-economic benefits may be long-term, and inter-generational.

Selling the Pulpmill site with a five year wastewater discharge consent in place increases the chance of a new owner being able to commence the same or similar operation without delay. That in itself increases the attractiveness of the site(s) to potential buyers. Therefore, the environmental effects of the discharge to Whangaehu River should, in our view, be considered alongside the significant economic and social benefits that the consent may facilitate.

Appendix 1 – Economic Linkages Model

The Economic Linkages Model (ELM) is a proprietary model that has been developed by Formative Limited to quantify and measure the economic activity and relationships within the New Zealand economy. In summary, the ELM measures the flows of money and goods through the economy, at a sector and subnational level.

The model records the interactions and relationships between actors in the economy, including businesses, households, government, exporters, and importers. At its essence, the interactions in the model describe how each industry responds to changes in the economy, which ripples out to influence a range of other outcomes (e.g. household decisions).

The ELM measures the economy using a range of standard economic metrics, which includes gross output[38], GDP[39], value added, employment[40], incomes[41], consumption[42], tax[43], and trade. The model uses a subnational Input-Output Table that has been regionalised by Formative. This appendix outlines the nature of the Input-Output table, the underlying assumptions within the ELM and the key modelling steps.

Input-Output Table

Input-Output (IO) models are quantitative economic tools used to analyse the interdependencies between different sectors of an economy[44]. IO models provide a detailed framework that captures how the output of one industry serves as an input for another. Essentially, they map the flow of goods and services in an economy, illustrating how changes in one sector can ripple through to affect others.[45]

At the core of an IO model is the IO table, a matrix representation where each row and column correspond to an industry or sector. The entries in the table show the monetary value of transactions between sectors—how much each industry purchases from and sells to every other industry. This allows for the examination of both direct and indirect economic impacts.

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[38] Similar to company revenue.

[39] There is a key difference between GDP and value added. The value added of a sector is measured net of taxes (for instance GST) and subsidies on products. In the GDP in the national accounts for New Zealand product taxes (minus subsidies) are recorded for the economy as a whole and are included as part of the value added.

[40] Formative uses the BED measure of Total Employment Count (TEC) which includes both the employee count and working proprietors.

[41] Includes salaries, wages and profits.

[42] Including household and government.

[43] Including income taxes, GST, government transfers and subsidies.

[44] Leontief, W. (1936). Quantitative Input and Output Relations in the Economic System of the United States. The Review of Economic Statistics, 18(3), 105–125

45 Miller, R. E., & Blair, P. D. (2009). Input-Output Analysis: Foundations and Extensions (2nd ed.). Cambridge University Press.

For instance, an increase in demand for dairy products not only boosts production in the dairy farming industry but also increases demand in related industries like animal feed production, veterinary services, equipment manufacturing, and transportation. This interconnectedness illustrates how a change in one sector can ripple through the economy, affecting multiple industries and contributing to overall economic growth.

Furthermore, IO models can be extended to capture economic interactions across different regions through Multi-Regional Input-Output (MRIO) tables. While conventional IO models focus on the interdependencies of industries within a single region (i.e. the total country), MRIO models map the flow of goods and services between industries both within and across multiple regions. This comprehensive approach allows for the analysis of how economic activities in one region can influence and be influenced by activities in other regions, acknowledging the interconnectedness of modern economies.

In MRIO models, each region is represented with its own set of industries, and the model includes detailed data on inter-regional trade flows. This structure enables analysts to examine the intra-regional transactions (activities within a region) and the inter-regional transactions (trade between regions). For example, an increase in dairy production in one region can lead to increased demand for agricultural equipment produced in another region, illustrating how regional economies are linked through supply chains.

The primary structural difference between MRIO and single-region IO models lies in their scope and complexity. A single-region IO model focuses on the economic transactions within one region, most often a national economy, considering industries' inputs and outputs and the final demand within the national economy. Imports from sub regions typically aggregated and not detailed in terms of their origin, which can limit the analysis of inter-regional dependencies.

In contrast, an MRIO model disaggregates a national IO (NIO) model into multiple regions, each with its own industries, and explicitly models the trade flows between these regions. This results in a more complex, block matrix structure where each block represents the transactions between industries in one region with industries in the same or another region. The MRIO model's structure allows for a detailed examination of how changes in one region's economy can affect other regions, providing insights into regional spillover effects, supply chain vulnerabilities, and the distribution of economic impacts across different areas.

While an IO model has been developed and released by Statistics New Zealand which captures the structure of the national economy as of March 2020, there is no official MRIO table for New Zealand.

Therefore, a Subnational Input-Output Table (SIOT) has been developed by Formative to provide detail on the economic linkages between sectors and geographies within New Zealand. The table has been defined to include 109 industries, 7 final demand sectors (including, households, non-profit organisations and the public sector) and 40 geographies.

The 109 industries have been defined using standard industry classification (ANZSIC06), and are consistent with the industries used in the Statistics New Zealand NIO. The 40 geographies have been defined according to either territorial or regional authority boundaries, with more disaggregation provided where there is more economic activity (e.g. upper North Island) and aggregation where there is less economic activity (e.g. West Coast of the South Island).

The SIOT has a base year of 2023. All transactions in the table are in 2023 dollars, and all economic impacts (for instance GDP, gross output, consumption, taxes) are also in 2023 dollars. The SIOT is based on a 2020 NIO table released by Statistics New Zealand which has been converted to a 2023 base year using Statistics New Zealand national account data for 2023[46]

The NIO table has been regionalised using a hybrid approach. The hybrid approach of combining survey and non-survey (i.e. modelled) methods to regionalise an IO table which is considered the gold standard when an official SIOT is not available. The survey data sources used in generation of the SIOT include a range of customised datasets that Formative have purchased and developed:

Total Employment: Formative maintains a detailed database of employment, by geographies and industry (Business Employment Database - BED), which records the total employment in each of 506 ANZISC06 industry classes and for Statistics New Zealand's Statistical Areas, including both employees and working proprietors.[47]

Electronic Card Transactions: Formative has purchased detailed electronic card transaction data from MarketView, which records the origin and destination of four retail and services spend types by the 40 geographies.[48]

Subnational Economic Data: a range of information that provides valuable insight into the scale of economic activity that is located within each geography. This includes regional GDP, Gross Output and household income.

[46] This includes gross output by sector, and national subsidies, exports, imports, change in inventories, gross fixed capital formation, consumption spending (includes households, local and central government and non-profit expenditure), compensation of employees, taxes, consumption of fixed capital and operating surplus.

[47] Formative (2021) Business and Employment Database – Employment Count, Working Proprietors, Total Employment.

[48] MarketView (2021) Card transaction data – four spend types and 40 geographies for the 2019 calendar year.

The above datasets have been combined along with non-survey regionalisation techniques to allocate the national economic activity into each of the geographies. The key method used to accomplish this is the Industry-Specific Flegg's Location Quotient (SFLQ)[49]. This method employs location quotients (LQ) to understand the specialisations and structure of regional economies compared to the national economy. The use of LQ's has been known to understate the amount of regional trade, however the SFLQ approach combats this by allowing for industry specific rates of cross hauling (where regions both import and export a product or service).

This approach has been shown to create accurate estimations of regional multipliers and outperform other non-survey approaches[50]. The SFLQ method was supplemented by a gravity model to help inform regional flows. The SIOT has been calibrated to better match the relationships in the NIO table and has been balanced using an iterative proportional fitting procedure to ensure that the table reflects regional gross out and input. The resulting SIOT table provides a modelled estimate of the relationships within the economy. This means that the economic linkages between sector-geography combinations as of 2023 are captured in the SIOT.

The ELM uses the SIOT to estimate the potential economic activity that can be expected from changes in the economy. All economic models apply assumptions because an economy and community is too complex to replicate exactly in a mathematical system. The structure of the ELM utilises the following assumptions:

- Leontief production function, which assume linear relationships between the production and inputs. This means change in the output for an industry will translate into a proportional change in demands for inputs.
- No supply constraints, which assumes that businesses can source sufficient resources (labour, capital, land, etc) to meet new demands.
- Constant returns to scale, which means that there are no economics of scale or diminishing returns in the model.

[49] Julia Kowalewksi (2015) Regionalization of National Input–Output Tables: Empirical Evidence on the Use of the FLQ Formula, Regional Studies, 49:2, 240-250.

[50] Anthony T. Flegg, Leonardo J. Mastronardi & Carlos A. Romero (2016) Evaluating the FLQ and AFLQ formulae for estimating regional input coefficients: empirical evidence for the province of Córdoba, Argentina, Economic Systems Research, 28:1, 21-37.; Zhao, X., Choi, SG. On the regionalization of input–output tables with an industry-specific location quotient. Ann Reg Sci 54, 901–926 (2015).

- Static prices, which assumes that prices remain at 2023 values. The model does not account for substitution effect or dynamic feedback from changes in demand and prices.

Key Modelling Steps

The first step in the ELM is to establish the direct economic activity that will be generated or influenced by the proposed policy, investment, or activity. This estimation of the direct economic activity is generally conducted using financial information or developed via a first principles understanding of how businesses or households may change their behaviour or be impacted as a result of the proposed policy, investment or activity.

The next step is to map this activity into the 109 economic sectors and 40 geographies. In most cases the direct economic activity will occur across a range of economic sectors, commonly this can be drawn from either operational or capital budgets. Similarly, in most cases the direct economic activity will accrue across multiple geographies. Therefore, the activity must be mapped to each geography to ensure that the modelling reflects likely patterns of activity.

Finally, the mapped activity is then fed into the ELM which measures the additional economic activity that can be expected to occur within the economy as a result of the new activity. In summary, other businesses and households in the community will respond to the changes in the economy.

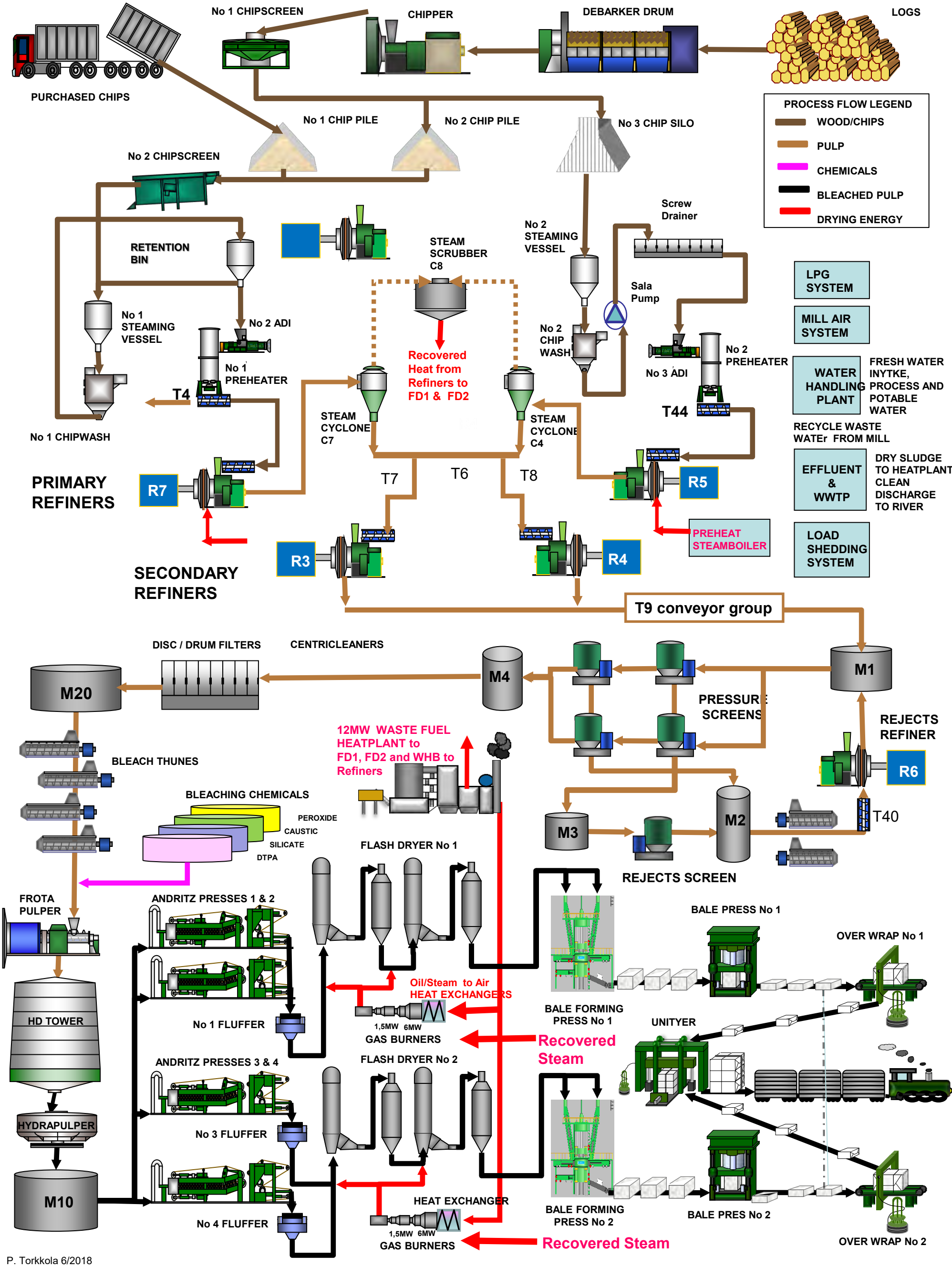
There are three types of economic impact the ELM calculates, direct, indirect, and induced:

- Direct impacts are the initial changes in the economy due to an economic shock (often new expenditure). The direct GDP effect is calculated based on the value of the shock and the direct employment effect is the number of jobs created by the shock itself.
- Indirect impacts arise as the firms that initially change their output as a result of an economic shock (i.e. the direct effects), purchase required inputs from their supply chain. These business-to-business transaction changes are known as the indirect impacts.
- Induced impacts flow from the direct and indirect impacts which generate wages, salaries, and profits for the households. The changed household incomes will generate more spending on goods and services. This household-to-business interaction is called induced activity.

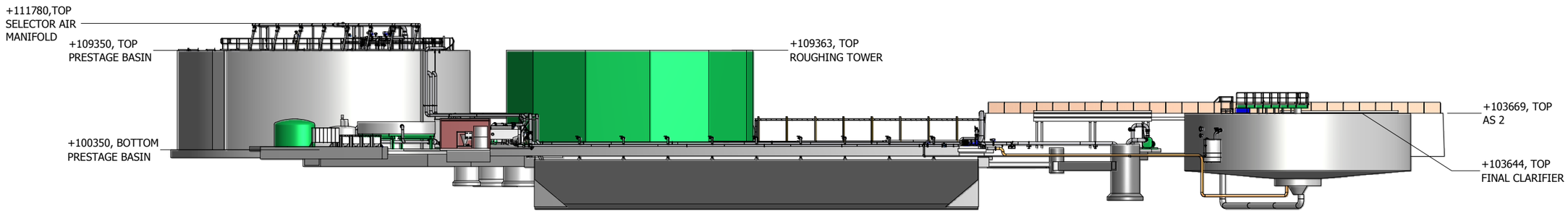
The ELM quantifies the economic activity in each geography and sector, which includes the direct, indirect, and induced activity. The associated employment impacts are calculated

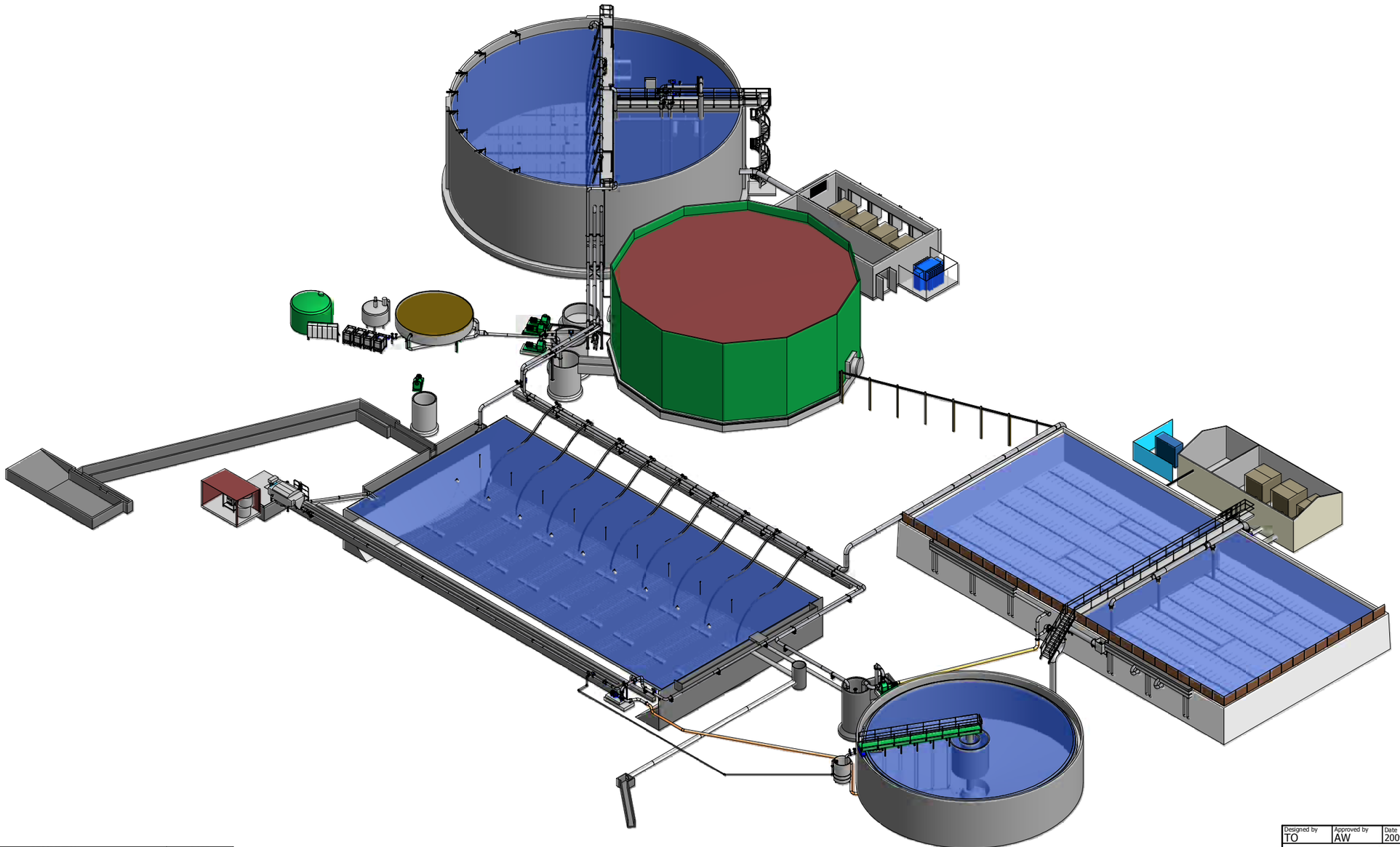
assuming constant productivity – that is, each sector-geography combination produces the same amount of output per employee.

Appendix F
Process Schematics and Standard Operating Procedures



P. Torkkola 6/2018





REV	DESCRIPTION	DATE
1	VARIOUS CHANGES	2009-12-14
2	FOAM INHIBITOR EQUIPM. REMOVED, INSTR. AIR AND FLUSH WATER TO BIO ADDED, NEW MECH. BUILDING.	2010-03-04
3	NEW PRESTAGE BASIN DESIGN	2010-05-11

Designed by	Approved by	Date
TO	AW	2009-10-06

VA-INGENJÖRERNA VEOLIA WATER
Scheelegatan 3, SE-212 28 Malmö, SWEDEN
TEL: +46 40-286700; FAX: +46 40-286701
www.vaing.se

Layout
Overview Horizontal

Project No	Paper-size
600810-WINSTONES-NEW ZEALAND	A1
Drawing No	**Rev.**	**Scale**
600810-011	3	1:200

RESPOND TO FOAM IN DISCHARGE TO WHANGAEHU RIVER

Purpose: TO RESPOND TO FOAM IN DISCHARGE TO WHANGAEHU RIVER.	
Required PPE:  Helmet- Safety footwear – Eye protection – Gloves – Hearing Protection – High viz Clothing	
Hazards and Controls: Where possible Use Mobile Hazard Boards to warn others of Hazards in Work Area	
Noise	Wear correct Hearing protection rated for area
Slip and Trips	Maintain Good house keeping
Climatic	Wearing of appropriate clothing for conditions – Correct Hydration for conditions
References: Effluent – Effluent Plant Manual	

Controlling foam in the river downstream of the discharge is a condition of resource consent and NOT OPTIONAL.

The river is to be monitored during daylight hours using the camera and images on the intranet.
Note: These images are updated every 5 minutes, however the time is not corrected for daylight savings

If the river is seen to be, or reported to be foaming, immediate action must be taken as detailed below.

RESPOND TO FOAM IN DISCHARGE TO WHANGAEHU RIVER

Review Hazards and Controls

1. Check defoamer dosing system

Step	Task Description (What is Required to be done)
1	When foaming is reported or observed: • Advise Shift Manager • Record as an Incident in Vault
2	Check the defoamer tank: • Level – top up if it is low • Discharge valve is open
3	Check dosing pump: • Is running • Stoke or speed is correct Contact Shift electrician if pump is not running Adjust the dosing rate if this is incorrect.
4	Check dosing system: • For leaks • For carrier water flow – valve is open?
5	Check and clean antifoam strainer if required.

2. Check River addition point

Step	Task Description (What is Required to be done)
1	Check spray nozzles and clean if they are blocked up.
2	Check carrier water and defoamer are at the nozzles and inspect supply lines for leaks
3	Clean antifoam strainer if required.
4	If foam is still present and all checks above have not identified a problem contact either: • Supervisor or • Callout or • Engineering

Appendix G
Treated Effluent Water Quality Data

Background

Values below their respective detection limits have been assigned the value of half the detection limit, as is accepted practice. Where relevant, effluent quality has been compared with consent limits, which apply to the load (kg/day) of select contaminants. Raw data is available upon request.

Monthly Monitoring Data

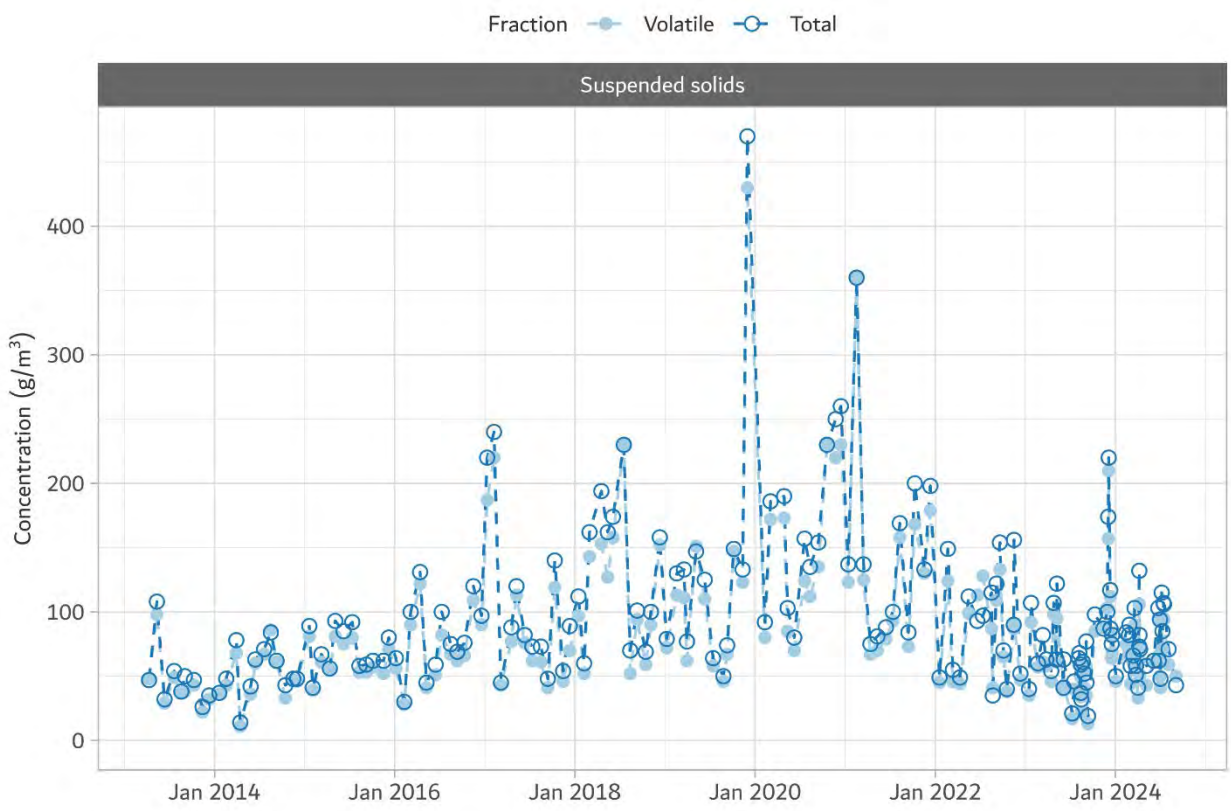


Figure G1. Total and volatile suspended solids concentrations of the treated effluent between 2013 and 2024.

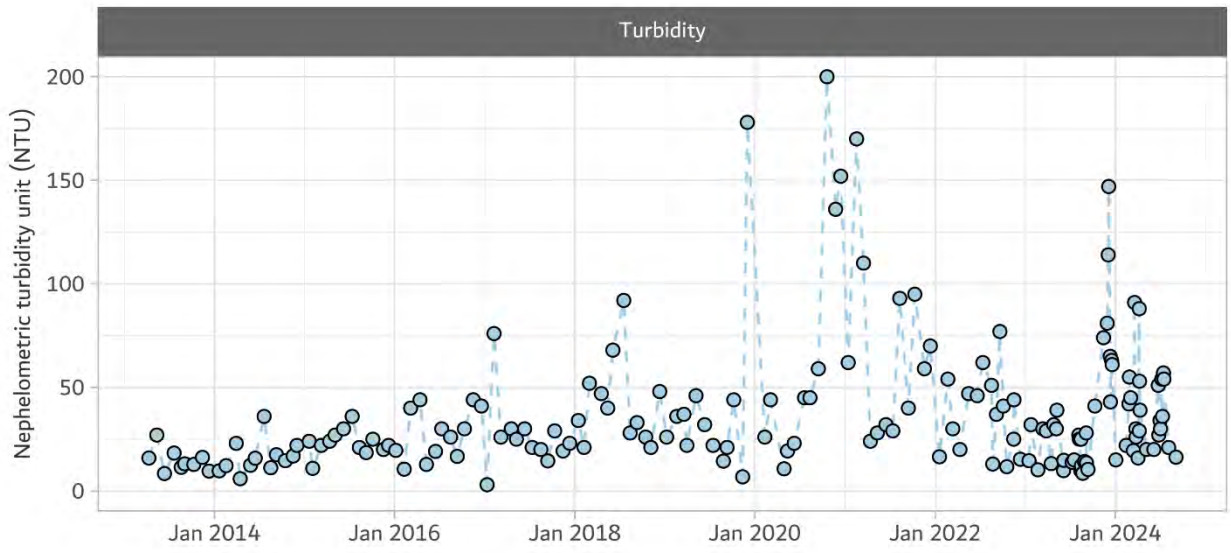


Figure G2. Turbidity of the treated effluent between 2013 and 2024.

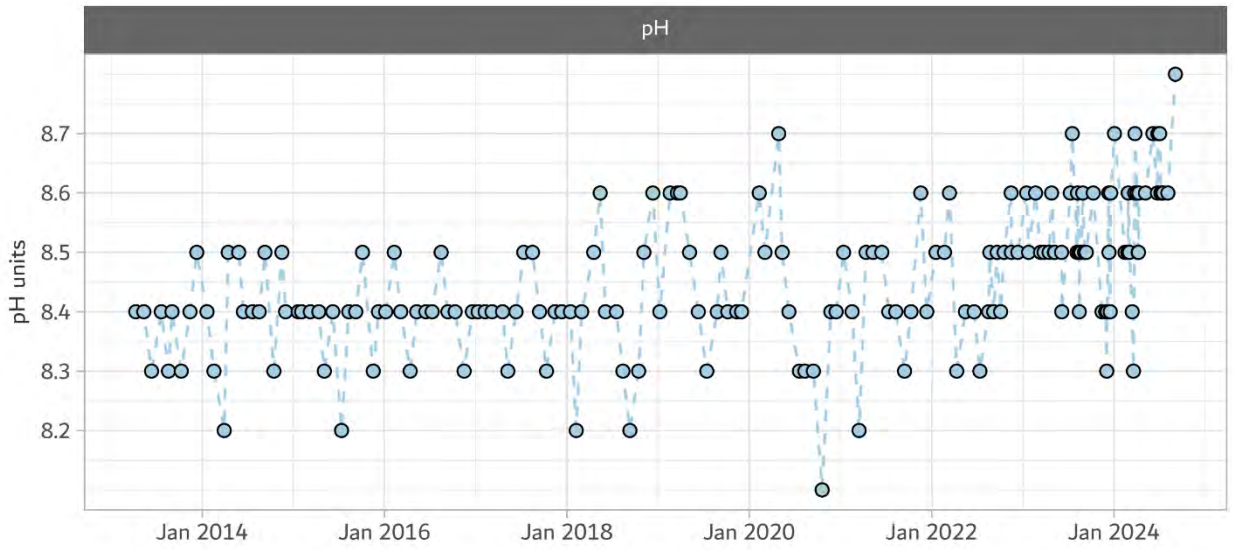


Figure G3. The pH of the treated effluent between 2013 and 2024.

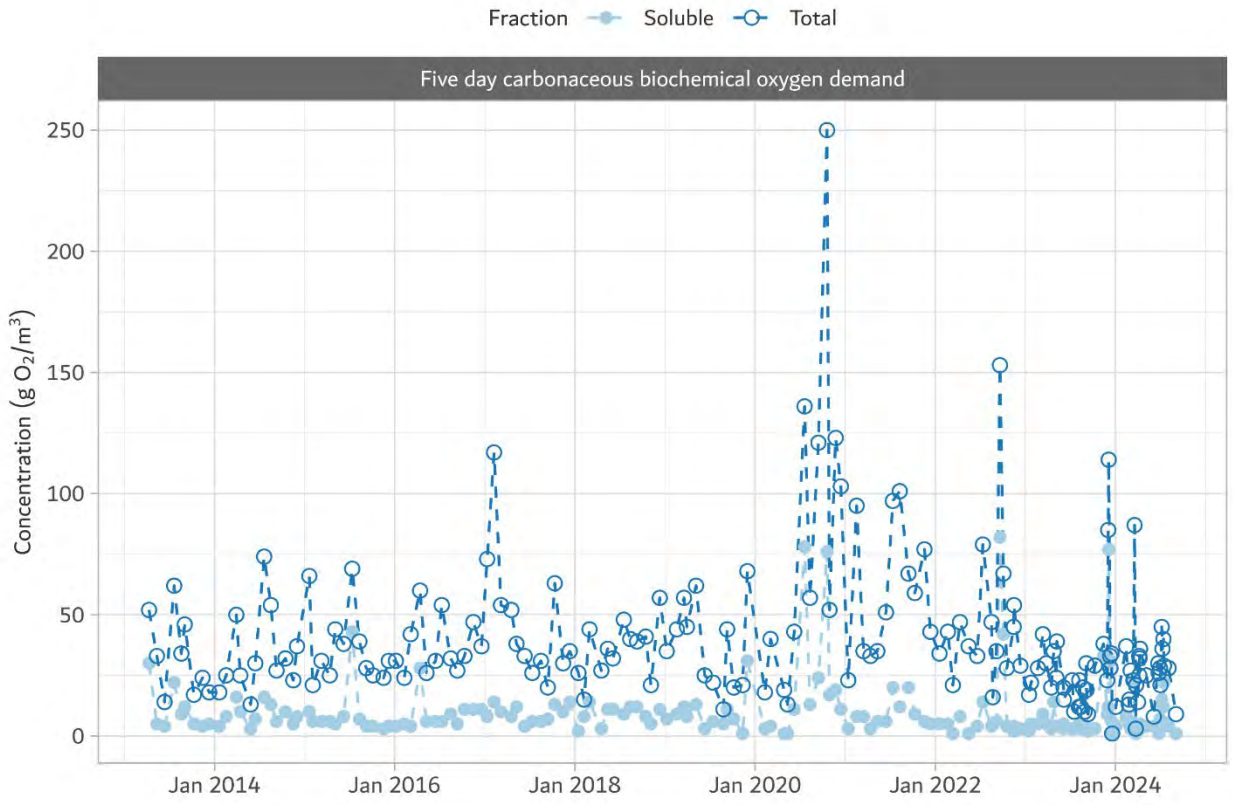


Figure G4. Biochemical oxygen demand of the treated effluent between 2013 and 2024.

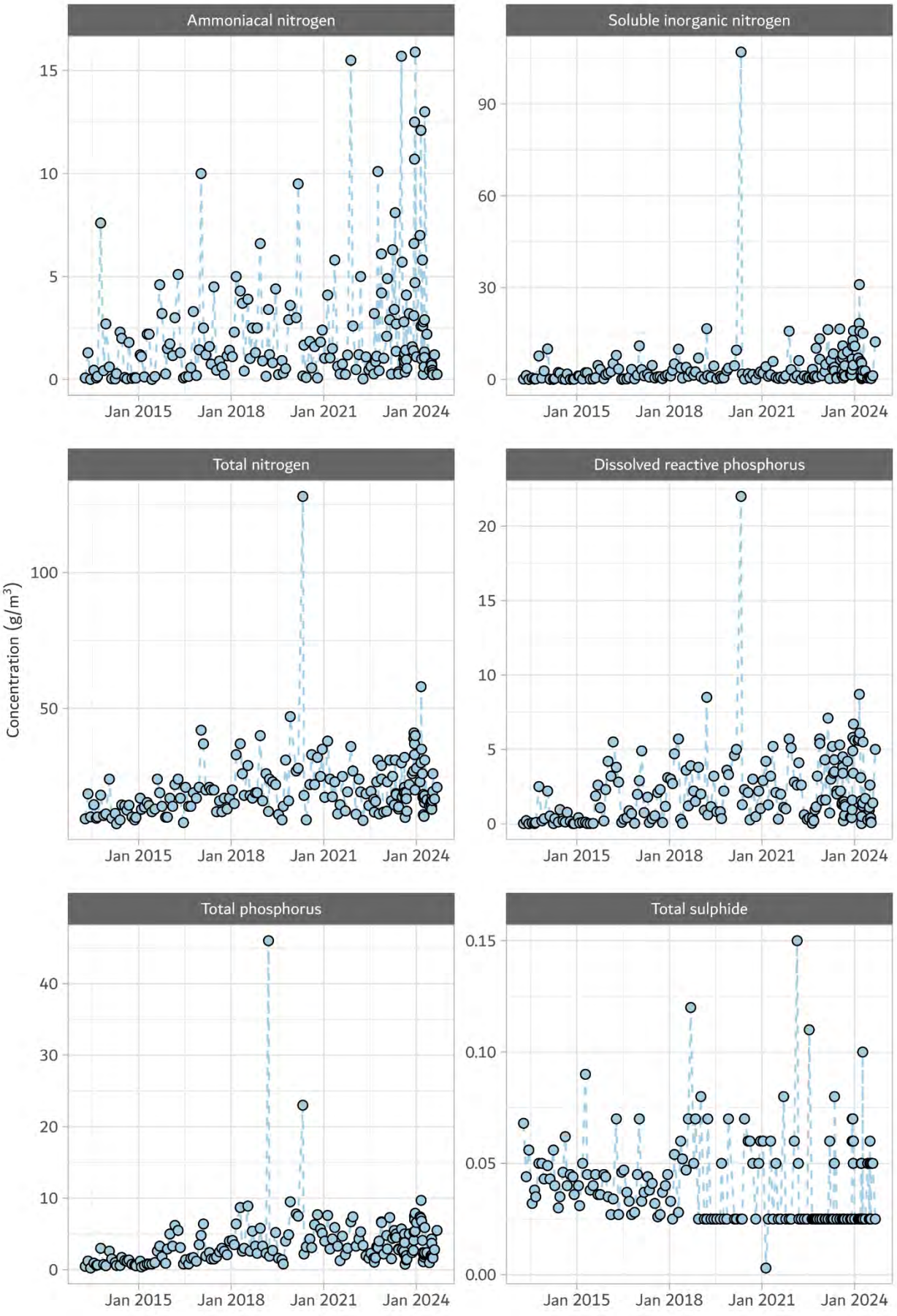


Figure G5. Nutrient concentrations of the treated effluent between 2013 and 2024.

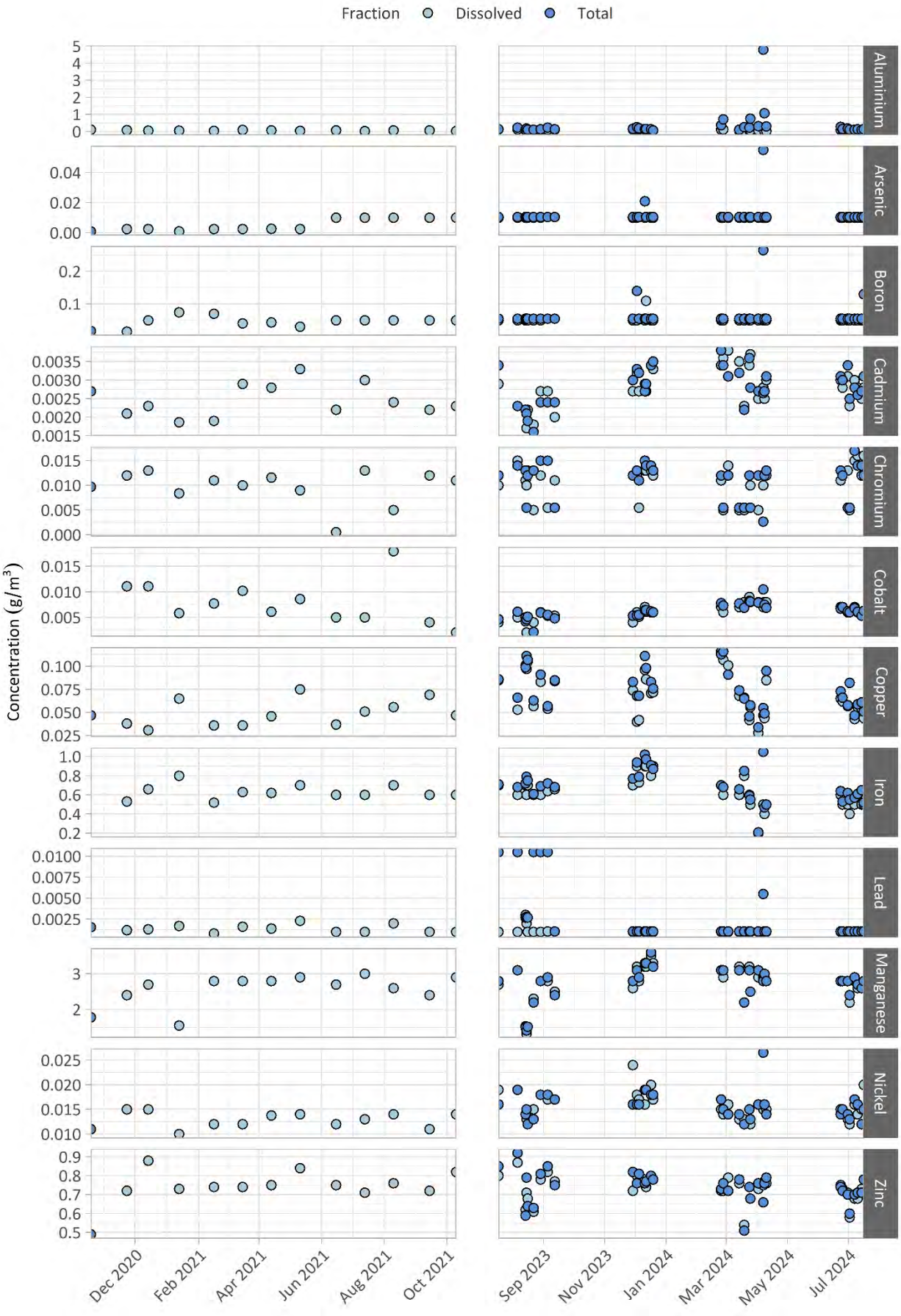


Figure G6. Metal and metalloid concentrations within the treated effluent between 2020 and 2024.

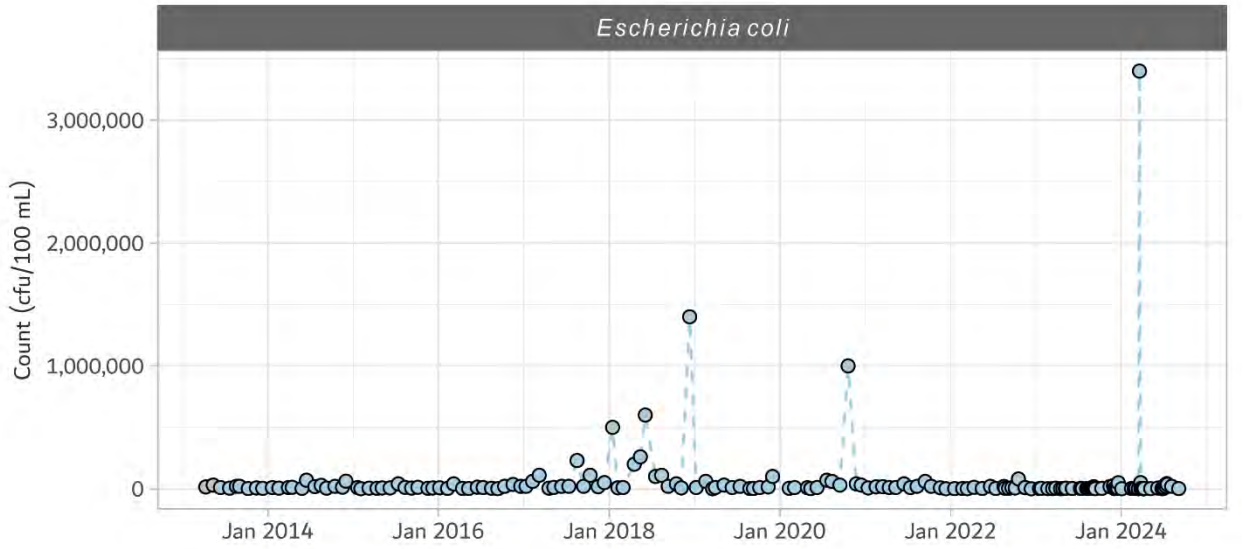


Figure G7. E. coli counts within the treated effluent between 2013 and 2024. Note: The elevated measurement on 19 March 2024 should be interpreted with caution, as the laboratory noted that the sample arrived more than 24 hours after collection.

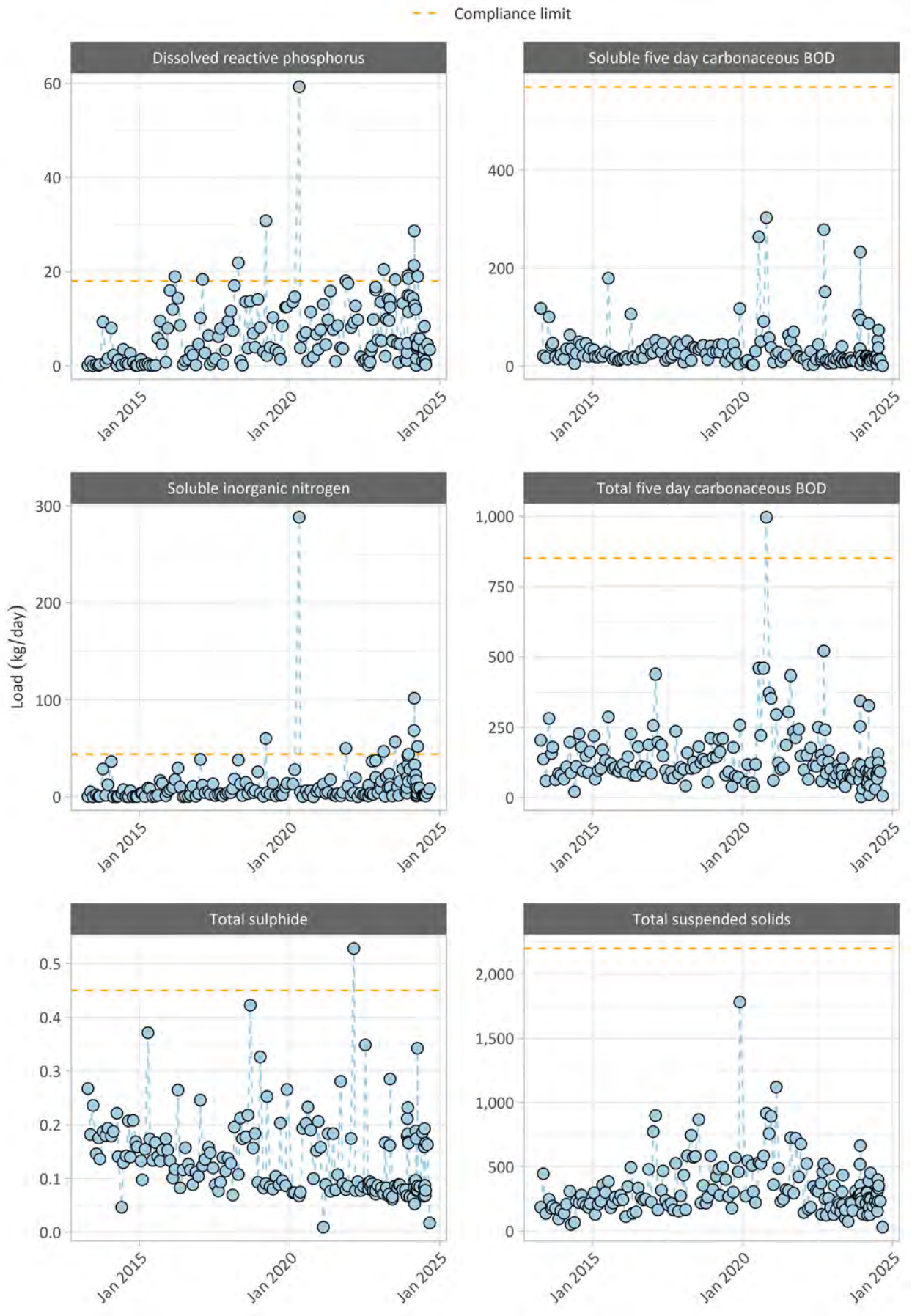


Figure G8. Treated effluent loads derived from monthly data between 2014 to 2024

Daily Monitoring Data

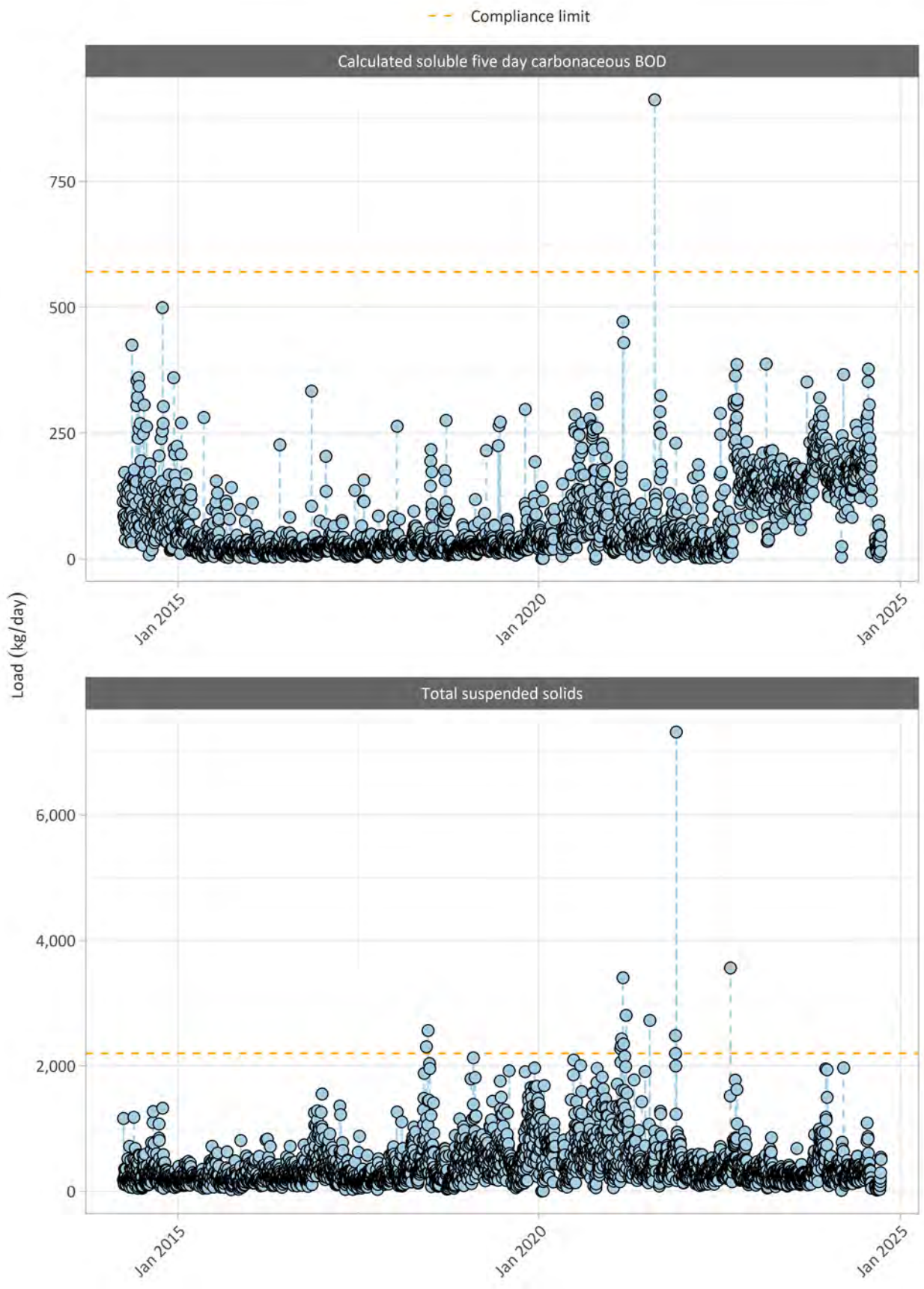


Figure G9. Biochemical oxygen demand and total suspended solids within the treated effluent, presented as loads, between 2013 and 2024.

Appendix H
Compliance Assessment

Compliance Assessment

Compliance with the conditions of the Permit between 2013 and 2024 is assessed by condition below. For ease of reference, each condition is reproduced in italics.

General conditions

Condition 1	**Status**	**COMPLIANT**
WPI has advised Viridis the pulp mill was compliant with Condition 1 since the Permit was granted in June 2010.		
The Consent Holder shall undertake the activity in general accordance with the application, including all accompanying plans and documents lodged with Manawatu-Wanganui Regional Council being: *a. the original application and AEE, prepared by Kingett Mitchell Ltd, dated November 2006;* *b. a response to section 92 request dated 11 August 2009, prepared by Golder Associates (NZ) Limited on behalf of Winstone Pulp International (WPI), and attached documents;* *c. letters / technical memorandums, prepared by Golder Associates (NZ) Limited on behalf of WPI, dated 1 September 2009, 9 November 2009 and 26 February 2010;* *d. addendum to the Assessment of Environmental Effects, prepared by Golder Associates (NZ) Limited, dated December 2009 (Addendum).* *e. the application for a variation of consent conditions lodged on 18 June 2021;* *f. further information provided on 3 September 2021 being in response to a s92 request for additional information; and* *g. further information provided on 2 November 2021 being withdrawing the application amendment to condition 20 and clarifying amendments regarding scBOD5.* *Where there may be inconsistencies between information provided by the Applicant and conditions of the resource consent, the conditions of the resource consent apply.*		

Condition 2	**Status**	**PARTIALLY COMPLIANT**
The daily volumes of treated wastewater discharged to the Whangaehu River between 2014 and 2024 are shown on Figure 11 of the AEE. The limit is identified by a dashed orange line. Discharge volumes were below the limit throughout the monitoring period. However, as described in an incident report (ID 16-2806) appended to the 2015/2016 annual report, filed with Horizons on 1 June 2016, a level sensor failed on 31 May 2016 causing untreated wastewater to discharge to the Whangaehu River for just over an hour. Accordingly, WPI was non-compliant with Condition 2a on a single occasion. A six-monthly maintenance schedule was established to reduce the likelihood of a recurrence. This measure proved effective, as no further non-compliance with Condition 2a has been recorded since. As shown on Figure 13 of the AEE, daily volumes of antifoam inhibitor remained below 125 L/day throughout the monitoring period. As such, WPI was compliant with Condition 2b.		
The activities authorised by this discharge permit shall be limited to the discharge of: *a) Treated pulp mill effluent not exceeding a rate of 5,200 m^3/day.* *b) Antifoam inhibitor not exceeding a rate of 125 L/day (at a maximum rate of 3 mL/second).* *This consent does not authorise the discharge of treated or untreated human wastewater.*		

Treated Pulp Mill Wastewater Discharge

Condition 3	**Status**	**COMPLIANT**
WPI has advised Viridis that treated wastewater discharge, when active, was discharged to the Whangaehu River at the location identified on Plan A of the Permit (Appendix A).		
The discharge of treated pulp mill effluent to the Whangaehu River, shall occur at or about map reference NZMS260 T20:323-903 (NZTopo50 BJ34:223-286; NZTM 1822233E, 5628706N) as shown on Plan A.		

Antifoam Inhibitor Discharge

Condition 4	Status	NON-COMPLIANT
WPI advised Viridis that between 2013 and 2024 it used antifoam agents with toxicity equal to or less than NALCO F3610 on all but one occasion. As described in the incident report (ID 17-5109) filed with Horizons on 9 January 2017, an operator inadvertently filled the river antifoam tank with a different antifoam agent (BuBreak 4390) on 6 January 2017. BuBreak 4390 is a silicon-based organic defoaming agent that was added to the WWTP to inhibit foaming. The safety data sheet for BuBreak 4390 did not identify the agent's specific constituents, but did note the low toxicity of its components. It is therefore unlikely any adverse environmental effects occurred as the result of the incident. To prevent recurrence, staff were retrained, and labelling was improved, successfully eliminating further incidents of incorrect antifoam use. All antifoam inhibitors were discharged to the Whangaehu River at the Tangiwai Rail Bridge, in general accordance with the coordinates provided in Condition 4 and with the location shown on Plan A of the Permit (Appendix A).		
The antifoam utilised will be an antifoam agent that has a toxicity that is equal to or less than the antifoam agent NALCO F3610. The discharge of antifoam inhibitor shall occur at about map reference NZMS260 T20:317-902 as shown on Plan A.		

Condition 4A	Status	COMPLIANT
The results of a desktop assessment of the toxicity of IXOM Sixin X-130FT were provided to Council and Ngā Waihua o Paerangi Trust on 14 October 2022, within three months of ATH-2010011593.01/APP-2006012018.01 being granted on 13 September 2022 (Babbage 2022). The toxicity assessment was undertaken by Amanda Good and Dr Grant Allen, then employed at Babbage, who are considered suitably qualified and experienced independent experts. The toxicity assessment of agent CS-53M, prepared by Viridis (2024a), was provided to Council and Ngā Waihua o Paerangi Trust on 5 April 2024, and approved by the former. However, this agent was never employed.		
Within three months of commencement of APP-200612018.01, the Consent Holder must undertake and provide a desktop assessment of the toxicity of the antifoam agent used. The assessment must be completed by a suitably qualified and experienced independent party and provided to the Consents Monitoring Team and the Ngā Waihua o Paerangi Trust.		

Condition 4B	Status	NOT APPLICABLE
This condition was not applicable, as the antifoam agent has not permanently been changed from IXOM Sixin X-130FT. Antifoam agents trialled under Rule 14-26 of the One Plan were agreed upon with Council, and the approved CS-53M antifoam agent was not employed.		
Any change to the antifoam agent used under condition 4, requires the Consent Holder to repeat the requirements of condition 4A.		

Condition 5	Status	COMPLIANT
The daily volume of antifoam inhibitor discharged to the Whangaehu River between 2014 and 2024 was recorded by WPI in logsheets. WPI has advised Viridis this information was relayed to Horizons monthly as specified in Condition 5 of the Permit. The logsheets were also appended to each monitoring period's annual report, which was supplied to Horizons by 30 June each year.		
The Consent Holder shall record the date, time and duration the antifoam is discharged and the volume of antifoam inhibitor used during each discharge period. The records shall be forwarded to the MWRC's Environmental Protection Manager on a monthly basis.		

Treatment Plant Upgrade

Condition 6	Status	COMPLIANT
Construction of the upgraded wastewater treatment plant (WWTP) was completed on 6 July 2011, 11 months after the Permit was granted on June 2010. The upgraded WWTP was commissioned on 1 October 2011, within the three-month period after the WWTP upgrade was completed.		
The Consent Holder shall upgrade its wastewater treatment plant in general accordance with sections 4 and 5 of the Addendum to the Assessment of Environmental Effects to improve the level of treatment of its effluent. The following sets out the timeframes for installation and commissioning: *a. The Consent Holder shall construct its upgraded wastewater treatment plant within 14 months of the granting of the consent. The commissioning of the new plant shall be completed within three months of construction being complete.*		

Cultural Health Indicators

Condition 7	Status	COMPLIANT
Ngāti Rangi reviewed the proposed Cultural Health Indicator (CHI) monitoring regime, which was provided to Horizons on 31 May 2012. The reviewed CHI monitoring regime was provided to Horizons on 31 May 2012. The reviewed CHI monitoring regime is included in Appendix I.		
The Consent Holder shall develop a monitoring regime using Ngati Rangi cultural health indicators for the Whangaehu River. This monitoring regime shall be implemented within 24 months of the granting of this consent. A copy of the monitoring regime shall be provided to the Environmental Protection Manager – Manawatu-Wanganui Regional Council.		

Monitoring of Effluent

Condition 8	Status	NON-COMPLIANT
WPI measured the daily volumes of treated wastewater discharged to the Whangaehu River. These data, which are presented on Figure 11 of the AEE, were provided via telemetry to Horizons. However, the system failed to transfer data to Horizons on several occasions in 2022 (1-6, 14-30 April; 1-18 May; 13 September; 18 October) and once in 20203 (7 April). As described in the associated environmental incident reports (appended to the relevant year's annual report), these errors were promptly addressed by notifying the on-site team, resolving data collection failures or upgrading telemetry storage.		
The Consent Holder shall measure and record the daily wastewater volume discharged to the Whangaehu River. The follow meter(s) used to measure and record the wastewater volume shall be calibrated to an accuracy of +/- 5% or better. The wastewater volume records shall be transferred daily to the Manawatu-Wanganui Regional Council via telemetry in a format compatible with the Council's telemetry system.		

Condition 9	Status	COMPLIANT
The results of the annual calibration tests were appended to the annual report submitted to Horizons by 30 June each year. These tests confirmed that the meter used to measure, and record treated wastewater volumes was calibrated to an accuracy of +/- 5% or better at the time of testing.		
The Consent Holder shall have the effluent flow meter calibrated annually by an authorised and certified contractor which confirms that the flow meter is accurate to within +/- 5% or better. This calibration shall be completed with the meter in-situ to ensure that the calibration takes into account any variability due to its location and installation. The calibration certificate shall be provided to the Manawatu-Wanganui Regional Council's Environmental Compliance Manager by 30 June each year commencing 30 June 2010.		

Condition 10	Status	COMPLIANT
As required by Condition 10, WPI collected daily 24-hour composite samples of treated effluent and measured pH, TSS and COD in five of every seven samples collected from 2013 and 2024. The results are presented in Appendix G (Figure G9) and were forwarded to Horizons each month.		
For the duration of the consent, the Consent Holder shall collect a daily 24 hour composite sample of the discharge (using a continuous sampling device). Five of the seven samples collected weekly shall be analysed for: *~~a. soluble carbonaceous biochemical oxygen demand (5 days) (soluble cBOD5);~~* *b. total Chemical Oxygen Demand;* *c. total Suspended Solids (TSS); and* *d. pH.* *The results shall be forwarded to the Manawatū-Whanganui Regional Council's Environmental Protection Manager on a monthly basis.* ***[Condition 10 amended as per decision APP-2006012018.01 dated [13 September 2022]]***		

Condition 11	Status	NON-COMPLIANT
As shown in Figure C4 in Appendix C, WPI was compliant with Condition 11's downstream *E. coli* count limits, except on the following occasions: • 20 August 2013, when an *E. coli* count of 900 cfu/100 mL was recorded. The results of retesting on 3 September 2013 were compliant. • 22 July 2014 and 16 October 2014, when *E. coli* counts of 600 cfu/100 mL and 3,000 cfu/100 mL were recorded, respectively. However, the laboratory advised caution in interpreting the results, as the sample temperature exceeded the recommend 8°C upon receipt, which is necessary for regulatory and analytical compliance. • 14 July 2015, when an *E. coli* count of 4,300 cfu/100 mL was recorded. Retesting on 27 July 2015 also returned non-complaint results (700 cfu/100 mL), but subsequent testing on 30 July 2025 showed a much lower count (10 cfu/100 mL), which complied with the limit. • 12 August 2020 and 15 September 2020, when *E. coli* counts of 700 and 1,000 cfu/100 mL were recorded. Retesting on 24 August 2020 (10 cfu/100mL) was compliant and, although retesting following the non-compliance in September 2020 was not undertaken until 20 October 2020, it was also compliant. Overall, management of *E. coli* non-compliances downstream of the discharge involved retesting, which consistently found concentrations to return to acceptable levels. On occasion, exceedances were suspected to result from sample handling issues, such as inadequate cooling transport delays. To mitigate this, stricter sample handling protocols were implemented and were found to be effective.		
Within one year of the upgraded wastewater treatment plant's completed commissioning the discharge shall not cause at or downstream of the Tangiwai Rail Bridge the Escherichia coli (E. coli) concentration in the Whangaehu River to exceed the following: *a. The concentration of E. coli when the River flow is at or below median flow shall not exceed 260 per 100 mL during the period 1st November to 30th April inclusive; and* *b. The concentration of E. coli when the river is at or below three times median flow shall not exceed 550 per 100 mL. This applies all year.*		

Condition 12	Status	NON-COMPLIANT
A 24-hour composite sample of the treated effluent was collected each month, except in January 2020, due to an internal communication failure (as per incident report 33152, as summary of which was		

appended to the 2019/20 annual report). To prevent recurrence, an automated calendaring IT system was implemented, effectively ensuring that no further sampling events have been missed. On each sampling occasion, samples were submitted to an IANZ accredited laboratory (Hill Laboratories) for analysis. The results, which are presented on Figures G1 through G8 in Appendix G, were forwarded to Horizons monthly, as specified in the Permit.
Post upgrade of the WWTP, the Consent Holder shall implement a monthly monitoring programme for the effluent. The programme shall include the collection of one 24-hour composite sample of the daily discharge (using a continuous sampling device) and analysis to provide: a. *Soluble $cBOD_5$;* b. *Total carbonaceous biochemical oxygen demand (5 days) ($TcBOD_5$)* c. *TSS;* d. *Volatile suspended solids (VSS);* e. *Total ammoniacal nitrogen (NH4-N);* f. *Soluble inorganic nitrogen (SIN)* g. *Total phosphorus (TP);* h. *Total nitrogen (TN);* i. *Dissolved reactive phosphorus (DRP);* j. *pH;* k. *Total sulphide;* l. *Turbidity; and* m. *E. coli.* *Monthly samples must be analysed by an International Accreditation New Zealand (IANZ) accredited laboratory. The results shall be forwarded to the Manawatu-Wanganui Regional Council's Environmental Protection Manager on a monthly basis.*

Condition 13	**Status**	**COMPLIANT**
An assessment of the toxic effects of total tannins in the effluent discharge on the Whangaehu River's aquatic life was completed in 2012 and provided to Horizons on 27 November 2012 (FSL 2012).		
Within 12 months of the upgraded wastewater treatment plant's completed commissioning the Consent Holder shall undertake an assessment of the toxic effects of total tannins in the effluent discharge on the Whangaehu River's aquatic life. This assessment shall be provided to the Manawatu-Wanganui Regional Council's Environmental Protection Manager.		

Monitoring of Receiving Water

Condition 14	**Status**	**NOT APPLICABLE**
This condition is no longer applicable as WPI upgraded its treatment plant in 2011.		
Prior to the upgrade of the wastewater treatment plant, the Consent Holder shall monitor the following parameters once per month in the Whangaehu River approximately 50 metres upstream of the discharge and at the Tangiwai Memorial, downstream of the discharge (as per attached Plan A): a. *Horizontal visibility;* b. *TSS;* c. *Soluble $cBOD_5$; and* d. *pH.* *Monthly samples must be analysed by an IANZ accredited laboratory.* *The results shall be forwarded to the MWRC's [Horizons] Environmental Compliance Manager on a monthly basis.*		

Condition 15	**Status**	**NON-COMPLIANT**
Between 2013 and 2024 in-river sampling was undertaken each month, except in January 2020, due to an internal communication failure (as per incident report 33152, as summary of which was appended		

to the 2019/20 annual report). To prevent a recurrence, an automated calendaring IT system was implemented, effectively ensuring that no further sampling events have been missed. The results of monitoring, which are provided on in Appendix C, were forwarded to Horizons on a monthly basis, as specified in the Permit.
Post upgrade of the wastewater treatment plant the Consent Holder shall monitor to provide the following parameters once per month in the River approximately 50 m upstream of the discharge and at the Tangiwai Memorial downstream of the discharge (as per attached Plan A): a. *$TcBOD_5$;* b. *Soluble $cBOD_5$;* c. *TSS;* d. *VSS;* e. *TNH4-N;* f. *SIN;* g. *TP;* h. *TN;* i. *DRP;* j. *pH;* k. *Total sulphide;* l. *Temperature;* m. *Total tannins;* n. *Turbidity;* o. *E. coli; and* p. *Horizontal visibility.* *Monthly samples must be analysed by an IANZ accredited laboratory.* *The results shall be forwarded to MWRC's [Horizons] Environmental Protection Manager on a monthly basis.*

Condition 16	**Status**	**COMPLIANT**
The information specified in Condition 16 was recorded at the time of sampling and entered into a logsheet that was forwarded to Horizons on a monthly basis (refer Condition 15). These logsheets were also appended to annual reports issued to Horizons by 30 June each year.		
On each sampling occasion, undertaken under Condition 14 or 15, the Consent Holder shall record: a. *Presence and Heterotrophic Abundance Level (HAL) of bacterial and/or fungal slime growths visible to the naked eye as plumose growths or mats as viewed from the riverbank.* b. *Presence and percentage cover of conspicuous scums, foams, floatable or suspended material of the water surface at any point.* c. *Objectionable odour.* d. *Hue, measured on the Munsell scale.*		

Discharge Loads Prior to the Upgrade of the Wastewater Treatment Plant

Condition 17	**Status**	**NOT APPLICABLE**
This condition is no longer applicable.		
Prior to commissioning of the upgraded WTP, in accordance with Condition 6, daily contaminant loads of effluent as specified in Table A shall not be exceeded in more than 1 of 20 consecutive samples. **Table A: Discharge loads prior to upgrade.**		
Parameter	*7 day rolling average load (kg/day)*	
Total $cBOD_5$	*9,500*	
Soluble $cBOD_5$	*5,000*	
TSS	*2,000*	

Condition 18	Status	NOT APPLICABLE
This condition is no longer applicable.		
Prior to commissioning of the upgraded wastewater treatment plant, in accordance with Condition 6, the discharge shall not cause the following at or downstream of the Tangiwai Railway Bridge: *a) A reduction in horizontal visibility by more than 50 %.* *b) A change in hue no greater than 10 points on the Munsell scale.*		

Effluent Quality Post Upgrade

Condition 19	Status	NON-COMPLIANT

Daily loads of $cBOD_5$, TSS, DRP, SIN and total sulphide corresponding to the concentrations measured (by an external laboratory) in samples collected each month are shown in Appendix G. Daily loads were compliant with the limits identified in Condition 19, except on the following occasions:

- 6 March 2016, a DRP load of 19 kg/day was recorded (incident ID 16-004). Resampling of the discharge on 20 March 2016 was compliant (14.3 kg/day).
- 18 April 2018, when a DRP load of 22 kg/day. The source was identified to be increased phosphoric acid dosing at the WWTP, to account for elevated organic loads (incident ID 31662). Resampling of the discharge on 2 May 2018 returned a compliant DRP load (13.4 kg/day).
- 19 March 2019, when a DRP load of 31 kg/day and SIN load of 60 kg/day were recorded. Non-optimum nutrient dosing at the WWTP was identified (incident ID 32943). Resampling on 1 April 2019 returned compliant DRP (2 kg/day) and SIN (4.3 kg/day) loads.
- 28 April 2020, when the DRP and SIN loads were 59 kg/day and 288 kg/day, respectively, and on 19 October 2020, when the total $cBOD_5$ load was 1,048 kg/day. The results of retesting on 12 May 2020 were compliant (DRP and SIN loads of 3.8 kg/day and 5.3 kg/day, respectively) as were the results of retesting on 29 October 2020 (the total $cBOD_5$ load was 153 kg/day on this occasion).
- 18 November 2021, when DRP and SIN loads were 18.1 kg/day and 50 kg/day, respectively. The results of resampling on 12 December 2021 were compliant (DRP: 17.5 kg/day, SIN: 11 kg/day).
- 21 February 2022, when the total sulphide load was 528 g/day. The results of resampling on 7 March 2022 were compliant, with a total sulphide load of 156 g/day.
- 22 February 2023, when DRP and SIN loads were 20.4 kg/day and 46.9 kg/day, respectively. The results of resampling on 14 March 2023 were compliant (DRP 2.0 kg/day and SIN 0.78 kg/day)
- 10 July 2023 when DRP and SIN loads were 18.3 kg/day and 57 kg/day, respectively, and on 12 December 2023 when the DRP load was 19.2 kg/day. The results of resampling on 19 July 2023 were compliant (DRP was 7.0 kg/day and SIN was 20.4 kg/day) as was the result of resampling on 4 January 2024 (DRP was 14.8 kg/day).

In addition to external testing, WPI measured soluble TSS concentrations in-house in five of the seven required weekly samples and estimated soluble cBOD5 from total COD concentrations, as specified in Condition 19. Compliance was maintained for these parameters except on the following occasions:

- 9 July 2013, when a soluble BOD_5 load of 824 kg/day was recorded, due to a pre-stage blower failure, causing low air flow in the WWTP (incident ID 13-008). A spare blower was purchased, and diffusers were cleaned in response.
- 8 August 2021, when the soluble $cBOD_5$ load was 912 kg/day, exceeding the limit of 570 kg/day.

Non-compliances with Condition 19 were managed through investigations and/or retesting, which typically confirmed acceptable contaminant loads. In some cases, exceedances were linked to over-dosing or equipment failure, prompting corrective action.
Post upgrade treated wastewater shall meet the following standards: a. *The daily load of TcBOD5 shall not exceed 850 kg/day.* b. *The daily load of soluble cBOD5 shall not exceed 570 kg/day.* c. *The daily load of TSS shall not exceed 2,200 kg/day.* d. *The daily load of DRP shall not exceed 18 kg/day.* e. *The daily load of SIN shall not exceed 44 kg/day.* f. *The daily load of total sulphide shall not exceed 485 g/day.* *ADVICE NOTE: Soluble $cBOD_5$ loads shall be calculated by Soluble $cBOD_5$ load (kg/day) = 0.04*TCOD (g/m^3)*Flow (m^3/day)/1000 g/kg* ***[Condition 19 amended as per decision APP-2006012018.01 dated [13 September 2022]]***

Receiving Water Limits Post Upgrade of the Wastewater Treatment Plant

Condition 20	**Status**	**NON-COMPLIANT**

WPI's observations during monthly river sampling and at other times confirmed full compliance with four of the seven parameters (Parameters 3, 4, 6 and 7). However, horizontal visibility (Parameter 1) exceeded the allowable 20% decrease, hue differences (Parameter 2) exceeded 15 Munsell units, and foaming (Parameter 4) was observed on multiple occasions. These instances are detailed in Table H1 and were reported to Horizons where practicable.

Sulphurous odours (Parameter 5) were noted on seven occasions. However, as odours were detected both upstream and downstream of the discharge, they were attributed to the crater lake, rather than the discharge, meaning WPI remained compliant with Parameter 5.

Sewage fungus and periphyton surveys (Section 2.2.4 of the AEE) confirmed the discharge did not contribute to sewage fungus growth. No streambed sewage fungus (HAL = 0) was recorded, and periphyton growth remained within the limits. Accordingly, WPI was compliant with Condition 20 in relation to bacterial and fungal slime growths (Parameters 3, 6 and 7). Survey results are described further in Golder (2012a, 2013a, 2014), Babbage (2019), and Viridis (2024b).

Ongoing non-compliance with Parameters 1, 2, and 4 was linked to natural in-river variability and discharge effects (colour, suspended solids and foaming). WPI investigated in-river variability (Golder 2013b, Babbage 2021) and explored treatment upgrades to support permit renewal.

Post commissioning of the upgraded wastewater treatment plant, in accordance with Condition 6, the following water quality limits in Table B shall apply as a result of the exercise of this consent, in the Whangaehu River at any point at or downstream of the Tangiwai Railway Bridge. The Consent Holder shall comply with these limits 100 % of the time over the monitoring year.

	Parameter	***Limit***
1	*Horizontal visibility (m)*	*Horizontal visibility shall not be reduced below 20 % of value at the upstream site.*
2	*Hue*	*A change in hue between the upstream site and at or downstream of the Tangiwai Rail Bridge of greater than 15 points on the Munsell scale.*
3	*Bacterial and / or fungal slime growths visible to the naked eye as plumose growths or mats*	*Growths to the naked eye shall be less than a HAL of 4*
4	*Presence and percentage coverage of conspicuous scums, foams, floatable or suspended material*	*No presence of conspicuous scums, foams, flotable or suspended material.*
5	*Odours*	*No emission of objectionable odour from the wastewater.*
6	*Periphyton cover as filamentous algae more than 2 cm long*	*The maximum cover of visible stream or riverbed shall not exceed 30%.*
7	*Periphyton as diatoms or cynobacteria more than 0.3 cm thick*	*The maximum cover of visible periphyton as diatoms or cynobacteria more than 0.3 cm thick shall not exceed 60%*

Table H1. Exceedances and retest results for monthly monitoring of the Whangaehu River quality between April 2013 and March 2024.

Parameter	1			2			3		4		5	
Date	Horizontal visibility (m)			Hue (Munsell)			Presence of bacterial and fungal slime growth (HAL)		% cover of conspicuous scums, foam, floatable or suspended material		Objectionable odour	
	Upstream	Downstream	% Difference	Upstream	Downstream	Absolute difference	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
May-13	0.34	0.24	-29	10GY (40)	5Y (25)	15	0	0	0	0	None	None
Jul-13	0.43	0.26	-40	7.5BG (57)	5BG (55)	2	0	0	0	0	None	None
Oct-13	0.38	0.2	-47	10GY (40)	2.5GY (32.5)	7.5	0	0	0	0	None	None
Nov-13	0.51	0.34	-33	7.5GY (37.5)	2.5GY (32.5)	5	0	0	0	0	None	None
Dec-13	0.45	0.34	-24	7.5GY (32.5)	2.5GY (32.5)	5	0	0	0	0	Slight sulfur	None
Mar-14	0.35	0.21	-40	10GY (40)	5GY (35)	5	0	0	0	0	None	None
May-14	0.42	0.18	-57	10GY (40)	10Y (30)	10	0	0	0	0	None	None
Jun-14	0.62	0.27	-56	5BG (55)	5GY (35)	20	0	0	0	0	None	None
Jul-14	0.49	0.24	-51	7.5G (47.5)	2.5GY (32.5)	15	0	0	0	0	None	None
Aug-14	0.48	0.2	-58	2.5G (42.5)	7.5GY (37.5)	5	0	0	0	0	None	Mild int. sulfur
Sep-14	0.45	0.3	-33	5BG (55)	2.5G (42.5)	12.5	0	0	0	0	None	None
Dec-14	0.54	0.34	-37	10GY (40)	5GY (35)	5	0	0	0	0	Int. sulfur	Mild sulfur
Mar-15	0.36	0.26	-28	2.5G (42.5)	5GY (35)	7.5	0	0	0	0	Intense sulfur	Mod. sulfur
April-15	0.14	0.09	-36	5Y (25)	2.5Y (22.5)	2.5	0	0	0	0	St. sulfur	Int. sulfur
May-15	0.3	0.18	-40	2.5GY (32.5)	7.5Y (27.5)	5	0	0	0	0	None	None
Jun-15	0.41	0.21	-49	5Y (25)	2.5Y (22.5)	2.5	0	0	0	0	St. sulfur	Int. sulfur
Aug-15	0.31	0.2	-35	7.5GY (32.5)	2.5GY (32.5)	5	0	0	0	0	Mild sulfur	Mild sulfur
Sep-15	0.43	0.31	-28	10G (50)	10GY (40)	10	0	0	0	0	None	None
Oct-15	0.54	0.24	-56	10G (50)	7.5GY (37.5)	12.5	0	0	0	0	None	None
Feb-16	0.27	0.18	-33	2.5GY (32.5)	7.5Y (27.5)	5	0	0	0	0	St. sulfur	St. sulfur
10/05/2016	0.27	0.19	-30	10Y(30)	10YR(20)	10	0	0	0	0	Int. st.sulfur	mild sulfur

Parameter	1			2			3		4		5	
Date	Horizontal visibility (m)			Hue (Munsell)			Presence of bacterial and fungal slime growth (HAL)		% cover of conspicuous scums, foam, floatable or suspended material		Objectionable odour	
	Upstream	Downstream	% Difference	Upstream	Downstream	Absolute difference	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
16/06/2016	0.27	0.13	-52	7.5G(47.5)	2.5Y(22.5)	25	0	0	0	0	none	none
11/07/2016	0.37	0.23	-38	7.5GY(37.5)	5GY(35)	2.5	0	0	0	0	none	none
11/10/2016	0.70	0.30	-57	10G(50)	2.5GY(32.5)	17.5	0	0	0	0	none	metallic
19/12/2016	0.71	0.43	-39	2.5G(42.5)	2.5GY(32.5)	10	0	0	0	0	St. sulfur	St. sulfur
07/03/2017	0.58	0.45	-22	2.5BG(52.5)	5G(45)	7.5	0	0	0	0	strong sulfur	strong sulfur
12/06/2017	0.54	0.25	-54	45	32.5	12.5	0	0	0	0	none	none
11/07/2017	0.76	0.26	-66	55	32.5	22.5	0	0	0	0	none	none
16/08/2017	0.18	0.15	-17	35	30	5	0	0	0	1	moderate sulfur	int. sulfur
18/07/2018	0.46	0.33	-28	40.0	30.0	10	0	0	0	0	none	none
06/11/2018	0.39	0.25	-36	40.0	30.0	10	0	0	0	0	none	none
12/12/2018	0.35	0.33	-6	37.5	32.5	5	0	0	0	3	St. sulfur	int. mod. sulfur
09/01/2019	0.23	0.22	-4	27.5	25.0	2.5	0	0	0	1	St. sulfur	int. sulfur
19/02/2019	0.32	0.27	-16	30.0	27.5	2.5	0	0	0	1	mild sulfur	int. mild sulfur
20/03/2019	0.26	0.21	-19	32.5	27.5	5	0	0	0	2	int. mod. sulfur	sl. sulfur
08/05/2019	0.28	0.17	-39	10GY (40)	7.5Y (27.5)	12.5	0	0	0	0	None	None
08/10/2019	0.59	0.32	-46	2.5GY (32.5)	10Y (30)	2.5	0	0	0	0	None	None
13/11/2019	0.60	0.38	-37	2.5G (42.5)	2.5GY (32.5	10	0	0	0	0	strong sulfur	strong sulfur
11/02/2019	0.34	0.18	-47	7.5Y (27.5)	5Y (25)	2.5	0	0	0	0	Ocean odour	Ocean odour
29/04/2020	0.42	0.17	-60	5GY (35)	10Y (30)	5	0	0	0	0	Metallic smell	Metallic smell
13/05/2020	0.62	0.20	-68	2.5G (42.5)	5GY (35)	7.5	0	0	0	0	None	None
09/06/2020	0.46	0.15	-67	7.5G(47.5)	7.5Y(27.5)	20	0	0	0	0	None	None
June 2020*	0.50	0.25	-50	7.5G(47.5)	7.5GY (37.5)	10	-	-	-	-	-	-

Parameter	1			2			3		4		5	
Date	Horizontal visibility (m)			Hue (Munsell)			Presence of bacterial and fungal slime growth (HAL)		% cover of conspicuous scums, foam, floatable or suspended material		Objectionable odour	
	Upstream	Downstream	% Difference	Upstream	Downstream	Absolute difference	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
June 2020*	0.40	0.28	-30	-	-	-	-	-	-	-	-	-
21/07/2020	0.55	0.19	-65	2.5G(42.5)	5GY(35)	7.5	0	0	0	0	None	None
12/08/2020	0.35	0.20	-43	7.5GY(37.5)	7.5Y(27.5)	10	0	0	0	0	None	None
XX/08/2020	0.40	0.32	-20	-	-	-	-	-	-	-	-	-
15/09/2020	0.40	0.27	-33	7.5GY(37.5)	5Y(25)	12.5	0	0	0	0	None	None
24/11/2020	0.73	0.33	-55	10G(50)	5GY(35)	15	0	0	0	0	St int sulphur	Int. sulphur
14/01/2021	0.46	0.34	-26	2.5GY(32.5)	5Y(25)	7.5	0	0	0	0	Fishy smell	Fishy smell
Jan 2021*	0.45	0.38	-17	-	-	-	-	-	-	-	-	-
14/07/2021	0.5	0.32	-36	5GY (35)	2.5GY (32.5)	2.5	0	0	Foam patches	30	st. sulphur	st. sulphur
11/08/2021	0.48	0.26	-46	10G (50)	10Y (30)	20	0	0	0	0	0	0
15/09/2021	0.36	0.17	-53	2.5G (42.5)	7.5GY (37.5)	5	0	0	0	0	0	0
11/10/2021	0.42	0.22	-48	5G (45)	2.5GY (32.5)	12.5	0	0	0	0	0	0
19/11/2021	0.11	0.11	0	10Y (30)	7.5Y (27.5)	2.5	0	0	0	30	st. sulphur	st. sulphur
19/11/2021	0.11	0.11	0	10Y (30)	7.5Y (27.5)	2.5	0	0	0	30	st. sulphur	st. sulphur
14/07/2022	0.12	0.13	8	10Y (30)	7.5Y (27.5)	2.5	0	0	0	100	none	none
18/08/2022	0.3	0.21	-30	2.5GY (32.5)	10Y (30)	2.5	0	0	0	0	none	none
19/10/2022	0.68	0.34	-50	5BG (55)	2.5G (42.5)	12.5	0	0	0	0	sl. sulphur	st. sulphur
17/04/2023	0.34	0.23	-32	7.5GY (37.5)	2.5GY (32.5)	5	0	0	0	0	none	none
26/04/2023*	0.35	0.28	-20	-	-	-	-	-	-	-	-	-
9/08/2023	0.62	0.37	-40	7.5G (47.5)	7.5GY (37.5)	10	0	0	foam patches	0	0	0
14/08/2023*	0.49	0.4	-18	-	-	-	-	-	-	-	-	-
Limit			***-20***			***15***		***<HAL 4***				

Notes: Non-compliances indicated in red; Abs. = absolute; int. = intermittent; mod. = moderate; sl. = slight; st. = strong; HAL = heterotrophic abundance level (from Quinn & McFarlane 1985); and *retest.

Condition 21	Status	COMPLIANT
A HAL monitoring manual was provided to Horizons in December 2011 (Golder 2011). A revised version was provided in September 2012 (Golder 2012b).		
The Consent Holder shall prepare a HAL monitoring manual which clearly describes the visual state of heterotrophic growths in River for each HAL level (1 to 6). This shall be provided to the Manawatu-Wanganui Regional Council's Environmental Protection Manager for review on completion of commissioning of the upgraded treatment plant, no later than 31 December 2011.		

Condition 22	Status	NON-COMPLIANT
WPI advised Viridis that it retested within one week of a non-compliance as required, except during the 2019/20 monitoring period. At the time, WPI was preparing a variation application to amend Condition 20, Parameter 1, due to recurring non-compliances with horizontal visibility. This was under investigation for a Permit change (Golder 2013b, Babbage 2021). After the proposed change was rejected, WPI resumed re-testing and reporting exceedances, ensuring compliance with Condition 22 for the rest of the period.		
In the event of an analytical result for any sample taken in accordance with Conditions 10, 12, 14, 15 and 16 that does not comply with the limits specified in Conditions 17, 18, 19 and 20 then the following action shall be taken: a) *The Consent Holder shall upon receipt of the results, investigate the possible cause of the exceedance and within one week of the result, the Consent Holder shall notify the Manawatu-Wanganui Regional Council's Environmental Protection Manager of the exceedance, with a written comment outlining mitigation measures taken and if required, further proposed measures to remedy the problem and comment whether this exceedance will affect the Consent Holder's ability to achieve 100 % compliance over the period specified in Condition 20; and* b) *Within one week of the exceedance result, the Consent Holder shall resample the effluent and/or River water in accordance with Conditions 10, 12, 14, 15 and 16 (whichever the exceedance applied to) and shall forward the analysis result to the Manawatu-Wanganui Regional Council's Environmental Protection Manager within one week of its receipt.*		

Monitoring

Condition 23	Status	COMPLIANT
WPI has advised Viridis sampling was undertaken by trained WPI staff using established procedures.		
The Consent Holder shall ensure that the monitoring required under this consent be undertaken by suitably qualified people.		

Condition 24	Status	COMPLIANT
All treated effluent and river samples collected as required by Conditions 12 and 15 were analysed by Hill Laboratories, an IANZ accredited laboratory, with results forwarded to Horizons. Samples collected for soluble $cBOD_5$ analysis were GF/C filtered as required by the Permit.		
All wastewater and river water quality analysis shall be undertaken by an appropriately accredited laboratory and all methodologies adopted shall be appropriate for either wastewater or river water analysis and the soluble $cBOD_5$ shall be GF/C filtered.		

Condition 25	Status	PARTIALLY COMPLIANT
A visual assessment of heterotrophic biofilm (sewage fungus) and filamentous algae cover at sites upstream and downstream of the discharge was undertaken by Golder (2012a, 2013a, 2014), Babbage (2019), and Viridis (2024b). In the 2023/24 monitoring period, two the surveys could not be completed within the specified timeframes due to inclement weather and river flow conditions. Therefore, as agreed with Horizons (McConachy 2024), the remaining surveys were undertaken prior to the end of		

the 2024/25 annual monitoring period (31 March 2025). The results of these surveys will be reported in 2024/25 annual report.

Periphyton samples were also collected between February and May for the analysis of chlorophyll *a* concentrations and AFDW. The results of the surveys, which are reported in Golder (2012a, 2013a, 2014), Babbage (2019), and Viridis (2024b), were discussed in relation to compliance with Condition 20 in Section 3.3 of the AEE.

Post commissioning of the upgraded wastewater treatment plant, in accordance with Condition 6, the Consent Holder shall engage a suitably qualified ecologist to undertake the following monitoring:

a) *Visual monitoring of sewage fungus and filamentous algae cover at established transects four times per year following an accrual period of no less than 20 days. Two monitoring events must be separated by a minimum of 2 weeks. An accrual is defined as no river flow in exceedance of three times the calculated median flow at the Tangiwai recorder occurring during this period. A minimum of four transects shall be established at each monitoring site and monitored on each monitoring occasion. Three monitoring sites shall be established 50 m to 500 m upstream of the discharge point, at or near the Tangiwai Memorial and at a point located approximately 15 km downstream of the discharge. The methods shall follow protocols outlined in Appendix 2 of "A periphyton monitoring plan for the Manawatu-Wanganui Region" (Kilroy et al. 2008) and include:*
   i. *% cover of visible river bed by bacterial and/or fungal growths visible to the naked eye;*
   ii. *HAL on visible river bed;*
   iii. *% cover of visible river bed by filamentous algae more than 2 cm long;*
   iv. *% cover of visible river bed by diatoms or cyanobacteria mats more than 0.3 cm thick; and*
   v. *Mean daily flow records from the Tangiwai flow site for the 20 days preceding the survey".*

b) *Collection of a periphyton sample on one occasion during February to May each year, at the same established monitoring sites and transects as defined in Condition 25(i), following an accrual period of no less than 20 days.*

   An accrual period is defined as no river flow in exceedance of 3 the calculated median flow at the Tangiwai recorder occurring during this period. The collection of periphyton samples shall follow the protocols outlined in Appendix 3 of "A periphyton monitoring plan for the Manawatu-Wanganui Region" (Kilroy et al. 2008). Reported estimates shall include:*
   i. *Mean periphyton biomass as Ash-free dry mass (AFDM, g/m2);*
   ii. *Mean periphyton biomass as Chlorophyll a (mg Chlorophyll a/m2);*
   iii. *Heterotrophic Index; and*
   iv. *Mean daily flow records from the Tangiwai flow site for the 20 days preceding the survey.*

The Consent Holder shall forward a comprehensive report on these surveys to the Manawatu-Wanganui Regional Council's Environmental Protection Manager by 30 June each year.

Condition 25(a)	**Status**	**COMPLIANT**

The results of Visual monitoring and periphyton sampling monitoring, as discussed in Golder (2012a, 2013a, 2014), Babbage (2019), and Viridis (2024b), show that WPI has maintained compliance with Parameters 3, 6 and 7 in Condition 20 of the Consent. Accordingly, surveys shall continue to be undertaken every five years for the duration of the consent.

Visual monitoring and periphyton sampling required under Condition 25 shall continue until such time as 3 years of continuous compliance with parameters 3, 6 and 7 in Table B Condition 20 is achieved. At that time monitoring frequency will then reduce to once every 5 years for the duration of the consent. However, should non-compliance occur, the monitoring frequency specified under Condition 25 (yearly monitoring) shall recommence until 3 years of continuous compliance is achieved.

Condition 26	**Status**	**NON-COMPLIANT**

In the 2013/14 and 2014/15 monitoring periods, several incidents (IDs 13-007,13-008, 13-011, 14-005, 15-006) were not reported to Horizons within the two-day timeframe. WPI amended its monitoring programme, ensuring that all subsequent incident reports were submitted promptly. Since then, late reporting has not occurred.

All non-compliances are recorded by WPI in an incident register, which also includes details of any incident that may result in a non-compliance (e.g., spills). A copy of the incident register for each monitoring period was appended to the annual report, supplied to Horizons by 30 June each year.
The Permit Holder shall notify the Manawatu-Wanganui Regional Council's Environmental Compliance Manager within two working days of any non-compliance occurring or when it becomes certain that a breach of Permit Conditions is about to occur. For conditions requiring compliance with a particular Water Quality Standard, notification is required within two working days of receipt of the water quality analysis from the Laboratory.

Condition 27	**Status**	**COMPLIANT**
WPI has advised Viridis that it received four complaints regarding the discharge were received between 2013 and 2024: • 18 February 2020: A member of the public lodged a complaint regarding foaming observed in the Whangaehu River. An investigation found that the site's defoamer application system was not operational at the time, due to a blockage in the application nozzles. Action was taken to clear filters and unblock nozzles immediately. Details of the complaint and incident response were provided in incident report (ID 33157), which was supplied to Horizons. • 17 May 2021: An email was received from a member of the public regarding the condition of the Whangaehu River at the Tangiwai Memorial site, attributing this state to WPI's discharge. An investigation found discoloration of the river at sites located upstream of the discharge. A response was sent to the complainant on 18 May 2020, which included photos and recent monitoring results (Gutsell 2021). An incident report (ID 33530) was provided to Horizons. • 11 July 2021: Horizons alerted WPI to a public complaint it had received from a member of the public regarding foaming in the Whangaehu River. In response, WPI undertook maintenance on its defoamer application system (incident report ID 34600). • 26 January 2022: A member of the public reported foaming in the river. In response, defoamer filter cleaning increased to three times a day, and 200 µm filters were replaced with 400 µm ones. An incident report (ID 36773) was supplied to Horizons.		
The Consent Holder shall keep a complaint's register to record complaints relating to all discharges of contaminants authorised by this Permit. The register shall include: a. *The details of the Complainant if given;* b. *The location of where the contaminant, e.g. odour, was detected;* c. *A description of wind speed and direction when the Complainant detected the alleged adverse environmental effect;* d. *The date and time of the detection;* e. *The most likely cause of the discharge detected; and* f. *Any corrective action undertaken by the Consent Holder to avoid, remedy or mitigate the adverse environmental effect detected by the Complainant.* *A copy of details in the register shall be forwarded to the Manawatu-Wanganui Regional Council's Environmental Compliance Manager by 30 June of each year for the term of this Discharge Permit, commencing 31 July 2010, or as otherwise requested by the Manawatu-Wanganui Regional Council's Environmental Compliance Monitoring staff.*		

River Flow Monitoring

Condition 28	Status	COMPLIANT
Estimates of the basic flow statistics for the Tangiwai flow recorder are provided in annual hydrological reports prepared by Horizons.		
Within three months of the granting of this permit, and every 12 months thereafter, the Consent Holder shall provide an estimate of basic flow statistics (including minimum flow, seven days mean annual low flow (MALF), mean flow, and median flow) for the Tangiwai flow recorder, based on the information available at the time. The flow statistics shall be provided to MWRC's [Horizons] Environmental Compliance Manager by 30 June each year commencing in 30 June 2010.		

Condition 29	Status	NOT APPLICABLE
Whangaehu River flows are monitored continuously at Tangiwai SH49 bridge recorder site by Horizons on behalf of WPI. As specified in Condition 29, a minimum of six gaugings were completed annually for the first five years following the commencement of the Permit.		
The Consent Holder shall continuously (15 minute intervals) monitor flow in the Whangaehu River at or near the existing Tangiwai recorder site NZMS260 T20:317-901 (NZTopo50 BJ34:217-284; NZTM 1821652E, 5628416N). A minimum of 6 instantaneous gaugings shall be completed annually and gaugings shall be undertaken under a range of flow conditions to establish a valid rating curve. Monitoring is to continue for a minimum period of 5 years to provide a better understanding of low flow events in the River at the vicinity of the discharge. The River flow monitoring information shall be provided to MWRC [Horizons] by 30 June each year commencing in 30 June 2010.		

Annual Reporting

Condition 30	Status	COMPLIANT
An annual report was required for each monitoring year and supplied to Council by 30 June of each year.		
The Consent Holder shall prepare a comprehensive report summarising the monitoring undertaken from April to March each year in accordance with Conditions 7 to 29. This report shall include: a. *Methods;* b. *Summary monitoring data;* c. *Analysis of compliance;* d. *Actions taken for non-compliance;* e. *Identification of downstream effects on the River and recommendations for avoiding or mitigating any adverse effects; and* f. *Summary of complaints received.* *The Consent Holder shall forward a copy of the annual report to the Manawatu-Wanganui Regional Council's Environmental Protection Manager by 30 June each year and to the River Group.*		

References

Babbage 2019. Sewage Fungus and Periphyton Monitoring - 2019. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. June 2019. eTrack No: 200027910.

Babbage 2021. Change of Conditions of Discharge Permit – Karioi Pulp Mill Assessment of Environmental Effects. A report prepared for Winstone Pulp International Limited by Babbage Consultants Limited. June 2021. eTrack No: 200037499.

Babbage 2022. Toxicity Assessment of IXOM Sixin X-130FT Antifoam Agent. A report prepared for Manawatu Wanganui Regional Council Consents Monitoring Team by Babbage Consultants Limited. November 2022. eTrack No: 200043949.

FSL 2012. Discharge Consent 103909 Condition 13 Toxicity Assessment. Report prepared for Winstone Pulp International Limited by Freshwater Solutions Limited. December 2012.

Golder 2011. Heterotrophic abundance level monitoring manual. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. December 2011.

Golder 2012a. Sewage Fungus and Periphyton Monitoring - 2012. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. July 2012.

Golder 2012b. Heterotrophic abundance level monitoring manual. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. September 2012.

Golder 2013a. Sewage Fungus and Periphyton Monitoring 2012/13. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. May 2013.

Golder 2013b. Assessment of Water Clarity Non-Compliances in the Whangaehu River. A letter report prepared for Winstone Pulp International Limited (WPI) by Golder Associates (NZ) Limited. 23 January 2013.

Golder 2014. Sewage Fungus and Periphyton Monitoring 2013/14. Report prepared for Winstone Pulp International Limited by Golder Associates (NZ) Limited. July 2014.

Gutsell 2021. Regarding your complaint received on 17 May 2021. A letter, issued to a complainant, from Rodney Gutsell (Winstone Pulp International Limited). 18 May 2021

McConachy 2024. WPI Sewage Fungus/Algae Monitoring. An email from Brydie McConachy (Horizons Regional Council) to Grant Allen (Viridis Limited), dated 13 June 2024.

Viridis 2024a. Toxicity Assessment of CS-53M Antifoam Agent. A letter, addressed to the Consents Monitoring Team at Manuwatu Waganui Regional Council, prepared by Viridis Limited on behalf of Winstone Pulp International Limited. 5 April 2024. Document no: 10001-033-1.

Viridis 2024b. Discharge Permit 103909 Sewage Fungus and Periphyton Surveys - 2024. A report prepared for Winstone Pulp International Limited by Viridis Limited. June 2024.

Appendix I
Consultation Documentation

Ngati Rangi Cultural Health Assessment

Catchment:	**Hapu/marae associated with site:**
Stream/river name:	**GPS co-ordinates:**
Site name	**Observer name:**
Site reference	**Date:**

Aspect Covered	**Question number**	**Question topic**	1	2	3	4	5
Pehea te ora o nga wahi tupuna	1	Cultural knowledge	There is no current knowledge of the kaitiaki here		There is some knowledge of kaitiaki here		There is knowledge of the kaitiaki here and the kaitiaki is regularly acknowledged
Pehea te ora o nga wahi tupuna	2	Cultural practices	I would not want to use this site for mahi tupuna (eg tohi, karakia) because of its degraded nature		I would use this site for mahi tupuna if I had to but would prefer other sites.		This site is very suitable for mahi tupuna. I feel comfortable conducting this mahi here.
			1	2	3	4	5
Pehea te ora o te whenua	3	Catchment land use	Entire surrounding area (in sight) is farmland or is urban	There is some exotic forest	There is some exotic or native vegetation (including wetland veg eg rushes, flax)	There is some native vegetation	The whole area that I can see is native vegetation (eg bush, tussock, wetland veg)
Pehea te ora o te whenua	4	Pollutants from roads	There are numerous roads, or there is a main road, within 500 m of the site		There are some small roads or bridges within 500 m of the site		There are no bridges, roads, crossings or culverts within 500 m of the site
Pehea te ora o te whenua	5	Use of banks	Stock have unlimited access to the site		It appears stock have occasional access to the site		Stock have no access to the site
Pehea te ora o te whenua	6	Riparian vegetation	There is no vegetation on the banks	There are non-native species on the banks.	About half the bank area is covered by non-native or native vegetation (including wetland veg eg rushes, flax)	Half to two-thirds of the bank area is covered by native vegetation	The whole bank area is native vegetation (eg bush, tussock, wetland veg)
Pehea te ora o te whenua	7	Stability of the land	The area is heavily eroded - many slips visible on surrounding hills, banks falling in etc		There are some slips but the area is generally intact		The area is intact - no slips in sight, banks stable

			1	2	3	4	5
Pehea te ora o te wai	8	Riverbed condition (sediment)	The bed is covered by mud, slime and/or weeds		About half the bed is covered by mud, slime and/or weeds		The bed is clear of mud, slime and weeds.
Pehea te ora o te wai	9	Changes to the riverbed and banks	Banks and channel are completely altered, eg concrete bed, rock baskets, channel dug out, channel been moved		Banks and/or bed partly changed eg some parts have manmade structures, part of channel dug out		Banks and bed are completely natural (ie no manmade structures visible)
Pehea te ora o te wai	10	Habitat variety	The stream is flat and mostly the same depth		There is the occasional riffle, rapid and/or pool		The area is made up of a variety of pools, riffles, rapids and runs.
Pehea te ora o te wai	11	Water clarity	I cannot see through the water		The water is murky but I can still see the bottom in some parts		I can see the bottom clearly, even in the deeper pools
Pehea te ora o te wai	12	Water quality	The water appears polluted - there is foam, scum, oil, slime etc		The water appears slightly polluted - there is a little foam, scum, oil or slime		The water appears to be healthy - no foam, scum, oil or slime.
Pehea te ora o te wai	13	Water quality - swimming	I do not feel comfortable using this site for swimming in its current state		I will swim here if I have to, but would prefer other sites, because of the state of the water here		I am happy to swim here
			1	2	3	4	5
Pehea te ora o te kai	14	Access	I am not able to access this site		I can access this site with some difficulty (eg have to ask permission, get written permit, get a key)		I have unimpeded access to this site.
Pehea te ora o te kai	15	Kai species - food safety	I would not feel safe eating kai from here		I would eat kai from here, but would prefer kai from sites I think are cleaner		I would feel very safe eating kai from here
Pehea te ora o te kai	16	Kai species - food safety	I would not feel safe eating watercress from here		I would eat watercress from here, but would prefer watercress from sites I think are cleaner		I would feel very safe eating watercess from here
Pehea te ora o te kai	17	Kai species - presence	I can't get koura or tuna here		I can get either koura or tuna here		I can get both koura and tuna here.
Pehea te ora o te kai	18	Kai species - presence	I can't get kakahi or other species (eg native trout, bullies) here		I can get either kakahi or some other species (eg native trout, bullies) here		I can get kakahi and other species (eg native trout, bullies) here
Pehea te ora o te kai	19	Kai species - abundance	I cannot obtain enough for a feed at this site	I can obtain enough kai for one person here.	I can obtain enough for my whanau (10-15 people) at this site.	I can obtain enough for a small hui (30 people) at this site.	I can obtain enough for a large hui or a tangi at this site.

			1	2	3	4	5
Pehea te mauri	20	Overall health	This stream is unhealthy		This stream is satisfactory		This stream is healthy
Comments:							
Notes: If there is a question you are unable to answer, leave it blank. Scores will be calculated with that question removed.							

TO:	Don Robinson, Nuthaniel Tonihi (Uenuku Charitable Trust)	Date:	7 November 2024
COPY:	Gemma Bishop (WSP), Mike Ryan, Lachlan Freear (WPI)	Document:	10001-049-2
FROM:	Amanda Naude, Dr Grant Allen (Viridis) Doyle Richardson (Mitchell Daysh)		

WPI WASTEWATER DISCHARGE RENEWAL APPLICATION: INFORMATION MEMORANDUM

Introduction

Winstone Pulp International Limited (WPI) owns and operates a pulp mill located in Karioi, near Ohakune ('the site', Figure 1). WPI currently holds resource consent (ATH-2010011593.01, 'the Consent') from Horizons Regional Council (Horizons) to discharge treated wastewater from its Karioi pulp mill to the Whangaehu River. The Consent expires on 1 July 2025.

Citing uncertainty over future electricity costs and the relatively low current and forecast market prices for pulp and timber, WPI closed its Karioi pulp mill and Tangiwai sawmill in September 2024. Before this decision, WPI had been investigating various wastewater treatment technologies, including membrane filtration and chemical coagulation, with the intention of upgrading its wastewater treatment plant (WWTP). These upgrades were expected to improve the quality of the treated wastewater discharge to the Whangaehu River and support an application to renew the Consent for a relatively long term.

Given the recent mill closure, actioning wastewater treatment improvements requiring significant capital outlay is no longer possible or practical. Committing to specific technologies in a new consent could also limit the potential sale of the site. WPI would like to keep the site attractive to prospective buyers, who may explore alternative operations at the site that the previously proposed wastewater treatment upgrades may not support. Keeping options open as much as possible for alternative uses will significantly enhance the prospects of selling the site, which is needed to create jobs to replace those that have been lost and revitalise the community.

As a result, WPI will prepare an application for a relatively short-term (five year), with no proposed changes to existing conditions. This approach will allow time for a potential sale, after which long-term uses for the site and discharge options (if needed) can be considered by a new owner.

This memorandum outlines how WPI endeavours to manage key ecological and cultural values under this proposal. WPI would appreciate feedback from Uenuku on these management measures as part of the reconsenting process.

Proposal

Under the existing Consent, WPI is authorised to:

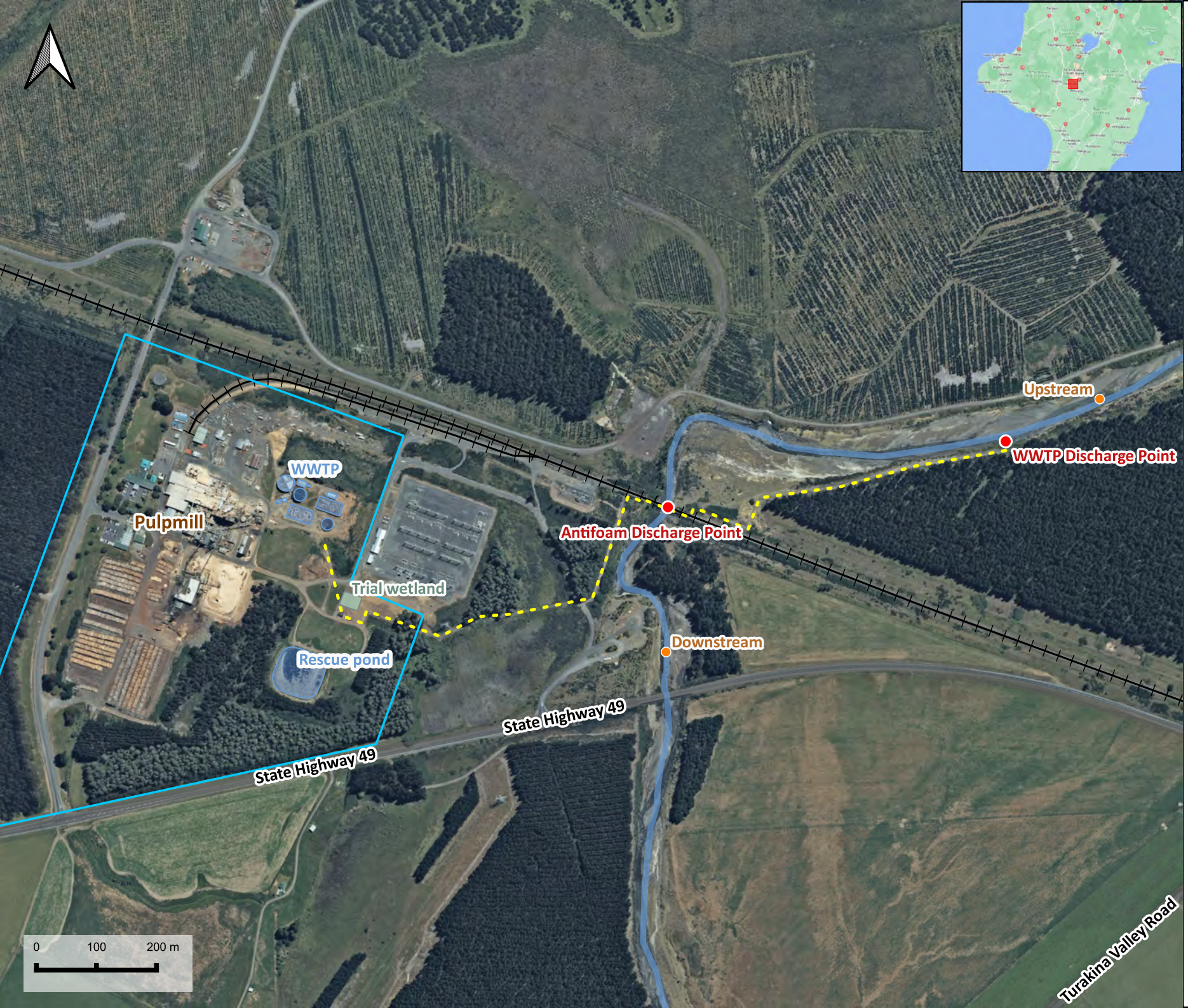
- Discharge up to 5,200 m^3/day of treated wastewater effluent and stormwater to the Whangaehu River, at a discharge point about 700 m upstream of the Tangiwai Railway Bridge.
- Discharge up to 125 L per day of foam inhibitor from the Tangiwai Railway Bridge on a periodic basis to control foam in the Whangaehu River.

The discharge locations are shown in Figure 1. WPI is not proposing to alter the details of these activities. However, the following key points will differentiate the proposal from the existing Consent:

- **Five-year consent duration**
  WPI is proposing a relatively limited five-year consent period. This duration acknowledges that further improvements must be considered for any long-term discharge approval.
- **Discharge inactivity**
  Since the plant will not operate for the foreseeable future, discharges during this interim consent period are expected to be minimal. However, a worst-case assessment of environmental effects will still be conducted as part of the application process, accounting for maximum discharges. This assessment will also consider the renewed cultural connections with the Whangaehu River, which are understood to have been promoted by the recent cessation of discharges.
- **Exceptional circumstances**
  WPI will be relying on the 'exceptional circumstances' provisions under section 107(2)(a) of the Resource Management Act (RMA) 1991 to enable consent to be granted for a relatively short term with the existing effects. Exceptional circumstances that would justify the granting of the consent include:
  - *Closure of the site*
    With the closure of WPI's site and uncertainty of future uses of these sites, it is not currently prudent to pursue further mitigation or upgrades to the WWTP at this stage.
  - *Electricity prices*
    Electricity prices, both current and forecasted, played a significant role in WPI's financial outlook, contributing to the site's closure and an inability to commit to costly WWTP upgrades. The lack of generation and resulting high prices were described by some as a "crisis", contrasting sharply with the more stable prices WPI has historically experienced.
  - *Economic and social benefits*
    Maintaining an operational consent makes the site significantly more attractive to prospective buyers, facilitating a resumption of operations (in some form) that would positively impact the community and future employment.
  - *Short-term duration*
    The proposed consent duration of 5 years would serve as a key mitigating factor for any residual adverse effects during this interim period.

Conclusion

In summary, WPI seeks to balance addressing potential effects on the Whangaehu River, while providing flexibility for a potential future buyer and securing significant economic and social benefits for the district and region. Given the current exceptional circumstances, this proposal is viewed as the most effective and feasible course of action and will ensure that future operations will need to assess any discharges for long-term sustainability. WPI intends to submit the resource consent application by 1 April 2025.



VIRIDIS Environmental Consultants

Figure 1. Site overview

Winstone Pulp International Limited

Renewal of Discharge Permit 103909

Legend

Pulpmill

- Site boundary
- WWTP area
- Trial wetland area
- WWTP discharge pipes
- WWTP Discharge Point
- Compliance Monitoring Sites

Geographical

- Whangaehu River
- NZ Roads (Addressing)
- Railway

SOURCES

LINZ Aerial Imagery (2021-2022)

DISCLAIMER:
This map/plan is not an engineering draft. This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE **1:8,000** **@ A4**

PROJECT NO.	10001
DRAWN BY:	A.N
DATE:	17 August 2023

TO:	Deana Wilson, Dr. Michael Morris (Ngā Waihua o Paerangi Trust), Goldie Akapita, Dr. Craig Rofe (Whangaehu Paepae)	Date:	7 November 2024
COPY:	Mike Ryan, Lachlan Freear (WPI)	Document:	10001-051-1
FROM:	Amanda Naude, Dr Grant Allen (Viridis) Doyle Richardson (Mitchell Daysh)		

WPI WASTEWATER DISCHARGE RENEWAL APPLICATION: INFORMATION MEMORANDUM FOR NGĀTI RANGI

Introduction

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Given the recent mill closure, actioning wastewater treatment improvements requiring significant capital outlay is no longer possible or practical. Committing to specific technologies in a new consent could also limit the potential sale of the site. WPI would like to keep the site attractive to prospective buyers, who may explore alternative operations at the site that the previously proposed wastewater treatment upgrades may not support. Keeping options open as much as possible for alternative uses will significantly enhance the prospects of selling the site, which is needed to create jobs to replace those that have been lost and revitalise the community.

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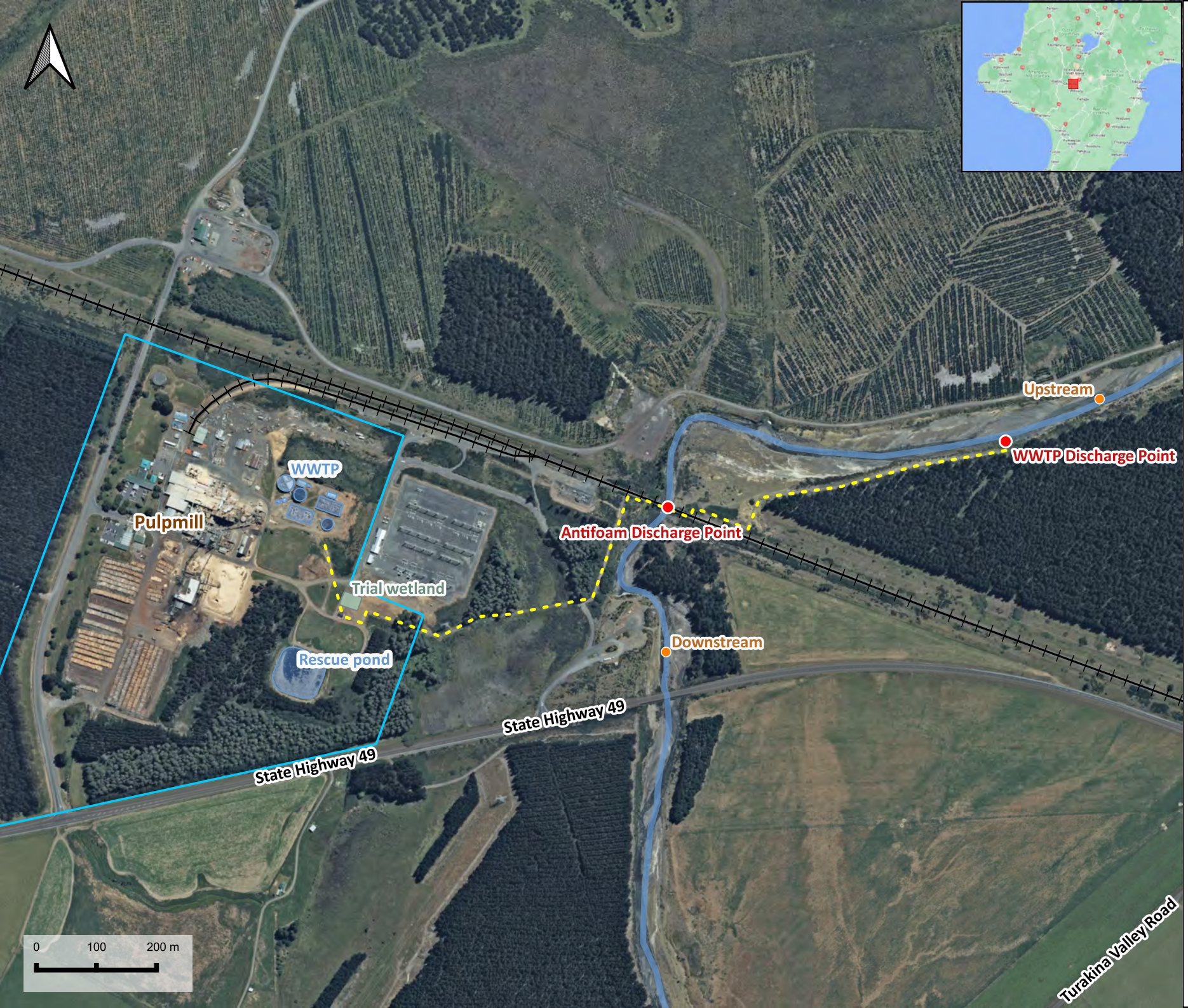

VIRIDIS Environmental Consultants

Figure 1. Site overview

Winstone Pulp International Limited

Renewal of Discharge Permit 103909

Legend

Pulpmill

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- WWTP area
- Trial wetland area
- WWTP discharge pipes
- WWTP Discharge Point
- Compliance Monitoring Sites

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SCALE **1:8,000** **@ A4**

PROJECT NO.	10001
DRAWN BY:	A.N
DATE:	17 August 2023

Winstone Pulp International Ltd
State Highway 49
Ohakune
New Zealand

Telephone: 61-6-3858 545

MEETING MINUTES

MEETING

Title	WPI-NR Environmental forum meeting
Date / Time	24th October 2024
Venue	Karioi Pulpmill - Boardroom
Minute Taker	Lachlan Freear

ATTENDEES

Name		
Deana Wilson - Ngāti Rangi Trust	Lachlan Freear - WPI	Mike Ryan - WPI
Goldie Akapita - Whangaehu Paepae	Dr. Craig Rofe - Whangaehu Paepae	Dr. Michael Morris – Ngāti Rangi Trust
Glenn Whiting - WPI		

ABSENT

Name		

Introduction:

Meeting was held at Karioi Pulpmill at 10:00am on the 24/10/2024 with Dr. Craig Rofe dialling in via teams.

DISCUSSION ITEMS

Item / Description	Notes / Action	Do	Due Date
Update on WPI current status	Sites have been closed – majority of staff have left. Chemicals have been removed from site – Pulpmill is no longer a Major Hazard Facility. Only residual chemicals are those required for safety systems and equipment maintenance. Significantly reduced take volume from Tokiahuru, will reduce further as leaks are fixed. Wastewater treatment plant has been decommissioned, and no discharge has occurred since the 26th of September.		

Winstone Pulp International Ltd
State Highway 49
Ohakune
New Zealand

Telephone: 61-6-3858 545

WPI Sale Process	There has been some interest to date. The sale process is slow and will occur over an extended period (>12 months). This will be extended further for overseas buyers due to Overseas Investment Office requirements. Starting to commence site visits with interested parties. Expectation that the sawmill would continue as a sawmilling operation. Multiple potential scenarios for the pulpmill site (biorefining, power generation, pellet fuel production). Lower probability of restarting as market pulpmill due to residual challenges (power price etc).		
Active consent applications	Update provided by WPI on active consent applications. Pulpmill Air Discharge – Updated modelling has been conducted and memo reflecting this will be provided to Horizons. Strachans Rd Landfill, Leachate – Memo has been provided to council outlining engagement with Ngāti Rangi Trust. Planting is ready to occur after spreading of vermicast top soil layer. (Update: planting completed on the 30th of October)		
Wastewater Discharge Consent	Given the uncertain future of the pulpmill site, it is no longer viable to commit to a technology upgrade that may not be suitable going forward. WPI's intention is to apply for a new consent, that does not require upgrade, in order to provide certainty for a new purchaser of the site over the short term. ***Action: WPI will provide a memo outlining the approach to reconsenting to the forum by the 7th of November***	Lachlan	7/11/24
Post Shutdown – State of Whangaehu	Has returned to a more pristine state with no discharge occurring. People now swimming further downstream towards Marae as we come into summer. Cultural connection is starting to be rebuilt. It was noted that this additional connection will need to be accounted for in the consent application. Ngāti Rangi Trust are conducting thrice weekly surveys of colour.		

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Continuation of Forum	Intention is to continue the forum despite WPI's closure. Funding for projects is still available until the expiry of the current discharge consent in 2025.		
Nursery	Business plan still in progress, with changes made to reflect WPI's closure. There is interest in Murimotu being the first customer, with riparian planting required around the Helios solar farm. Other customers are being explored, including Waka Kotahi. ***Action: Final draft of Nursery Business Plan in final draft for review by next meeting.***	Goldie	20/11/24
Next Meeting	20th of November chosen as placeholder date for next meeting		

29 November 2024

Winstone Pulp International
ATTN: Mike Ryan
Karioi Pulpmill
1002 State Highway 49
Ohakune 4691

Tēnā koe Mike,

Kaupapa: WPI Discharge of Wastewater and Ongoing Consenting Approach

This letter is in response to meeting held with Winstone Pulp International (WPI) 07 November 2024 outlining the proposed approach to the wastewater discharge consent renewal and proposed plan for all other consent renewals following closure of the pulpmill and saw mill.

Te Wainuiārua

Te Korowai o Wainuiārua is comprised of three Iwi; Tamakana, Tamahaki and Uenuku. Our area of interest extends across the whenua from Ruapehu to the Taranaki confiscation lines, encompassing Mount Ruapehu and the middle and upper reaches of the Whanganui River. The rohe of Wainuiārua spans more than 1,500,000 acres, featuring complex Iwi and hapū connections (see **Appendix A**). Wainuiārua is guided by, and represents the views and interests of our people, the descendants of three tupuna Tamakana, Tamahaki and Uenuku (see **Appendix B**).

As part of our strategic plan, which is derived from our vision '*Te Mana Motuhake o Wainuiārua',* we facilitate environmental restoration and promote Te Iwi as kaitiaki in the Taiao. This reinforces our whakapapa connections in the Taiao to Papatūānuku, to the Wai and to the Ngahere. These connections empower kaitiaki who can influence and inform decision making so as to protect, maintain and enhance the Taiao.

Te Korowai o Wainuiārua associates significant cultural values with the land, waterways, and natural resources within their ancestral rohe. These values are deeply intertwined with the obligations set out in the Te Tiriti o Waitangi, the Treaty of Waitangi.

Te Mano o Te Whenua Tupua

As part of the transition from Uenuku Charitable Trust to Te Korowai o Wainuiārua Trust, Te Mano o Te Whenua Tupua (Pou) was established as a subsidiary entity to enable environmental protection.

Te Mano o Te Whenua Tupua manages all Taiao matters in regard to resource consent applications and cultural monitoring, and its aim is to ensure that the environment and ecosystems are protected.

WPI Programme of Works

As outlined at the meeting held 07 November 2024, it is understood that the following actions will be taken with regards to existing and renewal of consent applications:

- WPI is applying for an interim renewal application for wastewater discharges for a period of 5 years under exceptional circumstances in recognition of discharge inactivity at the site due to closure, and to allow a resolution to be found for resumption of operations (in some form). Te Mano o Te Whenua Tupua looks forward to reviewing this application once available.
- Strachans Road Closed Landfill has been planted with 2700 natives and WPI are currently reviewing draft conditions from Horizons Regional Council for ongoing management of the closed site.
- Discharge to air consent renewal (APP-2002010157.06) has been applied for with anticipation that operations in some form will resume at the pulpmill site.
- All environmental monitoring as required under existing resource consents will continue as business as usual.
- The following activities require renewal:
  - 2029: water takes for the pulpmill and sawmill, and sawmill air discharge
  - 2032: pulpmill stormwater discharge
  - 2034: Karioi leachate discharge

Ongoing Communications

Te Mano o Te Whenua Tupua requests ongoing communications to uphold and enhance the cultural and environmental values of Te Korowai o Wainuiārua and Uenuku in the context of the proposed consenting renewal programme for WPI pulpmill and sawmill.

A successful partnership with Te Korowai o Wainuiārua requires an ongoing commitment to meeting with representatives as updates and information about the sites become available. We understand that WPI is still at the beginning of the process for sale of the sites and

determine what the future use/s may be, and we wish to continue the collaborative approach with WPI to ensure use of the site/s be carried out in harmony with cultural and environmental values. This will include provision of updates for any consent renewals required. Additionally, Te Mano o Te Whenua Tupua requests updates be provided as and when available on the likely use of the sites long-term to better understand potential environmental and cultural impacts.

We understand that the Wastewater Discharge consent application will be available for review in the new year and look forward to receiving this application.

Conclusion

Te Korowai o Wainuiārua (Te Mano o Te Whenua Tupua) supports and, we consider that, the proposed programme for consenting/management of the closure of WPI pulpmill and sawmill are consistent with the values of Te Waiū of Te Ika.

We look forward to continuing to work collaboratively with WPI to protect our whenua, including where the future may take the pulpmill and sawmill sites.

If you have any kōrero or questions, please do not hesitate to contact us to discuss further.

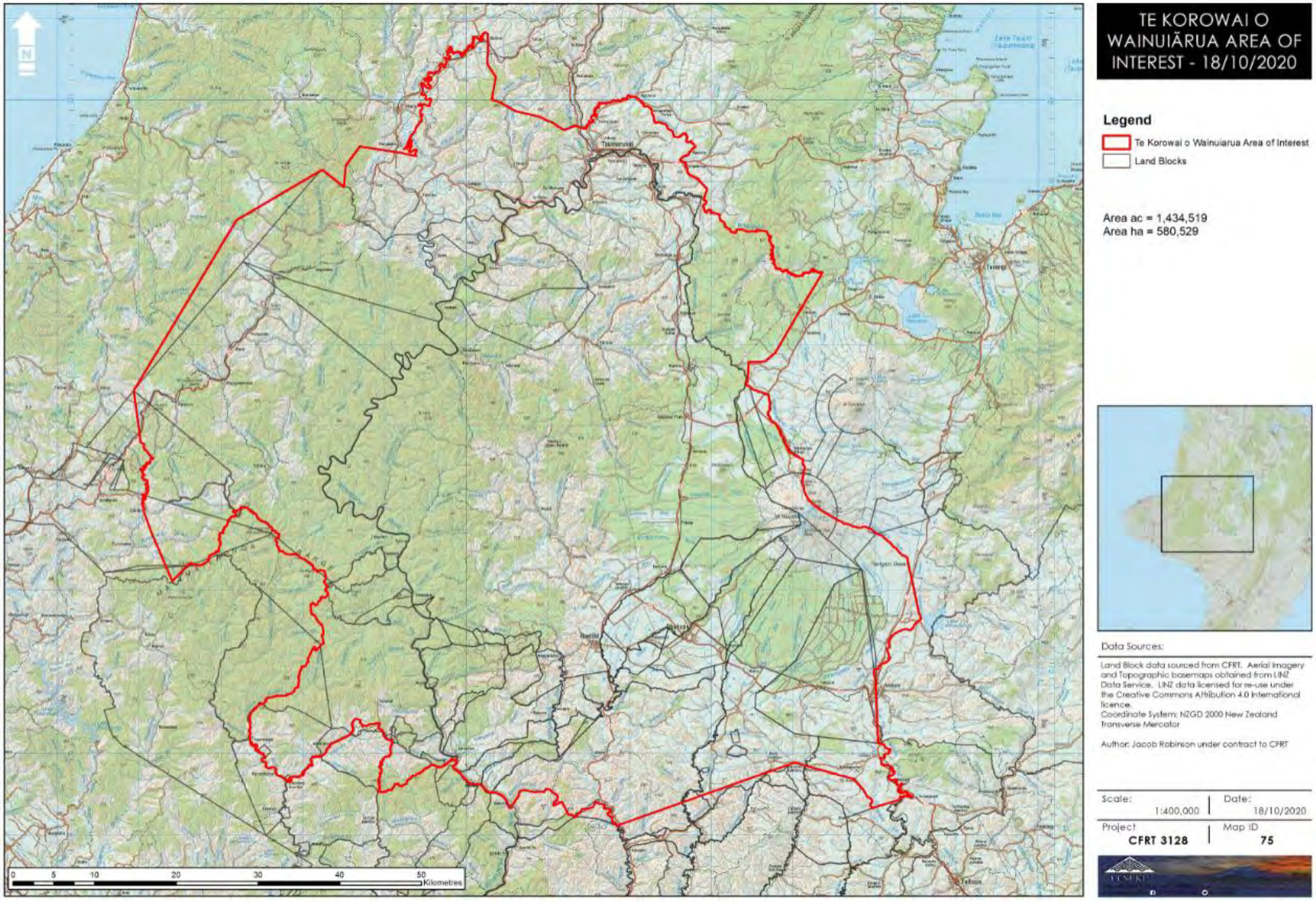
Ngā mihi nui,

Don Robinson
Te Mano o Te Whenua Tupua Charitable Trust
021 712 751
donrobinson@xtra.co.nz

Nuthaniel Tonihi
Deputy Chairperson
Te Korowai o Wainuiārua Trust
nuthanieltonihi@gmail.com

Te Wainuiārua
28 Queen Street
Raetihi 4632

Appendix A: Te Korowai o Wainuiārua Area of Interest



Appendix B: Crown recognition of mandate

Office of Hon Christopher Finlayson

20 JUN 2016

Aiden Gilbert
Chair
Uenuku Charitable Trust
PO Box 102
RAETIHI 4646

By email: Uenuku2@gmail.com

Tēnā koe

Crown recognition of mandate

Thank you for submitting the Uenuku Charitable Trust's Deed of Mandate to negotiate a comprehensive settlement of all Te Korowai o Wainuiārua historical Treaty of Waitangi claims.

We consider that Uenuku Charitable Trust has the support of Te Korowai o Wainuiārua and has processes and systems in place to ensure it is appropriately accountable to its claimant community.

We are, therefore, pleased to recognise the mandate of the Uenuku Charitable Trust to represent Te Korowai o Wainuiārua in negotiations for the comprehensive settlement of all outstanding historical Treaty of Waitangi claims of Te Korowai o Wainuiārua.

We understand that there are some differing views in the claimant community in regards to your mandate. We are aware you have been working hard to engage with those who do not support Uenuku Charitable Trust's mandate and we expect that you will continue this engagement.

We look forward to working with you during negotiations.

Nā māua,

Hon Christopher Finlayson
Minister for Treaty of Waitangi Negotiations

Hon Te Ururoa Flavell
Te Minita Whanaketanga Māori

Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand. Telephone 64 4 817 6808 Facsimile 64 4 817 6508

INFORMATION SHEET FOR INTERESTED PARTIES

WPI KARIOI PULP MILL:
UPGRADE OF TREATED EFFLUENT DISCHARGE

Overview

Winstone Pulp International Limited (WPI) has recently begun a wastewater treatment upgrade project at its Karioi pulp mill.

As part of operations, WPI holds resource consent from Horizons Regional Council (Horizons) to discharge treated pulp mill wastewater and a foam inhibitor to the Whangaehu River (Permit 103909). WPI is seeking to renew the permit, which expires on 1 July 2025, and upgrade the existing wastewater treatment plant (WWTP) to improve water colour, clarity, and lower nutrient concentrations.

What will the upgrade involve?

WPI is intending to upgrade the existing WWTP and add proprietary technologies for additional treatment. The treatment technologies selected for the upgrade will target key contaminants in the effluent, namely tannins (which can impact colour), surfactants (which can cause foaming) and nutrients (which can impact river biota).

What are the expected outcomes?

The upgrade will ensure WPI meets relevant receiving water quality guidelines or limits, such as those in the Australian and New Zealand Water Quality Guidelines, the National Policy Statement for Freshwater Management 2020 and Horizons' One Plan.

What has been done so far?

To date, WPI has begun consultation with Horizons, Ngāti Rangi and the Uenuku Charitable Trust to inform the design and feasibility stages. Trials of supplementary treatment technologies have been on-going since 2021, with a decision on the final treatment method expected by late 2024.

The aim of the trials is to evaluate the available technologies and select a solution fit for purpose, that will ensure the best outcome for the receiving environment.

Examples of technology trialed to date include:

Innovative membrane technology, proven to exhibit longevity and effectiveness in challenging wastewater systems, this technology enables water reclamation from waste streams without demanding extensive infrastructure investments, aligning with WPI's pursuit of sustainable and economical solutions. Refer Figure 1.

Figure 1. Membrane trial technology.

Chemical coagulation is a chemical treatment process used to remove solids from water, by manipulating electrostatic charges of particles suspended in water. This process introduces small, highly charged molecules into water to destabilize the charges on particles and colloidal materials in suspension. Refer Figure 2.

Figure 2. Chemical coagulation trial.

What comes next?

WPI has begun the process of preparing a renewal application and will submit this to Horizons later this year. Once approved, the construction will be carried out in stages, with works expected to begin in 2025.

How can I find out more, or provide feedback?

Please direct any queries to communications@wpinz.com.

18 November 2024

Winstone Pulp International Ltd
C/- Viridis Environmental Consultants
P O Box 301709
Albany
Auckland 0752
Via email: grant.allen@viridis.co.nz

Dear Grant,

REQUEST FOR EXTENSION TO LODGE A CONSENT APPLICATION FOR A WATER PERMIT – ATH-2012014288.00

Thank you for your email on 7 November 2024 regarding the renewal of the Discharge Permit held by Winstone Pulp International Ltd (WPI) to discharge treated wastewater from the Karioi pulp mill to the Whangaehu River.

The existing Discharge Permit (ATH-2010011593.01) expires on 1 July 2025. The email received on 7 November 2024 requests Horizons Regional Council exercises its discretion under Section 124 (2) of the Resource Management Act 1991 (RMA) to allow the lodgement of a consent application within the 3-6 month timeframe prior to expiry and to allow consent holder to retain existing use rights while a decision is determined on a replacement consent.

The reasons given for this request is to allow WPI to engage an independent third party to conduct and economic assessment for the application, noting the closure of the mill. Horizons Regional Council are supportive of this request by WPI to exercise its discretion. On this basis, I am comfortable with the request for the timeframe extension and the request for existing use rights is confirmed.

If you wish to discuss the contents of this letter, please contact me at Horizons Regional Council's Palmerston North office on 0508 800 800.

Yours sincerely,

Sara Westcott
TEAM LEADER CONSENTS
HORIZONS REGIONAL COUNCIL

Address | Unit A1, 72 Apollo Drive, Mairangi Bay, Auckland 0632
Post | PO Box 301709, Albany, Auckland 0752
Telephone | 64 9 475 5750
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Telephone | 64 3 477 7884
Email | doyle.richardson@mitchelldaysh.co.nz

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