

8 September 2026
Job No: 1103197

Horizons Regional Council
By email

Attention: Fiona Morton

Dear Fiona

APP-2006012018.03 WPI

Review of S 92 response information and Health NZ submission related to air quality

1 Introduction

Horizons Regional Council (Horizons) has engaged Tonkin & Taylor Limited (T+T) to provide advice on air quality aspects of the applications by Winstone Pulp International Ltd (WPI) for resource consents in relation to the Te Ara Hiko Project, which would establish a wood chip drying and torrefaction plant at the former WPI Pulp Mill site at Karioiri, Ohakune.

The consent applications lodged with Horizons for the project included an application for resource consent to discharge contaminants to water. However, they do not include an application for resource consent to discharge contaminants to air.

T+T has been asked by Horizons to comment (from a technical air quality perspective) on the following:

- Whether the discharges to air from the proposed torrefaction plant could be authorised by a change to the conditions of the existing air discharge consent under s 127 of the RMA or whether a new resource consent is required; and
- The extent to which the nature of contaminant discharges to air and water are inter-related and therefore need to be considered together to fully understand the effects of the project.
- The submission by Health New Zealand Te Whatu Ora National Public Health Service (Health NZ).

2 Scope of review

The new application APP-2006012018.03 was lodged on 9 July 2026 and has expressly incorporated the technical material originally prepared for APP-2006012018.02. I have reviewed that material in the context of APP-2006012018.03, as listed below:

- Resource Consent Application APP-2006012018.02 Planning Report - Karioi Wood Processing, prepared by Babbage Consultants, dated 30 April 2026.
- Te Ara Hiko - Project Summary and torrefaction technical memo, prepared by Babbage Consultants, dated 20 April 2026 (Torrefaction memo).
- Water Quality Assessment Memo, prepared by Babbage Consultants, dated 29 April 2026.

- WPI site future development - resource consent (air quality), prepared by Air Matters Ltd, dated 29 April 2026 (Technical Memo 7 – Air Discharge).

Based on our review of these documents, T+T contributed to the section 92 request for further information dated 18 May 2026 and participated in a meeting with the applicant's team to discuss the requested information on 28 May 2026.

T+T has reviewed the s92 response prepared by Babbage dated 11 June 2026, including the Torrefaction Process Diagram (Attachment 1 to the Response), which was particularly helpful in clarifying the process. We are satisfied that there is enough information to complete our review.

We have also reviewed the submission by Health New Zealand Te Whatu Ora National Public Health Service (Health NZ) dated 20 August 2026

3 Need for air discharge consent

WPI holds a resource consent (APP-2002010157.06/ATH-2010011241.01) to “*discharge to air emissions, odours and aerosols from a biomass boiler (12 MW), a sawdust dryer (2.4 MW), an LPG boiler, and pulping operation purposes at State Highway 49, Karioi*”.

A resource consent would be required for the discharges to air from the proposed torrefaction plant under One Plan (2025), Rule RP-AIR-R15. This rule provides for the discharge of contaminants to air from an activity located on industrial or trade premises that is not addressed by any other rule in the Plan.

We understand that WPI has indicated they consider the discharges to air from the proposed torrefaction plant could be authorised by a change to the conditions of the existing air discharge consent under s 127 of the RMA. Relevant case law on the application of s 127 includes the Court of Appeal decision on *Te Rūnanga o Ngāti Awa v Bay of Plenty Regional Council*¹, which related to a proposed water bottling plant. In this decision the Court stated that:

[187] We do not consider that Parliament intended s 127 to be used to authorise a completely new activity under the guise of changing the conditions to which the original activity was subject. We think the “activity” that continues subject to a changed condition must be the same activity that was taking place subject to the cancelled condition. In our view, it is not appropriate to treat “activity” in this context as if it embraces an activity which might be described as the same “kind” of activity.

A torrefaction plant is a different physical and chemical process to the pulping of wood or combustion of wood or LPG in a boiler. As such, we do not consider that the discharges to air from the proposed torrefaction plant can be described as the “same activity” authorised by consent APP-2002010157.06/ATH-2010011241.01.

While it could be argued that similar contaminants will be discharged to air from the torrefaction plant compared to the consented activities, there will be material differences in the rate of discharge, release height, exhaust temperature, exit velocity, etc. Therefore, the nature of the discharges to air from the proposed activities differ to the consented discharges.

Based on our view that the proposed activity is a new activity on the site, we consider an application would be required for a new resource consent (rather than a change to the existing consent).

4 Relationship between contaminant discharges to air and water

The objective of the proposed torrefaction plant is to produce a fuel product with a higher energy density per unit mass than the original wood feedstock. To achieve this, a proportion of the original wood mass is “driven off” as condensable and non-condensable gaseous products.

¹ [2022] NZCA 598

Wood is principally composed of hemicellulose, cellulose, and lignin. The decomposition chemistry of these materials in the torrefaction process varies with temperature. However, in general terms, the decomposition products from the torrefaction process can be summarised as follows:

- Condensable gases - mainly water, with small amounts of organic acids such as acetic acid, alcohols such as methanol, furans such as furfural, aldehydes such as formaldehyde and acetaldehyde, phenols, and terpenes.
- Non-condensable gases - mainly CO and CO₂, with small amounts of H₂ and CH₄.

Organic compounds in the torr gas are expected to be destroyed at high efficiency (>95%) in the torr gas burner, based on the proposed operating parameters of a two-second residence time at 850°C. Residual emissions from the burner are therefore expected to largely comprise CO₂ and water vapour, with low concentrations of combustion products (oxides of nitrogen (NO_x), carbon monoxide (CO) and sulphur dioxide (SO₂)) and very low residual concentrations of organic compounds. The main contaminants in the combusted torr gas are expected to be broadly similar to the combustion products from the biomass boiler, although there may be small differences in minor organic constituents. The combined torr gas burner and biomass boiler emissions will be treated through an electrostatic precipitator (ESP) to remove particulate matter before being passed to the condenser.

In the condenser, the combined torr gas burner and biomass boiler exhaust is cooled and separated into a condensed liquid stream and a non-condensable gas stream. From a process perspective, the contaminant discharges to water and air are therefore closely linked.

In practice, however, provided the torr gas burner is well designed and operated, the concentrations of residual organic contaminants in the gas stream entering the condenser are expected to be very low. It follows that the quantities of residual organic contaminants in both the condensate and the non-condensable gas stream leaving the condenser are also expected to be low. Although changes in condenser operation could theoretically affect the partitioning of contaminants between the water and gas streams, the low residual organic contaminant load entering the condenser means that any resulting change in the effects of either discharge is unlikely to be material.

The main discharges to air from the project will be gaseous byproducts of combustion and residual particulate matter (not removed in the ESP). There would be no material interaction between the effects of discharges of these contaminants to air and the discharge of contaminants to water.

5 Submission by Health NZ

The Health NZ submission identifies the nature of the feedstock and the operation of the torr gas burner as being related to air quality effects of the proposed activities. Air quality effects are outside the scope of the current applications. However, the nature of the feedstock and the operation of the torr gas burner are directly related to the composition of the condensate and therefore the proposed water discharge.

We agree with Health NZ that if the torr gas burner is not operated as stated in the application, there could be incomplete combustion which would change the nature of contaminants present in the condensate. We consider that a condition requiring the torr gas burner to be designed and operated to achieve a two-second residence time at 850°C could be included in the water consent as these process parameters are key controls for condensate quality. We note that a condition of this nature is also likely to be appropriate in any future air discharge consent.

The application describes the feedstock to the torrefaction plant as 'wood-based biomass'. T+T understands that the application is for the torrefaction of virgin forestry material. The issue raised by Health NZ is that the residual contaminants from the torrefaction process would be different to those assessed (based on virgin forestry material) if materials such as treated timber or

demolition/recycled timber were processed. We agree that the feedstock authorised by the consents, if they are granted, should be made clear, either in the purpose of the consent or in a condition. We do not consider it would be necessary to also include a list of materials that could not be processed, if it's clear that the consents only authorise the processing of virgin wood.

The Health NZ submission states that “*There are some uncertainties regarding the composition of the condensate under start-up, shutdown, malfunction or incomplete combustion conditions*”. The application does not provide specific detail on start-up procedures. However, based on our experience with similar processes, we have assumed that the biomass heater would be used to preheat the system and dry the woodchip before biomass feed is introduced to the torrefaction reactor. On that basis, start-up conditions are expected to be primarily relevant to discharges to air, rather than condensate quality, because limited torrefaction gas would be generated before normal operating conditions are established. This assumption could be confirmed with the applicant. Any conditions relating to start-up would more appropriately be considered as part of an air discharge consent application.

We also consider it unlikely that shutdown would result in a material change in condensate quality. For malfunction or incomplete combustion scenarios, our review has relied on the plant operating as described in the application documents, including the stated controls on torr gas combustion. Those operating assumptions underpin the expected condensate quality. If abnormal operation reduced the effectiveness of combustion or condensation, this could alter the relative distribution of contaminants between the condensate and the non-condensable gas stream. Depending on the nature of the malfunction, this may increase emissions to air, reduce the contaminant load to condensate, or change condensate quality.

If Council considers there is a plausible abnormal-operation scenario that could materially affect condensate quality and result in adverse effects, this could be managed through a consent condition requiring provision for emergency shut-off and detention or diversion of condensate generated during abnormal operation.

Health NZ recommends that “*a comprehensive air quality assessment, including dispersion modelling and identification of sensitive receptors*” is undertaken to enable the notified discharge to be assessed across a fuller operating range. As discussed in Section 4 of this report, as the combined torr gas burner and biomass boiler exhaust is cooled and separated into a condensed liquid stream and a non-condensable gas stream, the contaminant discharges to water and air are linked from a process perspective. However, the nature of the contaminants in the air and water discharges, their potential effects and their sensitive receptors differ. There is not expected to be any material interaction between the effects of discharges of contaminants to air (primarily combustion products) and the discharge of condensate to water. On this basis, T+T does not consider that a detailed air quality assessment is necessary to fully understand the effects of the proposed discharges to water.

6 Conclusions

The discharges to air from the proposed torrefaction plant require a resource consent under the One Plan. We do not consider that the proposed discharges to air can be described as a continuation of the consented activity and therefore we consider that a new air discharge consent would be required (rather than a change of conditions on the existing air discharge consent).

Although the torrefaction process creates a process link between the air and water discharges, the residual contaminants entering the condenser are expected to be very low if the torr gas burner is operated at a minimum temperature of 850°C with a residence time of at least 2 seconds. Consequentially any variability in contaminant partitioning between the gas and liquid streams is unlikely to be material.

The main discharges to air from the project are gaseous byproducts of combustion and particulate matter. There would be no material interaction between the effects of discharges of these contaminants to air and the discharge of contaminants to water.

Therefore, based on the information reviewed, we do not consider that an assessment of the effects of discharges to air is necessary to fully understand the other effects of the project, particularly the discharge of contaminants to water.

7 Applicability

This report has been prepared for the exclusive use of our client Horizons Regional Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that this report will be used by Horizons Regional Council in undertaking its regulatory functions in connection with the proposed Te Ara Hiko Project.

Tonkin & Taylor Ltd

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