BEFORE THE HEARINGS PANEL FOR THE PROPOSED TE TAI O POUTINI DISTRICT PLAN

IN THE MATTER OF	the Resource Management Act 1991
AND	
IN THE MATTER OF	the Proposed Te Tai o Poutini District Plan (Residential Zones topic)
SUBMITTER	Silver Fern Farms Limited, submitter no. 441

STATEMENT OF EVIDENCE BY DARRAN HUMPHESON

7 MARCH 2024

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1. QUALIFICATIONS AND EXPERIENCE.

1.1 My full name is Darran Humpheson. I am a Technical Director of Acoustics at Tonkin & Taylor Limited (**T+T**).

1.2 I hold a Bachelor of Science degree with Honors in Applied Physics and a Master of Science degree in Environmental Acoustics. I am a Member of the Acoustical Society of New Zealand and a Member of the United Kingdom's Institute of Acoustics. I am a New Zealand representative of the International Organization for Standardization (**ISO**) technical committee ISO/TC 43 SC1 "Noise", and I am also a member of the Joint Standards Australia/Standards New Zealand Committee AV-001 Acoustics.

1.3 I have been employed in acoustics since 1991 and have previously held positions as a consultant for international firms AECOM (Technical Director 2013-2019), Bureau Veritas (Technical Director 2012-2013), RPS Group plc (Technical Director 2002-2012) as a UK Ministry of Defence scientist (Head of the Royal Air Force's Noise and Vibration Division 1991-2002).

1.4 I have extensive experience providing acoustic services for industrial sites and providing expert evidence on the reverse sensitivity effects of noise. I have prepared acoustic assessment in relation to proposals to rezone land and have considered potential noise conflicts where land is zoned to residential. I have authored two research study reports which have investigated the effects of environmental noise on people and communities. I am familiar with the Silver Fern Farms site at Hokitika (the **Site**) and the local area.

2. SCOPE OF EVIDENCE

2.1 I have been engaged by Silver Fern Farms Limited (**Silver Fern Farms**) to prepare expert noise evidence on the proposed Te Tai O Poutini Plan (**TTPP**). This first statement of evidence provides an overview of issues regarding the potential for reverse sensitivity effects to arise if a residential zone is located next to the Site as shown in TTPP. The purpose of this statement is to assist the s42A report author by explaining the problems I consider likely to arise. This evidence is provided in advance, in accordance with the direction at

paragraph [51] of the Hearing Panel's Minute 2. After the s42A recommendation report is released in June, I will prepare a supplementary statement of evidence in response.

2.2 This statement of evidence sets out:

a. Acoustic terminology and typical residential amenity expectations;

b. A description of operations at the Site;

c. A summary of Silver Fern Farms' submission[1];

d. A comparison of the proposed zones and noise rules that apply under the Westland District Plan (**Operative Plan**) compared to those that would apply under TTPP;

e. The potential for reverse sensitivity effects to arise under TTPP's proposed residential rezoning and the implications of these effects for the operation of the Site;

f. My recommendations.

2.3 While this is not an Environment Court of hearing, I confirm that I have read, and agree to comply with, the Code of Conduct for Expert Witnesses stated in the Environment Court's Practice Note 2023. My qualifications as an expert are set out above. I confirm that the issues addressed in this statement of evidence are within my area of expertise. I confirm that I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

3. ACOUSTIC TERMINOLOGY AND DEFINITIONS

3.1 It is helpful to understand the acoustics terminology used in district plans and the differences between the Operative Plan and TTPP as to how noise is assessed.

[1] Silver Fern Farms Limited. *Submission on notified proposal for policy statement or plan, change or variation. 27 October 2023.*

3.2 The unit of noise measurement is the decibel (**dB**), which is based on a logarithmic scale. An A-weighting is applied to the decibel level (**dB(A)**) to account for the frequency response of the human ear. A range of typical sources of noise and their associated sound pressure level in dB(A) are shown in the following table:

TABLE 1 – SOUND LEVELS AND TYPICAL EXAMPLES

Sound pressure level - dB(A)	**Example**
0	Hearing threshold
20	Still night-time
30	Library
40	Typical office room with no talking
50	Heat pump running in living room
60	Conversational speech
70	10 m from edge of busy urban road
80	10 m from large diesel truck
90	Lawn mower – petrol
100	Riding a motorcycle at 80 kph
110	Rock band at a concert
120	Emergency vehicle siren
140	Threshold of permanent hearing damage

3.3 Different metrics may be used when describing sound levels. The metrics and other acoustic terms referred to in this evidence are explained in the following table.

TABLE 2 – NOISE DEFINITIONS

Metric / term	**Explanation**
A-weighting	Frequency weighting representative of human hearing
LA10	Level exceeded for 10% of the time. Used in Operative Plan
Leq	Energy averaged sound pressure level
LAeq	A-weighted Leq. Used in TTPP
LAeq(15min) or LAeq,t	LAeq averaged over 15 minutes or t. Used in TTPP
LAFmax	Maximum level with A-weighting and fast time weighting. Used in night-time noise limits as maximum levels (affected by impulsive or short-term events) can disturb sleep

Notional boundary	20 m from the façade of the receiving dwelling, or at the property boundary, whichever is closest to the dwelling. Typical assessment location for rural dwellings
NZS 6802:1991	New Zealand Standard 6802:1991 *Acoustics – Environmental noise*. Recommends using LA10
NZS 6802:2008	2008 revision to NZS 6802, supersedes 1991 version of standard. Recommends using LAeq and up to 5 dB penalty for SAC
SAC	Special Audible Characteristics such as thumps, bangs, whines or hums. SAC are more noticeable than steady-state noise (such as distant traffic) and have the potential to be more annoying

3.4 The Operative Plan uses the LA10 in common with many older district plans, with reference to the 1991 version of NZS 6802. Most recent district plans have replaced the now outdated LA10 with LAeq,t, in line with the 2008 version of NZS 6802.

3.5 The LAeq is a more reliable noise metric compared to the LA10 for assessing environmental noise. Typically a noise source of constant character (such as steady industrial noise) assessed using LA10 will be around 2-3 dB higher than the LAeq. For sound that occurs for less than 10% of the assessment period, use of the LA10 metric, unlike the LAeq,t metric, can significantly underestimate the true impact of the noise generating activity. An example could be a noisy vehicle delivering goods lasting less than 1½ minutes when the assessment period is 15 minutes.

3.6 In TTPP a time period is specified, i.e. LAeq(15min). This is an average level over the time period specified, in this case 15 minutes. If a time period is not specified, as is the case for the Operative Plan - LA10 limit for the 12-hour daytime period, this is taken to mean the noise level over the entire daytime period. As required by NZS 6802, noise levels within this longer time period will not be able to exceed the noise level by more than 5 dB. Use of a 15 minute time period can mean that short periods of noisy activity control the LAeq(15min), whereas these short but noisy periods of activity would be averaged out over a longer period such as 12-hours, i.e. use of LAeq(15min) would result in a higher noise level than use of LAeq(12h) or LA10(12h).

3.7 I support the noise metrics and averaging periods used in TTPP as these are consistent with NZS 6802:2008 and represent best practice, i.e. the use of

LAeq(15min) for daytime noise, both LAeq(15min) and LAFmax for night-time noise, and SAC penalties if warranted.

4. NOISE AMENITY

4.1 "Amenity values" are defined in section 2 of the RMA as "those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes".

4.2 I consider that amenity in the context of noise refers to the quality of a particular environment in terms of its noise conditions and how those conditions contribute to its comfortable, healthy and pleasant use. It is commonly accepted technical practice to consider the concept of noise amenity under two main categories: indoor noise amenity and outdoor noise amenity.

4.3 Indoor noise amenity refers to the acoustic environment within a building. This is significantly influenced by the structure's design and materials, indoor activities, and noise transfer from outside through openings or the building itself and mitigating measures such as sound proofing. People usually expect indoor spaces to be relatively peaceful and quiet to facilitate activities like sleep, rest, work, study, or communication – particularly in residential settings.

4.4 Outdoor noise amenity refers to the sound environment in outdoor spaces. This is influenced by environmental sources (wind, water, wildlife), human activities (traffic, construction, industrial, neighbourhood noise), and the configuration of physical space (building and landscape layout). Expectations for outdoor noise levels are usually more diverse and context-dependent. For example, noise levels that are acceptable at a busy urban park might be considered disruptive if encountered in a residential garden.

4.5 The World Health Organization (**WHO**) has issued a number of guidelines regarding environmental noise levels for both indoor and outdoor environments, including the "WHO Guidelines for Community Noise 1999" and "Environmental Noise Guidelines for the European Region 2018". These

guidelines provide the following recommendations for indoor and outdoor environmental noise levels:

a. For bedrooms in dwellings, the WHO recommends the annual average night exposure not to exceed 30 dB(A) to prevent sleep disturbance.

b. The WHO guideline for indoor living areas in dwellings is an absolute level of 35 dB(A) during the day and evening, to allow adequate speech communication.

c. To avoid annoyance, the WHO guidelines suggest that noise levels in outdoor amenity spaces should not exceed a daytime average of 55 dB(A).

4.6 These levels are consistent with permitted noise limits commonly found in district plan residential and / or rural zone provisions, including those of the Rural Zone in the Operative Plan. The indoor 'sleeping' level of 30 dB(A) would equate to an outdoor level of 40-45 dB(A) taking into account the 10-15 dB(A) sound reduction of a partially open window.

4.7 I support the proposed TTPP permitted noise levels for the General Residential (**GRZ**) and General Rural (**GRUZ**) zones as these are consistent with WHO guideline levels, i.e. 55 dB LAeq(15min) during the day and 45 dB LAeq(15min) at night. I explain in subsequent sections my position on industrial noise received in residential zones.

5. SILVER FERN FARMS HOKITIKA

5.1 Activities associated with meat processing at the Site are commensurate with a large industrial operation and as is typical for such operations, are not confined to standard business hours.

5.2 Sources of noise at the Site include vehicle movements for stock deliveries and product loading out, private vehicles accessing the Site at the start and end of shifts, as well as couriers and truck deliveries. Although most deliveries and other truck movements are likely to occur during the day, shifts vary seasonally and may start or finish during night-time hours. Static noise sources include air compressors and ventilation for the processing plant, and vehicles

including forklifts. Stock is sometimes held on the Site prior to processing. The current configuration of the Site is shown in Figure 1 below.

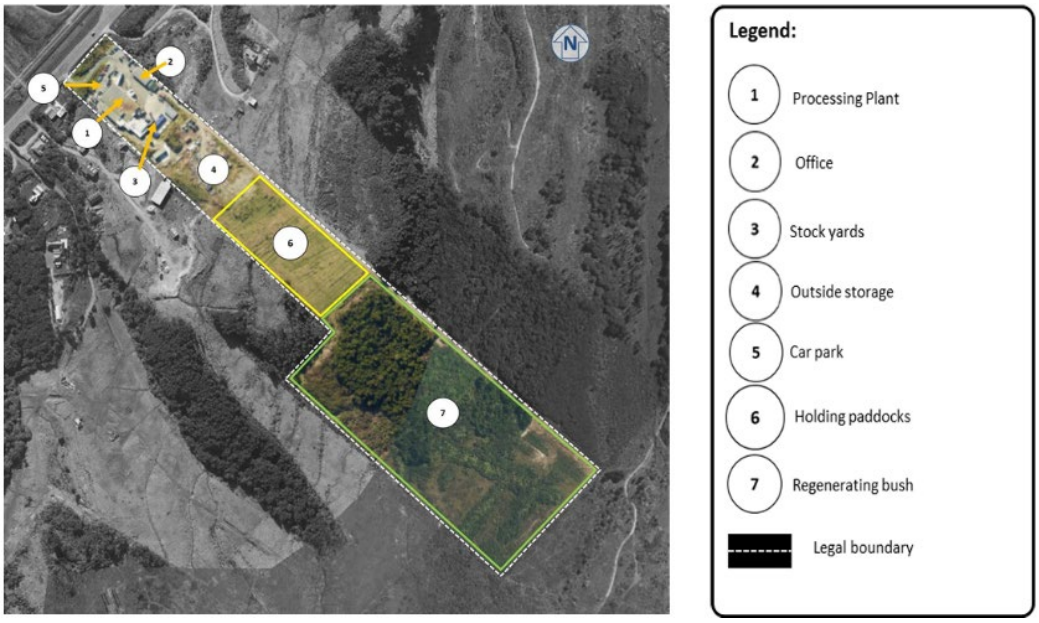

FIGURE 1: SILVER FERN FARMS' HOKITIKA SITE LAYOUT

5.3 Silver Fern Farms' submission provides additional information on the history of the Site and its operation. It also sets out the noise rules under the Operative Plan and proposed TTPP. The key resource management issues of concern to Silver Fern Farms are set out in paragraph 21 of its submission as follows:

> *The reverse sensitivity effects potentially caused by locating residential zones immediately adjacent to the GIZ boundary and near the Site. The Operative Plan expressly recognises that residential zonings in the vicinity of the Site would be problematic for various reasons;*
>
> *That the TTPP policy settings recognise and provide for the functional and operational requirements of industrial activities; and*
>
> *That the GIZ rules are suitable for industrial land uses, which require a more robust building typology compared to other land uses.*

5.4 The submission also sets out the relief sought on TTPP provisions.

6. OPERATIVE AND PROPOSED PLAN FRAMEWORKS

6.1 Key differences between the operative and proposed plans that I consider relevant in the context of the Site are:

a. The greatly increased lot density enabled in the GRZ and slightly further afield, in the proposed Medium Density Residential Zone (**MRZ**). Compared to the 5,000 m^2 minimum lot size anticipated by the current Rural Zone that surrounds the Site, the proposed GRZ enables the creation of lots at 350 m^2 while the MRZ enables 200 m^2 lots.

b. The higher permitted levels for noise from an industrial zone when received in a residential zone (proposed Rule NOISE – R8), as compared to Operative Plan permitted levels for the Rural zone and TTPP permitted levels for GRZ (proposed Rule NOISE – R5) and GRUZ (proposed Rule NOISE – R6). Proposed Rule NOISE – R8 permits a daytime level of 60 dB LAeq(15min) from the General Industrial Zone (**GIZ**) at notional boundaries of sensitive activities, including in the proposed adjacent GRZ. This is 5 dB higher than permitted daytime noise levels for noise produced within the GRZ or GRUZ, as well as exceeding the WHO guideline levels within external amenity spaces.

6.2 Noise levels of 60 dB LAeq(15min) received within residential areas are sufficient to interfere with speech and communication if people are outdoors. Allowing for 10-15 dB attenuation through an open window, an internal noise level of 45-50 dB could be experienced under these conditions. The WHO's recommended indoor noise levels within living [35 dB(A)] and resting [30 dB(A)] spaces would be exceeded by at least 10-15 dB under proposed Rule NOISE - R8.

6.3 Proposed Rule NOISE - R3 requires noise levels within bedrooms to achieve 35 dB(A), and 40 dB(A) within other habitable rooms. These design levels only apply to new dwellings within certain zones (excluding residential zones). An external level of 60 dB(A) LAeq(15min) would still result in exceedances of 5-

10 dB if these design levels are used (on the assumption that windows are open[2]).

6.4 In my opinion, 60 dB LAeq(15min) experienced at a residential receiver will compromise indoor and outdoor noise amenity and will result in reverse sensitivity effects.

6.5 While I consider that a noise level of 60 dB LAeq(15min) is typically applied to industrial zones based on my knowledge of other district plans. For the reasons I have explained above, I do not consider it is an appropriate limit to be met if a residential zone is directly adjacent to an industrial zone. This conflict is further emphasised regarding night time noise from industrial sites, i.e. adherence of a night time limit of 45 dB LAeq(15min) within residential sites. Industrial sites that operate at night are likely to be heavily constrained if there is a residential zone immediately adjacent. Therefore there is an incompatibility between the requirements of a residential zone and those of an industrial zone which cannot be resolved if they are located next to each other.

6.6 As I noted above, proposed Rule NOISE - R3 specifies acoustic insulation requirements to achieve appropriate indoor design noise levels for buildings within industrial zones. These requirements do not apply to future dwellings located in a residential zone, even if that residential zone is located adjacent to an industrial zone. Therefore there is no means in the TTPP to remedy or mitigate noise effects experienced within a residential zone.

6.7 Table 3 provides more context and compares the applicable noise rules under the Operative Plan and TTPP, with differences highlighted in **bold**. The GRZ and GRUZ permitted noise levels are also shown for reference.

[2] Unlike other zones, there would be no requirement to require new dwellings in a residential zone to be constructed with an alternative means of ventilation to ensure that windows remain closed at night – as required by NOISE – R3.

TABLE 3 – COMPARISON OF THE OPERATIVE PLAN AND TTPP NOISE RULES APPLICABLE TO THE SILVER FERN FARMS HOKITKA SITE

	Operative Plan		TTPP		
Zone	**Rural**	**Industrial (reference only)**	**General Industrial (GIZ)**	**General Rural (GRUZ) (reference only)**	**General Residential (GRZ) reference only)**
Rule	Table 5.7 (p160) (d) Noise	5.2.3.1 Table 5.1 Standards for Permitted Activities in the Hokitika Policy Unit. (l) Noise	NOISE – R8. Emission of Noise within the GIZ	NOISE – R6	NOISE – R5
Assessment location	Any point within the notional boundary of a residential activity	Any point within the boundary of a residential activity or a residential zone	Notional boundary of any sensitive activity, within any site receiving noise	Any point within the notional boundary of any sensitive activity within any site receiving noise	Any point within another site in the RESZ
Day / time period (daytime)	Monday to Friday 7 am to **9 pm** **Saturdays 7 am to 6 pm**	Monday to Friday 7 am to 10 pm Saturdays 7 am to 6 pm	All days 7 am to **10 pm**	7 am to 10 pm Mon-Fri, 8 am to 8 pm weekends / PH	7 am to 7 pm Mon-Fri, 8 am to 5 pm weekends / PH
Noise limit	**55 dBA L10**	55 dBA L10	**60 dB LAeq(15min)**	55 dB LAeq(15min)	55 dB LAeq(15min)
Day / time period (night-time)	All other times including public holidays	All other times including public holidays *All days 10 pm to 7 am	All days 10 pm to 7 am	All other times *10 pm to 7 am all days	All other times *7 pm to 7 am all days
Noise limit	45 dBA **L10**	45 dBA L10 *70 dBA Lmax	45 dB **LAeq(15min)** **75 dB LAFmax**	45 dB LAeq(15min) *75 dB LAFmax	45 dB LAeq(15min) *70 dB LAFmax

7. REVERSE SENSITIVITY

7.1 Silver Fern Farms' submission on TTPP identifies the potential for reverse sensitivity effects from the proposed introduction of GRZ and MRZ zones to the southwest of the Site. As more residential development will be enabled within the proposed residential zones, there is the potential for more residents to live relatively close to the Site and to be annoyed by noise from the meat processing facility.

7.2 Annoyance is a subjective response to noise which cannot always be quantified. The RMA has an overarching duty at section 16 for every occupier of land to adopt the best practicable option to ensure that emission of noise does not exceed a reasonable level. The level of noise which is considered "reasonable" is also subjective and will vary between people and circumstances. However, there is a correlation with noise level, meaning that an increase in noise exposure (level and duration) usually leads to more people feeling annoyed. The total number of people exposed to a given noise exposure level will therefore affect how many people are annoyed by that noise and may consider it unreasonable, i.e. larger populations in the receiving noise catchment are likely to mean more people are annoyed. Community noise research studies that I have led support this concept of increased prevalence of annoyance amongst New Zealand communities depending upon the type of development.

7.3 Where people move to live near a noise source and are subsequently annoyed by it is known as reverse sensitivity, and can have implications for the operation of the source of the noise. The generally accepted definition of reverse sensitivity was provided by the Environment Court in 2008[3].

> *Some lawfully existing activities may produce adverse effects on their surrounding environments, or at least they are perceived to do so. Reactions to those effects, ore perceived effects, by way of complaint or actions in nuisance can stifle their growth or, in extreme cases, drive them elsewhere. That stifling, or that loss, may be locally, regionally or even nationally significant. If an activity*

[3] Ngatarawa Development Trust Limited v The Hastings District Council W017/2008 [2008] NZEnvC 100 (14 April 2008)

likely to emit adverse effects seeks to come into an sensitive environment, the problem should be manageable by designing appropriate standards and conditions, or by refusing consent altogether. It is when sensitive activities (usually, but not always, residential activities) seek to establish within range of a lawfully established but effect emitting activity that management may become difficult. This is the concept of reverse sensitivity.

Reverse sensitivity is the legal vulnerability to an established activity to complaint from a new land use. It arises when an established use is causing adverse environmental impact to nearby land, and a new, benign activity is proposed for the land. The "sensitivity" is this: if the new use is permitted, the established use may be required to restrict its operations or mitigate its effects so as not to adversely affect the new activity.

It is well settled law now that the reverse sensitivity is an adverse effect, and is therefore to be avoided, remedied or mitigated.

7.4 TTPP also provides a definition of reverse sensitivity which aligns with this:

Reverse sensitivity means the potential for an approved, existing or permitted activity to be compromised or constrained, by the more recent establishment or alteration of another activity which may be sensitive to the actual, potential or perceived adverse environmental effects generated by an approved, existing or permitted activity.

7.5 The occupants of established dwellings near the Site are likely to have habituated to noise generated by Silver Fern Farms' activities. In contrast, new residents moving to the area may not have the same noise tolerance and may not even be aware of sources of noise in the surrounding area. Even when there is some awareness that an industrial facility (or other noise source) is nearby, the impact of that noise on daily life may not be anticipated until residents have moved in and experienced the noise for themselves.

7.6 Additionally, individuals may experience different levels of annoyance towards the same noise source, depending on their sensitivity to noise as well as subjective perception and / or acceptance towards the source of the noise. In my experience, typical sources of complaint around industrial noise include:

a. Night-time noise and potential sleep disturbance;

b. Events or equipment with SAC (e.g. machinery whine, bangs or crashes);

c. Unusual short-term events;

d. Shift patterns with staff vehicle movements to and from the Site;

e. Variation in noise emissions when working hours change as part of seasonal requirements – summer vs winter;

f. Changes in work practices or extension of existing facilities;

g. Intensification of site activities – bigger site footprint / extended working hours;

h. The commercial nature of the noise producer (people are generally more accepting of non-controversial operators – e.g. dairy producers versus oil / chemical plants; and

i. Outdoor residential noise amenity expectations – people living in townhouses or apartments will have different expectations compared to people who have access to private garden spaces.

8. IMPLICATIONS OF PROPOSED TTPP FRAMEWORK FOR SILVER FERN FARMS HOKITIKA

8.1 Proposed TTPP residential rezonings near the Site would enable substantially more residents to live nearby. This has the potential to result in complaints which could lead to operational restrictions for Silver Fern Farms regardless of compliance with permitted noise levels. Unlike noise controls in other zones there are no requirements in TTPP for sound insulation in dwellings located in the GRZ or MRZ.

8.2 I consider that the permitted level for noise produced in the GIZ under TTPP rules of 60 dB LAeq(15 min) during the day time (7 am to 10 pm) is appropriate for non-residential zoned sites. As I have highlighted in paragraph **6.2**, a 60 dB(A) limit applied to residential receivers is higher than the WHO's amenity guideline levels and I consider it to be wholly inappropriate in the context of a residential receiver.

8.3 This highlights the incompatibility of locating a residential zone adjacent to an industrial zone as there is an apparent conflict in TTPP Noise Objective NOISE - O2:

> *"the function and operation of existing and permitted future noise generating activities and community infrastructure are not compromised by adverse effects, including reverse sensitivity effects, from noise-sensitive activities".*

8.4 As worded, the permitted TTPP noise standards have the potential to constrain existing industrial sites if neighbouring sites are zoned residential. I do not believe that this is the intention of the TTPP. Rather it is the incompatibility of having a residential zone directly adjacent to an industrial zone.

8.5 If the adjacent land is rezoned to residential then I consider that noise complaints received from residents in the vicinity of the facility will be more likely, and in the future there is an increased likelihood that (while not all complaints are necessarily reasonable) complaints could seek for Site operations to be constrained.

8.6 The kind of operational restrictions sometimes sought by complainants (regardless of feasibility) in reverse sensitivity scenarios can include:

a. Restrictions on volume of processing;

b. Restrictions on hours of operation (for example, not operating / reduced operation at night and during more noise sensitive periods, such as early morning and evening periods); and

c. Deterioration in neighbour relations.

8.7 Given the potential land use conflicts outlined above, I do not support the proposed establishment of a residential zone directly adjacent to the Site. The next section outlines my recommended amendments to the proposed TTPP framework.

9. RECOMMENDATIONS

9.1 I consider that revising the proposed zones to introduce a buffer zone between the proposed GIZ and GRZ would be the optimal outcome for all stakeholders. Suitable land zoning for a buffer zone could include Light Industrial (**LIZ**) or GRUZ. The size of the buffer zone would need to be calculated such that any residential zone would receive appropriate noise levels and current and future operations at the Site would be unlikely to be constrained by reverse sensitivity effects. As a rough estimate, I consider that a suitable buffer to manage reverse sensitivity might be in the order of 100 metres, depending on how site-specific factors affect the noise environment.

9.2 If the proposed residential zones remain close to the Site as currently proposed (which I do not support), alternative (and likely more complex) means of managing potential noise effects on new dwellings should be introduced. These could include:

a. Requirements for new dwellings to adhere to acoustic insulation requirements. This approach is typically used near airports and ports. For example, the partially operative Selwyn District Plan has internal design noise levels (which a developer would be required to meet) where any new noise sensitive activities (including dwellings) are constructed within the Port Zone Noise Control Overlays[4]. This approach is limited insofar as it would improve internal amenity but would not address the external noise environment experienced in the proposed residential zone.

b. Registration of a "no complaints covenant" via a s221 consent notice to the titles of residential lots created within a certain distance of the Site. This would have the effect of alerting potential buyers of future residential land to the established presence of industrial noise in the vicinity. For example, a no complaints covenant is in place for certain properties near Lyttelton Port (applies only to lawfully established port activities). This mechanism is limited by the ability of purchasers to understand the implications of a consent notice.

[4] Rolleston inland port

10. SUMMARY

10.1 I support the noise metrics used in TTPP, i.e. LAeq(15min) and inclusion of LAFmax for night-time noise as this is in line with the 2008 revision of NZS 6802.

10.2 I have set out typical expectations of residential amenity, referencing WHO guidelines which recommend a daytime outdoor noise level not exceeding 55 dB(A) and internal noise level not exceeding 35 dB(A).

10.3 I have set out the applicable noise rules for the Rural Zone under the Operative Plan and proposed GIZ under TTPP. Although the proposed TTPP noise rules for the Site are in general no more restrictive than the current rules, I consider that they are likely to lead to reverse sensitivity issues for the Site due to:

a. More dwellings being permitted in residential zones and therefore the proposed rezoning of nearby land will expose more (future) occupants to noise from the Site;

b. An overly permissive outdoor noise level in residential zones of 60 dB LAeq which would be sufficient to interfere with speech and communication if people are outdoors and is above the WHO recommended outdoor amenity level;

c. Allowing for 10-15 dB sound attenuation through an open window, internal noise levels of 40-45 dB LAeq within dwellings would also exceed the WHO recommended indoor amenity levels by 5-10 dB;

d. In some cases TTPP noise rules are more permissive than the Operative Plan rules, e.g. the higher proposed GIZ daytime noise limits apply on Saturdays, Sundays and public holidays;

e. Even if the Site is compliant with TTPP noise rules, expectations of noise amenity in residential environments is likely to lead to reverse sensitivity issues which may constrain the Site's operations.

10.4 To avoid reverse sensitivity issues arising, I recommend that there is a buffer zone provided between the General Industrial and Residential zones of approximately 100 metres. Suitable land zoning for a buffer zone could include Light Industrial or Rural.

10.5 If the proposed residential zones remain where they are currently proposed (which I do not support), alternative means of controlling noise effects on new dwellings should be introduced. These could include acoustic insulation requirements, or a mechanism to require the registration of a "no complaints covenant" to lot titles via s221 consent notice.

Darran Humpheson

7 March 2024