BEFORE THE INDEPENDENT HEARINGS PANEL

IN THE MATTER	of the Resource Management Act 1991 ("**RMA**")
AND	
IN THE MATTER	Resource consent applications by Te Puna Industrial Limited in relation to 297 Te Puna Station Road

STATEMENT OF EVIDENCE OF ALEX ELI JACOB ON BEHALF OF TE PUNA INDUSTRIAL LIMITED

(ACOUSTICS)

25 JUNE 2024

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1. EXECUTIVE SUMMARY

1.1 My name is Alex Eli Jacob and I am an Engineering Director at Earcon Acoustics Limited. I was engaged by TPIL in March 2022 to assess the potential construction and operational noise and vibration effects of the Application and provide recommendations as to mitigation.

1.2 The Application is to authorise the establishment of yard based industrial activities at the eastern end of the Site primarily involving loading, unloading, stacking and refurbishing of shipping containers during daytime, and overnight running of refrigerated containers.

1.3 The Site is in an industrial zone, adjacent other industrial zoned sites to the north and east, and Rural zoned sites to the south and west. The surrounding environment includes Te Puna Station Road and railway tracks to the north, and Te Puna Road to the west. The closest dwellings are at approximately 70-90m from the western boundary of the Site.

1.4 When measured in November 2022, ambient noise levels at the western end of the Site are LA_{eq} 50-55dB during daytime dropping to LA_{eq} 35-47dB during nighttime. Ambient daytime noise levels at the south-eastern end of the Site were at circa LA_{eq} 2-4dB lower than the western end. Noise levels at the northern boundary were in the order of LA_{eq} 53-57dB.

1.5 At a high level, operational noise limits for the zones in the area are:

(a) Industrial: LA_{eq} 65dB at all times, LA_{max} 85dB at night.

(b) Rural: daytime LA_{eq} 55dB, and LA_{eq} 45dB, LA_{max} 75dB at night.

(c) Construction noise limits at all sites (daytime): LA_{eq} 70dB and LA_{max} 85dB.

1.6 The area is not subject to any regulatory vibration limits. Nevertheless, I propose adoption of commonly applied construction vibration limits for protection of amenity in occupied buildings (2mm/s) and for protection of structures in vacant buildings (5mm/s at lowest frequencies).

1.7 The main noise sources from the proposed container activities during daytime are the loading, unloading, stacking, and refurbishment of containers, in addition to heavy vehicle movements within the Site. The only operational noise at night would be from Reefers.

1.8 To mitigate noise from the Site (proposed and future facilities), I propose implementation of two layers of management plans:

(a) Master Noise Management Plan to be reviewed and approved by the Council. This includes compliance limits in addition to procedures, restrictions, and regulations applicable to the whole Site; and

(b) Individual Noise Management Plans available to the Council, specific to each facility including operational, equipment and shielding restrictions for each facility.

1.9 Mitigation measures specific to the proposed container facility include designating the location and construction of a workshop where all refurbishment work would be undertaken, shielding and limits on the number and location of refrigerated containers, limits on equipment sizes and operations, in addition to sealing internal roads with no speed humps.

1.10 Noise prediction models, with the proposed mitigation measures taken into account, demonstrate that the operations of the facility can be managed within the compliance limits at all receivers. The compliance noise levels are typical of other regions in New Zealand for the interface between industrial and residential/rural zones.

1.11 In terms of effects, the noise limits are in-line with the recommendations of the national standards and World Health Organisation guidelines, and as such are considered acceptable.

1.12 With regards to construction noise and vibration, these can readily be managed within the applicable compliance limits, especially considering the distances involved from the Site to the closest receivers.

1.13 I read the WBOPDC specialist review and relevant parts of the WBOPDC Section 42A Report and agree with the analysis and conclusions of both.

1.14 The WBOPDC Section 42A Report queries whether internal traffic movements were factored into the operational noise models. I confirm that internal traffic movements were included in all predictive models and predicted noise levels.

1.15 I reviewed the WBOPDC proposed conditions of consent relating to noise and vibration and consider these to be appropriate, other than some wording recommendations I make further in my evidence.

2. INTRODUCTION

2.1 My name is Alex Eli Jacob. I am an Engineering Director at Earcon Acoustics Limited ("**Earcon**").

Qualifications and experience

2.2 I hold a Bachelor of Science (BSc) in Mechanical Engineering, and I am a current member of the professional engineers' body, Engineering New Zealand.

2.3 I have over 28 years of experience in the field of engineering, including 10 years in New Zealand specialised in acoustics. I have advised, monitored, and prepared acoustic assessments and management plans for over 100 industrial, commercial, and residential activities and operations across New Zealand. I have provided expert evidence pertaining to acoustic matters in the Environment Court and at numerous Council level hearings.

Code of conduct

2.4 I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the Hearings Commissioners. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

3. SCOPE OF EVIDENCE

3.1 My evidence relates to the resource consent applications by Te Puna Industrial Limited ("**TPIL**") in relation to its site at 297 Te Puna Station Road ("**Site**"). The applications are to authorise the development of the Site for the establishment and operation of yard-based industrial activities ("**Project**"), with associated earthworks and discharge to water, within the Site. The proposed development will give effect to the Te Puna Business Park Structure Plan ("**Structure Plan**") provisions that apply to the Site under the Western Bay of Plenty District Plan. ContainerCo will be the anchor tenant of the Site. ContainerCo intends to store, repair, and lease out/sell shipping containers.

3.2 Regional resource consents to enable the Project are required from the Bay of Plenty Regional Council ("**BOPRC**") and land use consents are required from the Western Bay of Plenty District Council ("**WBOPDC**") (Together, the

"**Application**"). The specific consent requirements are set out in the planning evidence of Mr Murphy.

3.3 I was engaged by TPIL in March 2022 to assess the potential construction and operational noise and vibration effects of the Application and provide recommendations as to mitigation.

3.4 As part of this, I prepared the Operational Noise and Vibration Assessment ("**Operational Noise Report**") dated 6 April 2023, and the Operational Noise and Vibration s92 Queries response dated 29 March 2023 (**"S92 Response"**) which were attached in Appendix 13 of the Assessment of Environmental Effects ("**AEE**"). I also prepared the Draft Construction Noise and Vibration Management Plan ("**Draft CNVMP**") dated 19 December 2022 which was included at Appendix 12 of the AEE. My involvement also included consideration of, and response to, the s92 queries from the WBOPDC's acoustic specialist review and incorporated resulting changes into the Operational Noise Report.

3.5 I visited the Site on 5 November 2022 and 12 November 2022 and undertook an acoustic survey including noise measurements at multiple locations. I also supervised the automated noise logging undertaken at the Site to establish a general understanding of the ambient noise environment at the time.

3.6 In this statement of evidence, I will:

(a) describe the Site and the immediate and wider receiving environment in context of acoustics;

(b) summarise the noise and vibration standards, including the WBOPDC planning controls applicable to the Site and the surrounding environment;

(c) summarise my assessment of the potential operational noise and vibration effects associated with the Application and my recommendations to mitigate these potential effects;

(d) summarise my assessment and recommendations to address the potential construction noise and vibration effects associated with the Application, as set out in the Draft CNVMP;

(e) respond to the submissions received on the Application that raise matters relating to potential noise and vibration effects;

(f) comment on the WBOPDC's Section 42A Report; and

(g) comment on the relevant proposed conditions of the consent relating to noise and vibration matters.

4. EXISTING ENVIRONMENT

4.1 The Site is located approximately 450m along Te Puna Station Road, in Te Puna, Tauranga. The Site itself, and the sites to the north and east of the Site, are zoned Industrial. The sites to the west and south are zoned Rural.

4.2 The neighbouring areas adjacent the Site to the east, and to the north across Te Puna Station Road are predominantly industrial activities. Sites further to the east, and to the south and west of the Site that are rural zoned, and most include dwellings.

4.3 The closest industrial sites are about 25m from the Site across Te Puna Station Road at 288b and 250-264 Te Puna Station Road.[1] 205 and 245 Te Puna Station Road to the east are adjacent to the eastern boundary of the Site. These industrial sites mainly comprise outdoor open-yard operations, with some light industrial buildings.

4.4 The Operational Noise Report includes a table summarising the closest dwellings to the Site with the distances involved both to the boundary of the receiver sites, and from that boundary to the closest dwelling (for context of distances to notional boundaries).[2] The following are distances representative of the offset of the closest dwellings from the boundaries of the Site:

(a) **West:** The closest dwellings are circa 70-90m away (148 Te Puna Road and 138 Te Puna Road respectively) extending to receivers at circa 160-190m (eg 139 Te Puna Road, 118 Te Puna Road respectively) with some dwellings at 200-350m taken into account (112, 117, 107 Te Puna Road).

(b) **South / South-west:** Dwelling locations range from 200-400m from the boundaries with 110 Te Puna Road at 220m, 56D Te Puna Road at 385m and with some dwellings up to 600m away (eg 97A Clarke Road).

(c) **East:** Dwellings range from circa 400-500m away with 159 Clarke Road at 440m, 145 Clarke Road at 485m and 139 Clarke Road at

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1 Operational Noise Report dated 6 April 2023 at [3.3.1].
2 Operational Noise Report dated 6 April 2023 at [3.3.2], Tables 1 and 2.

507m, to farther dwellings at more than 500m away with 149 Clarke Road at 570m and 134 Clarke Road at 640m.

(d) **North:** The closest dwellings are 130-180m at 288 and 288a Te Puna Station Road at 135m and with 328a Te Puna Station Road at 175m with farther receivers at 200m at 72C Teihana Road.

4.5 The surrounding environment includes Te Puna Station Road and railway tracks to the north, and Te Puna Road to the west at about 100m from the Site.

4.6 I undertook a site survey in context of noise. This involved manned noise measurements[3] around the Site and week-long automated noise logging[4] at a designated representative location at the western end of the Site.

4.7 Based on the survey and measurements, I make the following observations pertaining to the current ambient sound environment:

(a) based on logging, noise levels at the western end of the Site were circa LA_{eq} 50-55dB during weekday daytime hours dropping to LA_{eq} 35-47dB during nighttime with the main noise source being traffic along Te Puna Station Road;

(b) ambient daytime noise levels at the south-eastern end of the Site were lowest at circa LA_{eq} 2-4dB lower than the western end;

(c) noise levels in proximity to the industrial facilities to the north at circa 30m from the northern boundary of the Site were in the order of LA_{eq} 53-57dB;

(d) the industrial operations to the north included use of forklifts with tonal reversing beepers, in addition to lifting and dropping / placement of steel materials; and

(e) general noise sources in the area included single engine aircraft traversals overhead, road and train noises at the northern end, and general rural sounds at the southern end (birds, animals, insects, rustling of trees etc).

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3 Operational Noise Report dated 6 April 2023 at [4.2].
4 Operational Noise Report dated 6 April 2023 at [4.1].

NOISE AND VIBRATION STANDARDS

Summary of noise descriptors

4.8 For reference and clarity pertaining to how noise is measured and assessed, the following are the main descriptors of sound and noise relevant to my evidence:

(a) **A-weighting**: an adjustment applied to sound levels at different frequencies across the audible spectrum, resulting in a single number reflecting how sound is generally perceived by human hearing;

(b) **$LA_{eq\ (15min)}$**: equivalent noise level, time-averaged over a 15-minute period, A-Weighted.

(c) **LA_{max}**: maximum noise level during a measurement period, A-Weighted; LA_{max} is used to measure the impulsiveness of a noise source. Impulsive noises occur for an instant at elevated levels above other sounds occurring at the same time. An example of an impulsive noise is steel on steel impact.

(d) **LA10 (or L10 [dBA])**: noise level exceeded for 10% of the time measured, as calculated statistically, and A-Weighted. I note this was the main descriptor for environmental noise prior to 1999. It has since been superseded[5] by the LA_{eq} descriptor.

4.9 To describe environmental noise, three elements must always be taken into account: (1) frequency or weighting across frequencies, (2) location and (3) timeframe. These are the "what, where and when" that must be associated with noise, otherwise a descriptor would have little if any meaning. As an example for context of the importance of these elements, it is a fact that a mosquito and a 20-tonne rock breaker can both generate $LA_{eq(1s)}$ 85dB. The omission in that statement is the "location" of each descriptor being 20mm vs 20m respectively from the source.

Operational noise standards

4.10 The following[6] operational noise standards[7] apply at any location within a neighbouring industrial zoned site from noise generated by activities within the

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5 NZS6802:1999 and NZS6802:2008 – Acoustics Environmental Noise.
6 Operational Noise Report dated 6 April 2023 at [6.1].
7 Western Bay of Plenty Operative District Plan at 4C.1.3.2(b)(ii).

Site (and conversely apply to noise generated by neighbouring industrial sites as received at the Site):

(a) Daytime 7am to 10pm: LA_{eq} 65dB; and

(b) Nighttime 10pm to 7am: LA_{eq} 65dB and LA_{max} 85dB.

4.11 The following[8] operational noise standards[9] apply at any location within neighbouring residential zoned sites, and at the notional boundary[10] of any dwelling in a rural or rural residential zoned site, from noise generated by activities within the Site:

(a) Monday to Saturday 6am to 10pm: LA_{eq} 55dB;

(b) Sunday and Public Holidays 9pm to 6pm: LA_{eq} 55dB;

(c) All other times: LA_{eq} 45dB and LA_{max} 75dB.

4.12 Noise generated by traffic on public roads is exempt from the rules of the Western Bay of Plenty District Plan ("**District Plan**").[11]

Operational vibration standards

4.13 The District Plan does not include or propose any specific standards to manage operational vibration.[12] Nevertheless, I reference in my evidence the vibration effects from the operation of the facility in context of amenity.

Construction noise standards

4.14 The following[13] construction noise standards[14] apply when measured at 1m from the façade of any occupied neighbouring building during hours when construction work can be undertaken and taking into account project duration and zoning of the area surrounding the Site:

(a) Monday to Saturday 7:30am to 6pm: LA_{eq} 70dB and LA_{max} 85dB

(b) Monday to Friday 6pm to 8pm: LA_{eq} 65dB and LA_{max} 80dB

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8 Operational Noise Report dated 6 April 2023 [6.2].
9 Western Bay of Plenty Operative District Plan, 4C.1.3.2(b)(i).
10 As per the New Zealand Standard NZS 6801:2008 Measurement of Sound, a notional boundary is defined as "a line 20m from any side of a dwelling, or the legal boundary of the property on which the dwelling is located, whichever point is closer to the dwelling".
11 Operational Noise Report dated 6 April 2023 at [6.3], referencing Western Bay of Plenty Operative District Plan – 4C.1.3.3(e).
12 Western Bay of Plenty Operative District Plan, 4C.1 – Explanatory Statement
13 Draft CNVMP – Section 10.1.
14 NZS6803:1999 Acoustics - Construction Noise, as referenced in the Western Bay of Plenty Operative District Plan, 4C.1.3.1.

Construction vibration standards

4.15 The District Plan does not include or propose any specific standards to manage construction vibration.[15] Nevertheless, as per the Draft CNVMP,[16] I propose the following construction vibration limits for protection of both amenity and structures in accordance with international standards commonly used in New Zealand:

(a) Amenity:[17] 2mm/s Peak Particle Velocity (PPV)

(b) Structural Protection:[18] 5mm/s PPV in the frequency range of 1-10 Hz, increasing in steps across the frequency range to 20mm/s at more than 100Hz.

5. OPERATIONAL NOISE AND VIBRATION

5.1 With regards to the proposed and potential activities at the Site, my evidence and the assessments underlying it are based on a “design” approach whereby the operational procedures, plans, equipment and activity locations are designed and selected to control noise and vibration to the lowest practicably achievable effects. I note this is different to an “observe and mitigate” approach where the operations are established independently, and then effects are assessed and mitigated. The "design" approach proposed here, in my view, is more appropriate as it results in lower potential effects and more certainty as to what those effects will be.

Operational noise and vibration sources

5.2 The anchor tenant of the Site (ContainerCo) is proposed to be a container storage and refurbishment facility with mainly yard based activities covering the eastern end of the Site and a sealed internal road extending from Te Puna Station Road at the northern boundary to the centre of the Site at the eastern end.

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15 Western Bay of Plenty Operative District Plan – 4C.1 – Explanatory Statement

16 Draft CNVMP – Section 10.2.

17 British Standard BS 5228-2:2009 and Amendment 1:2014 Code of practice for noise and vibration control on construction and open sites.

18 German Standard DIN4150-3:2016 – Vibrations in buildings – Part 3: Effects on structures.

5.3 Pertaining to daytime activities, the proposed container storage and refurbishment facility would involve a number of activities[19] with the potential to generate noise, including:

(a) loading, unloading and stacking of containers;

(b) refurbishment of containers involving steel works (for example: cutting, grinding, drilling, welding and so on) and jet washing; and

(c) storage of refrigerated containers ("**Reefers**").

5.4 Noise sources and levels from the proposed container facility activities, equipment and vehicles are typical of light industrial facilities. Representative noise levels associated with these activities are detailed in the Operational Noise Report. [20]

5.5 I note for reference here that for subjective comparison, sound levels from a noise source are typically reported as the Sound Pressure Level (which is how it would be experienced by people) at a specific distance from the source, in this case 10m. The farther a receiver is from the source, the lower the noise level experienced by the receiver becomes.

5.6 The development of the Site, including the proposed container facility and other potential industrial facilities, would result in daytime movements of vehicles through the internal road in the Site. Considering this would not be a public road, noise from traffic within the Site is subject to the applicable noise standards and is considered in the Operational Noise Report.[21] Based on the Transportation Report,[22] traffic volumes comprise 774 vehicle movements per day with 17% of these being heavy vehicles.

5.7 Pertaining to nighttime noise emissions, the container facility proposes the overnight storage of Reefers. It is my understanding that up to 100 of these may be stored overnight with 70% of these being empty containers that would not run at night, and the remaining 30% running at either low settings or for only 2-3 hours every 24-hour period.

5.8 Notwithstanding the above, to be conservative, I have taken into account the potential for the type of noise associated with refrigeration plant, if elevated at nighttime, to cause sleep disturbance. I am of the opinion that protection of

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19 Operational Noise Report dated 6 April 2023 at [8.2.1].
20 Operational Noise Report dated 6 April 2023 at [8.2.1].
21 Operational Noise Report dated 6 April 2023 at [8.2.2].
22 Transportation Assessment Report by Harrison Transport dated September 2023, at [8.2].

sleep in proximity to residential occupancies warrants conservative assumptions. As such, in my assessment I conservatively predict noise propagation based on all 100 Reefers running at night and propose mitigation measures accordingly.[23]

5.9 In addition to the proposed container storage and refurbishment facility at the eastern end of the Site, the Site may also include other industrial facilities at the western end. It is my understanding that the nature of potential other industrial facilities is not known at this stage. I discuss further in my evidence the mechanisms I propose for control of noise from potential future facilities through implementation of Noise Management Plans.

Operational noise and vibration mitigation measures

5.10 In considering mitigation measures for the Project, I take into account both the proposed container storage and refurbishment facility and the potential future introduction of other facilities and activities to the Site.

5.11 To control noise and vibration from the Site while accounting for the future need to accommodate for changing or new operations across the Site, I propose the implementation of two layers of controls:

(a) a Master Noise Management Plan to be reviewed and approved by the WBOPDC; and

(b) Individual Noise Management Plans specific to each facility undertaking activities within the Site.

5.12 The Master Noise Management Plan would include inter alia:[24]

(a) procedures, restrictions, and regulations applicable to the Site as a whole. This includes, for example, allowed operating hours, prohibited activities (eg no amplified music outside), restrictions on equipment, monitoring requirements, and compliance limits to name a few;

(b) the provisions of the Master Noise Management Plan would apply generally to all activities across the Site, in addition to including maximum noise level allowances for each operation at the time. This is to ensure that cumulative noise from multiple facilities is maintained within the compliance limits at all locations; and

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23 Operational Noise Report dated 6 April 2023 at [8.2.3].
24 Operational Noise Report dated 6 April 2023 at [10.2].

(c) The Master Noise Management Plan, and any subsequent iterations, would need be to reviewed and approved by the WBOPDC.

5.13 Individual Noise Management Plans[25] would be specifically tailored to each of the facilities and activities within the Site, and include, inter alia:

(a) operational and equipment restrictions, such as where certain activities can be undertaken, and what machines can be used at what locations, in addition to any noise shielding requirements to maintain compliance;

(b) the provisions of each individual Noise Management Plan would apply to the individual facility and its associated activities, and would include the maximum noise level allowances for the facility and its operations; and

(c) the specifics of each operation are likely to be technical, and it would not be reasonable to require the WBOPDC to delve into the mechanics of each operation. The intent of the individual plans is to ensure each operation develops and implements management procedures that enable compliance with the noise limits and requirements of the Master Noise Management Plan.

5.14 I provide in the Operational Noise Report recommendations pertaining specifically to the individual Noise Management Plan for the proposed container facility.[26] This includes requirements to:

(a) designate the location and construction of the proposed workshop as a key mitigation measure to both shield steel refurbishment noise within the workshop, and maintain a distance from the closest receivers;

(b) limit numbers, locations, and orientation of Reefers, in addition to shielding requirements for the area around Reefers which would involve use of empty non-refrigerated containers stacked above the elevation of stacked Reefers;

(c) limits on equipment sizes and operations specific to the facility. For example, forklifts must not use tonal reversing beepers; and

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25 Operational Noise Report dated 6 April 2023 at [10.4].
26 Operational Noise Report dated 6 April 2023 at [10.3].

(d) monitoring requirements to ensure the operations are undertaken in accordance with consented and approved limits.

5.15 In context of controlling traffic noise[27] within the Site, I propose that the full length of the internal road is sealed to avoid rattling noises associated with truck movements over gravel or metal roads. To the same end of avoiding steel on steel rattling noises I also propose that no speed humps are installed on any section of internal roading to be used by heavy vehicles.

Operational noise emissions relative to standards

5.16 To assess the operational noise effects of the Project, an environmental noise model[28] was constructed to calculate noise propagation[29] from representative activities associated with the proposed development pertaining to both daytime and nighttime activities for both compliance and amenity.

5.17 I note that due to the fact other facilities and operations may be introduced in the future, noise from operations within the Site received at surrounding areas would likely differ from the predictive models. Noise levels may be higher at some locations (for example if new operations include outdoor noise), or lower (if facilities include large buildings that create acoustic shielding). As such, the models are intended to demonstrate that compliance can be achieved with practicable mitigation measures that would be implemented in noise management plans as required.

5.18 The Operational Noise Report includes noise models[30] showing predicted noise levels at the surrounding receivers from activities associated with the container facility, taking into account the required mitigation measures (location, orientation, and shielding of workshop and Reefers).

5.19 The predicted noise models conservatively assume all noise generating activities within the Site are active simultaneously. While this does not normally occur, I have conservatively assessed the Application for compliance against this worst-case scenario.

5.20 The noise models cover the following:

(a) current ambient[31] noise levels for verification of the noise models against measured noise levels;

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27 Operational Noise Report dated 6 April 2023 at [10.1].
28 Operational Noise Report dated 6 April 2023 at [7].
29 Operational Noise Report dated 6 April 2023 at [9].
30 Operational Noise Report dated 6 April 2023 at Appendix I.
31 Operational Noise Report dated 6 April 2023 at [9.1].

(b) predicted noise levels from daytime operation of the container facility cumulative to existing noise from the environment[32] (eg roads and railway), and separately independent of existing noise levels for compliance assessment (noise only from the facility in daytime).[33] The predictive models include noise generated from two representative locations of the workshop South-eastern corner and western end of the facility) taking into account required mitigation measures; and

(c) predicted noise levels from nighttime running of all Reefers cumulative with noise from the environment[34] (eg roads and railway) and separately independent of existing noise levels for compliance assessment (noise only from the facility at night).[35] The model includes examples of the proposed mitigation measures associated with the location, orientation and shielding of Reefers to control noise propagation to the closest receivers.

5.21 I note for reference that in accordance with the applicable standards for noise measurement and assessment,[36] only noise from a source under investigation is taken into account when assessing compliance. Other noise sources and sounds, including ambient and background noise are disregarded.[37] Nevertheless, I provide in the Operational Noise Report noise models including existing noise levels for context of amenity taking into account cumulative effects.

5.22 In relation to compliance with the applicable standards, I note the following:

(a) with regards to daytime operations, noise from the container facility (taking into account the proposed mitigation measures) can be managed within daytime compliance limits at all receivers:

(i) the highest noise levels at other industrial sites (where compliance is at LA_{eq} 65dB) would be circa LA_{eq} 63dB to the north across Te Puna Station Rd; and

(ii) the highest noise levels at the notional boundary of a rural site (where compliance is at LA_{eq} 55dB) would be in the order of LA_{eq} 50-53dB at receivers to the west and south-

32 Operational Noise Report dated 6 April 2023 at [9.2].
33 Operational Noise Report dated 6 April 2023 at [9.4].
34 Operational Noise Report dated 6 April 2023 at [9.3].
35 Operational Noise Report dated 6 April 2023 at [9.5].
36 NZS6801:2008 and NZS6802:2008.
37 NZS6802:2008 – Section 5.4.2.

west along Te Puna Road, and to the north-west (eg 288A Te Puna Station Road).

(b) With regards to nighttime operations, noise from all Reefers running, (taking into account proposed mitigation measures), can be managed within nighttime compliance limits at all receivers:

(i) the highest noise levels at another industrial site (where compliance is at LA_{eq} 65dB) would be circa LA_{eq} 51-53dB to the north across Te Puna Station Rd and the east at the adjacent industrial side at 245 Te Puna Station Road;

(ii) the highest noise levels at the notional boundary of a rural site at night (where compliance is at LA_{eq} 45dB) would be at the receivers to the west and south-west along Te Puna Road in the order of LA_{eq} 37-41dB (eg at LA_{eq} 41dB at 66A Te Puna Road); and

(iii) in context of compliance with the nighttime impulsive noise limit of LA_{max} 75dBA at the notional boundary of rural receivers, I note that the only noise source at night from the container operation would be the running Reefers, which do not involve impulsive noise sources. As such, impulsive noise limits can readily be complied with at all receivers.

Assessment of operational noise effects

5.23 I have considered the effects of the proposed activities on the surrounding environment in context of the duty to avoid unreasonable noise as per the statutory requirements of Section 16 of the RMA. I summarise below the potential noise effects on the surrounding environment.

5.24 Regarding the effects of increase of noise above current ambient levels, as per the predictive noise models, noise levels in the vicinity of the Site would increase by circa 4-7dBA above current ambient levels at receivers outside the Site. I note in context of amenity that:

(a) the general threshold of human differentiation of noise levels is circa 3dBA and a 1-2dBA difference would not be generally noticeable;

(b) a 5dBA difference is considered louder, albeit “just louder”; and

(c) an 8dBA difference would be considered “noticeably louder”.

5.25 The highest relative increases from current noise levels would occur to the west of the Site at receiver dwellings away from Te Puna Road (eg at 66A, 56D, 56E Te Puna Road), where current daytime noise levels would be in the order of LA_{eq} 43-44dB. Noise levels at these receivers have the potential to reach up to LA_{eq} 49-50dB based on worst case scenario noise models from activities at the Site. The increase of 6-7dBA would be noticeable and would generally be described as "just louder to noticeably louder" compared to current ambient levels. However, the predicted worst case noise levels would be in the order of 5dBA below the District Plan daytime compliance limit commonly used in other regions[38] at the interface of industrial and residential zones.

5.26 For other receivers closer to current traffic and rail noise sources (eg along Te Puna Road, and close to the railway tracks), noise level increases above current ambient levels would be in the order of 2-5dBA. I note that 3dBA is the general threshold of human differentiation of noise levels, whereby increases of 2-3dBA would not generally be noticeable. Increases of 5dBA would be described as "just louder" and would generally occur at the closest receivers to the west and east.

5.27 Regarding the acceptability of effects of predicted noise levels, I quote the following from the national standard NZS6802:2008:[39]

> The recommended daytime limit of 55 dB L_{Aeq} (15min) is consistent with the guideline values for community noise in specific environments published by the World Health Organisation. The World Health Organisation identifies that during the daytime, few people are seriously annoyed by activities with levels below 55dB L_{Aeq}. The night-time limit recommended should not exceed 45dB $L_{Aeq(15min)}$ outside dwellings so that people can sleep with windows open for ventilation an achieve the desirable indoor 30-35 dB $L_{Aeq(15min)}$ level as a design level to protect against sleep disturbance.

5.28 The highest predicted noise levels at noise sensitive receivers would be within the compliance limits, and consistent with the guidelines for community noise[40], and as such are considered acceptable.

Operational vibration emissions

5.29 In relation to vibration propagation to neighbouring receivers, the Site is at significant distances from the closest structures and habitable buildings.

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38 Examples include the Auckland Unitary Plan (Operative in Part), Section E25.6.19 and the Waikato Proposed District Plan, NOISE-R18-(1).(b), NOISE-R19-(1)(b) and (c).

39 NZS6802:2008 – Acoustics – Environmental Noise - Section C.8.6.2.

40 NZS6802:2008 – Acoustics – Environmental Noise - Section C.8.6.2.

Vibration levels from industrial activities including movement of heavy machinery are unlikely to be perceptible at the distances involved to any sensitive receivers.

6. CONSTRUCTION NOISE AND VIBRATION

6.1 With regards to the proposed construction works, my evidence and the assessments underlying it are based on a “design” approach whereby the construction process, equipment and methodology are designed and selected to control noise and vibration to the lowest practicably achievable effects (taking into account both levels and durations). I note this is different to an “observe and mitigate” approach where the construction process is established independently, and then effects are assessed and mitigated. The "design" approach proposed here, in my view, is more appropriate as it results in lower potential effects and more certainty as to what those effects will be.

6.2 A main consideration pertaining to construction noise and vibration is minimising overall noise and vibration effects by balancing the emission levels and the durations of these levels. As an example of the balance required, allowing larger equipment may result in shorter durations of operation, but may also result in higher noise and vibration levels during construction. Conversely, selecting equipment too small may reduce the emission levels of noise and vibration, but would also prolong the duration.

Construction noise and vibration sources

6.3 I note that the proposed development of the wider Site is not known at this stage. As such, I take a conservative view of assuming the highest noise and vibration generating construction activities for construction of industrial buildings and facilities may be required. This includes potential need for:

(a) augering for bored cast in situ concrete piles;

(b) impact driven pilling of both timber and steel piles;

(c) vibratory compacting of roading, fill and foundations;

(d) earthworks with small, mid-sized, and large sized excavators;

(e) carting, including loading and unloading of trucks with both soft and solid materials;

(f) levelling ground with padfoot rollers and graders; and

(g) concrete operations, including pumping concrete to elevation.

6.4 The Draft CNVMP includes a list of equipment[41] representative of potential works that may occur in the construction of facilities across the Site.

Construction noise and vibration mitigation measures

6.5 The Draft CNVMP includes a number of practicable mitigation measures[42] to minimise construction noise and vibration effects on neighbours. These include:

(a) restricting hours of allowed construction work to avoid the highest noise generating activities occurring during periods of high noise sensitivity (early morning and evening);

(b) general equipment restrictions (limiting sizes of compactors and excavators allowed to operation within the Site);

(c) practicable mitigation measures for reducing noise from driven piling;

(d) requirement to communicate with neighbours regarding the nature, schedule, duration, and times of works; and

(e) monitoring requirements prior to commencement of any high noise generating activity to ensure any works are undertaken within the compliance limits, and all practicable measures to minimise effects are implemented.

6.6 The Draft CNVMP also includes contingency measures should these be needed to reduce noise levels if needed. These include specific contingency measures to reduce noise from driven piling.

Construction noise and vibration emissions relative to standards

6.7 I note for reference that the District Plan does not include any specific standards to manage construction vibration.[43] Nevertheless, for the protection of structures from construction vibration I propose adopting the limits of the German DIN4150-3[44] standard, and for protection of amenity from construction vibration I propose adopting a limit derived from the guidelines of the British

41 Draft CNVMP – Section 7.1.
42 Drat CNVNP – Section 11.
43 Western Bay of Plenty Operative District Plan, 4C.1 – Explanatory Statement.
44 DIN 4150-3:2016 Vibrations in buildings – Effects on Structures.

Standard BS5228-2[45]. Both standards are commonly used in other regions in New Zealand.

6.8 Noise and vibration levels can readily be managed to comply with all applicable limits (including vibration limits proposed in the Draft CNVMP)[46] at all receivers during all works provided the requirements of the CNVMP are adhered to and all best practice measures are followed.

Assessment of construction noise and vibration effects

6.9 All construction works inevitably result in undesirable noise effects in the surrounding environment. To quote from the national standard NZS6803:1999, pertaining to construction noise:[47]

> Although this may mean that the noise is undesirable, it is not necessarily unreasonable when all the relevant factors are taken into consideration. Construction noise is an inherent part of the progress of society. As noise from construction projects is generally of limited duration, people and communities will usually tolerate a higher noise level provided it is no louder than necessary, and occurs within appropriate hours of the day.

6.10 If the highest noise and vibration generating works are required for construction of industrial facilities within the Site and assuming noise levels at one or more receivers reaches (albeit stays within) the compliance limit, this would conservatively result in an internal noise level of LA_{eq} 50dB. For subjective comparison, this noise level is analogous with the interior of an average active home, or noise within a quiet open plan office. I note for reference that conversational speech at 1m separation is approximately 60dBA. As such, this noise level would not interfere with normal conversations within dwellings.

6.11 With regards to vibration, the proposed limit for protection of amenity from construction vibration is conservatively at the lower end of the range recommended in the British Standard BS5228-2 and as such provides a reasonable level of protection of amenity for the durations involved in construction.

6.12 Vibration levels at the distances involved from earthworks or construction works at the Site to the closest receivers can readily be managed within the guideline limit for protection of amenity from construction vibration

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45 BSI British Standard BS5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

46 Draft CNVMP – Section 10.2.

47 NZS 6803:1999 Acoustics – Construction Noise – Foreword.

Furthermore, in most cases, vibration from construction works is unlikely to be perceptible at receiver locations.

7. RESPONSE TO ISSUES RAISED IN SUBMISSIONS

7.1 I have reviewed relevant submissions on the Application that raise matters relating to noise and vibration.

7.2 I note that the submissions filed by 50 of the submitters on this Application are identical in form and substance.[48] I acknowledge that these submissions were made by individual submitters, however for ease of reference and given the likeness of these submissions, I will refer to these submitters as "Submitter Group 1", rather than by referring to their individual submitter number.

7.3 Many submitters have expressed general concerns over noise-related affects with the Application. In particular, submitters have expressed specific concerns relating to the noise and vibration effects during the construction period and during the operation of the activity, as well as noise and vibration effects from traffic. I address each area of concern separately below.

Environment Court noise limits vs District Plan noise limits

7.4 A main concern repeatedly raised in submissions[49] is the difference between the compliance limits in the District Plan and the limits set in the Environment Court decision in 2005.[50] I can make no comment regarding the application of Environment Court rules in the District Plan and defer this matter to the legal and planning teams. It is my understanding that the District Plan rules and noise limits are the regulatory standards applicable to activities within the jurisdiction of the WBPODC and I make my compliance assessments accordingly.

7.5 For completeness, however, I describe below the differences between the limits in the Environment Court decision (L_{10} 50dBA daytime and L_{10} 40dBA nighttime) and the District Plan (LA_{eq} 55dB daytime and LA_{eq} 45dB nighttime).

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48 Submitters #3, #4, #6, #8, #9, #10, #11, #12, #14, #15, #16, #17, #19, #20, #21, #22, #23, #24, #27, #28, #29, #31, #32, #33, #37, #40, #41, #42, #45, #47, #48, #51, #52, #57, #58, #61, #62, #63, #64, #66, #71, #72, #100, #105, #111, #112, #127, #187, #194 and #195.

49 Submitters #50, #55, #49, #80, #268, #73.2, #125, #132, #11, #118, #192, #110, #6, #262, #80, #97, #49, #120, #73.2, #30, #125, #56, #192

50 *Thomas and Flavell v Western Bay of Plenty District Council*, A016/2005, EnvC Auckland, 3 February 2005.

7.6 With regards to noise descriptors, the Environment Court decision uses the outdated L_{10} noise descriptor, which was replaced in the standards[51] by the L_{eq} descriptor. The following is quoted from the national standard NZS6802:2008:[52]

> It [L_{eq}] replaces L10 which was the main descriptor used in versions of NZS 6802 prior to 1999. This change is consistent with international practice and supported by research.

7.7 For activities with constantly fluctuating noise, L_{10} measurements are usually 2-3dBA higher than L_{eq} measurements. The L_{10} descriptor, however, has an inherent weakness/loophole in that it disregards the highest noise levels occurring for less than 10% of the time (regardless how high these noises are). This can cause issues in compliance monitoring if an operation only generates excessive noise for less than 10% of the time.

7.8 For the proposed activities for example, L_{10} measurements risk excluding loud crashes and bangs (eg uncontrolled stacking of containers regardless how loud these are) from compliance measurements if these only occur for 1 minute in any 15-minute period. L_{eq} on the other hand, appropriately includes all noise occurring in the period and is a more appropriate descriptor for control of environmental noise.

7.9 With regards to the numerical noise limits, the Environment Court decision in 2005 set limits 5 dBA numerically lower than the District Plan limits.[53] Assuming noise from the Site activities is continuously fluctuating (ie ignoring the loophole in L_{10} allowing for extreme noise for less than 1 minute) the District Plan allows in the order of 6-7dBA higher noise levels than the Environment Court decision. Nevertheless, I note that the District Plan noise limits are in-line with regulations in other districts and regions in New Zealand pertaining to the interface of industrial and residential/rural zones,[54] and furthermore in-line with the World Health Organisation guidelines as referenced in the national standard NZS6802:2008, from which I quote the following:[55]

> The recommended daytime limit of 55 dB $L_{Aeq\,(15min)}$ is consistent with the guideline values for community noise in specific environments published by the World Health Organisation. The World Health Organisation identifies that during the daytime, few people are seriously annoyed by activities with levels below

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51 NZS6802:2008 – Acoustics – Environmental Noise.

52 NZS6802:2008 – Acoustics – Environmental Noise – Section C5.3.

53 *Thomas and Flavell v Western Bay of Plenty District Council*, A016/2005, EnvC Auckland, 3 February 2005.

54 Examples include the Auckland Unitary Plan – Operative in Part - Section E25.6.19 and the Waikato Proposed District Plan, NOISE-R18-(1)(b), NOISE-R19-(1)(b), (c).

55 NZS6802:2008 – Acoustics – Environmental Noise - Section C.8.6.2.

> 55dB L_{Aeq}. The night-time limit recommended should not exceed 45dB $L_{Aeq(15min)}$ outside dwellings so that people can sleep with windows open for ventilation an achieve the desirable indoor 30-35 dB $L_{Aeq(15min)}$ level as a design level to protect against sleep disturbance.

7.10 With regards to the noise predictions in the Operational Noise Report,[56] I note that these are based on continuously running plant and machinery, and disregard fluctuations of machinery on/off cycles (which usually lower noise levels by including lower noise periods). Under normal circumstances (ie ignoring the loophole inherent in the L_{10} descriptor), the predicted noise levels would be the same regardless which descriptor is used as the noise models are based on continuous noise.

Operational Noise

7.11 Submitters[57] indicated a general concern with noise from the proposed operation involving handling, maintenance and washing of containers, and noise from reversing beepers.[58] I note here that the key to managing noise from industrial operations is establishing strict operating procedures that control noise sources. This includes for example restricting high noise activities such as maintenance of containers to a specific location away from receivers and shielding these within a suitably constructed and orientated enclosure. In addition, operating procedures would enforce best practice measures on activities, including for example prohibiting use of tonal reversing beepers and replacing them with atonal reversing buzzers or lights if safety allows. The above control procedures and best practice measures are proposed to be established formally in Noise Management Plans. If activities are undertaken in breach of these approved procedures resulting in excessive noise levels, this becomes a matter of compliance enforcement.

7.12 Some submitters[59] raised a concern that the noise levels from specific equipment quoted in the Operational Noise Report would not comply with the District Plan limits. I note that it is a matter of convention that noise levels from specific sources are expressed as the noise level received from each source at a distance of 10m. Noise decreases over distance and the farther a receiver is from a source, the lower the received noise level. The noise modelling, predictions, mitigation measures and conclusions of the Operational Noise Report take this into account, whereby sources with higher noise levels are

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56 Operational Noise Report – Section 9.
57 Submitters #73.2, #49, #134, #120, #132, #101, #103, #110, #6, #262, #138, #97, #101.
58 Submitter #110.
59 Submitters #30, #73.2, #97.

located farther from the boundaries, and where needed are shielded to achieve compliance at all receivers.

7.13 A concern was raised[60] regarding noise channelling up the valley due to the amphitheatre like topography. I can confirm that the predictive noise models take into account the topography and ground contours of the surrounding area.

7.14 Reference was made in several submissions to the requirement for acoustic bunds.[61] I note that all predictions and proposed mitigation measures conservatively exclude any shielding effects from bunds or mounds. If any bunds are established, any reduction in noise levels from these would be additional to the levels based on the proposed mitigation measures. For reference, I note that acoustic shielding is most effective when close to the receiver or to the source. When bunds are established at a distance from both source and receiver, the acoustic shielding effects are reduced. I understand that TPIL no longer proposes to include bunds on the northern boundary of the Site. Given my assessment does not include shielding effects from bunds or mounds (as set out above), the absence of bunds on the northern boundary does not in any way change my assessment.

7.15 A concern was raised regarding noise levels measured at 56E Te Puna Station Road from noise generated from the yard operations at 260 Te Puna Station Road.[62] I cannot comment on noise measurements from another operation without reference to the location, duration, orientation and metrics of the measurements, and what background noises were prominent at the time. Nevertheless, I do note subjectively that during my site visits, activities within 260 Te Puna Station Road included use of a forklift with a tonal reversing beeper which is contrary to best practice in proximity to residential zones.

7.16 Some submitters raised concerns regarding noise at night from the proposed operations.[63] I note here that operations within the Site are limited to daytime hours. The only operational noise source at night would be the running of Reefers. The proposed mitigation measures for Reefer noise are based on the conservative assumption that all would be running at night, which it is my understanding they would not be. The mitigation measures include locating Reefers away from the closest receivers, in addition to shielding them within container enclosures. These measures would control noise from Reefers at night to within the compliance levels at all locations.

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60 Submitter #13.
61 Submitters #73.2, #120.
62 Submitter #73.2.
63 Submitters #49, #55, #73.2.

Construction Noise and Vibration

7.17 Some submitters raised concerns regarding construction noise.[64] While noise levels from construction works are higher than normal operational noise levels, construction noise is of limited duration. Provided construction noise occurs within compliance limits and at appropriate hours of the day, it would be acceptable. Considering the distances involved from the Site to the closest receivers, and with the proposed mitigation measures, construction noise can be managed within compliance levels at all receivers.

7.18 Some submitters also raised concerns regarding construction vibration,[65] especially regarding the soft soils typical of the surrounding environment and the potential for construction vibration to cause ground instability at receiver dwellings. I cannot comment on geotechnical considerations pertaining to ground stability, but do note that at the distances involved, and with the proposed mitigation measures, even the highest vibration sources (eg impact driven piling) would likely attenuate to below perception levels at most receivers.

Traffic Noise and Vibration

7.19 A number of submissions raised concerns regarding traffic noise[66] and vibration[67] especially associated with carting of soil during earthworks.

7.20 I note here that noise and vibration effects associated with traffic on public roads is out of scope of compliance considerations. Nevertheless, I discuss these below in context of both construction traffic and operational traffic.

7.21 With regards to traffic within the site during operation of the proposed facility, this is subject to the same noise limits and restrictions associated with other activities and was considered in all noise modelling and predictions. Specific mitigation measures are also proposed, whereby the full length of internal roading used by heavy vehicles must be sealed with no speed humps. Provided the proposed mitigation measures are implemented, noise from internal traffic (as included in the predictive models) would be within the compliance limits at all receivers.

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64 Submitters #70, #78, #73.1.
65 Submitters #78, 73.2.
66 Submitters #70, #73.1, #30, #90, #7, #120, #125, #56, #110, #6, #114, #90.
67 Submitters #30, #7, #120, #125, #56, #110, #6, #90.

7.22 Similarly for internal traffic during construction, noise levels from heavy vehicle movements within the Site can readily be managed within the construction noise compliance limits at all receivers.

7.23 With regards to noise and vibration from traffic on public roads, this is highly dependent on multiple parameters specific to each receiver location. This includes the offset of a receiver from the road (distance to vehicle path), the gradient of the road in proximity (ie engines spooling up or down, or braking), presence of curves or intersections in the road (deceleration and acceleration), and usual traffic speeds.

7.24 Notwithstanding the above, a generalisation can be made that for the same relative vehicle types (ie percentage of heavy vehicles), doubling of traffic volumes would increase noise levels in the order of 3-4 dBA.

7.25 With reference to the Transportation Assessment,[68] it is my understanding that operational traffic from all sites within the business park (including all potential facilities within the Site) would increase by 2,599 vehicles per day, from pre-slip traffic volumes of 2,865 vehicles per day (or post slip traffic volumes of 1,484 vehicles per day). Based on this, noise levels to the west of the Site along Te Puna Station Road may increase by 3-4dBA compared to pre-slip noise levels (or circa 4-5dBA if percentage of heavy vehicles increases materially), or by 5-6 dBA (or circa 6-7dBA if percentage of heavy vehicles increases materially) compared to post-slip noise levels. As I noted previously, these noise levels would be described as “just louder” to “noticeably louder” but would not be unusual for a road in proximity to industrial zones.

7.26 With regards to noise from construction traffic along public roads, this is also exempt from compliance considerations. In terms of effects, the same considerations that apply to noise from construction work (which includes earthworks) also apply to noise effects from construction traffic on public roads. Noise from construction traffic is of limited duration, and provided it occurs at appropriate hours of the day, it would be acceptable and commonly encountered in proximity to construction sites during construction works.

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68 Transportation Assessment Report by Harrison Transport dated September 2023 – section 9.

8. RESPONSE TO MATTERS RAISED IN THE SECTION 42A REPORT

8.1 I have reviewed the WBOPDC's Section 42A Report and recommendation dated 17 June 2024 pertaining to noise and vibration (primarily dealt with at [228]-[244]),[69] and I agree with the conclusions.

8.2 I note the following at [243] of the WBOPDC s42A Report:

> However, noise could be considered for the privateway within the site. I invite the applicant to clarify in their evidence if that has been factored into the noise model.

8.3 In response, I can confirm that all modelling and predictions of noise includes and takes into account internal traffic along the full length of the internal road (private way). I quote the following from the Operational Noise Report:[70]

> Noise assessment in this report pertains to the full operation of the site, and as such, traffic volumes are modelled as […] 774 movements per day with 17% heavy vehicles, all traversing the length of the proposed internal road from the northern boundary.

8.4 I have also read the WBOPDC specialist review prepared by Mr Peter Runcie – SLR Consulting NZ Ltd,[71] and I agree with the analysis and conclusions in Mr Runcie's specialist review.

9. COMMENTS ON PROPOSED CONDITIONS

9.1 I have reviewed the WBOPDC recommended consent conditions[72] for the Application pertaining to noise and vibration and consider these to be appropriate, other than the following recommendations.

9.2 **Construction Noise and Vibration (conditions 25-30):** I note that construction noise and vibration management plans are live documents that may need to be changed over time, and any changes must also be reviewed and approved by the Council (not just the first revision). As such, I recommend the following wording (or wording to this effect) is added to these conditions where appropriate:

> Any variations to the CNVMP or ECNVMP must also be prepared by a suitably qualified and experienced person and provided to the Council for written certification and must only be implemented once written certification is received.

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69 WBOPDC s42A Report and Attachments, p. 261-265.
70 Operational Noise Report dated 6 April 2023 at [8.2.2].
71 WBOPDC s42A Report Attachment 11: Acoustic Review – SLR Consulting, page 425.
72 WBOPDC s42A Report WBPODC Recommended Consent Conditions, page 454.

9.3 **Operational Noise (Condition 32):** Similar to construction, the Noise Management Plan ("**NMP**") is also a live document. To ensure any changes are appropriately reviewed and approved, I recommend the last paragraph of the Condition is updated to:

> The NMP shall apply at all times. It is a 'living document' that shall be expanded and updated as appropriate. Any variations or additions to the NMP must be provided to the Council for written certification and must only be implemented once written certification is received.

9.4 **Operational Noise (Condition 35):** The condition states that "The individual NMP's shall be approved and then held by the consent holder". For the avoidance of doubt, I recommend the wording clarifies that the approval process of individual NMPs is the responsibility of the consent holder.

10. CONCLUSION

10.1 Construction works associated with the development of the Site can be managed within the applicable noise compliance limits and within the proposed vibration limits, provided adequate mitigation measures and best practice procedures are implemented through construction noise and vibration management plans.

10.2 With regards to operation of industrial facilities within the Site, provided adequate mitigation measures and best practice procedures are implemented through noise management plans, the development of the Site can be managed within the applicable compliance limits at all receivers.

10.3 The resulting noise levels at receivers, being within the compliance limits, are in-line with the applicable national standards and the World Health Organisation guidelines, and as such the effects are deemed acceptable.

Alex Eli Jacob
25 June 2024