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Gisborne District Council

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Dear Todd,

Eastland Port Twin Berths Project- Acoustic review

1.0 Introduction

Gisborne District Council have engaged Styles Group to review the airborne and underwater noise effects from Eastland Port's Twin Berth Project.

We have reviewed the following information:

- i. The Assessment of Environmental Effects dated August 2022 prepared by 4Sight Consulting (the **AEE**)
- ii. The construction and operational noise assessments prepared by Marshall Day Acoustics (**MDA**) dated 17 August 2022 (the **Construction Noise Assessment** and **Operational Noise Assessment**)
- iii. The Section 92 response prepared by MDA titled "Section 92 response noise matters" dated 17 April 2023 (the **Response**).
- iv. The MDA memorandum titled "Additional information for Styles Group for s42a report- underwater" dated 21 September 2023 (the **Underwater Memo**)
- v. The MDA memorandum titled "Additional information for Styles Group for s42a report" dated 15 September 2023 (the **Airborne Memo**)

This review has been prepared following several engagements with MDA and the applicant team generally. These engagements have been necessary to inform the provision of some further information (contained in the Underwater memo and the Airborne Memo) and to resolve areas of disagreement as far as possible.

The airborne and underwater noise issues have been resolved nearly completely between the applicant and the Council, to the point where we consider that the applicant's assessments can be relied on for the decision-making process, except for some specific issues that we address in this advice.

This review addresses the following three main effects:

- 1) Airborne construction noise effects
- 2) Underwater construction noise levels (and effects)
- 3) Airborne operational noise effects

The ongoing operational underwater noise effects will be negligible – and simply a factor of more ships coming and going from the port.

2.0 Comment on the TRMP provisions relating to port noise

The provisions of the Tairāwhiti Resource Management Plan (**TRMP**) that manage operational and construction noise and vibration are relatively complex and largely out-of-date. Noise emissions from the Port are currently controlled by a complex regime of noise limits specified in the TRMP, and across individual several resource consents.

The operative TRMP noise control boundaries do not take into account all activities that comprise typical port operations and appear to be based on an out-dated layout (of major noise sources).

Figures 2 and 3 below identify the Port is zoned Port A or Port B, with these zones collectively forming the “Port Noise Management Zones” of the TRMP. Where port noise levels are managed by the TRMP, noise levels from “essential port activities” must be measured in accordance with New Zealand Acoustical Standard 6809:1999 *Acoustics – Port Noise Management and Land Use Planning (NZS:6809)*. The TRMP adopts NZS:6809’s recommended land use planning controls by identifying noise control boundaries and associated noise limits for port noise management.

Noise levels from the Port Management Zones¹ are controlled by C11.2.15.G1 of the TRMP. This rule requires:

Port Management Zones

1. General

- a) The longer term average sound level (L_{dn}) from “essential port activities” within the Port Management zones shall not exceed 55dBA at any point outside the 55dBA noise contour nor 65dBA at any point outside the 65dBA noise contour.
 - b) Non-essential port activities conducted in the Port Management zones shall comply with noise limits specified in C11.2.15.1.
 - c) The short term average sound level (L_{eq}) shall not exceed 60dBA between 10pm and 7am.
 - d) The night time maximum sound level (L_{max}) shall not exceed 85dBA between the hours of 10pm and 7am at any point outside the 65 dBA noise contour.
 - e) Persons carrying out essential port activities shall provide, on the third anniversary of the Plan becoming operative – and every three years thereafter – certification that noise produced complies with standards a)–d) above.
2. No structure or additions to existing structures associated with a noise sensitive activity shall be erected on land located between the 55dBA Noise Contour

¹ Including Port Management A, B, C & Cook “Cone of Vision”

Boundary and the 65dBA Noise Contour Boundary for the Port of Gisborne, except where the internal Ldn of 45dBA in all habitable rooms with doors and windows closed is achieved.

Figure 1 displays the:

- Port Noise 55L_{dn} Boundary
- Port Noise 65L_{dn} Boundary
- Port Inner Control Boundary
- Port Outer Control Boundary

There are several issues associated with these mapped areas/ boundaries - including:

- The Port Inner and Outer Control boundary is not a boundary, but a mapped area that does not correspond with the “Port Noise 55 L_{dn} Boundary” or the “65 L_{dn} Boundary”;
- The Inner Control Boundary excludes significant areas of Port B zoned land, including the log yards;
- The noise control boundaries do not appear to represent the current noise emissions as depicted in the MDA assessments and the Airborne Memo.

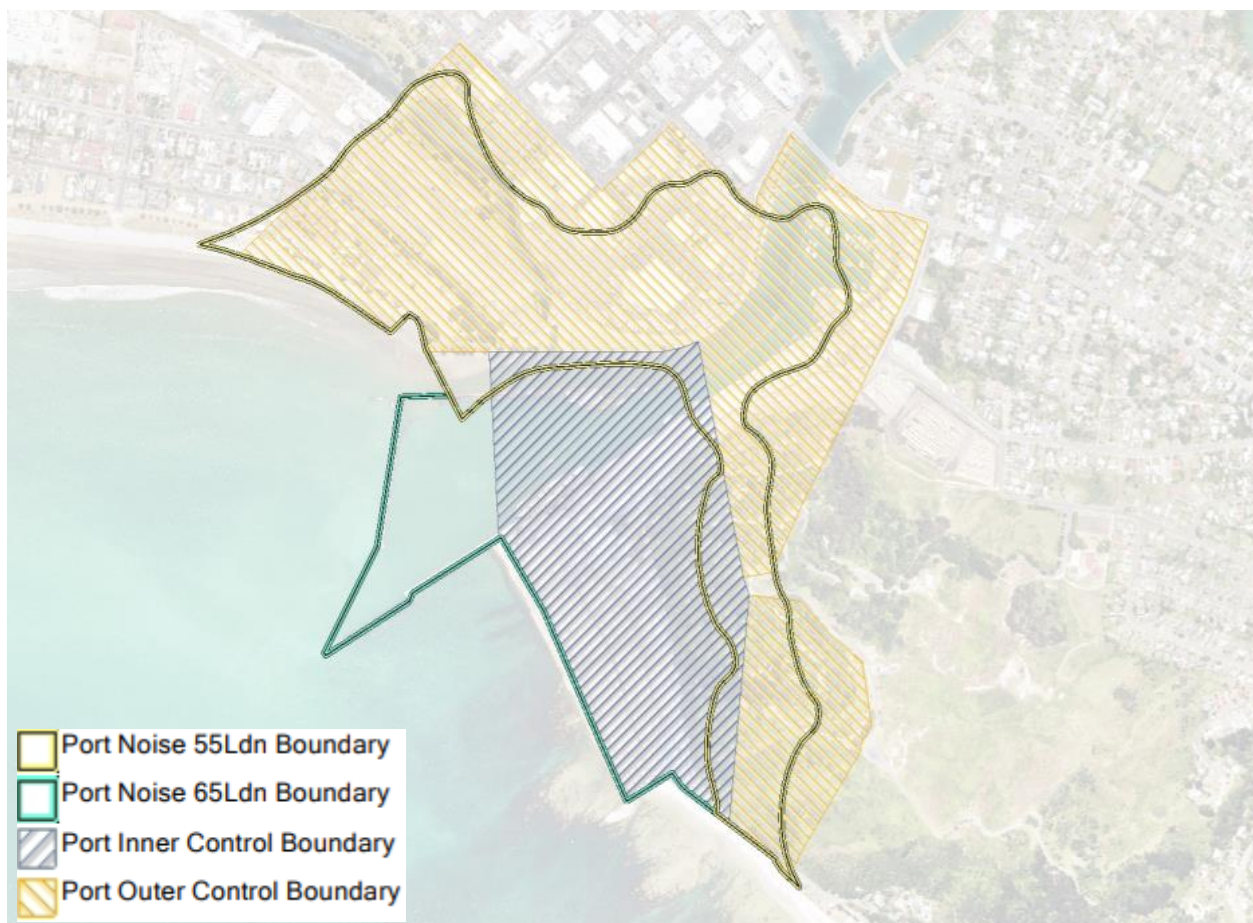


Figure 1 Port noise boundaries

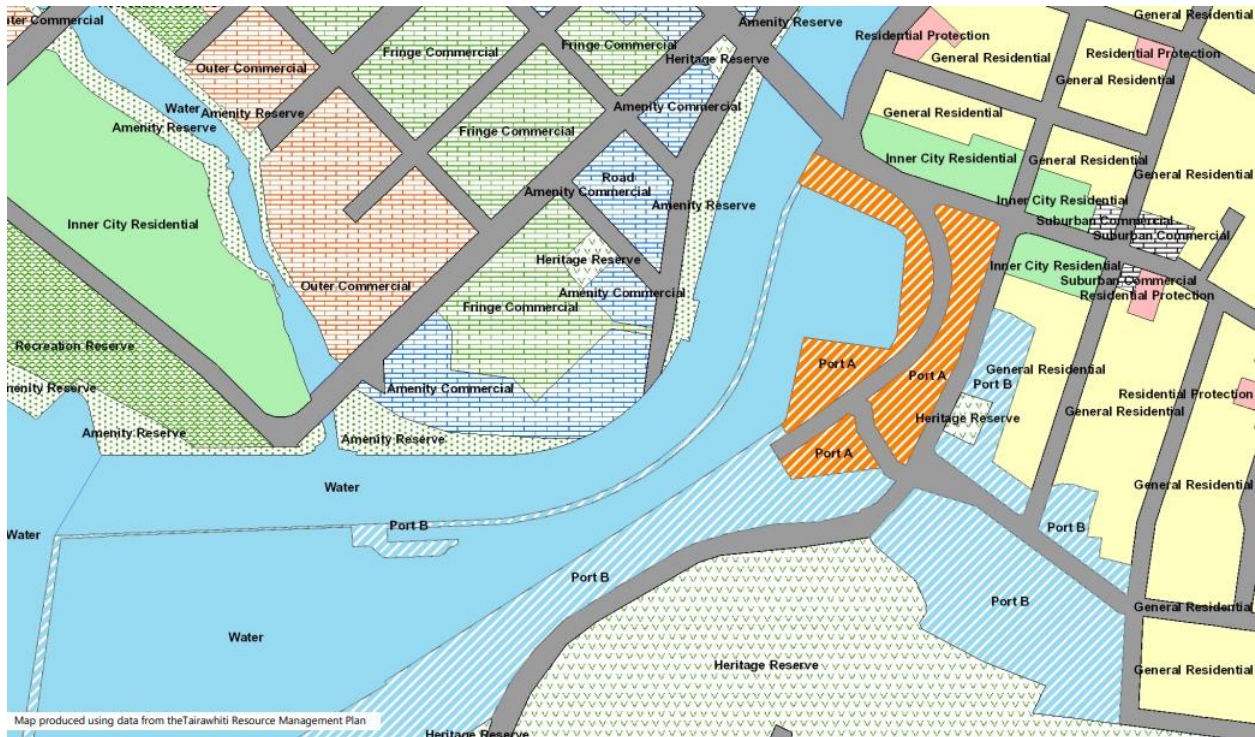


Figure 2 Zoning of the Port and surrounding environment

The TRMP provisions require that a range of noise sensitive activities inside the port noise boundaries are acoustically treated to ensure that the indoor noise environment is reasonable for the occupants. We note that the TRMP controls require that the indoor noise level does not exceed 45dB L_{DN} . We consider that this level is at least 5dB too high and that a lower level is appropriate and reasonable. An indoor port noise level of 40dB L_{DN} is typically adopted. We note that the Operational Noise Assessment and Airborne Memo both make several statements that support this. If an indoor noise level of 40dB L_{DN} is achieved, the operative TRMP would require a maximum outside to inside noise level reduction (NR) of 25dB.

Notwithstanding, many of the inner-city zones require that noise sensitive activities are acoustically treated to achieve an NR of 30dB. This is a considerably higher target and will ensure that the potential cumulative effects of port noise and inner-city noise will be adequately managed (within 1dB or so, in theory).

The noise control boundaries identified in the TRMP should accurately identify the Port's acoustic envelope for noise emissions, based on the current operations and Port's predicted growth. In accordance with C6.4.6 of NZS:6809, the noise contours should reflect the day-night average sound levels that can arise from port activities. The noise control boundaries and noise contours are well out-of-date and will require updating if this consent is granted. The main change will be the shape and position of the contours and increasing the effective 'noise limit' at the closest land-based receiver from 65dB L_{DN} to 67dB L_{DN} .

We recommend that the TRMP noise control boundaries are updated, taking into account a “whole of port’ approach to noise emissions from the Port. This will ensure that all noise emissions from the Port’s operation are accurately understood.

We appreciate that this will require a plan change or inclusion in the upcoming TRMP review process. We expect that the noise modelling process presented in the MDA assessments should form the basis for the noise control boundaries and planning provisions to be developed in the TRMP review process.

We make this point in this review to highlight that even if this consent is not granted, the TRMP provisions that control port noise and that manage compatibility with the port are out of date and require considerable amendments and improvements. The need for review and improvement will become more pressing if this consent is granted.

We note that the construction noise and vibration controls in the TRMP also require updating to ensure that they are based on and referring to contemporary New Zealand standards and best practice.

3.0 The Upper Log Yard

The upper log yard is separated from the main wharf areas by a considerable distance and topography for many receivers. The operational effects of the proposal will not give rise to any appreciable cumulative noise level increase for the receivers adjacent to and affected by the upper log yard, and the noise generated by that log yard will continue to be the main source of port noise for those receivers.

We understand from MDA and the applicant that the proposal does not involve or affect the upper log yard, and that it will continue to operate under its’ own resource consents that are separate to the application.

Accordingly, we have not assessed any effects of the operational of the upper log yard.

4.0 Airborne construction noise effects

The Construction Noise Assessment sets out the construction activities and expected durations of the various phases of work.

The Construction Noise Assessment and the AEE both set out the reasons that the proposal requires consent under the TRMP.

Section 13.8.4 of the AEE states that (our emphasis underlined):

Section 3 of the report notes that Rule 11.2.15.2 is not consistent with NZS6803. Clause A- Long Term Construction, states that “Emissions of construction noise shall not exceed 168 days in any 12-month period.” NZS 6803 has no such time limit and as such the legality (vires) of the rule is questioned.

We note that a District Plan rule does not have to be consistent with an otherwise non-statutory New Zealand Standard in order for the plan provisions to be lawful. We consider that the 168-day timeframe in Rule 11.2.15.2 is a legitimate plan rule.

The AEE goes on to state that consent is required under Rule 11.2.15.2 for exceeding the 168-day timeframe, and under Rule C11.16(C) for the infringement of the relevant construction noise and vibration limits for works in the GCMA. We agree.

The Construction Noise Assessment proposes that the construction noise level predictions and proposed noise limits are based on the provisions of NZS6803:1999. We agree with this proposition and consider that the conditions of consent should deliver this outcome.

4.1 Land-based construction works

The Construction Noise Assessment sets out predicted noise levels for the various works. The Construction Noise Assessment concludes that the works will comply with the noise limits set out in NZS6803:1999. We agree with the noise level predictions generally and we agree that the works can be managed to comply with these limits.

4.2 Dredging activities in the CMA

The Construction Noise Assessment and the Response address the dredging activity. The Response provides a revised assessment of dredging noise levels that take into account a range of TSHD vessels, including vessels that are known to be at the louder-end of the range of vessels that may be contracted for the work.

We agree with the noise level predictions for the various types of dredging work.

The noise from the various types of dredging will readily comply with the relevant noise limits that apply during the early morning, day and evening periods as prescribed by NZS6803:1999.

The noise from TSHD dredging will not comply with the night time noise limit of 45dB L_{Aeq} . The Airborne Memo proposes that a noise limit of 50dB L_{Aeq} applies to dredging activities at night. The Airborne Memo proposes that the noise effects of dredging at night can be minimised by 'prioritising' dredging during the day and in the campgrounds' low season. Such measures may reduce the effects, but we understand that there is no guarantee that they will result in dredging only in the day or in the low season, and that the applicant is not willing to comply with a condition that firmly delivered such outcomes. Accordingly, we have based our assessment on the basis that such prioritisation may not be achievable and that the applicant's proposal still allows dredging at night, and in the busy season for the Waikanae Holiday Park.

We consider that a noise limit of 50dB L_{Aeq} is too high and will result in an unreasonable level of noise and potential sleep disturbance at the Waikanae Holiday Park.

We recommend that a limit of 45dB L_{Aeq} is applied to night time dredging. This accords with the recommended noise limits in NZS6803:1999. We consider that compliance with these limits is reasonable in this case, especially given the relatively long length of construction noise effects overall.

We understand that dredging noise levels exceeding 45dB L_{Aeq} will only arise:

- 1) If a TSHD at the louder end of the scale is contracted for the work. Quieter vessels will be able to comply with a limit of 45dB L_{Aeq} at all times with no operational restrictions;
- 2) For the louder TSHD vessel, noise levels over 45dB L_{Aeq} will only generally arise when operating in dredging mode relatively close to the Waikanae Holiday Park. The noise levels will comply with 45dB L_{Aeq} when the vessel is in transit between the port and the outer dredging or disposal area.

As such, we understand that even if a louder TSHD vessel is contracted for the project, the dredging work could theoretically continue 24 hours per day whilst complying with our recommended noise limit of 45dB L_{Aeq} . It would require that the areas close to the Waikanae Holiday Park are dredged during the day only. All other areas could be dredged at night.

We consider that compliance with a limit of 45dB L_{Aeq} at night will ensure that the noise effects at the Waikanae Holiday Park will be reasonable. There may still be some sleep disturbance effects at night for people camping in tents or lightweight structures, but the levels will generally be consistent with operational port noise.

4.3 Recommended conditions

We recommend that the consent conditions for airborne construction noise are drafted to deliver the following outcomes:

- 1) Compliance with the noise limits for Long Term projects as set out in NZS6803:1999 to be achieved at all times and for all works;
- 2) A Construction Noise and Vibration Management Plan (CNVMP) be prepared, certified by the Council and complied with. The objective of the CNVMP is to identify and require the adoption of the Best Practicable Option (**BPO** - as defined in the RMA) for the minimisation of noise and vibration from all works, and to ensure compliance with the noise limits set out in the consent.
- 3) The CNVMP should contain a specific section setting out how the noise from dredging at night will be managed to comply with the night time noise limit of 45dB L_{Aeq} . This section will need to be completed when the vessel contracted to do the work and it's noise output is known.

5.0 Construction Vibration

The Construction Noise Assessment sets out that the vibration from construction work will comply with the TRMP provisions for construction vibration. Section 6 of the Construction Noise Assessment states that the construction vibration levels will be 'negligible'. We agree. The separation distances are so great that we expect the effects to be barely noticeable, and if noticeable they will be well below a level that could cause any amenity concerns and significantly below a level that might cause structural damage.

We consider that the CNVMP should contain provisions to manage vibration effects as is proposed by the Construction Noise Assessment.

6.0 Underwater construction noise effects

The Construction Noise Assessment and the Underwater Memo provide the applicant's assessment of the underwater noise levels arising from the various construction activities.

The assessment of underwater noise effects is to accurately define the spatial extent of the various noise effects for various species of marine mammals. The spatial extents and predicted noise levels are then assessed by ecologists to determine the nature and extent of effects that may arise. The ecologists will take into account factors such as the importance of the affected habitat(s), the prevalence of the species of concern and other factors to arrive at an overall determination of the effects that might arise and the best methods to manage them.

The potential noise effects, and severity, depend on the distance between the source and receiver, with injury (permanent threshold shifts, PTS) occurring close to the source, followed by temporary threshold shift (TTS), behavioural responses and auditory masking.

6.1 Permanent and Temporary Threshold Shift Effects

When a receiver is exposed to high noise levels over an extended period of time, the cells within the inner ear begin to fatigue and become less sensitive. This results in a change in the receiver's hearing threshold occurs. The degree at which those thresholds change is referred to as a threshold shift. If hearing returns to normal after a certain time post-exposure, the threshold shift is temporary (termed TTS), but if not, the effect is permanent and it is referred to as PTS. PTS is essentially, a degree of permanent hearing loss.

The amount of threshold shift depends on the duration of noise, rise times, duty cycles, sound pressure levels within the receiver's critical bandwidths' (i.e. the spectral composition of the noise) and, of course, the overall energy.

PTS effects arise when there is a high degree of noise level and / or cumulative exposure duration for given animal. TTS effects will occur at a lower cumulative exposure.

PTS and TTS are the two most-critical effects that the proposal might generate. Most port development work will see the TTS and PTS effects occur within a radius of approximately 500m to 1000m from the works. This area can vary considerably in size and shape depending on the bathymetry, presence of screening (from headlands and breakwaters etc), the type of work being undertaken and the effectiveness of any mitigation that is being proposed.

Appendix D to the Underwater Memo provides a table of TTS and PTS effects areas for the proposal. This table supercedes the assessment provided in the Construction Noise Assessment.

This table shows:

Impact and vibro piling

- 1) The maximum extent of **PTS** effects is 1.2km for HF cetaceans during piling without a bubble curtain. The radii for all other species is less.
- 2) The maximum extent of **PTS** effects is 150m for HF cetaceans during piling with a bubble curtain. The radii for all other species is less.

- 3) The maximum extent of **TTS** effects is 5.1km for HF cetaceans during piling without a bubble curtain. The radii for all other species is less.
- 4) The maximum extent of **TTS** effects is 450m for LF cetaceans during piling with a bubble curtain. The radii for all other species is less.

Xcentric Ripper, TSHD and Backhoe Dredge

- 1) The maximum extent of **PTS** effects is 210m for HF cetaceans when the TSHD is dredging. The radii for all other species and activities is less.
- 2) The maximum extent of **TTS** effects is 1.6km for HF cetaceans. The radii for all other species is less.

The prediction results show that the bubble curtain has the potential to significantly reduce the potential effects area for PTS and TTS. The bubble curtains will not only reduce the effects significantly, but based on our experience they will also reduce the PTS and TTS areas to be a size that can be observed by one MMO. We understand that the applicant's ecologist is recommending the adoption of a bubble curtain for all piling activities. We have made our recommendations on the same basis.

We are satisfied that the effects areas specified for all activities except piling with a bubble curtain in place are reasonable and we consider that they can be used to inform the management measures.

In relation to piling with a bubble curtain in place, we note that the noise-reducing effects of bubble curtains can vary significantly depending on the depth, type and size of curtain, type of piling and a variety of other less important factors. The implication of this is that there is considerable uncertainty on the degree that a bubble curtain might reduce the PTS and TTS effects radii.

We consider that the only way to meaningfully quantify the effect of the bubble curtain and its ability to reduce the PTS and TTS effects radii is to measure its performance in-situ during construction. Ideally, this monitoring would be conducted in real-time given that the effectiveness of the bubble curtain can vary between piles depending on its nature and configuration.

We recommend that the CNVMP requires in-situ testing of the proposed bubble curtain to determine its effectiveness and to confirm the PTS and TTS effects areas that the MMO will need to monitor.

The ultimate assessment of PTS and TTS effects is left to an ecologist.

6.2 Behavioural effects

The Underwater Memo presents an updated assessment of the extent of Poverty Bay affected by underwater construction noise levels high enough to cause behavioural effects and masking for marine mammals.

The Underwater Memo uses the 120 dB_{rms} re 1 µPa contour, stating the reason being it's the only measure of behavioural effects on marine mammals. However, because of the uncertainty in assessing the risk of behavioural effects within and between species (based on the highly

contextual nature of behavioural effects), we consider that the application of a simplistic noise threshold value for behaviours should be avoided or treated with caution.

There is a substantial amount of literature on the behavioural effects of noise on marine mammals – either direct evidence-based studies, opportunistic studies, or observations. Behavioural effects are highly varied and may include changes in swimming behaviours (directions and speeds), diving behaviours (durations, depths, surface intervals), time spent on the surface, respiration rates, fleeing the noise source and changes to vocalisations. Predicting the zones within which behavioural effects may be seen is the most difficult noise effect to quantify due their dependency on the context, species and location.

There is no widely-accepted regulatory guidance on behavioural effects currently in existence – it is still a research problem. The only preliminary and formalised guidance in existence for behavioural responses is a single unweighted decibel value of 120 dB_{rms} re 1 µPa (from the National Oceanic and Atmospheric Administration (**NOAA**)), but it has not had a wide-spread uptake. One of the issues of using a single noise threshold for behavioural responses is that the data currently available are not very comparable with limited relationships between the severity of the behavioural response and the received level of underwater noise.

Recent scientific research assesses behavioural zones based on the probability of occurrence using dose-response curves specific for the species of interest. Dose-response curves show the relationship between the probabilities of a behavioural effect occurring at a given level of noise exposure. The dose-response formulas have been used by the US Navy and the scientific community for a number of years – primarily for impulsive signals. However, a recent scientific investigation from the Sea Mammal Research Unit (SMRU), JASCO Applied Sciences and the Ports of Vancouver in British Columbia, Canada, has been published that provides a specific dose-response function and thresholds for southern resident killer whales and a continuous noise source.

Our assessment is that the NOAA 120dB_{rms} threshold is likely to result in behavioural effects radii that are greater than the outcome from a dose-response approach. Accordingly, we consider that the behavioural effects radii presented in the Underwater Memo will be greater than what would be expected in reality.

As with the PTS and TTS radii, the behavioural effects on marine mammals are to be assessed by an ecologist.

6.3 Auditory masking effects

The Underwater Memo provides updated effects radii for possible auditory masking.

Several species of marine mammals (and fish) are known to have hearing ranges that overlap with low-frequency anthropogenic noise – such as vessels or machinery such as renewable energy devices. Auditory masking is the interference of an unimportant noise with a biologically important signal (such as vocalisations from conspecifics or predator/prey etc) that prevents the listener from properly perceiving the signal.

Therefore, the dredging, piling and other underwater activities have the potential to interfere with an animal's ability to perceive their natural acoustic environment. The assessment of auditory

masking in underwater noise effects assessments is best practice and important because behavioural effects generally occur at moderate levels of masking and thus understanding the spatial limits of masking is important.

We consider that the best practice assessment methodology for auditory masking for marine mammals is by quantifying the reduction in a species' listening space. An animal's listening space is the immediate volume of ocean surrounding it within which it can detect and perceive a biologically important signal. The listening space method should be used instead of sonar equations because the call structures of the species of interest at the source are poorly understood, while the listening space method is more sensitive to changes in the existing sound environment.

As the anthropogenic noise source approaches an animal (or vice versa), the animal's listening space will decrease to a smaller listening space. The difference between the original and the smaller listening space under masking conditions is termed the listening space reduction (*LSR*).

The Construction Noise Assessment and Underwater Memo do not use the *LSR* method. The applicants' approach has been to compare the predicted noise levels against the noise levels measured reasonably close to the port itself. In our initial review, we considered that these measurements were too close to either the reef / shore environment or the port itself to accurately represent the ambient noise levels found in deeper water out in Poverty Bay where the affected animals are likely to be.

The Underwater Memo provides updated diagrams and audibility / masking effects radii based on measurements of ambient deep water conditions on another project referred to by MDA.

The general result of the updates includes potential audibility / masking effects radii that grow to over 100km from the port area. We consider that an effects area of this size is likely to represent the largest possible area within which audibility / masking effects could occur.

Whilst we consider that the method for calculating and determining the audibility / masking effects should have been conducted using the *LSR* method, the potential audibility / masking radii used will still describe the area of water that has the potential for effects on marine mammals.

As with all other effects radii, we recommend that the updated effects areas are assessed by an ecologist to determine the overall degree of effects on the marine mammals that could be in the area(s).

6.4 Summary on underwater noise effects

In summary, our findings are that:

- 1) The TTS and PTS radii set out in the Response are reasonable.
- 2) The use of bubble curtains during piling work is proposed and we support that recommendation.
- 3) The effectiveness of bubble curtains can vary considerably between projects. We recommend that their effectiveness and ability to effectively reduce the PTS and TTS effects areas (and the areas that the MMO must observe) are measured during the works,

ideally in real-time. This outcome should be delivered by a specific condition of consent and as part of the CNVMP;

- 4) The radii for behavioural effects has been calculated using the standard NOAA 120dB_{rms} method. We consider that this is most-likely to over-estimate the size of the area within which behavioural effects might occur.
- 5) The method used to calculate the updated audibility / masking effects areas has resulted in very large areas (up to ≈100km) requiring assessment. We consider that the method used to calculate these areas is not as accurate or meaningful as the LSR method. However, we consider that the method used by MDA is sufficient to demonstrate that audibility / masking effects have the potential to cover a significant area of water off the coast of Poverty Bay.
- 6) We generally support the management and mitigation measures proposed to manage the potential underwater noise effects. We consider that they should be required by specific conditions of consent.

7.0 Operational airborne noise effects

The TRMP has historically managed the compatibility issues between the port and surrounding land by adopting the general principles of NZS6809:1999 *Acoustics – Port Noise Management and Land Use Planning (NZS:6809)*. The noise management provisions for most major ports around New Zealand adopt the general principles of the Port Noise Standard, although most have a degree of customisation for the particular circumstances of each situation, as is the case in Gisborne. Some ports do not use the Port Noise Standard approach at all, including Ports of Auckland.

The Port Noise Standard approach recognises that ports generally cannot reduce their noise emissions to be compatible with residential activity that is nearby. The land use planning controls in the Port Noise Standard seek to minimise the conflict as far as practicable.

It is important to note that the scope of the port noise controls may minimise the conflict, reduce annoyance and adverse health effects and make the best of a compromised noise environment. They will not achieve compatibility between the port and the surrounding noise sensitive activities.

As we have noted earlier, the TRMP provisions do not appear to have been updated for some considerable time, and they do not reflect or manage the operational port noise that is currently generated, and do not deliver an appropriate internal noise level for new and altered activity sensitive to noise that might establish in areas affected by port noise.

Our assessment of operational noise effects has been informed by the Operational Noise Assessment, Response and the Airborne Memo. The most up-to-date assessment of the operational noise effects is set out in the Airborne Memo.

The main reason for the increase in operational noise effects arises from the ability to have two log ships at berth and being worked at the same time. There will be no change to the character of the noise.

Our engagement with MDA and the applicant has result in only three main issues arising in the operational phase:

- 1) The predicted port noise level of 67dB L_{DN} at the closest receivers across the Turanganui River in the Amenity Commercial Zone (mainly the Portside Hotel and 100 Customhouse Road);
- 2) The potential effects on the Inner City Residential zone to the west of the Amenity Commercial Zone and directly north of the Twin Berth area;
- 3) The increase in noise level and potential effects on the Waikanae Holiday Park.

7.1 Effects on the Amenity Commercial Zone

Overall, we agree with the noise level prediction and assessment methods set out in the Operational Noise Assessment and Airborne Memo.

The Airborne Memo states:

The TRMP requires an internal noise level of 35 dB L_{A10} to be achieved at night inside residential and visitor accommodation in Commercial zones, assuming a level of 70 dB L_{A10} outside (a 35-decibel façade reduction). The highest predicted level from the Twin Berths is 67 dB $L_{dn(5-day)}$, so this 30-decibel reduction is sufficient to achieve below 40 dB $L_{dn(5-day)}$ for all receivers in the Commercial zone.

100 Customhouse Road and the Portside Hotel are the closest receivers in this zone. The most exposed outdoor areas are predicted to receive port noise levels of up to 56 dB L_{Aeq} during the day from current operations and 60 dB L_{Aeq} from the Twin Berths. Both scenarios are higher than desirable for typical residential zones, but there is a lower expectation of outdoor amenity in commercial zones.

We generally agree with this statement, subject to the assessment below.

We consider that the port noise acoustic treatment controls alone are insufficient to ensure that a reasonable level of noise is achieved, even for the existing port operations. The main issue is that they only require the internal noise level to be reduced to 45dB $L_{DN(5-day)}$, whereas current best-practice is to ensure that internal noise levels are reduced to at least 40dB $L_{DN(5-day)}$, and ideally lower. The second (and compounding) reason is that this proposal seeks to authorise noise levels 2dB higher than the current 65dB $L_{DN(5-day)}$ noise limit. This will worsen the effects of the port noise acoustic treatment controls that are already insufficient to achieve a reasonable indoor noise level.

However, we consider that the presence of the TRMP requirement in Rule C11.2.15.1.C.2 to acoustically treat activities sensitive to noise in this zone to manage the effects within the zone, (i.e. not the port noise controls) is the only reason we consider that the noise levels can be managed to a reasonable level. The NR required by this rule will be sufficient to manage the potential cumulative effects of port noise and inner-city noise to an acceptable degree (within a decibel or so).

7.2 Effects on the Inner City Residential Zone

Overall, we agree with the noise level prediction and assessment methods set out in the Operational Noise Assessment and Airborne Memo.

The Airborne Memo states:

The Inner City Residential zone closest to the port has temporary accommodation on the north of the site (Captain Cook Motor Lodge). There are no current or known proposed noise sensitive developments on the southern half of the site closest to the port.

The site is within the 55 dB $L_{dn(5-day)}$ Port Noise Contour in the TRMP. An internal noise level of 45 dB $L_{dn(5-day)}$ must therefore be achieved for habitable rooms in any future residential or temporary accommodation developments.

We predict that noise levels across the site would range from 49 – 59 $L_{dn(5-day)}$ for current port operations and 53 – 63 dB $L_{dn(5-day)}$ from the Twin Berths:

- A ventilation system would need to be provided for future residential or visitor accommodation developments inside the 60 dB $L_{dn(5-day)}$ contour to enable windows to be closed. Modern lightweight buildings typically have a façade reduction of 25 decibels, so we calculate that internal noise levels would be below 40 dB $L_{dn(5-day)}$. This scenario covers the southern tip of the site.*
- Future residential or accommodation developments between the 55 – 60 dB $L_{dn(5-day)}$ contours would have internal noise levels of 40 – 45 dB $L_{dn(5-day)}$ without any specific acoustic treatment. This meets the TRMP requirement, but internal noise levels would be higher than desirable. This scenario covers roughly the southern quarter of the site. However, the area may be significantly smaller if development on the southern boundary provides screening for the rest of the site (similar to the front row of the 100 Customhouse Road apartments).*
- Current developments (e.g. the lodge) and future developments outside the 55 dB $L_{dn(5-day)}$ contour would have internal noise levels below 40 dB $L_{dn(5-day)}$ without specific acoustic treatment.*

Port noise levels in outdoor areas during the daytime are predicted to range from 41 – 51 with current port operations and 45 – 55 dB L_{Aeq} with the Twin Berths. These levels are within the typical range for urban residential areas.

We generally agree with this assessment.

We note that the Inner City Residential zone is included in Figure C11.5 of the TRMP where an internal noise limit of 35dB L_{A10} is specified, but the outdoor level for this zone is not specified in Figure C11.4 as it is for all other zones requiring acoustic treatment. We expect that this is a mistake in the drafting of the plan. The effects on this zone are not therefore managed by the intra-zone provisions as they are in the Amenity Commercial Zone.

The issues with this zone do not arise with the present mix and location of receivers. The potential incompatibility will arise if / when there is new development, as it will not be adequately managed by the operative TRMP provisions.

We suggest that this could be managed by either:

- 1) Not permitting the applicant to exceed the current permitted noise levels in the TRMP until there is a change to the TRMP that will require adequate mitigation and mechanical ventilation / cooling for any activity sensitive to noise established on the Inner City Residential site in question, (this would essentially comprise a 'fix' to what we assume is a mistake in the operative TRMP);
- 2) Granting consent to this proposal with a condition requiring that the consent holder engage with any developer of an activity sensitive to noise on the Inner City Residential site and with a requirement to contribute to the cost of achieving compliance with an internal noise limit of 40dB $L_{DN(5\text{-day})}$ for port noise, along with mechanical ventilation / cooling to ensure that occupants can keep their windows closed (and the noise out). We accept that this could be a complex and problematic condition to draft and administer;
- 3) Granting consent and taking no specific action and running the risk that there is no development of any activity sensitive to noise on the Inner City Residential land before the TRMP is reviewed. If an activity sensitive to noise is developed, it will not be adequately acoustically treated and the internal port noise levels are likely to be unreasonable.

We consider that the most appropriate option is likely to be (1) or (2).

7.3 Effects on the Recreation Reserve Zone / Waikanae Holiday Park

Figure 3 of the Airborne Memo demonstrates that the predicted noise levels across the Waikanae Holiday Park will range from approximately 55dB $L_{DN(5\text{-day})}$ around the middle of the site to as high as 59dB $L_{DN(5\text{-day})}$ at the eastern extent, closest to the port.

We consider that the noise levels (including the permitted levels) are generally incompatible with camping activities and we expect that if the consent is granted, busy nights at the port are likely to result in high noise levels in the Waikanae Holiday Park and probably sleep disturbance for its occupants – especially those in tents and lightweight structures.

Notwithstanding, these levels are compliant with the TRMP provisions. The TRMP specifies that the 55dB L_{DN} contour extends right to the western boundary of the site, with the 65dB L_{DN} contour immediately to the south over the Turanganui River.

The predicted noise levels for the Waikanae Holiday Park are therefore compliant with the TRMP provisions.

Accordingly we do not recommend any specific conditions of consent for the effects on the Recreation Reserve Zone / Waikanae Holiday Park, other than to ensure compliance with the permitted port noise limits set out in the Operative TRMP.

7.4 Conclusion on operational noise effects

As we have noted earlier, the TRMP provisions do not appear to have been updated for some considerable time, and they do not reflect or manage the operational port noise that is currently generated, and do not deliver an appropriate internal noise level for new and altered activity sensitive to noise that might establish in areas affected by port noise.

It is important to note that the scope of the port noise controls may minimise the conflict, reduce annoyance and adverse health effects and make the best of a compromised noise environment. They will not achieve compatibility between the port and the surrounding noise sensitive activities.

Overall, we consider that the increase of 2dB over the TRMP limits to be reasonable for most receivers but potentially problematic for any future developer of the Inner City Residential site immediately north of the port.

The effects on this zone are not managed by the intra-zone provisions as they are in the Amenity Commercial Zone. The issues with this zone do not arise with the present mix and location of receivers. The potential incompatibility will arise if / when there is new development, as it will not be adequately managed by the operative TRMP provisions.

We have presented three options for managing the potential effects. We expect that some non-acoustic expertise to determine the most appropriate option(s).

Please contact me if you require any further information.

Yours sincerely,



Jon Styles, MASNZ
Director and Principal