

under: the Resource Management Act 1991

in the matter of: An application by Eastland Port Limited for land use consents, coastal permits and other consents related to the Port of Gisborne upgrade project known as "Twin Berth Stage 2"

between: **Eastland Port Limited**
Applicant

and: **Gisborne District Council**
Consent Authority

Statement of evidence of **Ben Lawrence** on behalf of Eastland Port Limited

Dated:

3 October 2023

Reference: Alana Lampitt (alana.lampitt@chapmantripp.com)
Hadleigh Pedler (hadleigh.pedler@chapmantripp.com)

STATEMENT OF EVIDENCE OF BEN LAWRENCE ON BEHALF OF EASTLAND PORT LIMITED

INTRODUCTION

- 1 My full name is Ben Christopher Lawrence.
- 2 I am an associate with Marshall Day Acoustics (*MDA*) specialising in environmental noise, vibration and underwater noise. I have a bachelor of Engineering (Electrical) from the University of Auckland. I am an affiliate of the Acoustical Society of New Zealand and a qualified Marine Mammal Observer (*MMO*).
- 3 I have 9 years' experience as an engineer and have spent the past 6 years focussing on large infrastructure projects and port redevelopments. My work has included prediction, assessment and monitoring of airborne noise, vibration, and underwater noise. I have appeared as an expert witness for Council Hearings.
- 4 My recent and relevant project experience includes providing noise and vibration expert assessment in relation to:
 - 4.1 Northport's Vision for Growth;
 - 4.2 Waitohi Picton and Kaiwharawhara Wellington Ferry Precinct Redevelopments;
 - 4.3 CentrePort's Thorndon Container Wharf and Seaview Wharf remediation;
 - 4.4 Whanganui Port Redevelopment;
 - 4.5 Napier Port's Wharf 6; and
 - 4.6 Auckland's Downtown Infrastructure Development Programme.
- 5 My evidence is given in relation to Eastland Port Limited's (*Eastland*) applications for land use consents, coastal permits and other consents (*Application*) for the second and final stage of the Twin Berths Project (the *Project*).
- 6 I am familiar with the scope and content of the Project. I am the author of the Construction Noise Assessment and Operational Noise Assessment reports lodged on 22 August 2022 (*Assessments*) in relation to the Project, and the noise and vibration-related responses to the request for further information from Gisborne District Council (*GDC*).
- 7 I am familiar with the Project site and have visited on five separate occasions since 2020, including most recently in February 2023.

- 8 I have read the relevant sections of the Assessment of Environmental Effects (*AEE*) that accompanied the Application for preparing my evidence. I have also read the public submissions lodged in relation to the Project.

CODE OF CONDUCT

- 9 Although these proceedings are not before the Environment Court, I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note (2023), and I agree to comply with it as if these proceedings were before the Court. My qualifications as an expert are set out above. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 10 My evidence will:
- 10.1 Provide an executive summary of my key conclusions;
 - 10.2 Describe the existing noise environment;
 - 10.3 Summarise the relevant noise planning provisions, including the Port Noise Standard, and port noise conditions in Eastland's resource consents;
 - 10.4 Present my assessment of likely noise and vibration effects resulting from construction of the Project, including underwater noise;
 - 10.5 Present my assessment of noise and vibration effects resulting from operation of the Project;
 - 10.6 Respond to noise and vibration issues raised in submissions;
 - 10.7 Respond to the noise and vibration matters addressed in the Council Officer's Report under section 42A of the Resource Management Act 1991 (*Act*) (*Officer's Report*);
 - 10.8 Comment on Eastland's proposed conditions (as attached to Ms Georgina McPherson's evidence); and
 - 10.9 Summarise my conclusions with respect to noise and vibration effects of the Project.

SUMMARY OF EVIDENCE

- 11 I have been engaged to undertake an assessment of acoustic effects for the Project. My assessment has addressed airborne noise, underwater noise and vibration.
- 12 With respect to the Project's construction noise and vibration effects:
 - 12.1 I predict that the proposed construction works will comply with the relevant daytime noise limits set out in New Zealand Standard NZS 6803: 1999 *Acoustics - Construction Noise (Construction Noise Standard)*.
 - 12.2 Dredging is the only proposed night-time construction activity. I have recommended appropriate noise limits and specific mitigation measures to ensure night-time noise effects are controlled to an acceptable level.
 - 12.3 I have predicted underwater noise levels for the proposed construction works to inform the marine mammal effects assessment. Based on these predictions and the assessment by Ms Helen McConnell, a marine mammal ecologist, I consider that standard best practice mitigation and management measures would avoid physiological effects on marine mammals in close proximity to the Port as far as practicable. Noise from the construction works may result in behavioural responses from marine mammals at large distances, but this effect has been assessed as less than minor by Ms McConnell with the application of mitigation measures discussed in this statement.
- 13 With respect to the Project's operational noise and vibration effects:
 - 13.1 I have assessed the potential operational noise effects by comparing the predicted noise levels from the Project to the current noise levels. I predict that the change in noise level for the most affected receivers will be 3 – 4 decibels, which is subjectively just perceptible.
 - 13.2 It is my opinion that the façade controls in the Tairāwhiti Resource Management Plan (*TRMP*) are sufficient to ensure that internal noise levels are at an acceptable level for existing and future noise sensitive developments nearby the Port.
 - 13.3 I have recommended additional mitigation and management measures to minimise the potential effects of night-time operational noise on occupants of tents and similar structures in the Holiday Park campground to the north.

- 14 Overall, I consider the potential acoustic effects from the Project to be acceptable on the basis that:
- 14.1 The potential noise and vibration effects are appropriately controlled by the proposed conditions of consent;
 - 14.2 Construction acoustic effects will be mitigated and managed through a Construction Noise Management Plan (*CNMP*); and
 - 14.3 Port operational acoustic effects will be managed through an operational Port Noise Management Plan (*PNMP*).

EXISTING ENVIRONMENT

- 15 Eastland Port (the *Port*) operates on land zoned Port B in the TRMP at the base of Titirangi Reserve. There are three distinct areas of the Port as shown on **Figure 1** below:
- 15.1 The Southern Logyard (*SLY*) is the largest area of the Port. The Port activities undertaken in this area are well set back from the sensitive receiving environments on the northern side of Tūranganui River.
 - 15.2 Wharves 6, 7 & 8 and the Wharveside Logyard (*WLY*) interface with the receivers in the Commercial, Residential and Reserve zones across the Tūranganui River.
 - 15.3 The Upper Logyard is a satellite logyard in Kaiti that is connected to the Port by a tunnel under Rakaiatane Road. It has a separate group of receivers to the main Port area, and is generally unaffected by the Project.
- 16 The Project and its noise and vibration effects are principally contained within Wharves 6, 7 and 8 and the SLY. Consequently, these areas are the focus of my evidence.
- 17 The closest receivers to the Project area are also show on **Figure 1**. They are:
- 17.1 **The 100 Customhouse Street Apartments and Portside Hotel:** These receivers are located in the Amenity Commercial zone. The District Plan (operative at the time these sites were consented) required these developments to ensure noise levels from the adjacent commercial sites were no more than 35 dB L_{A10} inside at nighttime, based on an incident façade noise level of 70 dB L_{A10} . This high performance façade requirement was intended to mitigate noise from adjacent commercial sites, but also mitigates against Port noise.

- 17.2 **The Waikanae Beach Top 10 Holiday Park:** The Holiday Park consists of a motel, cabins and camping areas. The site is within the 55 dB L_{dn} (5-day) port noise contour in the TRMP, so any noise sensitive activities must achieve a minimum of 45 dB L_{dn} (5-day) indoors as required by Rule C11.2.15.1.G.2 of the TRMP. I note that this façade requirement is approximately 5 decibels less stringent than the 35 dB L_{A10} requirement for noise sensitive activities in all Commercial zones.
- 17.3 **Undeveloped area of Residential Zone:** The southern half of the Inner City Residential Zone currently has commercial operations, but could feasibly have residential development in the future. Noise sensitive activities in this site are also subject to the minimum of 45 dB L_{dn} (5-day) indoors criterion for Port noise.
- 17.4 **Titirangi Reserve:** This area has walking trails, memorials and lookout points. The existing environment on the hillside adjacent to the Port is dominated by noise from the wharfside areas and the SLY. Port noise levels are lower in other areas of the reserve due to the shielding from topography. I am not aware of any noise sensitive activities on this site.

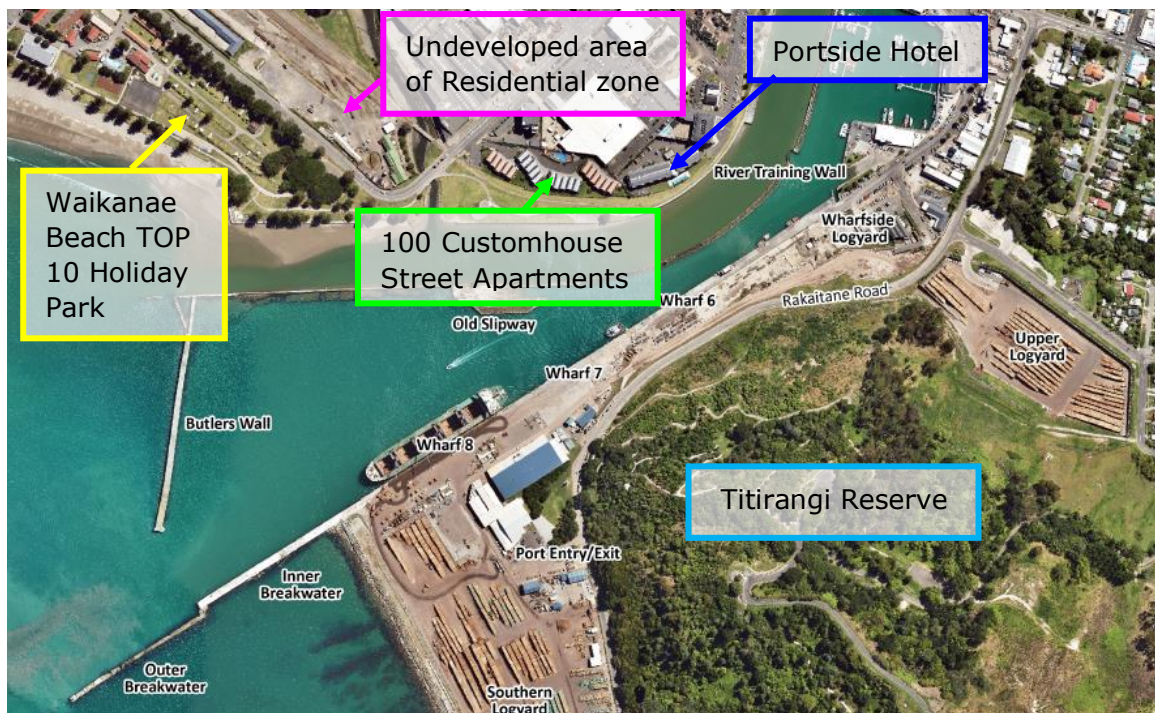


Figure 1: Port areas and closest receivers

- 18 Eastland has maintained a permanent noise logger on the roof of the Portside Hotel since February 2018. The logger has direct line of sight to the wharf area and provides a good indication of noise levels from Port operations received across the river, but may also

be influenced by other sources such as traffic on Rakaiatane Road. The logger is around 140 m from the closest Port operations area (the WLY) and around 400 m from the log ship loading area.

- 19 The past year of data from the logger shows that:
- 19.1 Long term noise levels ranged from 59 – 67 dB L_{dn} (5-day), with an average of 64 dB L_{dn} (5-day). I note there has been daytime construction at Wharf 6 and 7 over the past year, but the contribution to the long term noise levels appears to be minimal.
 - 19.2 Night-time noise levels range from 48 – 62 dB L_{Aeq} (9-hour), with an average of 54 dB L_{Aeq} (9-hour).
 - 19.3 Variations in the long-term and night-time noise levels appear to be due to intermittent night time operations in the adjacent WLY.
- 20 I carried out short-term noise measurements in the receiving environment to identify the key noise sources and the contribution of ambient noise. The full set of measurement details is summarised in **Table 1**. A map of the measurement locations is included in **Appendix A**.

Location	Date, time	Measured levels	Description of noise sources
Reserve area in front of the Portside Hotel and 100 Customhouse Street Apartments	5 October 2020, 10:51 pm	49 dB L_{Aeq} (15 min) 62 dB L_{AFmax} 46 dB L_{A90} (15 min)	Log ship in berth was the dominant noise source.
	6 October 2020, 12:14 am	53 dB L_{Aeq} (15 min) 77 dB L_{AFmax} 49 dB L_{A90} (15 min)	Log ship in berth, high stacker in WLY and Port trucks. I estimate the contribution from the WLY to be 50 dB L_{Aeq} based on the isolated measurement of the log ship above
Campground area of Holiday Park	16 December 2022, 1:39 am	48 dB L_{Aeq} (15 min) 64 dB L_{AFmax} 45 dB L_{A90} (15 min)	Dominated by intermittent vehicle movements on SH35 and the hum of the Port. I estimate that the Port noise contribution was 46 – 47 dB L_{Aeq} . Occasional bangs from log handling were audible but did

			not affect the measurement results.
	16 December 2022, 10 pm to 7 am	50 dB L _{Aeq} (15 min) 44 dB L _{A90} (15 min)	Overnight unattended noise logger measurement.
	3 September 2022, 10:03 am	54 dB L _{Aeq} (15 min) 65 dB L _{AFmax} 51 dB L _{A90} (15 min)	Vehicles on SH35 dominant, Port noise audible.
Titirangi Reserve (on track near base of hill adjacent to Port)	23 November 2020, 3:51 pm	63 dB L _{Aeq} (5 min) 80 dB L _{AFmax} 58 dB L _{A90} (5 min)	Wharfside yard activities were dominant.
Titirangi Reserve lookout	6 October 2020, 12:14 am	61 dB L _{Aeq} (5 min) 73 dB L _{AFmax} 57 dB L _{A90} (5 min)	Southern Log Yard was dominant. This was a night-time measurement, but would also be representative of daytime noise levels

Table 1: Summary of short-term measurements

NOISE STANDARDS

Port Noise Resource Consents

- 21 Port noise has been the subject of considerable assessment and controls via a series of resource consent applications sought by Eastland over the last ten years. These relevant consents include:
- 21.1 WLY (2017): this consent contains specific noise limits for activities in the WLY. Under this consent, 'Essential Port Activity' must comply with a slightly altered version of the TRMP rules, and 'Non-Essential Port Activity' must comply with a more stringent set of short-term noise limits.
 - 21.2 Wharves 6 & 7 and Slipway (2018): this was the first consent to impose cumulative noise limits for all Port operations. The limits are set out in general accordance with the Port Noise Standard, which is discussed in greater detail below and is referenced in the TRMP.
 - 21.3 Port Entry (2019): this is the most recent granted consent and specifies the same cumulative noise limits as the Wharves 6 & 7 and Slipway.
- 22 The decision for the Port Entry consent summarises the evolution of port noise controls:

As part of the Wharf 6 and 7/Slipway consent applications, which were publicly notified and heard by a Commissioner in June 2018, a significant evolution in the way port noise is assessed and managed was achieved. This led to conditions for permanent noise monitoring and noise levels that applied to all noise from the port activities. These conditions were endorsed by noise experts for Eastland Port and engaged by Council.

- 23 I support the approach taken with the most recent consents for Wharves 6 & 7 and Slipway and the Port Entry. Those consents include conditions that apply controls on cumulative Port noise as opposed to activity-specific controls. This approach is clear, enforceable, in line with current best practice, and enables effective management of noise from the Port as a whole. The key control is Condition 42 of the Wharves 6 & 7 and Slipway consent and Condition 43 of the Port Entry consent, both of which provide:

Sound from all activities in the Tairāwhiti Resource Management Plan Port Management Area excluding the rail bridge, Port A Management zone and area outside the breakwater must comply with the following noise limits when measured and assessed in accordance with NZS 6801 and NZS 6809.

<i>At any point in the Amenity Reserve Zone or Heritage Reserve Zone outside the Port Inner Control Boundary</i>	<i>65 dB L_{dn}</i>
<i>At any point in the Amenity Commercial Zone, Residential General Zone or Inner City Residential Zone</i>	<i>65 dB L_{dn}</i> <i>60 dB L_{Aeq (9h)} (2200h-0700h)</i> <i>65 dB L_{Aeq (15 min)} (2200h-0700h)</i> <i>85 dB L_{AFmax} (2200h-0700h)</i>
<i>At the permanent port noise monitoring location (Portside Hotel)</i>	<i>64 dB L_{dn}</i> <i>60 dB L_{Aeq (9h)} (2200h-0700h)</i> <i>65 dB L_{Aeq (15 min)} (2200h-0700h)</i> <i>85 dB L_{AFmax} (2200h-0700h)"</i>

- 24 The Wharves 6 & 7 and Slipway and the Port Entry Consents require the preparation of and compliance with a Noise Management Plan (NMP), with the objective to "set out the methods and procedures necessary to ensure that the noise levels from all port activities are minimised as far as practicable." This approach is current best practice and I support a similar requirement for the Project.

Construction noise

- 25 All consents listed above specify construction noise limits based on New Zealand Standard NZS 6803:1999 *Acoustics - Construction Noise (Construction Noise Standard)*. I support the application of this standard as current best practice and have carried out my assessment in accordance with the Construction Noise Standard.

Operational noise

- 26 It is my opinion that adopting New Zealand Standard NZS 6809:1999 *Acoustics – Port Noise Management and Land Use Planning (Port Noise Standard)* is current best practice for assessing and managing port noise. This Port Noise Standard is referenced in the TRMP¹ and Eastland’s most recent resource consents.
- 27 The Port Noise Standard uses the L_{dn} descriptor, commonly referred to as the Day-Night Level. L_{dn} is the A-weighted energy averaged sound level, calculated over a 24-hour period. The night-time component, between 10 pm and 7 am, is penalised/weighted by adding 10 dB to reflect the greater sensitivity to noise at night.
- 28 The Port Noise Standard recommends the implementation of Inner and Outer Control Boundaries on planning maps. The Inner and Outer Control Boundaries represent the predicted 65 dB $L_{dn (5-day)}$ and 55 dB $L_{dn (5-day)}$ levels (respectively) over a busy ‘future’ 5-day operating period. The Port Noise Standard recommends façade controls to ensure that a ‘satisfactory indoor sound environment’ of 45 dB $L_{dn (5-day)}$ or lower is achieved for any noise sensitive activity within the 55 dB $L_{dn (5-day)}$ contour.
- 29 These 65 dB $L_{dn (5-day)}$ and 55 dB $L_{dn (5-day)}$ noise contours are included in the TRMP as illustrated on **Figure 2**. Rule C11.2.15.1.G.2 of the TRMP requires all noise sensitive activities in the 55 dB $L_{dn (5-day)}$ contour to achieve 45 dB $L_{dn (5-day)}$ or lower indoors, which aligns with the Port Noise Standard. I note that the contours do not include the WLY operations.

¹ C11.2.15.8 Method of Assessment of Noise.

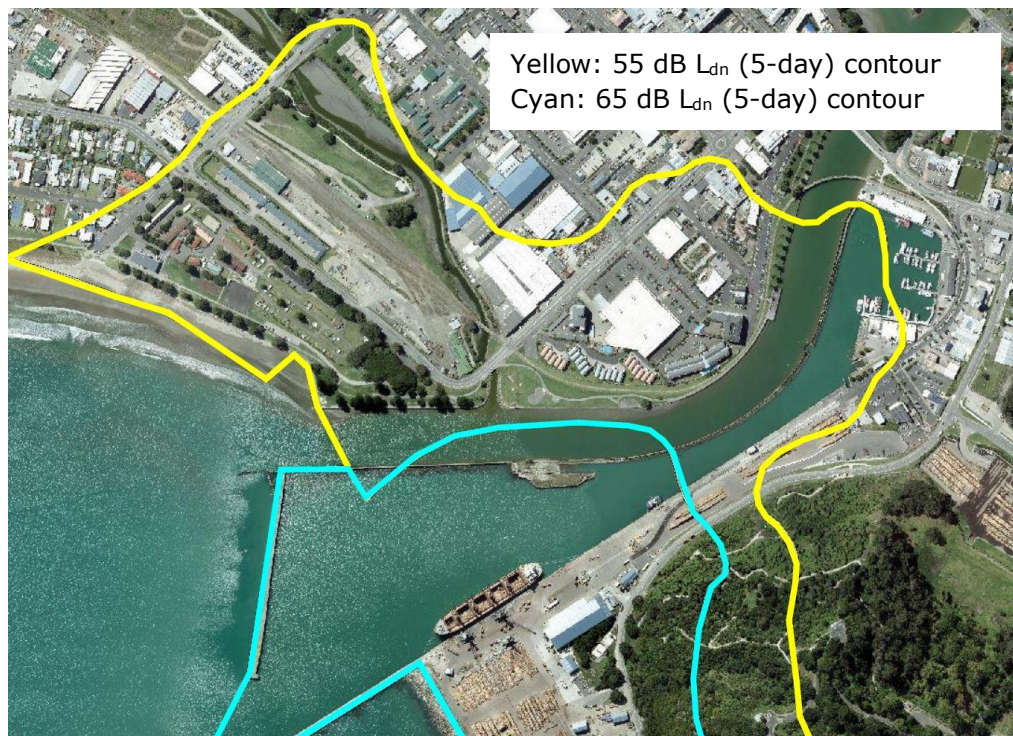


Figure 2: Port noise contours in the TRMP

SUMMARY OF CONSTRUCTION NOISE ASSESSMENT

- 30 The proposed construction activities and associated noise sources include:
- 30.1 Construction of a new wharf (Wharf 8): impact piling, vibro piling, crane operations;
 - 30.2 Ground improvements: excavators, jet grouting, deep soil mixing, compaction;
 - 30.3 A 1-hectare reclamation: excavators, compactors, truck movements; and
 - 30.4 Capital dredging: backhoe dredge, trailing suction hopper dredge (*TSHD*) and underwater rock breaker (*Xcentric Ripper*). This includes disposal of the capital and maintenance dredge material at the existing Offshore Disposal Ground (*OSDG*) located approximately 4 km offshore in Tūranganui-a-Kiwa/Poverty Bay.
- 31 **Figure 3** shows a map of the construction areas.

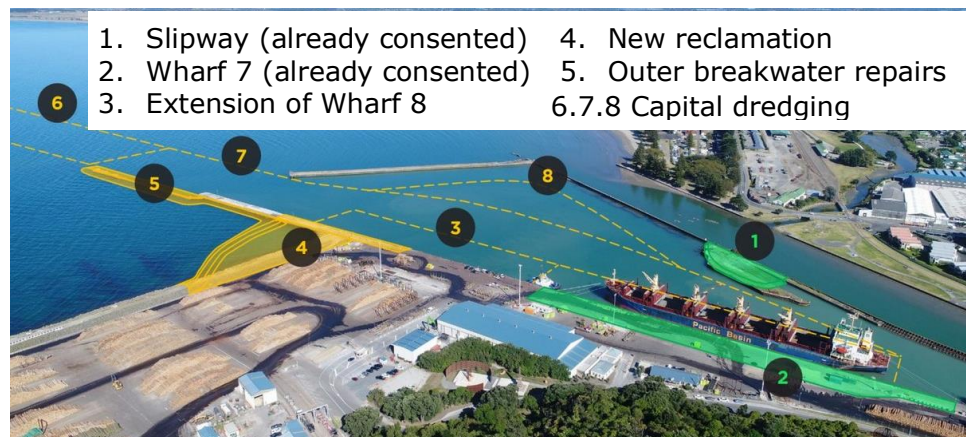


Figure 3: Map of construction areas

Daytime airborne construction noise

- 32 I have predicted airborne noise levels from the proposed construction works based on my measurements of representative equipment, data from MDA's noise source database and British Standard BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*.
- 33 I have assessed the predicted levels against the relevant limits in the Construction Noise Standard. I predict that all daytime construction activities would comfortably comply with the 70 dB L_{Aeq} limit without specific mitigation.
- 34 Typical daytime construction activities such as excavation, crane operations, dredging, ground improvements and vehicle movements would be comparable in level and character to current Port operations.
- 35 The exception is the proposed impact driving the steel piles for Wharf 8, which would be noticeable due to the difference in character to existing Port operations. The impact piling would be very similar to the Wharf 7 piling that has recently been completed, but slightly lower in level due to the larger setback from receivers.

Night-time airborne construction noise

- 36 The only proposed night-time construction activity is capital dredging of the outer harbour and berth areas. Most dredging would be a significant distance from nearby receivers and readily comply with the typical night-time construction noise limit of 45 dB L_{Aeq} . However, dredging of the berth area has the potential to infringe the noise limit depending on the type and size of dredge.
- 37 I recommend a night-time noise limit of 50 dB L_{Aeq} on the southern boundary of the camping area of the Holiday Park. I consider this limit appropriate as:

- 37.1 Current ambient noise levels in the campground area are 50 dB L_{Aeq} during the night when a ship is in berth. The highest cumulative noise levels with the dredging would therefore be no more than 53 dB L_{Aeq} . This is additional noise is only just perceptibly above the existing noise levels.
- 37.2 The character of dredging would be very similar to the existing hum of the log ships.
- 37.3 The period of elevated noise levels would be limited to a single period lasting several months while the capital dredging is completed but would not be continued indefinitely.
- 37.4 I have investigated the option of Eastland offering to install an extension of the Holiday Park's existing acoustic fence to cover the southern boundary of the campground. I predict that, if this offer was taken up, this would generally offset the cumulative increase in noise levels from the dredging. There would be a significant reduction in dredging noise levels for people sleeping in tents at the southern end of the campground, as the fence would fully screen receivers near ground level from the dredging operations. I note that this fence would also offset the cumulative increase in operational port noise for receivers in the southern end of the campground. I have provided a recommended location and construction of the fence in **Appendix B**.
- 37.5 The following management measures would be implemented through the Project's CNMP:
- (a) Prioritising dredging works in the deep vessel turning basin and the shallow vessel turning basin to take place during the daytime;
 - (b) Engage with the Holiday Park owners, Gisborne Holdings, if dredging noise levels exceed the 50 dB $L_{Aeq (15-min)}$ night-time noise limits. The engagement would include offering to extend their existing acoustic fence to cover the southern boundary of the campground (noting that this is private land over which Eastland has no control);
 - (c) Carry out noise monitoring to confirm compliance with the 50 dB L_{Aeq} night-time limit during dredging; and
 - (d) Inform the Holiday Park of any proposed night-time dredging before commencement.

Construction Vibration Assessment

38 I have predicted vibration levels from the proposed construction works based on MDA's vibration source database. I have assessed the predicted levels against the thresholds in DIN 4150-3:2016 as per standard best practice, and against the vibration limits in the TRMP.

39 In summary:

39.1 The closest receiver buildings are over 200 m from the Project area. This is a significant distance in terms of vibration propagation.

39.2 I calculate that vibration levels would be well below the relevant thresholds for cosmetic building damage for all receiver buildings.

39.3 Vibration would also readily comply with the limits in the TRMP and would be imperceptible to nearby receivers.

40 Overall I consider that the potential for vibration effects is negligible, and no specific mitigation or management measures are required.

Underwater Construction Noise Assessment

Methodology

41 I have assessed potential underwater noise from the Project by:

41.1 Measuring the ambient underwater noise levels in the Project vicinity and reviewing published underwater noise data to quantify the ambient underwater environment;

41.2 Predicting underwater construction noise levels;

41.3 Comparing the results to relevant thresholds and ambient environment to determine effect zones; and

41.4 Recommending mitigation and management measures to minimise the effects where practicable.

42 **Figure 4** illustrates the potential effects of underwater noise on marine species. These effects range from permanent hearing damage at close distances to potential changes in behaviour at large setbacks from the noise source.

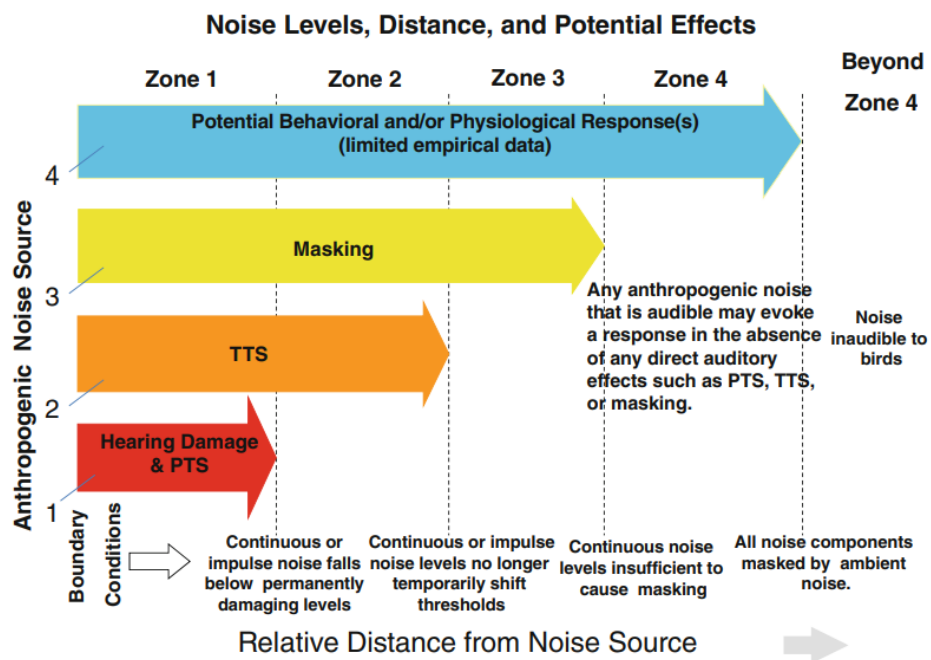


Figure 4: Potential effects of underwater noise on marine species (Dooling and Therrien 2012)

- 43 My assessment focusses on avoiding physiological hearing effects on marine mammals ('Zone 1' and 'Zone 2' in **Figure 4**). I have followed current industry best practice by calculating management zones for the species of interest based on the temporary threshold shift (*TTS*)² and permanent threshold shift (*PTS*)³ levels in the '2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0)'. I have referred to this document as the National Oceanic and Atmospheric Administration Guidance (*NOAA Guidance*).
- 44 I have also calculated zones where the construction activities are predicted to be above the ambient underwater noise levels ('Zone 4' in **Figure 4**). These zones estimate the area where there could be behavioural responses in marine mammals were they to be present, such as masking of communication and avoidance of the area.
- 45 My predicted zones have informed the assessment of potential effects on marine mammals carried out by Ms Helen McConnell of SLR Consulting in her Section 92 response to the RFI from GDC. Ms

² Temporary Threshold Shift (*TTS*) is the temporary loss of hearing caused by sound exposure. The duration of *TTS* varies depending on the nature of the stimulus, but there is generally recovery of full hearing over time. *TTS* in humans can be likened to the 'muffled' effect on hearing after being exposed to high noise levels such as at a concert. The effect eventually goes away, but the longer the exposure, the longer the threshold shift lasts. Eventually, the *TTS* becomes permanent (*PTS*).

³ Permanent Threshold Shift (*PTS*) is the permanent loss of hearing caused by acoustic trauma. *PTS* results in irreversible damage to the sensory hair cells of the ear.

McConnell has provided an additional memo based on her review of the recent updates to the behavioural response zones, which I have included as **Appendix C**. Ms McConnell's memo states that the recommendations presented in her Section 92 response remain valid and unchanged following my updated modelling.

Inputs

- 46 I have predicted underwater noise levels using the software dBSea, which accounts for the frequency content of the noise source, bathymetry, seafloor materials and other variables. The model parameters are included in **Appendix D**.
- 47 I have considered the following proposed activities in my underwater noise assessment:
- 47.1 Impact piling with a hammer cushion and bubble curtain for mitigation (impulsive noise).
 - 47.2 Vibratory piling (continuous noise).
 - 47.3 Rock breaking using an Xcentric Ripper (continuous noise).
 - 47.4 TSDH (continuous noise).
 - 47.5 Backhoe dredging (continuous noise).
- 48 I have considered the NOAA Guidance species groups of mid-frequency cetaceans (common dolphin, bottlenose dolphin, dusky dolphin, orca), otariid pinnipeds (fur seals), low-frequency cetaceans (baleen whales) and high-frequency cetaceans (Hectors and Maui dolphin). These groups cover all species listed in the document 'Marine Mammals within Gisborne District Coastal Waters' (*Cawthron Report*) prepared by Dr Deanna Clement of Cawthron Institute for the GDC.⁴
- 49 Only common dolphin, bottlenose dolphin, orca and fur seals are listed as seasonal or year-round residents. All other species were listed as either potential offshore residents, rare visitors, or migrants. I note there have been a number of Hectors dolphin sightings from Hawkes Bay to the Bay of Plenty since the Cawthron Report was prepared, although none were in the vicinity of Eastland Port.⁵

⁴ <https://envirolink.govt.nz/assets/Envirolink/827-GSDC67-Marine-mammals-within-Gisborne-District-coastal-waters.pdf>

⁵ 'Maui and Hectors dolphin sightings database spreadsheet January 2023', available at <https://www.doc.govt.nz/mauisightings>

Predicted TTS Zones

- 50 I have predicted TTS zones based on the criteria in the NOAA Guidance for each of the species' groups of interest. The zones are shown in **Table 2**.

Activity	Zones (distance in metres from activity)			
	High-frequency cetaceans	Mid-frequency cetaceans	Low-frequency cetaceans	Otariid pinnipeds
Impact piling with dolly and bubble curtain	255 m	No zone	450 m	No zone
Vibro piling	70 m	< 10 m	100 m	< 10 m
Rock breaking	1 km	< 10 m	100 m	< 10 m
TSHD	1.6 km	< 10 m	100 m	< 10 m
Backhoe dredging	< 10 m	< 10 m	< 10 m	< 10 m

Table 2: Predicted TTS zones

- 51 In summary:
- 51.1 All TTS zones for piling can be reduced to 450 m with the inclusion of a dolly and bubble curtain for impact piling. In my experience on similar projects, 500 m is routinely applied as the upper limit for marine mammal observation zones. This aligns with my training as an MMO.
- 51.2 The TTS zones for rock breaking and the TSHD are large due to the duration of the activity (8 hours per day). However, the duration of exposure for marine mammals passing by the activity would be significantly shorter, so TTS thresholds are unlikely to be exceeded in practice.
- 51.3 The TTS zones for backhoe dredging are negligible.

Predicted Behavioural Response Zones

- 52 I have predicted behavioural response zone ranges based on the following criteria:

52.1 Likely behavioural response based on the 120 dB RMS criteria for marine mammals from NOAA Fisheries for continuous noise sources.⁶

52.2 Possible behavioural response based on the ambient noise levels in Poverty Bay and the nearby coast. I have reviewed published ambient noise measurement data in offshore environments around the North Island to determine a representative ambient level for my assessment. I consider that ambient noise levels in the wider Project area could be as low as 92 dB RMS re 1 uPa (unweighted) based on measurements at depth of 113 m near the Cook Strait.⁷ Noise levels in deeper water are likely to be 96 – 106 dB RMS re 1 uPa (unweighted) based on measurements at a depth of 1,480 m off the coast of the lower North Island.⁸

53 My predicted zones for each activity are provided in **Table 3**.

Activity	Zones (distance in km from activity)	
	Likely behavioural response extent	Possible behavioural response extent
Impact piling with dolly and bubble curtain	8 km	47 km
Vibro piling	3 km	24 km
Rock breaking	6 km	61 km
TSHD	8 km	76 km
Backhoe dredging	No zone	< 1 km

Table 3: Predicted behavioural response zones

54 In summary:

⁶ 'National Marine Fisheries Service: Summary of Endangered Species Act Acoustic Thresholds (Marine Mammals, Fishes, and Sea Turtles)', dated January 2023.

⁷ 'Underwater sound propagation modelling to illustrate potential noise exposure to Maui dolphins from seismic surveys and vessel traffic on West Coast North Island, New Zealand' (2019), Appendix A.4. (data from 113 m depth near Cook Strait).

⁸ 'Passive Acoustic Monitoring in the greater Cook Strait region with particular focus on Queen Charlotte Sound / Tōtaranui' (2017), Table 17 (L₅₀ data from Station 7 (lower North Island), 1,481 m depth).

54.1 Underwater noise from the impact and vibro piling, TSHD and Xcentric Ripper is predicted to be above ambient levels in shallow water areas in the Project vicinity (< 100 m depth).

54.2 My noise model indicates that low frequency noise from the Project may propagate beyond Poverty Bay and the continental shelf up to 76 km. However, ambient noise measurements in deep water in published literature show increased low frequency noise levels compared with shallower environments, likely due to distant shipping and seismic activity. This means that underwater noise from the Project would likely be below the ambient noise levels in deeper water.

Mitigation and Management

55 As is consistent with the view from MS McConnell, I recommend the following standard best practice measures to avoid physiological effects on marine mammals:

55.1 Prioritise lower noise methodologies where practicable. For example, vibro piling should be prioritised over impact piling.

55.2 Use a dolly and bubble curtain to mitigate underwater noise levels from impact piling.

55.3 Use MMOs to monitor the TTS zones for the presence of marine mammals before and during piling. The piling operations must be shut down if a marine mammal is identified within these zones.

55.4 Ensure equipment is well maintained.

55.5 Measure underwater noise levels from piling, rock breaking and the TSHD to verify the predicted zones and update the mitigation and management measures where required.

Assessment of Effects on Marine Mammals

56 Ms McConnell has assessed the potential effects of the Project based on the physiological effect (TTS and PTS) and behavioural response zones I presented above. I have attached her assessment memo in Appendix C. She states in conclusion that:

Overall I consider that the predicted effects to marine mammals from the proposed activities will be no more than minor and that no population effects are predicted for any marine mammal species. I consider that effects can therefore be appropriately managed through consent conditions.

57 As noted below in my discussion of draft conditions, I consider that the proposed conditions of consent address the mitigation and management controls for underwater noise recommended by Ms

McConnell and myself.

PREDICTED OPERATIONAL NOISE LEVELS

Modelling Methodology

- 58 I prepared a noise model using the SoundPLAN noise propagation software, which is an internationally recognised computer noise modelling programme. It uses a digital topographical terrain map of the area as its base. Each noise source is located at an appropriate height above the digital map and the software then calculates noise propagation in multiple directions, allowing for buildings, topography, shielding and reflections. The model accounts for slight downwind conditions in all directions as a conservative scenario.
- 59 I used the noise model to predict the 'energy average' noise emissions from Port operations over busy 5-day operating period in accordance with the Port Noise Standard. The two modelled scenarios are:
- 59.1 Current Port activities (*Current Scenario*); and
- 59.2 Future Port activities with the Project (*Project Scenario*).
- 60 The detailed noise source data for the models were prepared primarily from my measurements of the Port's equipment and supplemented with representative machinery data measured at other New Zealand ports. In every case, the octave band spectrum of the noise source was measured at a known distance while the equipment undertook several cycles of operation. I calculated the sound power level of the equipment from this data and cross checked the results against data for similar equipment.
- 61 I worked with Mr Martin Bayley and Mr Andy Kinsella from Eastland to ensure the modelling operations assumptions reflect the representative a busy five-day period of Port activity. The modelling assumptions in each scenario include a description, the number of, and an equivalent 'on-time' description for each noise source.
- 62 I have not made any adjustment of noise source levels in the modelling to account for potential equipment improvements over time, so I consider the results represent a generally conservative approach.
- 63 I used the results from the long-term noise monitor at the Portside Hotel to verify the Current Scenario predicted noise levels, and my attended monitoring to verify the noise contour shape at multiple locations. In summary, the model results were within 1 decibel of the average long-term level of 64 dB $L_{dn(5-day)}$, which indicates good agreement.

Port Noise Model – Current Scenario

- 64 Current peak Port operations include the following activities:
- 64.1 A log ship operating at Wharf 8 and a kiwifruit ship operating at Wharf 7.
 - 64.2 Road trucks delivering logs to the log yards.
 - 64.3 High stackers and log loaders in the log yards stacking logs and loading port trucks.
 - 64.4 Port trucks taking logs to be loaded onto the ship.
 - 64.5 Debarking in the SLY.
 - 64.6 Small scale kiwifruit handling and storage.
- 65 Port Noise Maps for the Current Scenario, and the associated Port operations assumptions, are included in **Appendix E**. The predicted noise contours and a façade noise map are shown on **Figure 5**.

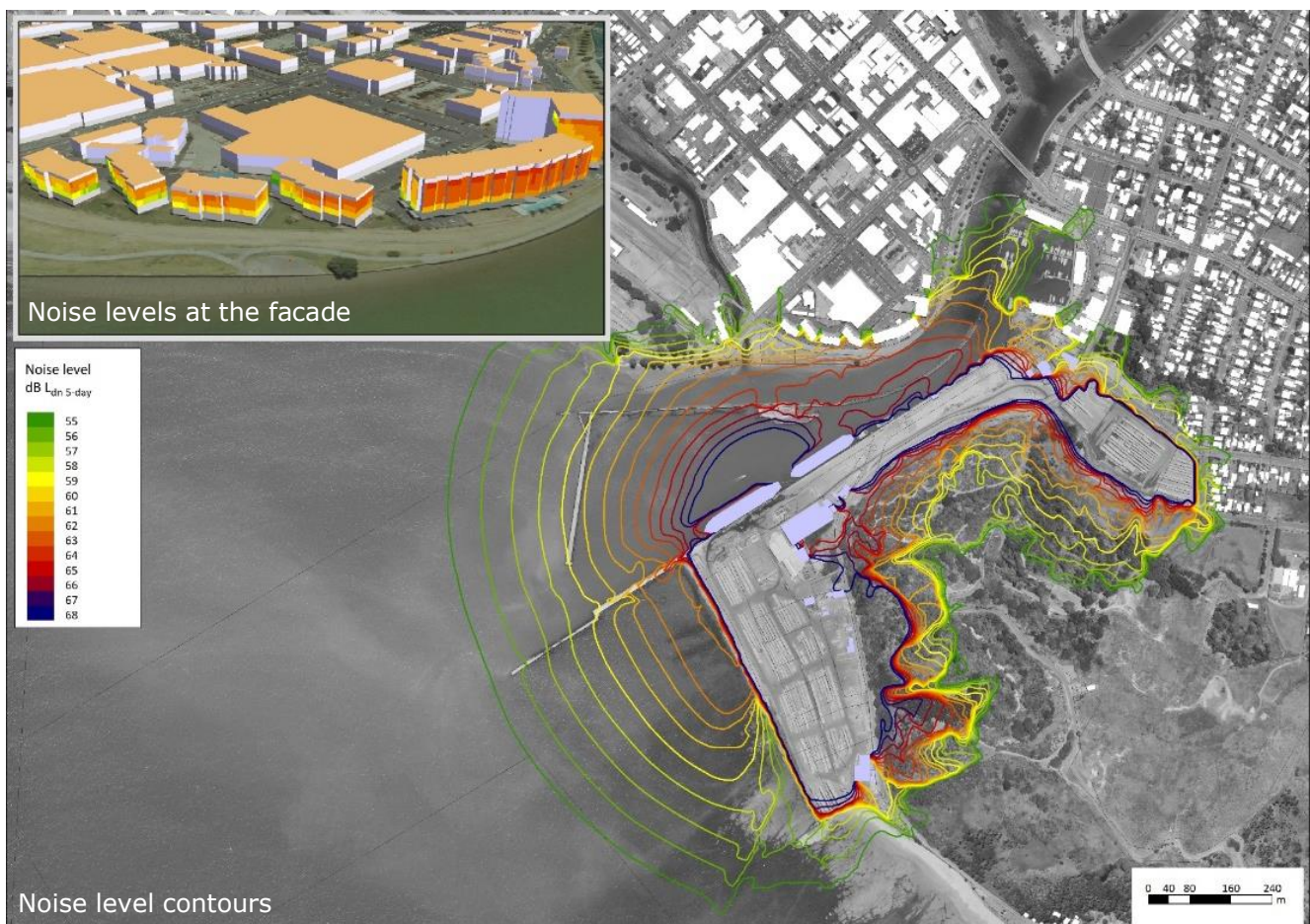


Figure 5: Predicted noise contours and façade noise map for Current Scenario

- 66 The Current Scenario model predicts the following external noise levels:
- 66.1 Noise levels of 63 dB L_{dn} (5 day) and 56 dB L_{night} (9 hour) at the façade of the closest dwellings on the 100 Customhouse Street site. The main noise sources at this location are engine noise from the log ship, log handling at the WLY and Port trucks.
 - 66.2 Noise levels of 64 dB L_{dn} (5 day) and 57 dB L_{night} (9 hour) at the most exposed façade of the Portside Hotel. The main noise sources are log handling in the WLY, port trucks passing by and, to a lesser extent, engine noise from the log ship.
 - 66.3 Noise levels of 55 dB L_{dn} (5 day) and 49 dB L_{night} (9 hour) at the southern end of the campground. The main noise source is engine noise from the log ship. I note that the predicted night-time level is only 2 – 3 decibels higher than the results from my overnight measurement described earlier in my evidence, which shows good alignment considering the model accounts for peak operations.
- 67 These peak operations would generally occur for around nine days a year when both a log ship and kiwifruit ship are in berth. Typical operations with just a log ship which would occur for around 290 days a year and would be comparable to peak operations in terms of noise levels. The remaining 60 or so days would not have a ship in berth and Port noise levels would be appreciably lower.
- Port Noise Model – Project Scenario**
- 68 The peak operations for the Project Scenario are the same as the Current Scenario except for:
- 68.1 Inclusion of a second log ship at the seaside end of the wharf;
 - 68.2 Repositioning of the existing log ship further to the west to make space for the second ship; and
 - 68.3 Use of harbour cranes instead of ship cranes to load the log ships.
- 69 Port Noise maps for the Project Scenario, including the associated Port operations assumptions, are included in Appendix E. The predicted noise contours and a façade noise map are shown on **Figure 56**.

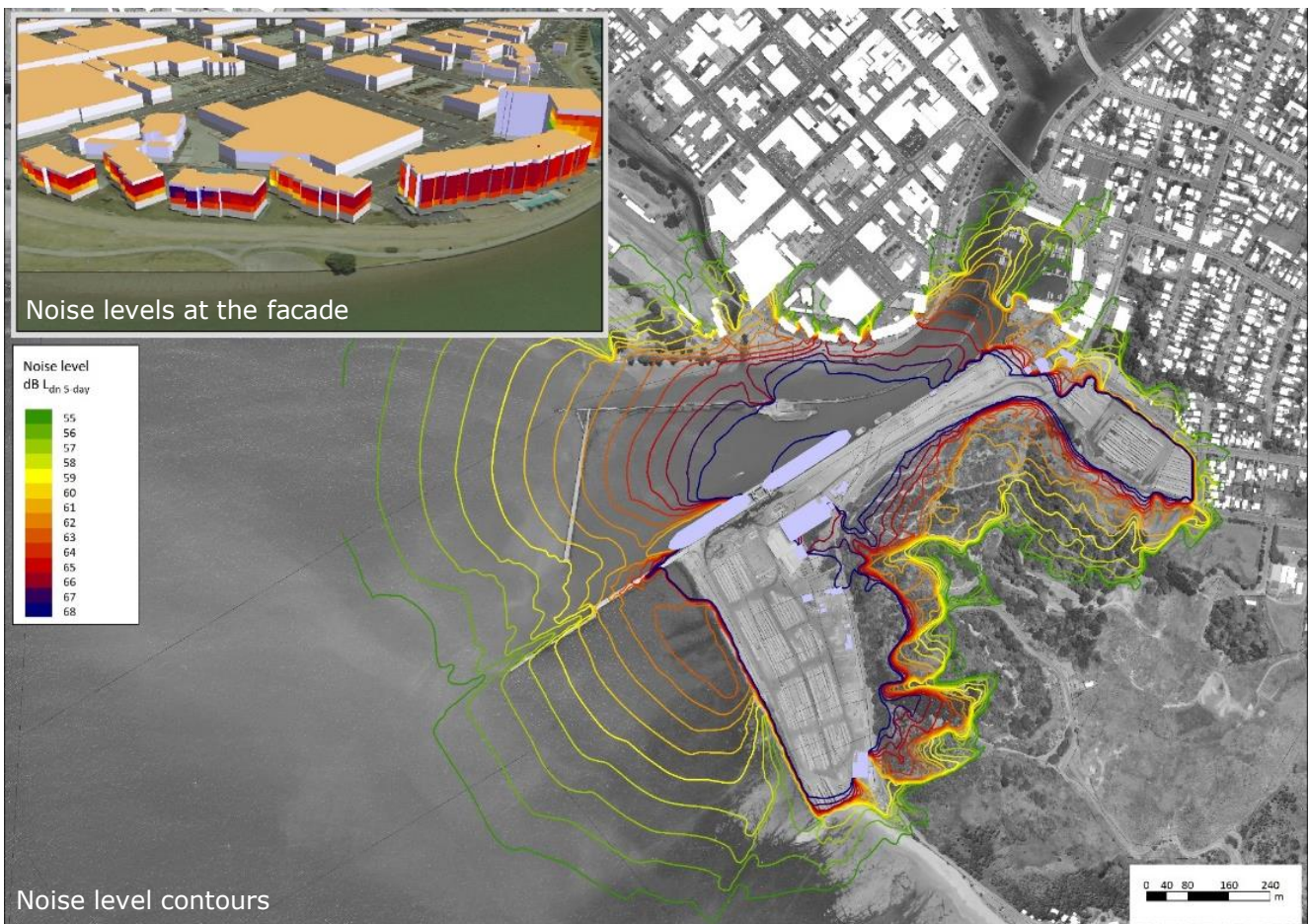


Figure 5: Predicted noise contours and façade noise map for the Project Scenario

- 70 The Project Scenario noise model predicts the following external noise levels:
- 70.1 Noise levels of 67 dB L_{dn} (5 day) and 60 dB L_{night} (9 hour) at the closest dwellings on the 100 Customhouse Street site. The main noise sources are the log ships and harbour cranes.
 - 70.2 Noise levels of 66 dB L_{dn} (5 day) and 60 dB L_{night} (9 hour) at the most exposed façade of the Portside Hotel. The noise levels are equally controlled by the log ship and the loader in the WLY.
 - 70.3 Noise levels of 59 dB L_{dn} (5 day) and 52 dB L_{night} (9 hour) at the southern end of the campground. The main noise sources are the log ships and harbour cranes.
- 71 These peak operations would generally occur for around 150 days a year when two log ships are in berth. The rest of the year would have one log ship in berth, so noise levels would be comparable to

the Current Scenario. There would be very few periods with no ships in berth.

OPERATIONAL NOISE EFFECTS

- 72 There are four key receiver areas which may be impacted by operational Port noise from the Project. These are:
- 72.1 The Amenity Commercial zone directly opposite to the wharves, which include 100 Customhouse Street and the Portside Hotel;
 - 72.2 The Recreation Reserve zone to the north of the Port, which includes the Holiday Park;
 - 72.3 The undeveloped Inner City Residential zone to the north, which has the potential for residential development; and
 - 72.4 The Heritage Reserve zone, which includes the walkways and lookout on Titirangi Hill adjacent to the Port.
- 73 I have described the potential effect of the change in noise level as perceived by receivers. **Table 4** summarises the general relationship between noise level changes, subjective response and impact of the effect. This effect is based on peoples' annoyance reaction to noise level changes.

Noise level change	General subjective perception	Impact
1 – 2 dB	Insignificant/imperceptible change	Negligible
3 – 4 dB	Just perceptible change	Slight
5 – 8 dB	Appreciable to clearly noticeable change	Moderate
9 – 11 dB	Doubling of loudness	Significant
More than 11 dB	Doubling of loudness	Substantial

Table 4: Noise level change compared with general subjective perception

- 74 I have also assessed the impact from the overall noise levels on indoor amenity during the night and outdoor amenity during the day.

Operational Noise Effects on Receivers in the Amenity Commercial Zone

- 75 The closest receivers to the Project are the 100 Customhouse Street apartments and the Portside Hotel, which are located in the Amenity Commercial zone. I predict that the Project will result in noise levels of up to 67 dB $L_{dn(5-day)}$ and 66 dB $L_{dn(5-day)}$ at these receivers

respectively. This is 3 – 4 dB higher than noise levels from current Port operations, which is a 'just perceptible' change. This increase is the result of the additional log ship and associated location operations.

- 76 These high levels of Port noise are generally incompatible with typical residential activities. However, these noise levels are similar to existing noise levels, and permanent residential and visitor accommodation development in the Amenity Commercial zone is (and was at the time of the current development of these sites) subject to stringent façade controls as described earlier in my evidence. I consider the façade controls would result in acceptable internal noise levels from both current and future operations.
- 77 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 Project. Both scenarios are higher than desirable for typical residential zones. However, a lower expectation of outdoor amenity is generally expected in commercial zones, particularly where those zones border commercial or industrial areas such as ports.
- 78 In summary, I consider that noise from the Project is unlikely to have a material effect on amenity for receivers in this zone.

Operational Noise Effects on the Holiday Park

- 79 I predict the noise levels from the Project would range from 49 – 59 dB $L_{dn (5-day)}$ across the Holiday Park site. This is 4 dB higher than current Port operations, which is a just perceptible difference. This increase is the result of the additional log ship and associated location operations.
- 80 This site is within the 55 dB $L_{dn (5-day)}$ port noise contour in the TRMP, so any buildings containing noise sensitive activities such as the cabins must meet the 45 dB $L_{dn (5-day)}$ indoor criteria for a '*satisfactory indoor sound environment*' as described in the Port Noise Standard. All existing buildings on this site would meet the internal criteria with the Project, as the predicted noise levels at the building façades are below 60 dB $L_{dn (5-day)}$.
- 81 The TRMP does not apply an internal noise criteria to motorhomes, caravans, tents and similar. Motorhomes and caravans would generally have moderate sound insulation, and I expect noise levels from existing Port operations would be audible at times inside but at a low level. However, tents have negligible sound insulation, so existing Port noise would be clearly audible in sleeping areas for both existing operations and the Project. It is likely that some occupants of tents and similar structures in the southern end of the site are affected by the existing night-time noise levels from the Port and SH35 traffic. Additional occupants may be affected by the slightly higher noise levels associated with the Project.

- 82 I calculate that daytime noise levels range from 39 – 49 dB L_{Aeq} with current operations and 43 to 53 dB L_{Aeq} with the Project. I consider both scenarios to be acceptable for a campground in an urban environment adjoining a State Highway. This aligns with my subjective impressions when I visited the southern end of the campground during a day when a log ship was being loaded in berth.
- 83 In summary, I consider that the impact of the Project on the Holiday Park would be minimal with the exception of the camping area at the south end of the site. The slightly higher night-time noise levels may cause increased disturbance to occupants of tents and similar structures. These effects can be addressed with the following mitigation and management measures:
- 83.1 Eastland offering to extend the existing acoustic fence along the southern boundary of the campground. If this offer was taken up and the fence installed it would provide a noticeable reduction in Port noise for campers. I recommend that this mitigation is offered as part of the engagement with the Holiday Park owners in regard to the night-time dredging operations discussed earlier in my evidence. I have shown the recommended location and construction of the fence in Appendix B.
- 83.2 Noise from intermittent bangs and crashes from night-time log handling would be addressed by measures in the PNMP. The proposed Conditions 73 and 74 as attached to Ms McPherson's evidence set out the requirements for the Project's PNMP which include training, best practice operation, and identifying problematic activities etc. I understand the main cause of disturbance to occupants of the campground is intermittent bangs and crashes from night-time log handling, as opposed to the 'hum' of the Port.

Operational Noise Effects on the Undeveloped Inner City Residential Zone

- 84 The Inner City Residential zone closest to the Port has temporary accommodation on the north of the site (Captain Cook Motor Lodge). The southern half of the site is currently occupied by commercial and industrial activities. I understand that there are no current or known proposed noise sensitive developments this section of the site.
- 85 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.

- 86 I predict that noise levels across the site would range from 50 – 60 $L_{dn(5\text{-day})}$ for current Port operations and 53 – 63 dB $L_{dn(5\text{-day})}$ from the Project. For any future currently hypothetical development of this site I note:
- 86.1 A ventilation system would need to be provided for future residential or visitor accommodation developments inside the 60 dB $L_{dn(5\text{-day})}$ contour to enable windows to be closed⁹. I predict that internal noise levels would be below 40 dB $L_{dn(5\text{-day})}$ based on typical façade reductions for modern lightweight buildings with windows closed. This applies to the southern tip of the site.
 - 86.2 Future residential or accommodation developments between the 55 – 60 dB $L_{dn(5\text{-day})}$ contours would have internal noise levels of up to 45 dB $L_{dn(5\text{-day})}$ without any specific acoustic treatment¹⁰. This meets the TRMP requirement for *satisfactory internal sound levels*. 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 Street apartments.
 - 86.3 Current developments such as the Captain Cook Motor Lodge and future developments outside the 55 dB $L_{dn(5\text{-day})}$ contour would have internal noise levels well below 40 dB $L_{dn(5\text{-day})}$ without specific acoustic treatment.
 - 86.4 Port noise levels in outdoor areas at this site during the daytime are predicted to range from 42 – 52 dB with current Port operations and 45 – 55 dB L_{Aeq} with the Project. These levels are within the typical range for urban residential areas.
- 87 Overall, I consider that noise levels from the Project would have minimal adverse effects on future developments on the Inner City Residential zone, and the effect on the existing lodge to the north would be negligible.

Operational Noise Effects on the Heritage Reserve

- 88 Noise levels on the side of Titirangi Reserve are predicted to increase by 4 dB as result of the Project, which is subjectively just perceptible. However, there are no noise sensitive activities in the reserve that I am aware of, and use is intermittent, so the slight

⁹ Residential buildings with windows partially open for ventilation typically achieve a noise reduction of 15 dB from outside to inside. Therefore, external noise levels above 60 dB $L_{dn(5\text{-day})}$ would require windows to be closed and ventilation provided by alternative means to achieve the 45 dB $L_{dn(5\text{-day})}$ criteria in the TRMP.

¹⁰ External noise levels of 55 – 60 dB $L_{dn(5\text{-day})}$ and below would achieve internal noise levels of 40 – 45 dB $L_{dn(5\text{-day})}$ with windows partially open for ventilation.

change in noise levels is unlikely to affect the use of this space by the public.

OPERATIONAL VIBRATION EFFECTS

- 89 I have not carried out operational vibration predictions for the Project as the closest receivers are over 150 m from the operations. Vibration levels at this distance would be imperceptible to people and would be well below the relevant thresholds for building damage.
- 90 Notwithstanding the above, the Project's PNMP as recommended will contain measures that minimise vibration such as training of staff for best practice operation, maintenance of road surfaces and similar.

NOISE AND VIBRATION ISSUES RAISED IN SUBMISSIONS

- 91 I have read the submission lodged on the Project that raises issues about noise and vibration effects.
- 92 As Mr Todd Whittaker notes in the Officer's Report, I understand that operational and construction noise were prevalent issues raised in the submissions for previous Eastland resource consent applications (including the Wharf 6 & 7 application). In contrast, only one submission, from Mr Winston Moreton, mentions noise effects, and only then in relation to noise of logging trucks on the roading network. I have not assessed noise from trucks on public roads as this activity can be carried out by right and is not subject to any performance standards.
- 93 No submissions raise operational or construction noise issues associated with the Project.

RESPONSE TO THE OFFICER'S REPORT

- 94 I have read the Officer's Report prepared by Mr Whittaker on behalf of GDC dated 25 September 2023 and Mr Jon Styles' noise and vibration report included as Appendix 3 of the Officer's Report.
- 95 The Officer's Report notes that "*there are no significant issues outstanding in terms of modelling and assessment of potential noise sources and the extent and scope of potential noise effects*".¹¹ However, the report identifies that there are residual aspects where full agreement has not been reached.w

¹¹ Paragraph 136

- 96 The residual aspects are outlined in Mr Styles' report. These are as follows:
- 96.1 Mr Styles recommends a night-time limit of 45 dB L_{Aeq} for dredging noise received at the Holiday Park. I consider that this limit is overly stringent, given that the measured night-time noise level at this location was 50 dB L_{Aeq} (9 hour). It is my opinion that a 50 dB L_{Aeq} limit is appropriate to manage potential night-time noise effects from the dredging, particularly with Eastland's proposal to offer an acoustic fence as discussed above.
- 96.2 Mr Styles agreed with the updated behavioural response zones for marine mammals that I calculated, but recommends that the updated areas are assessed by an ecologist to determine the potential effects on marine mammals. Ms McConnell has now reviewed the updates and states that her conclusions and recommendations remain valid and unchanged. Her memo is attached to my evidence as Appendix C.
- 96.3 It is Mr Styles' opinion that the 45 dB L_{dn} (5-day) internal criteria in the TRMP is insufficient to ensure that an acceptable level of noise is achieved for any future noise sensitive developments at the southern end of the Inner City Residential Zone. In response I note that the Port Noise Standard states an internal noise level of 45 dB L_{dn} (5-day) or lower would ensure that a '*satisfactory indoor sound environment*' is achieved for noise sensitive activities. It is my opinion that, while perhaps higher than the desirable, an internal noise level of 45 dB L_{dn} (5-day) is generally acceptable as the upper threshold for Port noise.
- 96.4 I consider it too speculative to provide for mitigation below a noise level that is consistent with what the Port Noise Standard considers to be satisfactory. Nonetheless, I note that if the site was developed similarly to 100 Customhouse Road, then I expect that internal noise levels would be well below 45 dB L_{dn} (5-day) in most habitable spaces due to screening and orientation.

COMMENTS ON THE DRAFT CONDITIONS

- 97 It is my opinion that the Consent Conditions from the Wharves 6 & 7 Consent are appropriate for addressing the potential noise and vibration effects from the Project, with the exception of two aspects:
- 97.1 I recommend the inclusion of a requirement for the CNMP to specifically address mitigation and management measures to minimise potential effects on marine mammals; and

97.2 I recommend that the operational Port noise limits be revised to reflect the assessed noise levels set out in this evidence as being acceptable.

98 The draft noise and vibration conditions for the Project essentially duplicate the Wharves 6 & 7 conditions aside from the items above. This approach enables consistency across the wider Twin Berths project.

99 The proposed noise conditions which I support as appropriate conditions to address the noise and vibration effects of the Project are presented below.

Wharf 8 Extension, Outer Port Reclamation, Outer Breakwater Upgrade

53.	Construction noise shall be measured and assessed in accordance with New Zealand Standard NZS 6803:1999 "Acoustics - Construction Noise" and comply with the following Project Standards at any occupied dwelling unless otherwise provided for in the CNMP (Condition 55).					
	Time period	Weekdays (dB)		Saturdays (dB)		Sundays and Public Holidays (dB)
		L _{Aeq}	L _{AFmax}	L _{Aeq}	L _{AFmax}	L _{Aeq} L _{AFmax}
	6:30am – 7:30am	55	75	45	75	45 75
	7:30am – 6pm	70	85	70	85	55 85
	6pm – 8pm	65	80	45	75	45 75
	8pm – 6:30am	45	75	45	75	45 75

54.	<p>Construction vibration shall be measured and assessed in accordance with ISO 4866:2010. The Category A construction vibration criteria in the following table must be complied with as far as practicable. If measured or predicted vibration from construction activities exceeds the Category A criteria, a suitably qualified person must assess and manage the construction vibration during those activities. If measured or predicted vibration from construction activities exceeds the Category B criteria, those activities must only proceed if vibration effects on affected buildings are assessed, monitored and mitigated by a suitably qualified person.</p>		
Receiver	Details	Category A	Category B
Occupied residential or visitor accommodation	Night-time 2000h – 0630h	0.3 mm/s PPV	1 mm/s PPV
	Daytime 0630h – 2000h	1 mm/s PPV	5 mm/s PPV
Other occupied buildings	Daytime 0630h – 2000h	2 mm/s PPV	5 mm/s PPV
All other buildings	Vibration – transient	5 mm/s PPV	BS 5228-2* Table B2
	Vibration – continuous		BS 5228-2* 50% of table B2 values
55.	<p>A Construction Noise Management Plan (CNMP) must be prepared by a suitably qualified person and submitted to the Consents Manager for certification that the CNMP gives effect to the objectives in Condition 56 and complies with the requirements in Condition 57.</p>		
56.	<p>The CNMP objectives are to:</p> <ol style="list-style-type: none"> a) Identify and adopt the best practicable option (BPO) for the management of construction noise; b) Define the procedures to be followed when the noise standards in Condition 53 and the vibration standards in Condition 54 cannot be met; c) Inform the duration, frequency and timing of works to manage disruption; d) Require engagement with affected receivers and timely management of complaints; and e) Manage the underwater noise levels from impact and vibratory pile driving methods to protect marine mammals and avoid adverse effects on threatened or at-risk species. 		
57.	<p>The CNMP shall include:</p> <ol style="list-style-type: none"> a) The relevant measures from NZS 6803:1999 “Acoustics – Construction Noise”, Annex E2 “Noise management plans” b) Prioritising dredging works in the deep vessel turning basin and the shallow vessel turning basin to take place during the daytime; c) A requirement to engage with the Holiday Park owners, Gisborne Holdings, prior to any night-time dredging where noise levels are predicted or measured to be above 50 dB $L_{Aeq}(15\text{ min})$ at any point within the campground. The engagement shall include an offer to construct an extension to the existing acoustic fence to cover the southern boundary of the campground; and d) Measures to minimise underwater noise effects on marine mammals as set out in the evidence of Ben Lawrence for Eastland dated 2 October 2023 and the attached memorandum by Helen McConnell dated 29 September 2023. 		
58.	<p>No construction activities involving piling, excavation, dredging, compaction, drilling, concrete/rock breaking and/or the trucking of fill or waste material shall be permitted on Waitangi Day, Good Friday, Easter Monday, Christmas Day, Boxing Day or New Years Day.</p>		

70.	<p>Sound from all port activities in the Tairāwhiti Resource Management Plan Port Management Area excluding the rail bridge, Port A Management zone and area outside the Breakwater must comply with the following noise limits when assessed in accordance with NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning.</p> <table border="1" data-bbox="280 421 1449 943"> <tr> <td data-bbox="280 421 791 595">At any point in the Amenity Reserve Zone or Amenity Commercial Zone</td> <td data-bbox="791 421 1449 595"> 67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h) </td> </tr> <tr> <td data-bbox="280 595 791 770">At any point in the Recreation Reserve Zone or Inner City Residential Zone</td> <td data-bbox="791 595 1449 770"> 65 dB L_{dn} (5-day) 60 dB L_{Aeq} (9h) (2200h – 0700h) 65 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h) </td> </tr> <tr> <td data-bbox="280 770 791 943">At the permanent port noise monitoring location (Portside Hotel)</td> <td data-bbox="791 770 1449 943"> 67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h) </td> </tr> </table>	At any point in the Amenity Reserve Zone or Amenity Commercial Zone	67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)	At any point in the Recreation Reserve Zone or Inner City Residential Zone	65 dB L_{dn} (5-day) 60 dB L_{Aeq} (9h) (2200h – 0700h) 65 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)	At the permanent port noise monitoring location (Portside Hotel)	67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)
At any point in the Amenity Reserve Zone or Amenity Commercial Zone	67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)						
At any point in the Recreation Reserve Zone or Inner City Residential Zone	65 dB L_{dn} (5-day) 60 dB L_{Aeq} (9h) (2200h – 0700h) 65 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)						
At the permanent port noise monitoring location (Portside Hotel)	67 dB L_{dn} (5-day) 62 dB L_{Aeq} (9h) (2200h – 0700h) 67 dB L_{Aeq} (15 min) (2200h – 0700h) 85 dB L_{Amax} (2200h – 0700h)						
71.	<p>The Consent Holder shall maintain a permanent noise monitor at the Portside Hotel or an alternative location agreed by the Council's Consents manager. The monitor shall be regularly calibrated and continuously measure sound levels to provide sufficient valid data for the Consent Holder to prepare reports regarding compliance with the limits applying at this location under these conditions. The Consent Holder shall prepare a summary report of monitoring results and submit this to Council's Consents Manager, Te Tai Uru and the PCLG annually, within one month of the end of the reporting period. Data from the monitor must be publicly available on a website in real-time.</p>						
72.	<p>Not less than 30 working days prior to the commencement of operations on the upgraded Wharf 8 and Outer Port Reclamation an operational Port Noise Management Plan (PNMP) prepared by a suitably qualified and experienced person in accordance with Section 8 of NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning shall be submitted to Council's Consent Manager for certification. Certification shall be limited to ensuring that the PNMP gives effect to the objectives in Condition 73 and complies with the requirements in Condition 74. The certified PNMP must be implemented throughout operation of Wharf 8 and the Outer Port Reclamation.</p>						
73.	<p>The objectives of the PNMP shall be to:</p> <ol style="list-style-type: none"> Ensure the port complies with the relevant noise performance standards in Condition 70; Provide a framework for the measurement, monitoring, assessment, and management of noise; Identify and adopt the BPO for the management of noise effects; and Require engagement with the community and timely management of noise complaints. 						
74.	<p>The PNMP shall, as a minimum, address the following matters:</p> <ol style="list-style-type: none"> Annual reviews of the PNMP, and include noise contour maps showing the predicted port noise levels based on current operations. Operator and staff training Equipment selection General measures Safety/reversing alarms Night-time activities Noise monitoring Te Tai Uru engagement Community engagement 						

Capital and Maintenance Dredging and Disposal

3.	Noise from all capital and maintenance dredging shall comply with 50 dB LAeq (15 min) during the night-time (10 pm – 7 am) at any point within the Holiday Park campground. Noise levels shall be measured in accordance with New Zealand Standard NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with New Zealand Standard NZS 6802:2008 Acoustics - Environmental Noise.
----	---

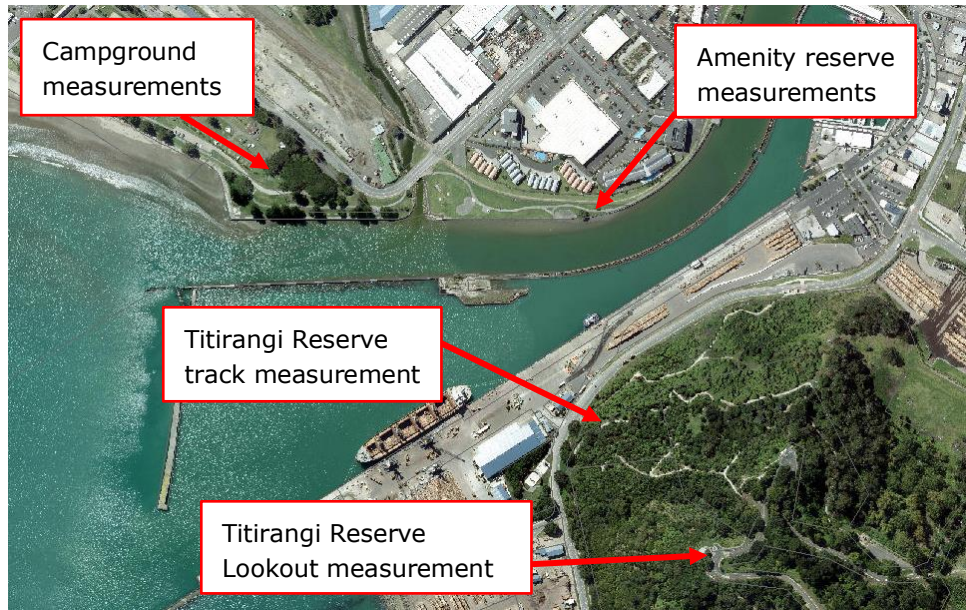
CONCLUSIONS

- 100 I consider that construction noise from the Project will comply with the relevant daytime noise limits. The only proposed night-time construction activity, dredging, will be subject to recommended noise limits and specific mitigation measures to ensure night-time noise effects are controlled to an acceptable level.
- 101 The potential vibration effects from the Project's construction and operational activities would be negligible due to the large setbacks between receivers and the activities.
- 102 With respect to underwater noise levels, both Ms McConnell and I agree on the appropriate implementation of standard best practice mitigation and management measures will avoid physiological effects and minimise behavioural effects on marine mammals as far as practicable.
- 103 I have assessed the potential operational noise effects by comparing the predicted noise levels from the Project to the current noise levels. I predict that the change in noise level for the most affected receivers will be 3 – 4 decibels, which is subjectively just perceptible.
- 104 It is my opinion that the façade controls in the TRMP are sufficient to ensure that internal noise levels during the night-time are at an acceptable level for both existing and future hypothetical noise sensitive developments nearby the Port.
- 105 Overall, I consider the potential noise effects from the Project to be acceptable on the basis that:
- 105.1 The potential noise and vibration effects are appropriately controlled by the proposed conditions of consent;
- 105.2 Construction is mitigated and managed through a Construction Noise Management Plan (CNMP); and

105.3 Port operations are managed through an operational Port Noise Management Plan (PNMP).

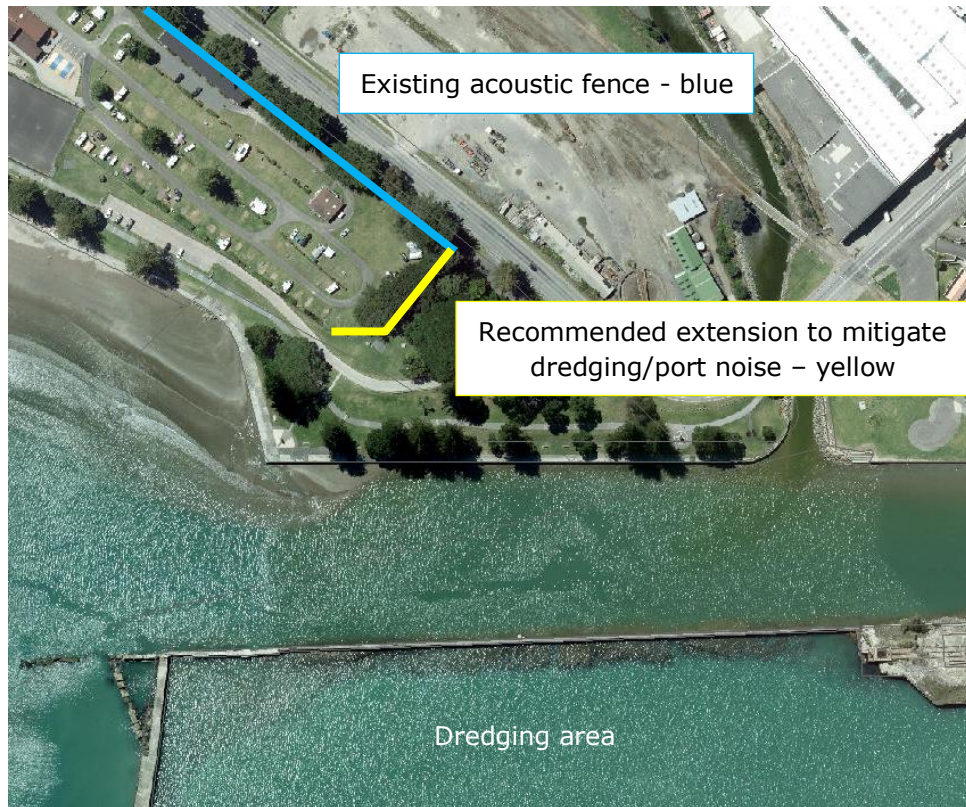
Ben Lawrence
3 October 2023

APPENDIX A: MAP OF NOISE MEASUREMENTS

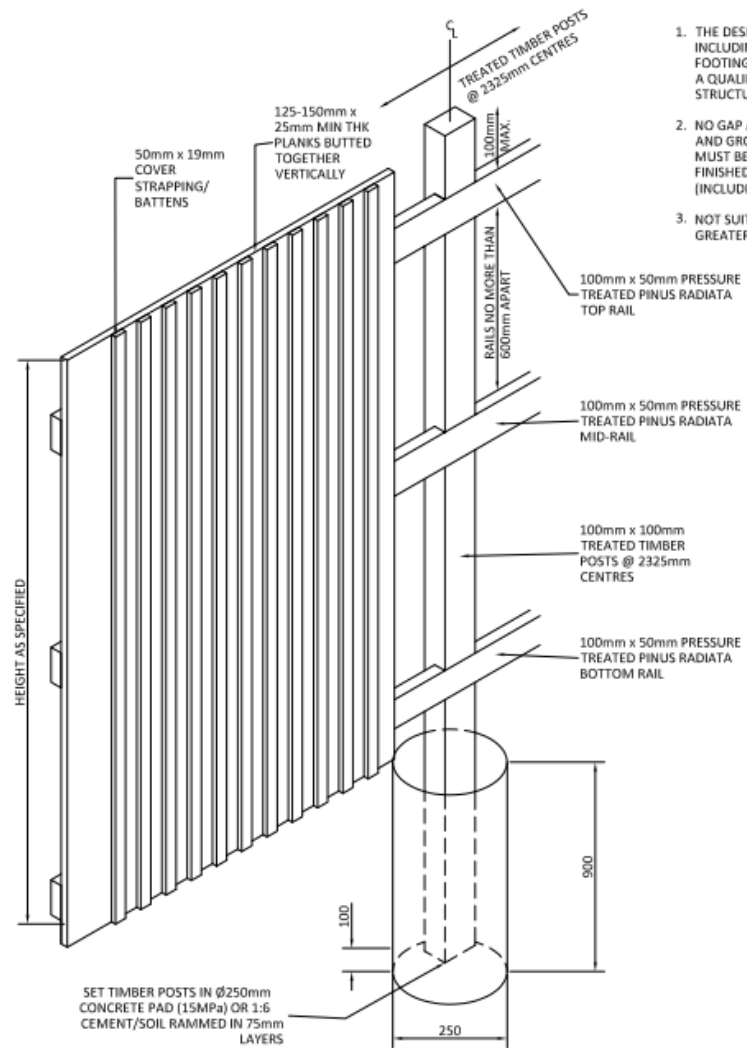


APPENDIX B: CAMPGROUND ACOUSTIC FENCE RECOMMENDATIONS

The recommended location of the acoustic fence extension is shown in yellow on the map below.



A typical acoustic fence construction is shown on the drawing overleaf.



1. THE DESIGN OF THE FENCE, INCLUDING THE FASTENINGS AND FOOTINGS, SHALL BE APPROVED BY A QUALIFIED EXPERIENCED STRUCTURAL ENGINEER.
2. NO GAP ALLOWED BETWEEN FENCE AND GROUND. BOTTOM OF PLANKS MUST BE AT LEAST 100mm BELOW FINISHED GROUND SURFACE (INCLUDING ANY MULCH LAYER).
3. NOT SUITABLE FOR HEIGHTS GREATER THAN 3.0m.

	<p>ACOUSTIC TIMBER FENCE - VERTICAL PLANKS</p>	<p>For approval only on the basis of the information provided. Not for use without the approval of Marshall Day Acoustics.</p>	<p>MDA-ENV-FEN-001 REVISION: C</p>
--	--	--	--

**APPENDIX C: MARINE MAMMAL EFFECTS ASSESSMENT FROM
MS HELEN MCCONNELL (SLR)**

To: Marty Bayley
From: Helen McConnell
Company: Eastland Port
SLR Consulting NZ Ltd
cc:
Date: 29 September 2023
Project No. 740.30044.00000

RE:
Eastland Port Twin Berths Stage 2
Updated underwater noise modelling:
Implications for marine mammal assessment and recommendations

I have reviewed the updated underwater noise modelling outputs as provided by Ben Lawrence, Marshall Day Acoustics (MDA) (dated 21 September 2023 and 29 September 2023). I have also reviewed the comments provided by Styles Group in Appendix 3 of the s42A report (dated 24 September 2023).

In light of the updated model results and associated comments, and regarding my previous response to the s92 request that assessed the potential effects of underwater piling and dredging noise on marine mammals and that made several recommendations for the management of these effects (dated 10 May 2023), I make the following comments:

- The updated modelling does not materially change the predicted onset distances to TTS and PTS thresholds for proposed piling or dredging activities. For piling activities, these are the thresholds that are typically used to underpin the size of mitigation zones. On this basis, my recommendations regarding 1) the use of bubble curtains for impact piling and 2) the initial establishment of a single 500 m mitigation zone that is monitored by a dedicated, trained marine mammal observer before and during piling activities, still stand. As per my previous recommendations, the appropriateness of this mitigation zone should be verified by in-situ monitoring soon after the project commences and refined according to monitoring results as required.
- The updated modelling has resulted in slight increases to the predicted zones of behavioural response for marine mammals for the proposed activities. These zones were calculated using the NOAA 120 dB RMS threshold. I agree with the Styles Group comments that these zones should be interpreted with caution as behavioural responses tend to be highly species and context dependent. However, I am reassured by the Styles Group finding that the approach taken by the model is conservative and likely over-estimates the actual zone in which behavioral responses will occur. Consequently MDA suggest the following interpretation: that the 120 dB RMS contour represents the zone of 'likely behavioural response' with the predicted zones of audibility representing the zone of 'possible behavioural response'. This is a highly conservative interpretation that I endorse in accordance with the precautionary approach.
- While likely behavioural responses associated with dredging are now predicted out to 6-8 km, and possible behavioural responses could occur out to and beyond 50 km offshore during quiet ambient conditions, this zone is still in keeping with my earlier assessment conclusion that behavioural effects from dredging will be spatially restricted and not dissimilar to the underwater noise characteristics and propagation distances expected from commercial shipping (following De Jong et al., 2010 and

Todd et al., 2015). When these modelled predictions are considered in terms of the infrequent presence of marine mammals in and around the project area, the potential for occasional low level behavioural response from individual marine mammals is of little concern to marine mammal populations. Further to this, displacement from the immediate project area (which is the most likely behavioural response expected) is protective to marine mammals in that it prevents individual animals from closely approaching the operating dredge thereby avoiding potential hearing damage.

- As well as representing the zone of possible behavioural response, the extended zones of audibility predicted by the updated modelling also influence the area over which masking of marine mammal vocalisations could occur. Although the updated modelling suggests that masking could occur out to and beyond 50 km, I understand from the Styles Group comments that these predictions are greater than what would be expected from Listening Space Reduction calculations; hence can be interpreted very much as worst case scenarios. On the basis that low frequency sounds propagate more readily through water than other mid- and high-frequencies, the audibility zones that extend into the deeper offshore water are of greatest relevance to baleen whales that use low frequency calls to communicate. While baleen whales use waters off the east coast of the North Island as a seasonal migratory corridor, most individual whales typically pass by any given point on the coast quite quickly (e.g., migrating humpback whales travel at average speeds of 3.2 – 5.8 km/hr; Riekkola et al., 2020; Modest et al., 2021). On this basis, the masking effects of the proposed activities would be low level and temporary for most migrating whales (< 1 day). While southern right whales have the potential for a more sustained presence in coastal locations during their seasonal breeding migrations, it is probable that exposed individuals would avoid the zone of audibility and take advantage of nearby unaffected coastal habitat.
- My s92 response clearly identified that despite the occasional presence of threatened marine mammal species, Poverty Bay and surrounds does not specifically represent important marine mammal habitat in terms of relative ecological significance. On this basis, and notwithstanding the increased zones of behavioural response and audibility generated by the updated underwater noise modelling, the conclusions and recommendations presented in my s92 response remain valid and unchanged.
- Overall I consider that the predicted effects to marine mammals from the proposed activities will be no more than minor and that no population effects are predicted for any marine mammal species. I consider that effects can therefore be appropriately managed through consent conditions.



Helen McConnell, MSc
Principal Consultant, Marine Science



Dan Govier, MSc
Technical Discipline Manager, Marine Science



APPENDIX D: UNDERWATER NOISE MODEL PARAMETERS

The underwater noise model parameters are summarised below:

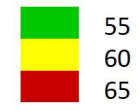
- Bathymetry: LINZ data service
- Seafloor: sand
- Water temperature: 12 degrees (winter)
- Sound speed profile from '*Underwater sound propagation modelling to illustrate potential noise exposure to Maui dolphins from seismic surveys and vessel traffic on West Coast North Island, New Zealand*' (2019), Figure A-1.
- Source levels:
 - Impact piling with bubble curtain: 189 dB RMS re. 1 uPa (source: Marshall Day measurement)
 - Vibro piling: 175 dB RMS re. 1 uPa (source: Marshall Day measurement)
 - TSHD: 168 dB RMS re 1 uPa (source: NPL for spectrum¹², adjusted based on data from Styles Group¹³)
 - Rock breaking (Xcentric Ripper): 164 dB RMS re. 1 uPa (source: Marshall Day measurement)
 - Backhoe dredge: 123 dB RMS re. 1 uPa (source: Marshall Day measurement)

¹² PowerPoint presentation at WODA Workshop, Paris, 26th March 2015.

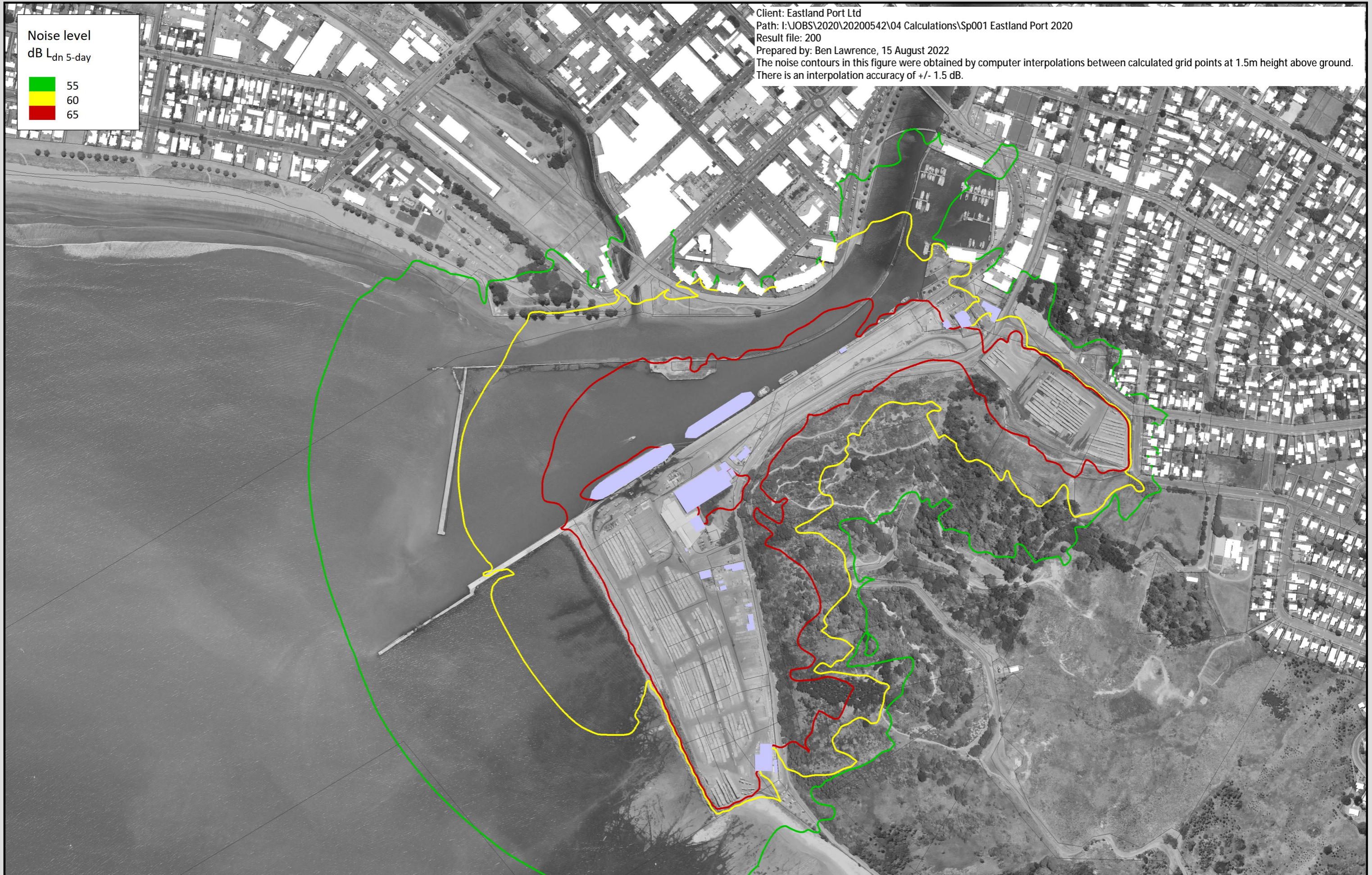
¹³ 'Assessment of Underwater Noise Effects, Sand Extraction – Auckland Offshore Extraction Area – Mangawhai – Pakiri Embankment', dated 31 March 2020.

APPENDIX E: PORT NOISE MAPS FOR THE CURRENT AND PROJECT SCENARIOS, AND THE ASSOCIATED PORT OPERATIONS ASSUMPTIONS

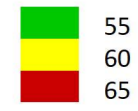
Noise level
dB L_{dn} 5-day



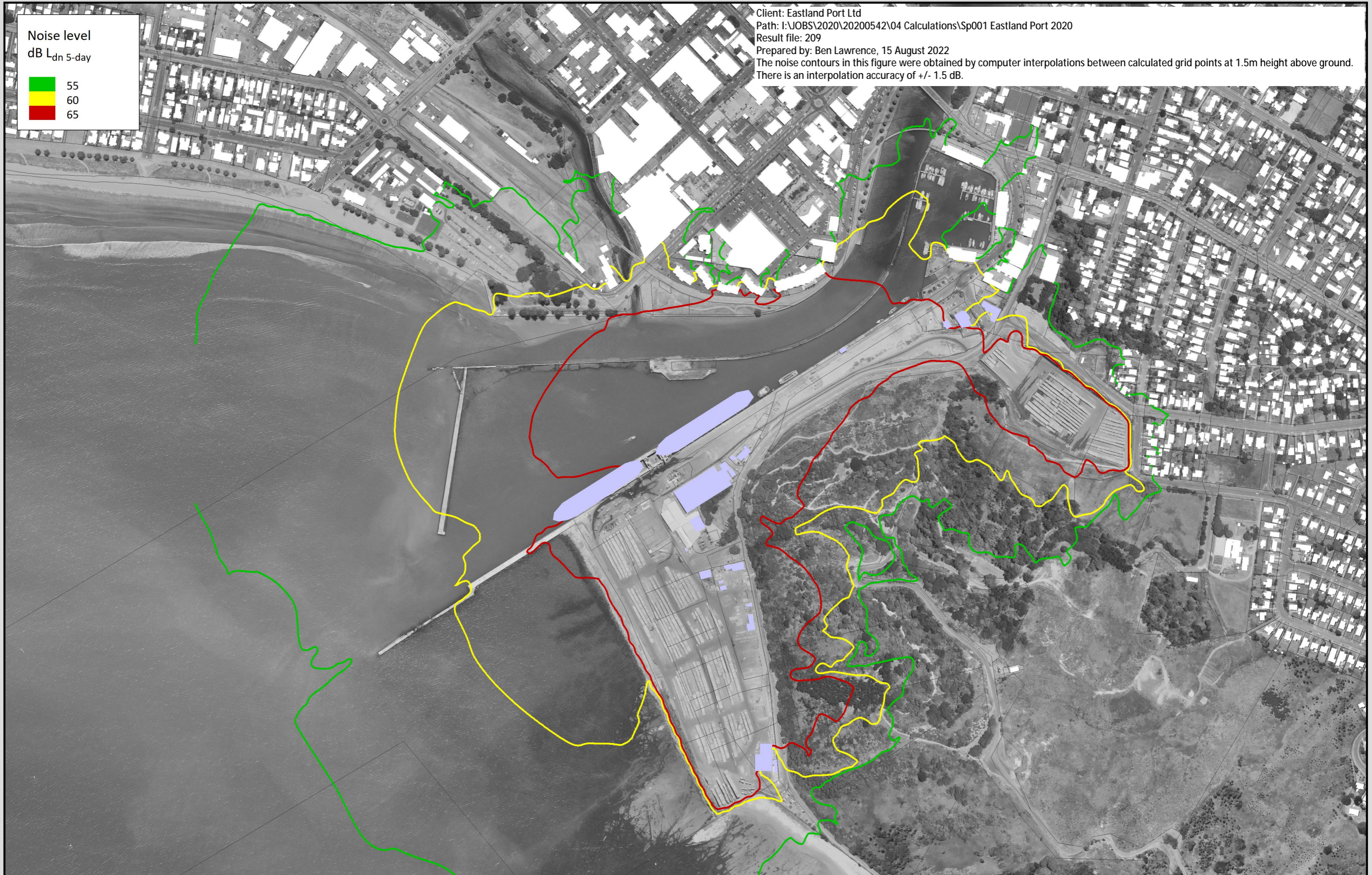
Client: Eastland Port Ltd
Path: I:\JOBS\2020\20200542\04 Calculations\Sp001 Eastland Port 2020
Result file: 200
Prepared by: Ben Lawrence, 15 August 2022
The noise contours in this figure were obtained by computer interpolations between calculated grid points at 1.5m height above ground.
There is an interpolation accuracy of +/- 1.5 dB.



Noise level
dB L_{dn} 5-day

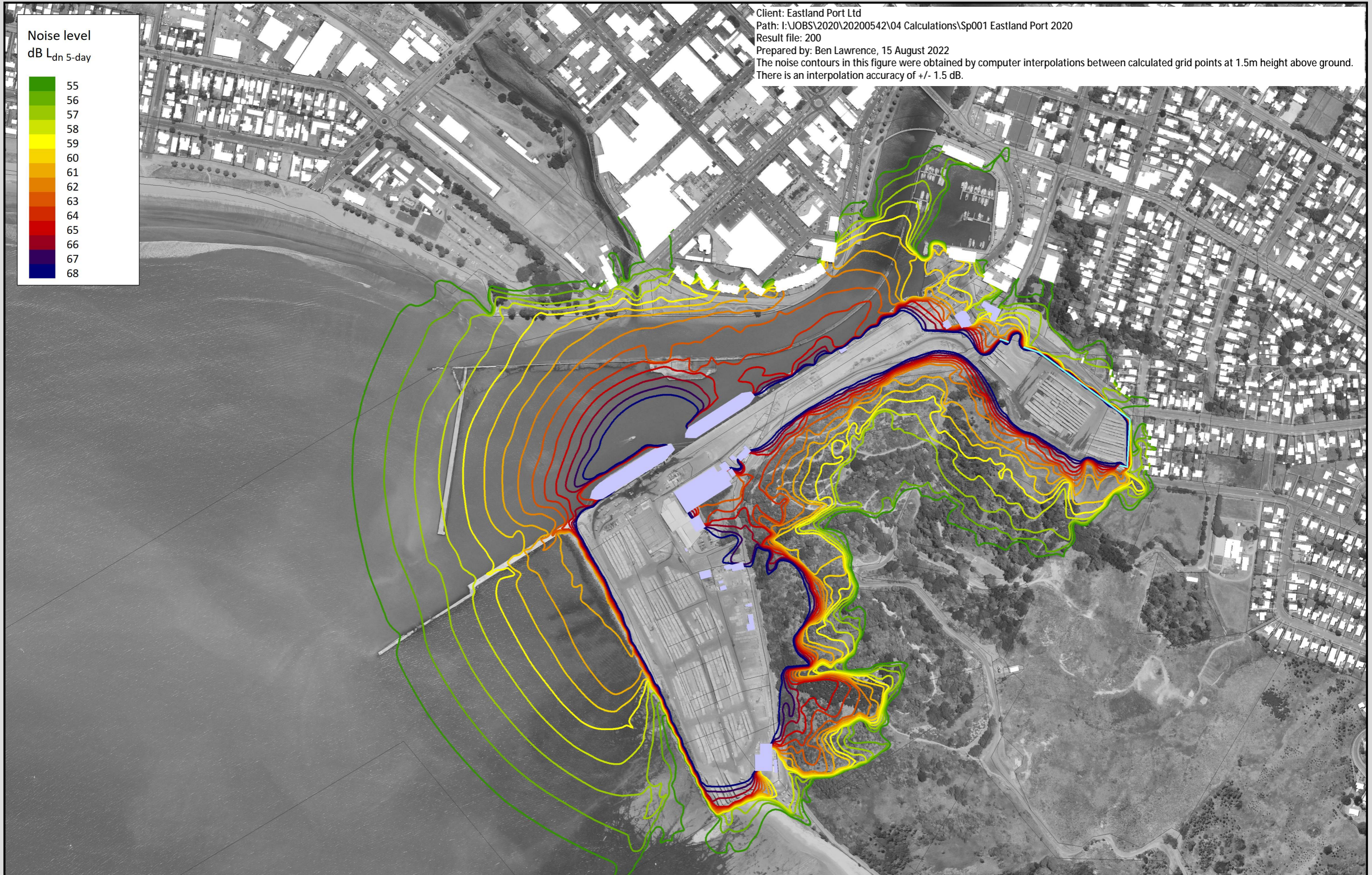
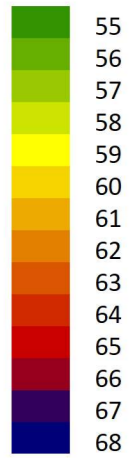


Client: Eastland Port Ltd
Path: I:\JOBS\2020\20200542\04 Calculations\Sp001 Eastland Port 2020
Result file: 209
Prepared by: Ben Lawrence, 15 August 2022
The noise contours in this figure were obtained by computer interpolations between calculated grid points at 1.5m height above ground.
There is an interpolation accuracy of +/- 1.5 dB.

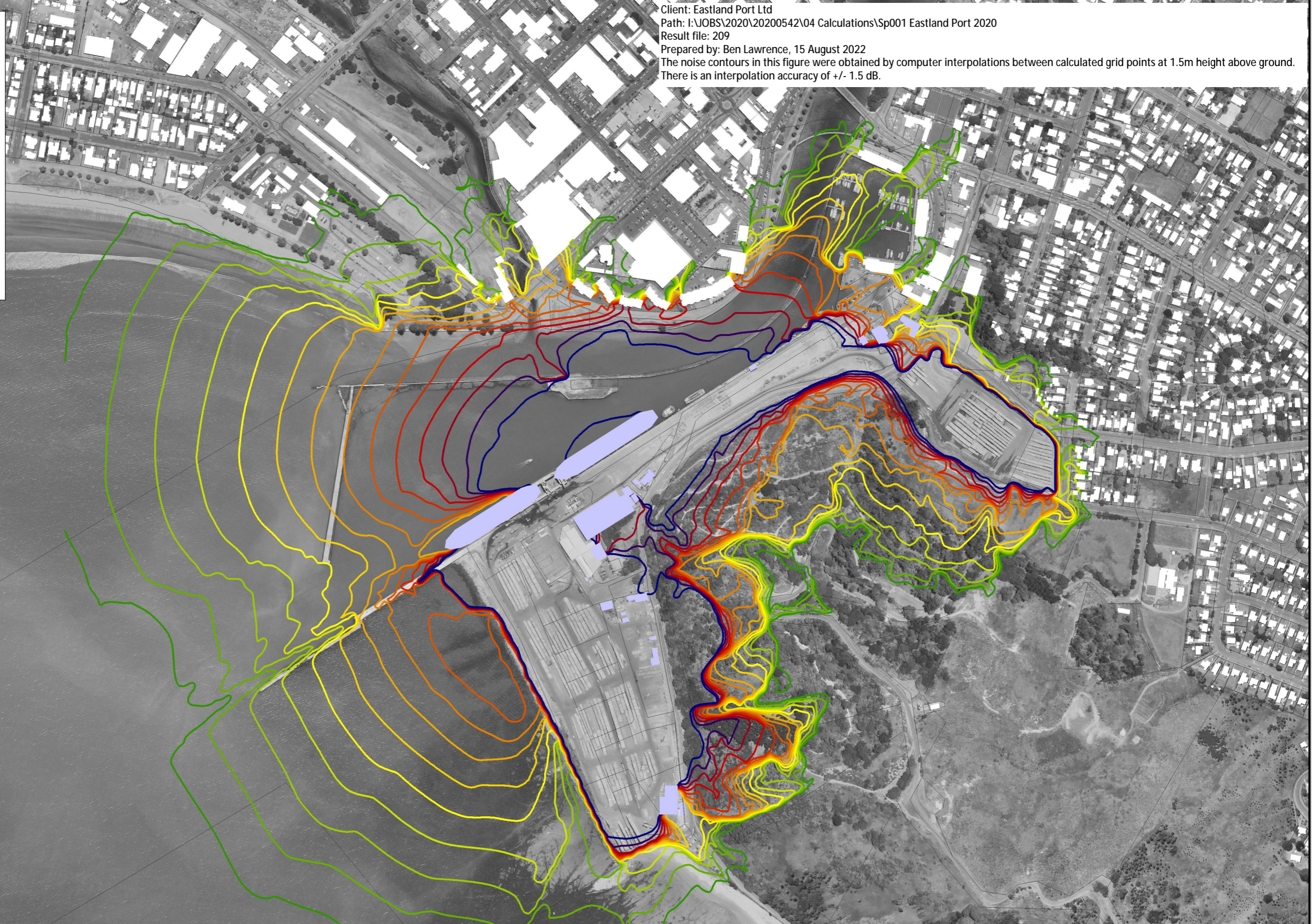
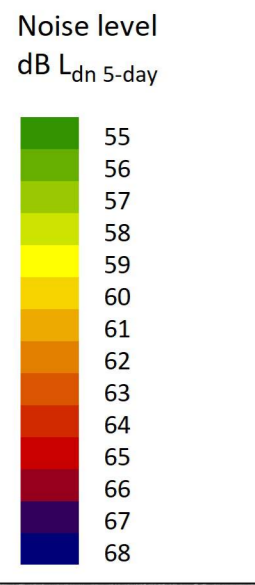


Client: Eastland Port Ltd
Path: I:\JOBS\2020\20200542\04 Calculations\Sp001 Eastland Port 2020
Result file: 200
Prepared by: Ben Lawrence, 15 August 2022
The noise contours in this figure were obtained by computer interpolations between calculated grid points at 1.5m height above ground.
There is an interpolation accuracy of +/- 1.5 dB.

Noise level
dB L_{dn} 5-day



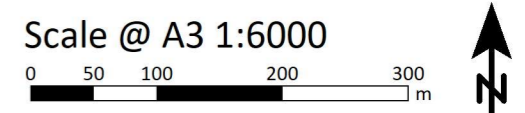
Client: Eastland Port Ltd
Path: I:\JOBS\2020\20200542\04 Calculations\Sp001 Eastland Port 2020
Result file: 209
Prepared by: Ben Lawrence, 15 August 2022
The noise contours in this figure were obtained by computer interpolations between calculated grid points at 1.5m height above ground.
There is an interpolation accuracy of +/- 1.5 dB.



Scenario A 1 LOG SHIP AND 1 KIWIFRUIT SHIP (current operations)			Info sourced from Marty Bayley (EP), Andy Kinsella (EP), Paul Coker (ISO) and Rod Blake (EP ops manager)				
Code	Model Source Description	Number of sources in model	Site activities 'on-time'		Movements (average hour)		
			Day (07-22)	Night (22-07)	Day (07-22)	Night (22-07)	km/hr
A Upper yard							
A1	Log Trucks	1		N/A	6	3	15
A2	Log Loaders	2	100%	100%		N/A	
A3	High stacker	2	100%	0%		N/A	
B Wharfside logyard							
B1	Log trucks			N/A	3	2	15
B2	High stacker	1	100%	33%		N/A	
B3	Loaders	1	50%	50%		N/A	
C Southern logyard							
C1	Log truck			N/A	22	11	15
C2	High stacker	4	100%	50%		N/A	
C3	Loaders	2	100%	100%		N/A	
D Wharf							
D1	Maffi (dedicated to ship)	1	100%	100%		N/A	
D2	Excavators (included in log ship source)	-	N/A	N/A		N/A	
D3	Log ship stack (Wharf 8)	1	100%	100%		N/A	
D4	Log ship cranes (Wharf 8)	4	100%	100%		N/A	
E Debarking							
E1	Debarker	1	53%	89%		N/A	
E2	Loader for debarker	1	40%	22%		N/A	
F Port-wide equipment							
F1	4x maffi spread across all log yards	1	400%	400%		N/A	
F2	Sweeper	1	33%	22%		N/A	
F3	Water truck (full log yard)	1	33%	44%		N/A	
F4	Loader over whole site (odd jobs)	1	22%	22%		N/A	
G Kiwifruit/squash operations							
G1	Container trucks	1		N/A	2	0	15
G2	Container forklift (truck unloading, diesel)	1	27%	4%		N/A	
G3	Reefer ship (Wharf 7)	1	40%	40%		N/A	
G4	Coolstore (negligible noise)	-	N/A	N/A		N/A	



MARSHALL DAY Acoustics Figure 3A: Noise Model Assumptions (Current Operations)
All port operations



Scenario A 1 LOG SHIP AND 1 KIWIFRUIT SHIP (current operations)			Info sourced from Marty Bayley (EP), Andy Kinsella (EP), Paul Coker (ISO) and Rod Blake (EP ops manager)				
Eastland Port noise model inputs Peak 5-day period during the year			Site activities 'on-time'		Movements (average hour)		
Code	Model Source Description	Number of sources in model	Day (07-22)	Night (22-07)	Day (07-22)	Night (22-07)	km/hr
A	Upper yard						
A1	Log Trucks	1		N/A	6	3	15
A2	Log Loaders	2	100%	100%		N/A	
A3	High stacker	2	100%	0%		N/A	
B	Wharfside logyard						
B1	Log trucks			N/A	3	2	15
B2	High stacker	1	100%	33%		N/A	
B3	Loaders	1	50%	50%		N/A	
C	Southern logyard						
C1	Log truck			N/A	22	11	15
C2	High stacker	4	100%	50%		N/A	
C3	Loaders	2	100%	100%		N/A	
D	Wharf						
D1	Maffi (dedicated to ship)	1	100%	100%		N/A	
D2	Excavators (included in log ship source)	-	N/A	N/A		N/A	
D3	Log ship stack (Wharf 8)	1	100%	100%		N/A	
D4	Log ship cranes (Wharf 8)	4	100%	100%		N/A	
E	Debarking						
E1	Debarker	1	53%	89%		N/A	
E2	Loader for debarker	1	40%	22%		N/A	
F	Port-wide equipment						
F1	4x maffi spread across all log yards	1	400%	400%		N/A	
F2	Sweeper	1	33%	22%		N/A	
F3	Water truck (full log yard)	1	33%	44%		N/A	
F4	Loader over whole site (odd jobs)	1	22%	22%		N/A	
G	Kiwifruit/squash operations						
G1	Container trucks	1		N/A	2	0	15
G2	Container forklift (truck unloading, diesel)	1	27%	4%		N/A	
G3	Reefer ship (Wharf 7)	1	40%	40%		N/A	
G4	Coolstore (negligible noise)	-	N/A	N/A		N/A	

