MARSHALL DAY Acoustics

STELLA PASSAGE
FAST-TRACK APPLICATION
CONSTRUCTION NOISE

Rp 001 20240814 | 13 February 2025

84 Symonds Street
PO Box 5811
Victoria Street West
Auckland 1142 New Zealand
T: +64 9 379 7822 F: +64 9 309 3540
www.marshallday.com

Project: **STELLA PASSAGE FAST-TRACK APPLICATION**

Prepared for: **Port of Tauranga Limited**
C/- Mitchell Daysh
33 Totara Street
Mount Maunganui 3116

Attention: **Steve Tuck**

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1.0 EXCUTIVE SUMMARY

Port of Tauranga Limited's (**POTL**) Stella Passage Project (the **project**) is a project listed under the Fast-track Approvals Act 2024 (**FTA**) for direct referral to an expert panel.

1.1 Scope of Assessment Undertaken

Hegley Acoustic Consultants prepared a noise report in 2022 for similar activities. The Hegley report has informed our assessment, but the project has since been reconfigured, so we have undertaken a new assessment based on what is currently proposed.

This assessment addresses the project's potential construction noise effects on people. Ultimately, it focuses on the noise effects from pile driving (the loudest activity) received by residents at Whareroa Marae (the closest noise sensitive receivers) during the day. We have also assessed the noise effects of 24/7 dredging.

Construction-related vibration is predicted to be imperceptible at the closest sensitive receivers due to the very large setback distances. Therefore, vibration is not addressed in detail in this assessment.

A glossary of relevant technical terminology is provided in Appendix A.

1.2 Environmental Effects Identified

Pile driving and dredging noise received at Whareroa Marae is predicted to easily comply with the daytime construction noise limits specified in NZS 6803:1999 Acoustics – Construction (the **construction noise standard**).

Dredging noise is predicted to generally comply with the 45 dB L_{Aeq} night-time limit in the construction noise standard. The exceptions are BHD dredging noise levels are predicted to be up to 46 dB L_{Aeq} and TSHD dredging up to 47 dB L_{Aeq} at the most exposed façade of the dwelling at 27 Taiaho Place and only when dredging occurs in a particular portion of the dredging footprint (see Figure 2). Notwithstanding these very small potential exceedances of the night-time construction noise limit in the construction noise standard, construction noise levels are well below the night-time port noise limits specified in RCP Rule PZ1 (b) and (c).

1.3 Assessment of Environmental Effects

Impact pile driving will likely be audible at Whareroa Marae due to its impulsive character, but will not materially elevate the existing ambient noise environment. We conclude that the effects of noise generated by landward construction activities will be negligible.

We consider there is a low likelihood of sleep disturbance arising from night-time dredging and the noise effects are reasonable due to reasons detailed in Section 5.2.4.

1.4 Recommendations and Mitigation Measures

We support POTL's proposed construction noise management measures for pile driving activities:

- Prioritise vibratory pile driving methods over impact pile driving methods where practicable;
- Timber piles will be used for the piles closest to Whareroa Marae that are associated with the penguin ramp (as these are quieter to install in comparison to driving steel piles);
- Pile driving will be limited to the daytime period; and
- POTL propose the following consent condition to reflect previous consultation between POTL and Whareroa Marae: *"Piling at the Butters Landing/Bunker wharf area will be suspended for 3 days where piling noise is above 50 dB L_{Aeq} and when the Port has been advised 24 hours in advance of a Tangihanga at the Whareroa Marae*".

We recommend that dredging activities in inside the red polygon in Figure 2 (refer Section 5.2.2) are undertaken during the day or evening periods where practicable.

2.0 PROJECT DESCRIPTION

2.1 Overview

The project is detailed in the Assessment of Environmental Effects (**AEE**)[1]. The project masterplan is included in Appendix B for reference. In short, it features:

- Sulphur Point and Mount Maunganui wharf extensions and reclamations; and
- Dredging in the Coastal Marine Area (**CMA**) adjacent to the Sulphur Point wharf extensions.

2.2 Environment Court (NZEnvC 270)

The Environment Court[2] issued an Interim Decision in relation to the project which authorised a limited first stage of dredging and wharf development at Sulphur Point subject to a series of directions. A decision on the balance of dredging, balance of Sulphur Point wharf and whole Mount Maunganui scope is reserved.

Section 6.18 of the Environment Court's Interim Decision addressed the construction noise effects at Whareroa Marae (paragraphs 507 – 516). It relied on the expert evidence of Mr Nevil Hegley, dated 30 September 2022 (the **Hegley noise evidence**). Mr Hegley's evidence relied on his Assessment of Noise report No. 22057 (the **Hegley noise assessment**), attached to the Hegley noise evidence.

In summary:

- The Hegley noise assessment focusses on pile driving noise (the loudest activity). It measured nearby representative impact and vibratory pile driving activities and predicted the noise levels received at Whareroa Marae would be less than 55 dB L_{Aeq}. It stated that the predicted noise levels are "*below the background noise level created by the highway*" and well below the daytime construction noise limit of 70 dB L_{Aeq} (Section 4.3).
- Paragraph 511 of the Environment Court decision detailed proposed conditions 11.10 and 11.11 to address pile driving noise. We understand that the same proposed conditions will be offered again for consistency. Those conditions are reproduced below for reference:

  > 11.10 Piling operations and other significant noise emitting activities shall not be undertaken on Sundays and Public Holidays; and shall only be performed between the following times subject to the further limitation set out in condition 16.8 where daylight hours are shorter than the hours listed below:
  >
  > a) Monday to Friday 7.30am to 8.00pm
  >
  > b) Saturday 9.00am to 7.00pm
  >
  > 11.11 Piling at the Butters Landing/Bunker wharf area will be suspended for 3 days where piling noise is above 50dB LAeq and when the Port has been advised 24 hours in advance of a Tangihanga at the Whareroa Marae.

- Proposed condition 11.10 constrains pile driving to daylight hours, Monday to Saturday. We note paragraph 512 of the Environment Court decision links the daylight constraint to enabling effective marine mammal observation.

[1] Mitchell Daysh Limited 2025.

[2] Port of Tauranga Ltd v Bay of Plenty Regional Council [2023] NZEnvC 270

2.3 Construction Methodology

A detailed construction methodology is not available at this design stage. Instead, and for consistency, this assessment uses the representative assumptions and representative pile driving measurements previously detailed in the Hegley noise assessment (Section 2.2).

In summary:

- *2 crawler cranes in general (1 piling, 1 general work)*
- *1 excavator, handling rock rip rap or moving sand around*
- *2 compressors (1 for cleaning down form work, one for below water air curtain)*
- *Grinding*
- *Welding to splice piles being driven*
- *Vibrators during concrete placement*
- *Dumping of rock from truck into skip (up to 10 loads a day)*
- *Rock tipped from skip*
- *Piling, expected to drive 5 - 7 piles in 5 days*
- *Pile diameter 800mm*
- *Reinforcing cage will be lowered into pile by crane and filled with concrete*
- *A reinforced concrete deck will be formed on top of the piles*

The Hegley noise assessment focused on the pile driving, stating: *"Piling will be the noisiest activity by a significant amount. Thus, when piling there will not be any perceptible cumulative noise effects from other construction activities that may occur at the same time. Therefore, if the noise from piling is within a reasonable level, then all construction activities will be within a reasonable level."*

We agree with the above statement for daytime construction and include our assessment of pile driving noise in Section 5.1. However, in our experience, large concrete pours often commence before dawn and dredging activities can operate 24 hours per day. Dredging is predicted to be both the loudest and longest duration activity of the two at night, so we also assess potential night-time dredging activities in Section 5.2.

3.0 EXISTING ENVIRONMENT

3.1 Description

We are familiar with the Port and surrounding receiving environment. In general, the land is relatively flat. Port related industrial buildings and activities occupy the land near the proposed wharf construction works. Whareroa Marae is the closest noise sensitive receiver, just over 200 m away from the closest proposed works. The Marae is positioned on the harbours edge, between State Highway 2 (**SH2**) and Tauranga Airport. Ōtūmoetai and the Tauranga city centre are the next closest noise sensitive receivers to the Port, but are over 800 m away. Therefore, Whareroa Marae is the focus of this noise assessment, an approach which aligns with the Hegley noise assessment.

The closest dwelling at Whareroa Marae to the area of the proposed works is identified in Figure 2 (refer Section 5.2.2). The dwelling is approximately:

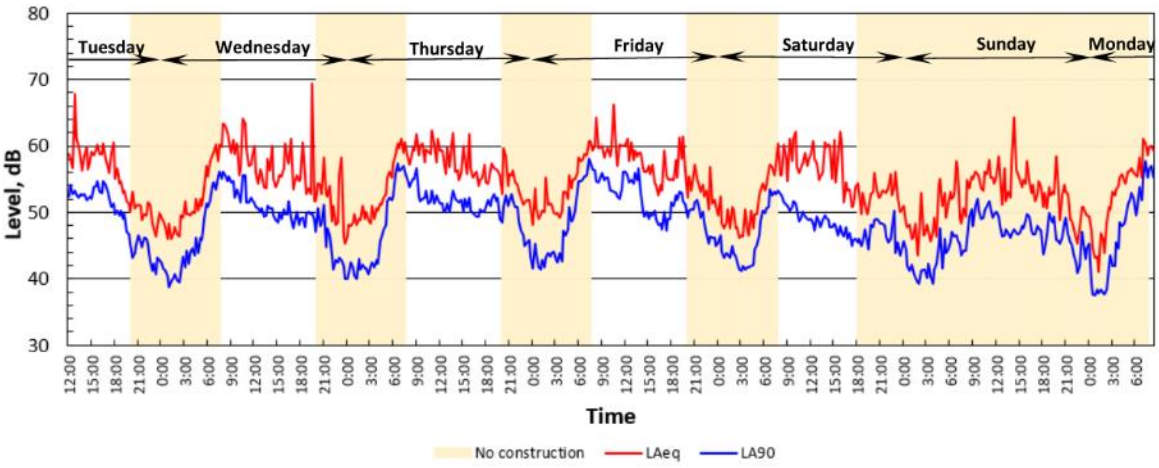
- 250 m from the closest bunker barge piles (impact and/or vibro driven steel piles);
- 230 m from the closest penguin ramp pile (impact driven timber piles);
- 400 m from the closest dredging works; and

- 800 m from the closest Sulphur Point and Mount Maunganui wharf extensions or reclamations

3.2 Noise environment

The Hegley noise assessment included noise monitoring undertaken adjacent to Whareroa Marae. We understand the proxy measurement location was near the Balance Agriculture site boundary at a similar setback from the Port. The measurements were undertaken in fine, mild weather conditions over a six-day period from Tuesday 2 August to Monday 8 August 2022, with typical traffic volumes (SH2). The measured noise levels were shown graphically in Figure 11 of the noise assessment. The Figure is reproduced as Figure 1 below.

Figure 1: Hegley report (*Figure 11. Existing noise environment*)



In summary:

- Daytime ambient noise levels were typically between 55 – 60 dB $L_{Aeq\ (15min)}$ Monday to Saturday, while the background noise level was typically 50 dB $L_{A90\ (15min)}$.
- At night, the noise levels reduced in accordance with a typical diurnal pattern observed near a busy road. The ambient levels reduced to 45 – 50 dB $L_{Aeq\ (15min)}$ and the background levels reduced to 40 – 45 dB $L_{A90\ (15min)}$.

We are not aware of any changes in the area since the Hegley noise assessment was prepared that would materially affect the representative noise environment set out in the Hegley noise assessment. We have therefore relied upon it for consistent baseline analysis.

3.3 Site visit

We visited POTL and the representative receiving environment near Whareroa Marae on Wednesday 20 November 2024. Short-term noise measurements were taken in the late morning, early afternoon and early evening. Our measurements were taken near the closest dwelling[3] at Whareroa Marae as shown in Appendix C. A westerly (downwind) breeze resulted in representative 'worst-case' noise levels received from SH2 traffic (similar propagation conditions to those modelled in Section 5.0).

The measurement results are detailed in Table 1. In summary, the measured levels and character descriptions from the Hegley noise monitoring (Section 3.2) remain representative for the Marae.

[3] Parcel ID: 0674428402, Legal Description: SEC 4 SO 438687 SEC 3 SO 438687

Table 1: Noise monitoring on 20 November 2024 at closest dwelling

Start	Duration	Noise Level			Description
	mm:ss	dB L_{AFmax}	dB L_{Aeq}	dB L_{A90}	
11:12am	15:09	74	58	50	Controlled by SH2 road traffic. Port not obviously audible. Other intermittent sounds include plane flyovers (2 @ 72 dB $L_{Aeq\ 1sec}$), light vehicle movements accessing boat ramp, birds chirping, scissor lift at Balance Fertiliser site. 7/8 cloud cover, light westerly (~1m/s).
3:33pm	15:01	72	60	56	Same as above: Controlled by SH2 road traffic. 2/8 cloud cover, moderate westerly (~5m/s).
10:38pm	15:01	65	56	50	Same as above: Controlled by SH2 road traffic. 0/8 cloud cover, moderate westerly (~4m/s).

4.0 PERFORMANCE STANDARDS

4.1 Bay of Plenty Regional Coastal Environment Plan (RCEP)

Construction activities in the CMA are controlled by the Bay of Plenty Regional Coastal Environment Plan (**RCEP**). Construction activities on land are controlled by the Tauranga City Plan (**TCP**) (discussed in Section 4.2, below).

RCEP Policy PZ 10 requires decision makers to:

> "*Manage noise from the Port of Tauranga using the Port Zone noise control boundary and appropriate standards".*

RCEP Map 11c (Appendix D) shows that proposed construction activities are in the Tauranga Harbour Port Zone, spanning both the CMA (dredging, reclamations and wharf extensions) and terrestrial environment (reclamations and wharf extensions).

RCEP Rule PZ 1 is the only Port Zone noise rule. It requires noise from activities within the Port Zone to be assessed in accordance with NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning (the **Port Noise Standard**). It also limits permitted noise emissions to the levels specified in sub-clauses (a), (b) and (c) of the rule.

Clause 1.6 of the Port Noise Standard precludes the assessment of construction noise, stating:

> *"Assessment or control of construction noise associated with facilities and structures, other than noise associated with maintenance, repair or construction of ships at any port, requires special measurement and assessment techniques that are outside the scope of this Standard. These activities may be assessed using the relevant New Zealand Standard dealing with construction noise. See list of related documents."*

The list of related documents referred to includes the Construction Noise Standard, discussed at Section 4.3 below. Therefore, the Construction Noise Standard is the "*relevant New Zealand Standard dealing with construction noise*" for the purposes of clause 1.6 of the Port Noise Standard and is the "*appropriate standard*" in terms of RCEP Policy PZ 10 for assessing construction noise generated in the CMA at the Port Zone. This ensures a consistent method to assess construction noise across the CMA and terrestrial environments, noting the TCP applies the Construction Noise Standard in the latter (as detailed in Section 4.2 below).

4.2 Tauranga City Plan (TCP)

Construction activities on land are controlled by the TCP.

The relevant TCP maps and rules are reproduced for reference in Appendix E:

- The TCP map shows that proposed construction activities on POTL's land are in the *Port Industry Zone*. Other nearby land is zoned either *Open Space, Industry* or *Urban Marae Community* (i.e. Whareroa Marae). Further afield, Tauranga Airport is to the east of the Port Industry Zone, the suburb of Otūmoetai is to the west, and the Tauranga Central Business District (**CBD**) is to the south.
- Rule 4E.2.7 sets Port Industry Zone noise rules that apply at the Port Noise Control Boundaries. The Port Noise Control Boundaries are shown on Diagram 4, Section 5, Plan Maps Part B. The boundaries are consistent with those in the RCEP (Section 4.1). The port operations noise limits must be measured and assessed in accordance with the Port Noise Standard, consistent with the RCEP (Section 4.1).
- Rule 4E.2.14 requires that construction noise must be measured and assessed in accordance with, and comply with, the recommended limits in the Construction Noise Standard (Section 4.3).

4.3 NZS 6803:1999 Acoustics – Construction Noise

The TCP requires that construction noise from activities on land, received at Whareroa Marae, must be measured and assessed accordance with NZS 6803:1999 "*Acoustics – Construction Noise*" (the **Construction Noise Standard**). We have also used the Construction Noise Standard to assess construction activities in the CMA for RCEP Policy PZ10 and ensure consistency.

Clause 7.1.1 states: "*This section specifies desirable upper limits for construction noise received by the community for the reasonable protection of health and amenity. The desirable limits vary according to the type of land use, time of day and anticipated duration of the construction work. The best practicable options should always be adopted to ensure that the emission of noise from the site is minimised*".

The recommended noise limits in section 7 of the Construction Noise Standard are reproduced in Appendix F. The recommended noise limits apply at 1m outside the façades of occupied buildings.

The proposed construction is of long-term duration. Pile driving will be undertaken during the daytime, Monday to Saturday. Other quieter activities may be undertaken at any time (e.g. concrete pour and dredging).

The key noise limits from the Construction Noise Standard are:

- 70 dB L_{Aeq} and 85 dB L_{AFmax} during the daytime works, Monday to Saturday; and
- 45 dB L_{Aeq} and 75 dB L_{AFmax} during works at night-time.

Clause 7.2.6 states: "*One major factor which should be considered is whether there is a relatively high background sound level (L_{90}) due to noise from sources other than construction work at the location under investigation. In such cases limits should be based on a determination of the existing level of noise in the area (a "background plus" approach)."*

The "background plus" approach is not defined in NZS 6803:1999, but was defined in the now superseded version of 6802:1991 (Assessment of Environmental Noise). 6802 Clause 4.2.1 notes that the limit should not exceed the background sound level by 10 dB or more. It highlights limitations of this approach and that "*reaction to the sound might depend more on any special audible characteristics than on the extent to which the background sound level is exceeded*".

Section 3.2 identified background noise levels of approximately 50 dB L_{A90} during the day and 40 – 45 dB L_{A90} at night. There is no basis for raising the daytime construction noise limits, but night-time noise limits of up to 50 dB L_{Aeq} could be justified in the absence of special audible characteristics (e.g. tonal or impulsive components of the sound that disproportionately draw attention). This is discussed in relation to dredging noise effects at night (refer Section 5.2.4).

5.0 CONSTRUCTION NOISE ASSESSMENT AT WHAREROA MARAE

5.1 Pile driving

5.1.1 Hegley noise assessment predictions

As explained in Section 2.3, the Hegley noise assessment focuses on pile driving activities during the day. The closest proposed pile driving activities remain the same as those assessed in the Hegley noise assessment. The Hegley noise assessment included representative noise modelling for pile driving near Whareroa Marae. Three figures were produced:

- Figure 8: The closest bunker barge steel pile – impact driven;
- Figure 9: The closest bunker barge steel pile – vibro driven; and
- Figure 10: The closest penguin ramp timber pile – impact driven.

The noise source levels were from comparable pile driving measured at Mount Maunganui:

- Impact steel pile driving: 86 dB L_{Aeq} at 40m (approx. 126 dB L_{WA});
- Vibro steel pile driving: 75 dB L_{Aeq} at 30m (approx. 106 dB L_{WA}); and
- Impact timber pile driving: 77 dB L_{Aeq} at 20m (approx. 114 dB L_{WA}).

The noise model was prepared in Brüel & Kjær Predictor using the propagation algorithm in ISO 9613 and the following model settings:

- Pile driving noise source heights of 4m in each case;
- Ground absorption of 0 over water and 0.7 on land;
- 10m calculation grid spacing; and
- Noise contour receiver height of 1.5m.

The Hegley noise assessment predicted noise levels of up to 55 dB L_{Aeq} and 73 dB L_{AFmax} for impact driving the closest steel pile, and below 50 dB L_{Aeq} and 67 dB L_{AFmax} for the other two piling methods.

We generally agree with the model methodology and assumptions in the Hegley noise assessment. In our experience, the noise source level measured for impact steel pile driving is at the upper range, with more representative levels 5 – 10 decibels lower. Conversely, the noise source level measured for vibro steel pile driving is representative, but the upper range would be 5 – 10 decibels higher. As both pile driving methods are often used sequentially, the predicted noise levels for impact and vibro pile driving provide a range of maximum to representative levels respectively.

5.1.2 Our noise assessment predictions

We have reproduced the three modelled scenarios in SoundPLAN (a comparable proprietary noise modelling software to Brüel & Kjær Predictor used by Hegley). The following noise modelling figures are included in Appendix G:

- Figure 10: Bunker Barge piling (impact driven steel piles);
- Figure 11: Bunker Barge piling (vibro driven steel piles); and
- Figure 12: Penguin Ramp piling (impact driven timber piles).

Our results generally align with the Hegley noise assessment. Notably, Figure 10 predicts noise levels of up to 58 dB L_{Aeq} received at the closest dwelling at Whareroa Marae during impact driving the closest steel pile at the Bunker Barge jetty. Figure 11 and Figure 12 show the noise levels from the other two piling methods are well below 50 dB L_{Aeq}. An important component of the results to note is that the adjacent industrial buildings effectively screen Whareroa Marae, reducing the received noise levels.

The proposed Sulphur Point extension is much further away from Whareroa Marae, but impact driving the closest steel pile at the southern extent will not benefit from screening to the same extent as is the case for construction activities undertaken at the Bunker Barge jetty. Figure 13 predicts noise levels of up to 57 dB L_{Aeq} received at the most exposed dwelling at 27 Taiaho Place. Therefore, similar noise levels to those received from the closest pile driving carried out at the much closer Bunker Barge jetty.

While we have focussed on the representative worst case piling noise levels, if two piling rigs were driving piles simultaneously, the predicted cumulative noise level could be slightly higher (e.g. 1 – 3 decibels). This is generally an indiscernible change in level. What may be more apparent is the potential increase in piling noise duration with two rigs operating.

Overall, pile driving noise received at Whareroa Marae is predicted to easily comply with the permitted daytime construction noise limits specified in the Construction Noise Standard, and the noise limits specified in RCEP rule PZ 1. Impact pile driving will likely be audible at times due to its impulsive character, but will not materially elevate the existing ambient noise environment described in Section 3.2.

5.1.3 Proposed condition of consent

The following consent condition was previously proposed following consultation between POTL and Whareroa Marae:

> "*Piling at the Butters Landing/Bunker wharf area will be suspended for 3 days where piling noise is above 50 dB L_{Aeq} and when the Port has been advised 24 hours in advance of a Tangihanga at the Whareroa Marae*".

We accept the outcomes of that consultation, but note:

- Both the Hegley noise assessment, and this subsequent assessment, predict that only impact pile driving is predicted to be above 50 dB L_{Aeq} at Whareroa Marae.
- Impact pile driving at Sulphur Wharf extension is also predicted to be above the 50 dB L_{Aeq} at times (not just the Butters Landing/Bunker wharf area). However as noted in Section 5.1.1, the predicted noise levels are conservative, and representative piling noise levels are routinely verified through monitoring at the commencement of works.

5.2 Dredging

5.2.1 Dredging methodology

As discussed in Section 2.3, in our experience, dredging activities can operate 24 hours per day. Dredging is predicted to be both the loudest and longest duration activity at night. Two dredging methods are proposed:

- Backhoe dredger (BHD): An excavator that digs up sediment from a stationary pontoon.
- Trailing suction hopper dredger (TSHD): A vessel that sucks up sediment as it travels slowly.

5.2.2 BHD

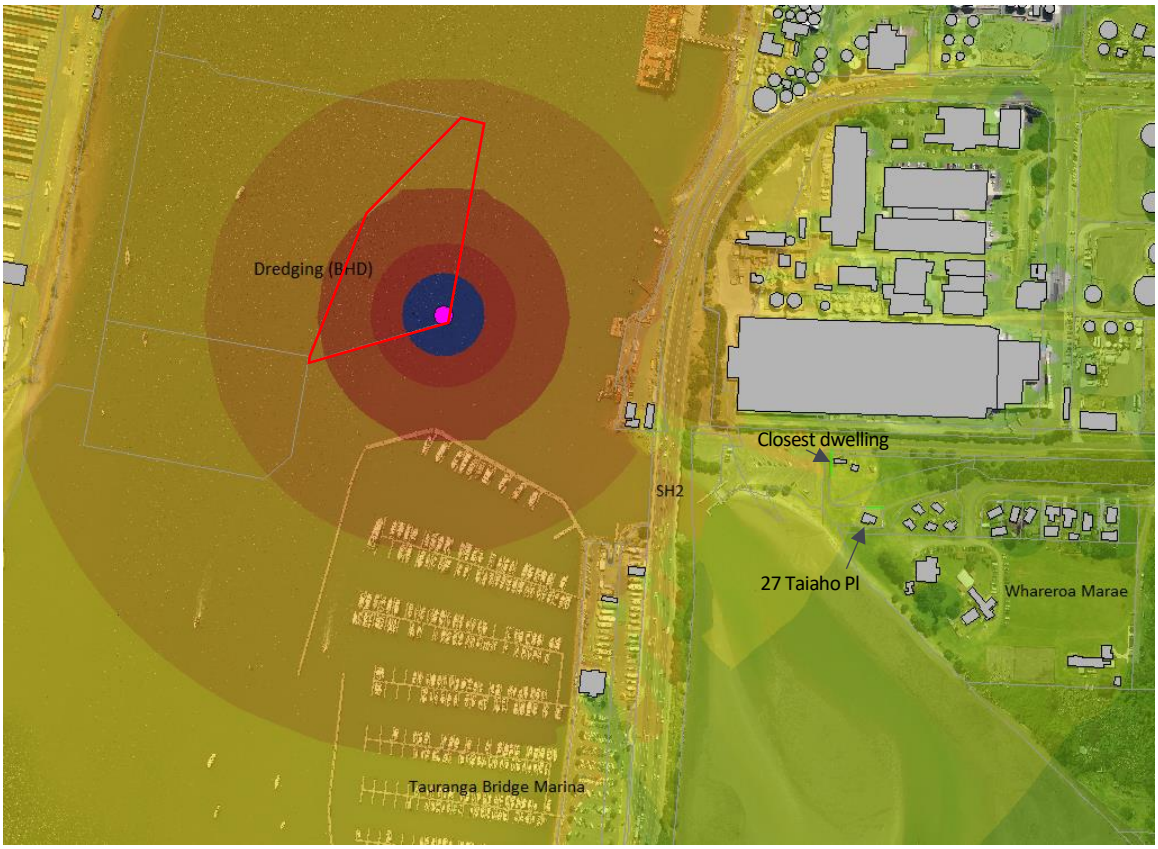
Figure 14 (refer Appendix G) predicts BHD dredging noise at the closest position relative to Whareroa Marae. The representative source level is based on measurements of Heron's largest backhoe dredge operating in Auckland's Waitematā harbour with a calculated sound power level of 110 dB L_{WA}.

BHD dredging noise levels received at Whareroa Marae are predicted to be generally between 30 – 45 dB L_{Aeq}, which complies with the night-time limit of 45 dB L_{Aeq} recommended in the Construction Noise Standard. Note the closest dwelling[4] (see Figure 2) is screened by a close boarded 1.8m high

[4] Parcel ID: 0674428402, Legal Description: SEC 4 SO 438687 SEC 3 SO 438687

timber fence and predicted to receive levels of up to 43 dB L_{Aeq}. The exception is BHD dredging inside the red polygon, received at 27 Taiaho Place identified in Figure 2. BHD dredging noise levels are predicted to be up to 46 dB L_{Aeq} at the most exposed façade.

Figure 2: Extent of potential dredging night-time noise infringement identified by red polygon



5.2.3 TSHD

Figure 15 (refer Appendix G) predicts TSHD dredging noise at the boundary closest to Whareroa Marae, while travelling north – south at a speed of approximately 2 knots. The representative source level is based on measurements of Heron's 'New Era' dredge operating at Port Otago with a calculated sound power level of 112 dB L_{WA}.

TSHD dredging noise levels received at Whareroa Marae are predicted to be generally between 35 – 45 dB L_{Aeq}. The exception is TSHD dredging inside the red polygon received at 27 Taiaho Place identified in Figure 2 above. TSHD dredging noise levels are predicted to be up to 47 dB L_{Aeq} at the most exposed façade. Note The closest dwelling is screened by a close boarded 1.8m high timber fence and predicted to receive levels of up to 43 dB L_{Aeq}.

5.2.4 Dredging noise effects

Exceedances of the 45 dB L_{Aeq} construction noise limit are predicted to be small and isolated (up to 2 decibels at 27 Taiaho Place). A difference in level of 1-2 decibels is generally indistinguishable, whereas 3-4 decibels is just noticeable. The construction noise levels are also well below the night-time port noise limits specified in RCP Rule PZ1 (b) and (c). The character of noise from BHD and TSHD dredging activities would be generally perceived as a stable 'hum'. Therefore, while dredging could be audible, it is unlikely to be distinguishable from other permitted noise sources (e.g. road traffic or port activities).

The highest predicted noise level of 47 dB L_{Aeq} is below the 50 dB L_{Aeq} noise threshold that would otherwise be deemed appropriate using the 'background plus' approach discussed at Section 4.3.

The primary noise effects are those received inside bedrooms at night. The indoor noise level is generally controlled by any open window path. A partially open hinged window on a standard 100mm deep security stay is representative in a bedroom at night. Conventionally, the internal noise level is estimated be 15 decibels lower than the external incident noise level. Therefore, noise levels within a bedroom on the most exposed façade, of the closest dwelling, with an open window, would be between 25 – 30 dB L_{Aeq} inside.

AS/NZS 2107: 2016 provides the following design level ranges for "*Sleeping areas (night time)*" to enable evaluation of the internal noise levels:

- *Houses in rural areas with negligible transportation: 25 – 30 dB L_{night}*
- *Houses and apartments in suburban areas or near minor roads: 30 – 35 dB L_{night}*
- *Houses and apartments in inner city areas or entertainment districts or near major roads: 35 – 40 dB L_{night}*

We consider there is a low likelihood of sleep disturbance from any dredging activities. Therefore, we consider the noise effects are reasonable.

6.0 CONSTRUCTION NOISE MANAGEMENT

We support the construction noise management measures for pile driving activities previously summarised in the Hegley noise assessment. Namely:

- Prioritise vibratory pile driving methods over impact pile driving methods where practical;
- Timber (instead of steel) piles will be used for the piles associated with the penguin ramp as these are the nearest piles to a sensitive receptor;
- Pile driving will be limited to the daytime period; and
- Impact pile driving at Butters Landing will be suspended for 3 days where piling noise levels are above 50 dB L_{Aeq} and the Port has been advised 24 hours in advance of a Tangihanga at the Whareroa Marae.

7.0 CONSULTATION

We have reviewed the Cultural Value Assessments (CVA's) and Cultural Impact Assessments (CIA's). This construction noise assessment was identified by some, but there are no questions, requests or recommendations. Concerns about port operations noise are outside the scope of this assessment.

8.0 CONCLUSIONS

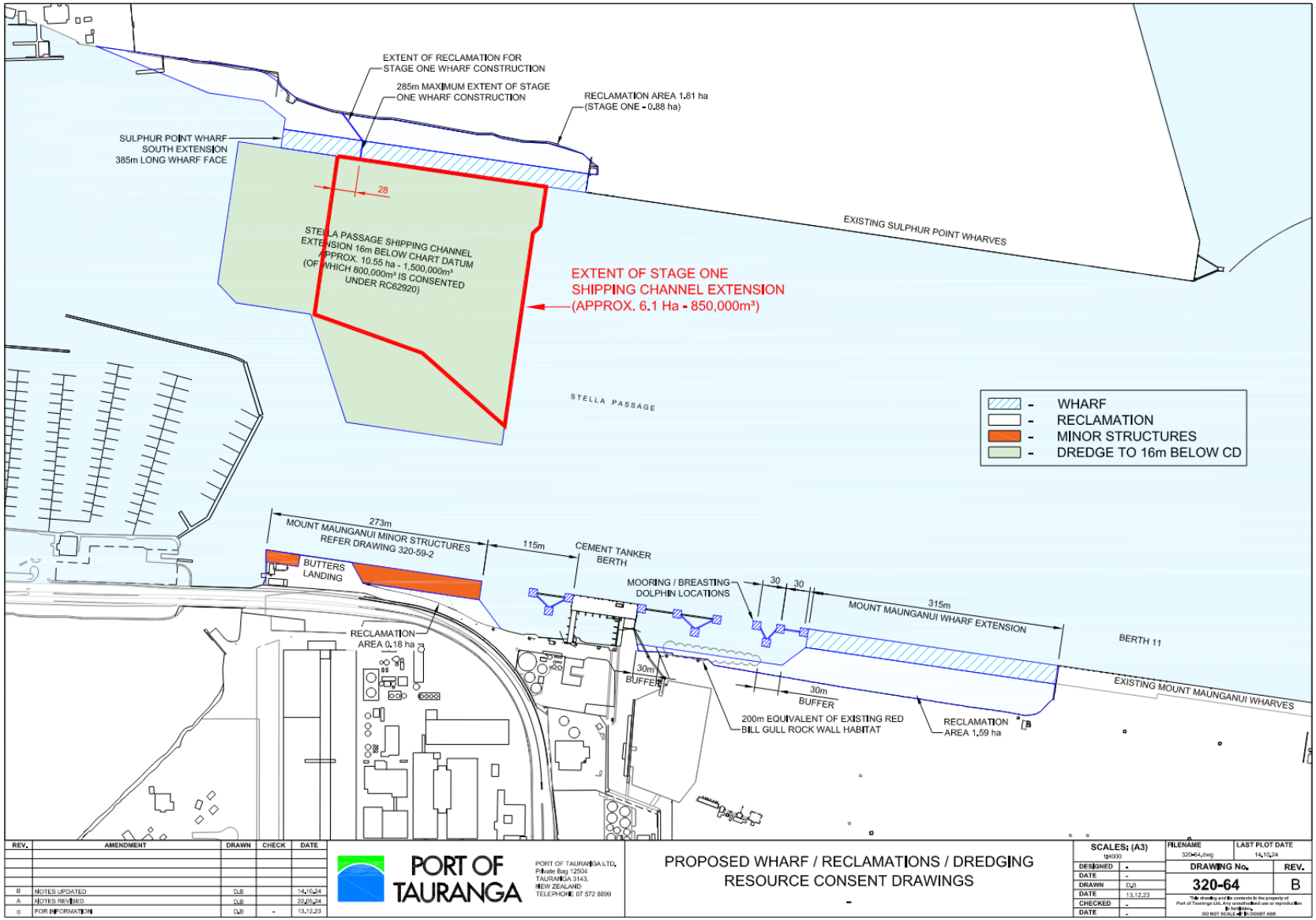
Daytime construction activities are predicted to readily comply with the limits specified in the Construction Noise Standard. We agree with the conclusion in the Hegley noise assessment for a very similar project configuration that "*Noise from the proposed construction works will be at or below the existing noise environment for all dwellings within the Marae. When coupled with the proposal to suspend piling* [at Butters Landing] *where piling noise is above 50dB L_{Aeq} during a Tangihanga at the Marae, the effects of the proposed construction work are considered to be negligible for anyone on the Marae*".

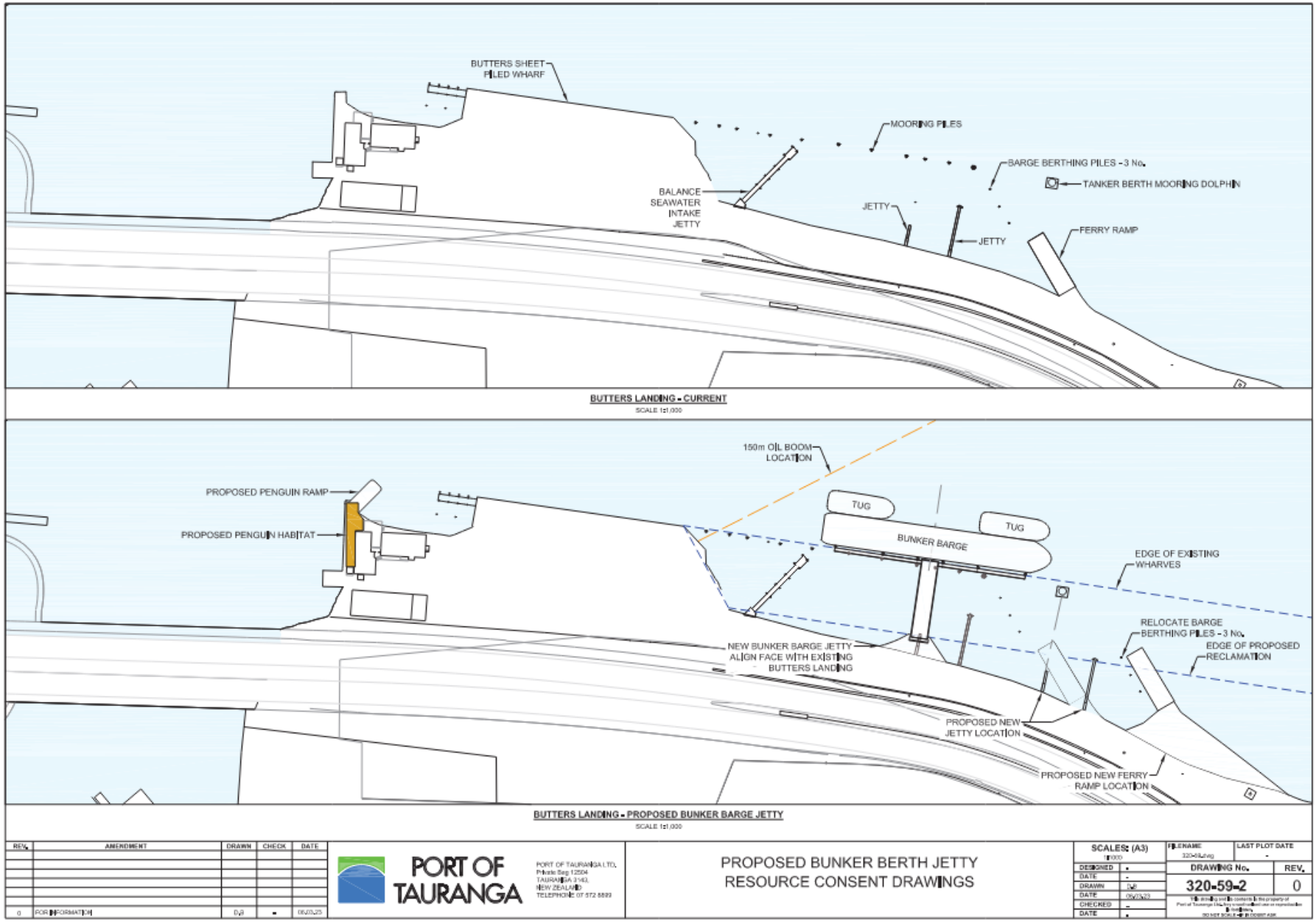
Dredging is predicted to generally comply with the 45 dB L_{Aeq} night-time noise limit specified in the Construction Noise Standard. The exceptions are BHD dredging noise levels are predicted to be up to 46 dB L_{Aeq}, and TSHD dredging up to 47 dB L_{Aeq}, at the most exposed façade of the dwelling at 27 Taiaho Place and erroonly when dredging occurs in a particular portion of the dredging footprint (see Figure 2). However, we consider there is a low likelihood of sleep disturbance and the noise effects are reasonable for the reasons detailed in Section 5.2.4. The construction noise levels are also well below the night-time port noise limits specified in RCP Rule PZ1 (b) and (c).

APPENDIX A GLOSSARY OF TERMINOLOGY

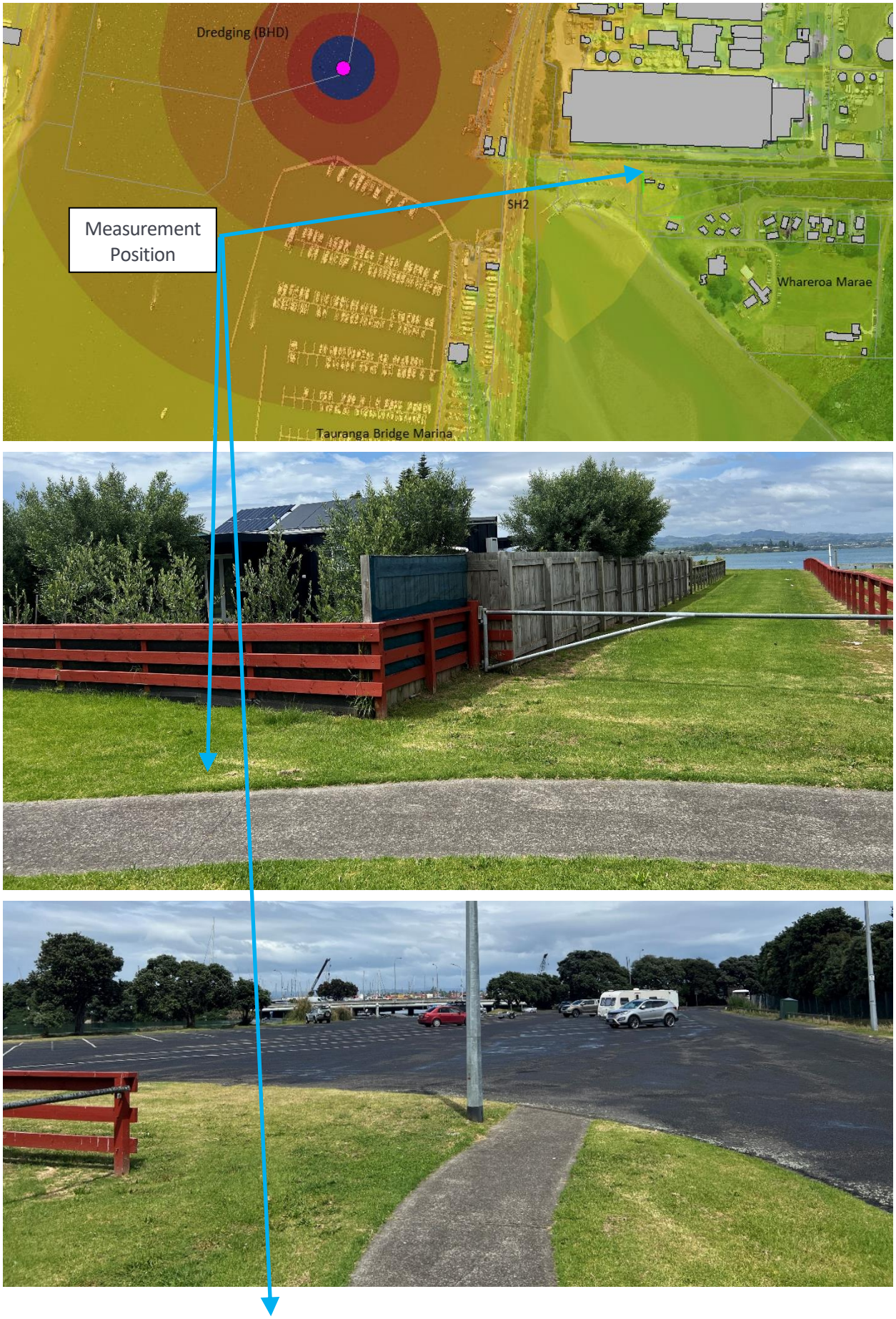
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr). The convention is a reference pressure of Pr = 20 μPa in air.
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
L_{dn}	The day night noise level which is calculated from the 24 hour L_{Aeq} with a 10 dB penalty applied to the night-time (2200-0700 hours) L_{Aeq}.
Noise	A sound that is unwanted by, or distracting to, the receiver.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 *"Acoustics – Measurement of environmental sound"*
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"
NZS 6809:1999	New Zealand Standard NZS 6809:1999 "Acoustics – Port Noise Management and Land Use Planning"

APPENDIX B STELLA PASSAGE PLANS





APPENDIX C SITE VISIT MEASUREMENT POSITION



APPENDIX D BAY OF PLENTY REGIONAL COASTAL ENVIRONMENT PLAN

Figure 3: RCEP Map 11C (in part)

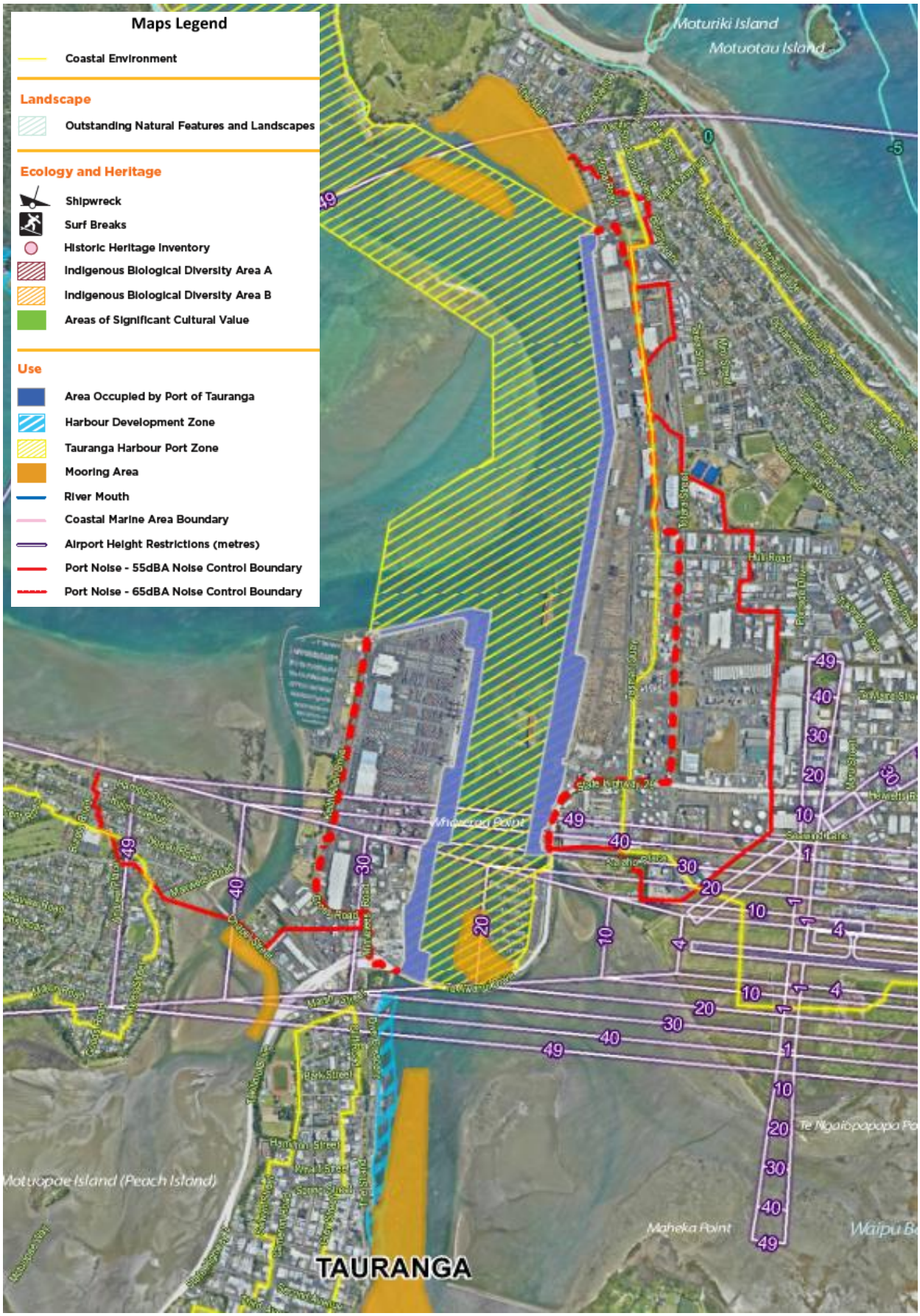


Figure 4: RCEP, Section 9.2, Port Zone Rule PZ1

Rule PZ 1 **Permitted – Noise from activities in the Port Zone**

The emission of noise from activities in the coastal marine area of the Port Zone is a permitted activity, subject to the noise not exceeding the following conditions:

(a) The long-term average sound level (Ldn) from all activities within the Port Zone shall not exceed 55 dBA at any point outside the 55 dBA noise control boundary (shown on Map Sheet 11c) nor 65 dBA at any point outside the 65 dBA noise control boundary;

(b) No single 15-minute sound measurement level shall exceed 65 dBA Leq between 2200 and 0700 at any point outside the 65 dBA noise control boundary;

(c) The night-time maximum sound level (Lmax) shall not exceed 85 dBA at any point outside of the 65 dBA noise control boundary;

(d) Sound levels shall be measured in accordance with NZS 6801:2008 Acoustics - Measurement of Sound and assessed in accordance with NZS6809:1999 Acoustics – Port Noise Management and Land Use Planning.

APPENDIX E TAURANGA CITY PLAN

Figure 5: Tauranga City Plan Zoning Map (in part)

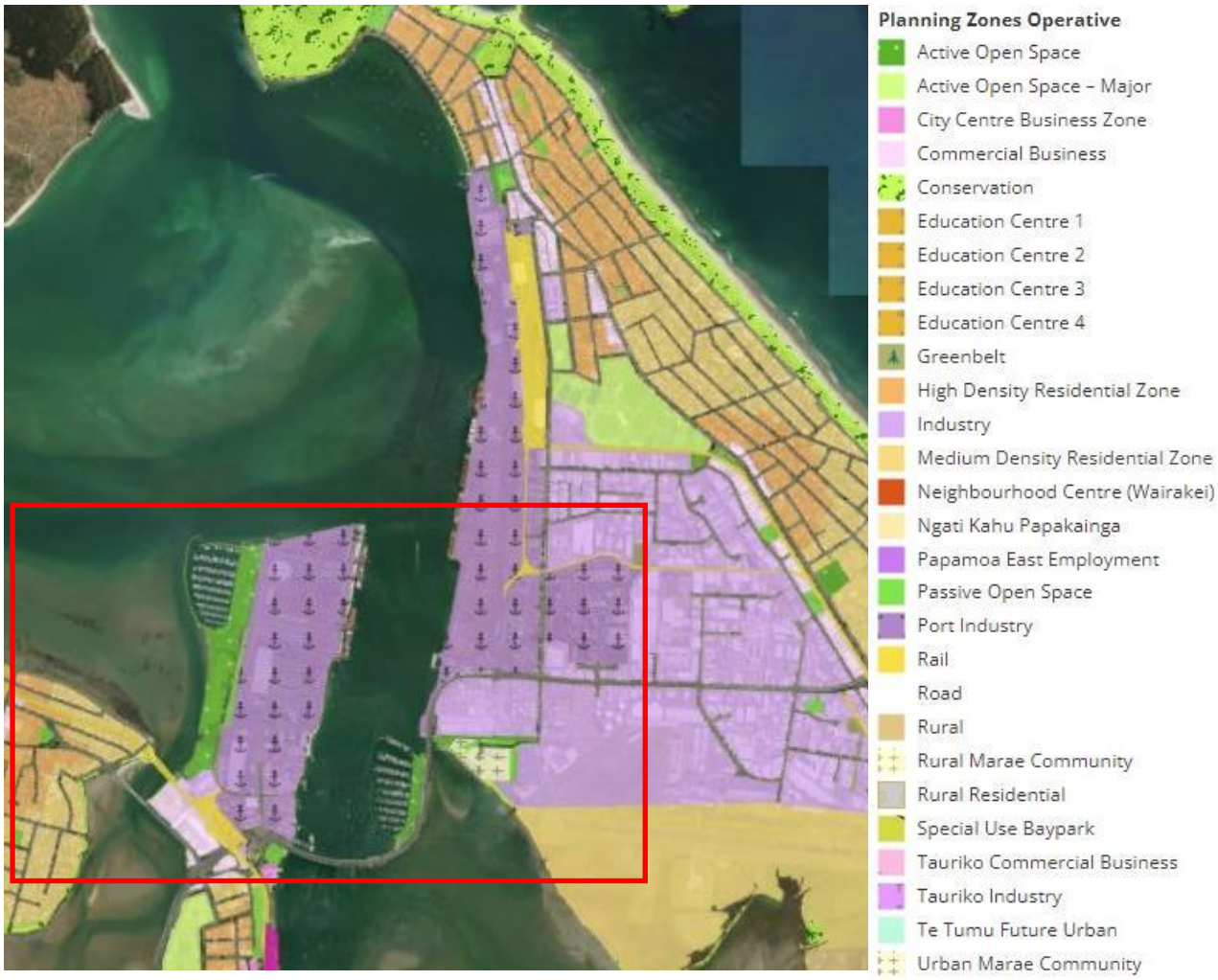


Figure 6: Tauranga City Plan Zoning Map (in part expanded)

Figure 7: Tauranga Port Noise Control Boundaries

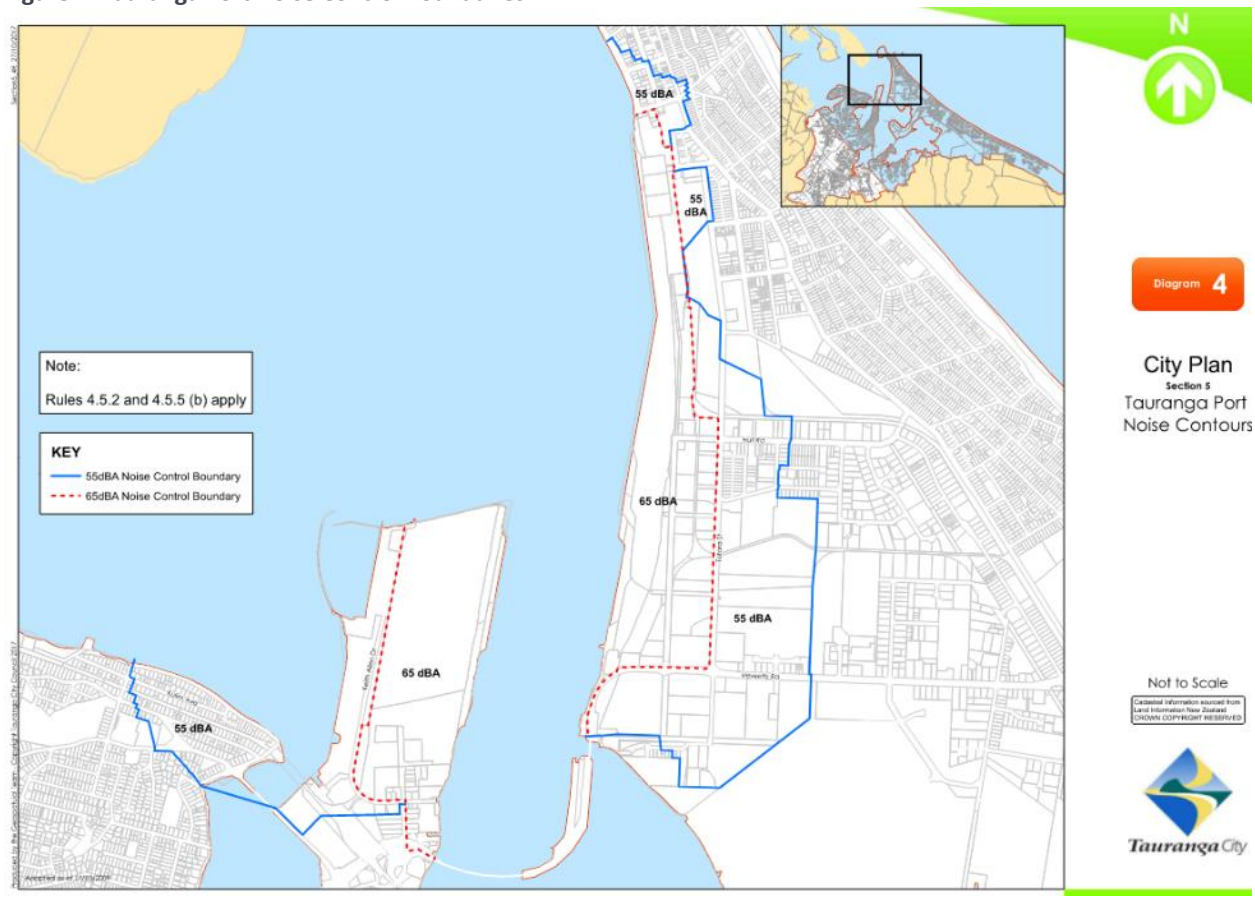


Figure 8: Tauranga Airport Noise Control Boundaries

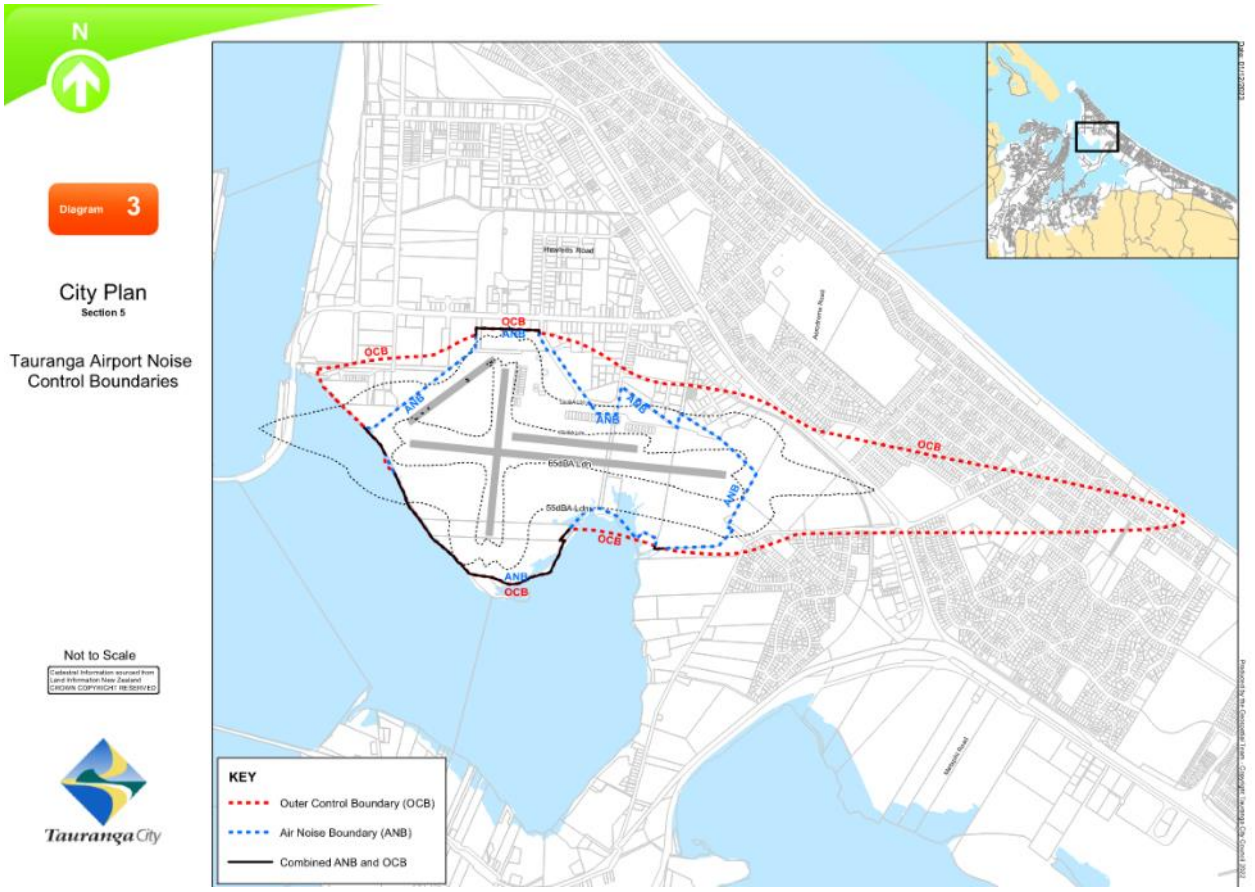


Figure 9: TCP Port and Construction Noise Rules

4E.2.7 Port Industry Zone and Noise Control Boundary Requirements

a. The long-term average sound level (Ldn) from all activities within the Port Industry Zone shall not exceed 55 dBA at any point outside the 55 dBA noise control boundary (Diagram 4, Section 5, Plan Maps Part B), nor 65 dBA at any point outside the 65 dBA noise control boundary;
b. No single 15-minute sound measurement level shall exceed 65 dBA Leq between 2200 and 0700 at any point outside the 65 dBA noise control boundary;
c. The night-time maximum sound level (Lmax) shall not exceed 85 dBA at any point outside of the 65 dBA noise control boundary;
d. Between the 55 dBA Ldn and 65 dBA Ldn noise control boundaries (Diagram 4, Section 5, Plan Maps Part B), additions to existing buildings beyond 25% of existing gross floor area, new residential activities, visitor accommodation, homestay, schools and tertiary education premises and health centres shall meet the following requirements:
    i. All habitable room(s) shall be designed by a suitably qualified acoustic engineer to achieve 45 dBA Ldn within that room. Where exterior windows and/or doors need to be closed to achieve this internal level a ventilation system shall be provided that is capable of providing an airflow that is controlled within the range of 5 to 10 air changes per hour throughout the habitable rooms of the building. For the avoidance of doubt the internal design of 45 dBA Ldn shall include noise from both the Port Industry Zone and any ventilation system operating at its design rating.
e. Sound levels shall be measured in accordance with NZS 6801:2008 Acoustics - Measurement of Sound and assessed in accordance with NZS6809:1999 Acoustics – Port Noise Management and Land Use Planning.

4E.2.14 Construction Noise

a. Construction noise from a site in any zone within the City shall not exceed the limits recommended in, and shall be measured and assessed in accordance with, NZS 6803:1999 Acoustics Construction Noise;
b. For construction activities being undertaken from 20 December – 10 January (inclusive) within the Mount Maunganui area from Adams Avenue to Grace Avenue, noise levels shall not exceed Rule 4E.2.1 – Residential Zones and Rural-Residential Zone.

APPENDIX F CONSTRUCTION NOISE STANDARD

The noise limits recommended in section 7.2 of the construction noise standard are summarised in Table 2 and Table 3. The noise limits apply at 1m outside the façades of occupied buildings.

Table 2: Construction noise levels received in residential zones

Time of week	Time period	Typical duration[5]		Short-term duration[6]		Long-term duration[7]	
		dB L_{Aeq}	dB L_{AFmax}	dB L_{Aeq}	dB L_{AFmax}	dB L_{Aeq}	dB L_{AFmax}
Weekdays	0630 – 0730	60	75	65	75	55	75
	0730 – 1800	75	90	80	95	70	85
	1800 – 2000	70	85	75	90	65	80
	2000 – 0630	45	75	45	75	45	75
Saturdays	0730 – 1800	75	90	80	95	70	85
	1800 – 0630	45	75	45	75	45	75
Sundays and public holidays	0730 – 1800	55	85	55	85	55	85
	1800 – 0630	45	75	45	75	45	75

Table 3: Construction noise levels received in industrial or commercial areas

Time of week	Time period	Typical duration[5]	Short-term duration[6]	Long-term duration[7]
		dB L_{Aeq}	dB L_{Aeq}	dB L_{Aeq}
All days	0730 – 1800	75	80	70
	1800 – 0730	80	85	75

[5] Construction work at any one location for more than 14 calendar days but less than 20 weeks

[6] Construction work at any one location for up to 14 calendar days

[7] Construction work at any one location with a duration exceeding 20 weeks

APPENDIX G NOISE CONTOURS

The following figures are attached overleaf:

Figure 10: Bunker Barge piling (impact driven steel piles)

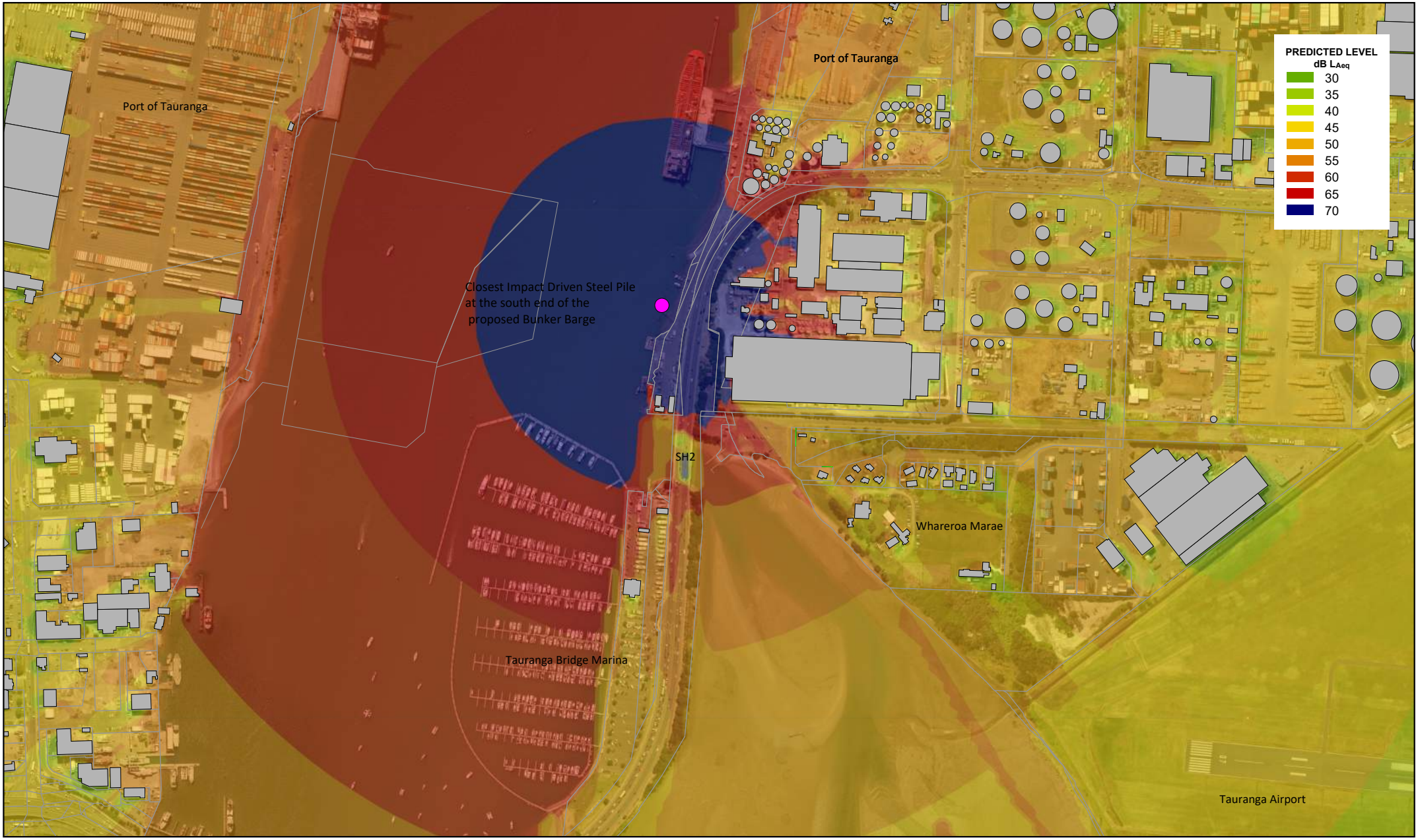
Figure 11: Bunker Barge piling (vibro driven steel piles)

Figure 12: Penguin Ramp piling (impact driven timber piles)

Figure 13: Sulphur Point piling (impact driven steel piles)

Figure 14: Stella Passage dredging (BHD)

Figure 15: Stella Passage dredging (TSHD)



LEGEND

- Impact Piling
- Boundary
- Main building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 12

File: Impact piling (steel) Bunker Barge GNM

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

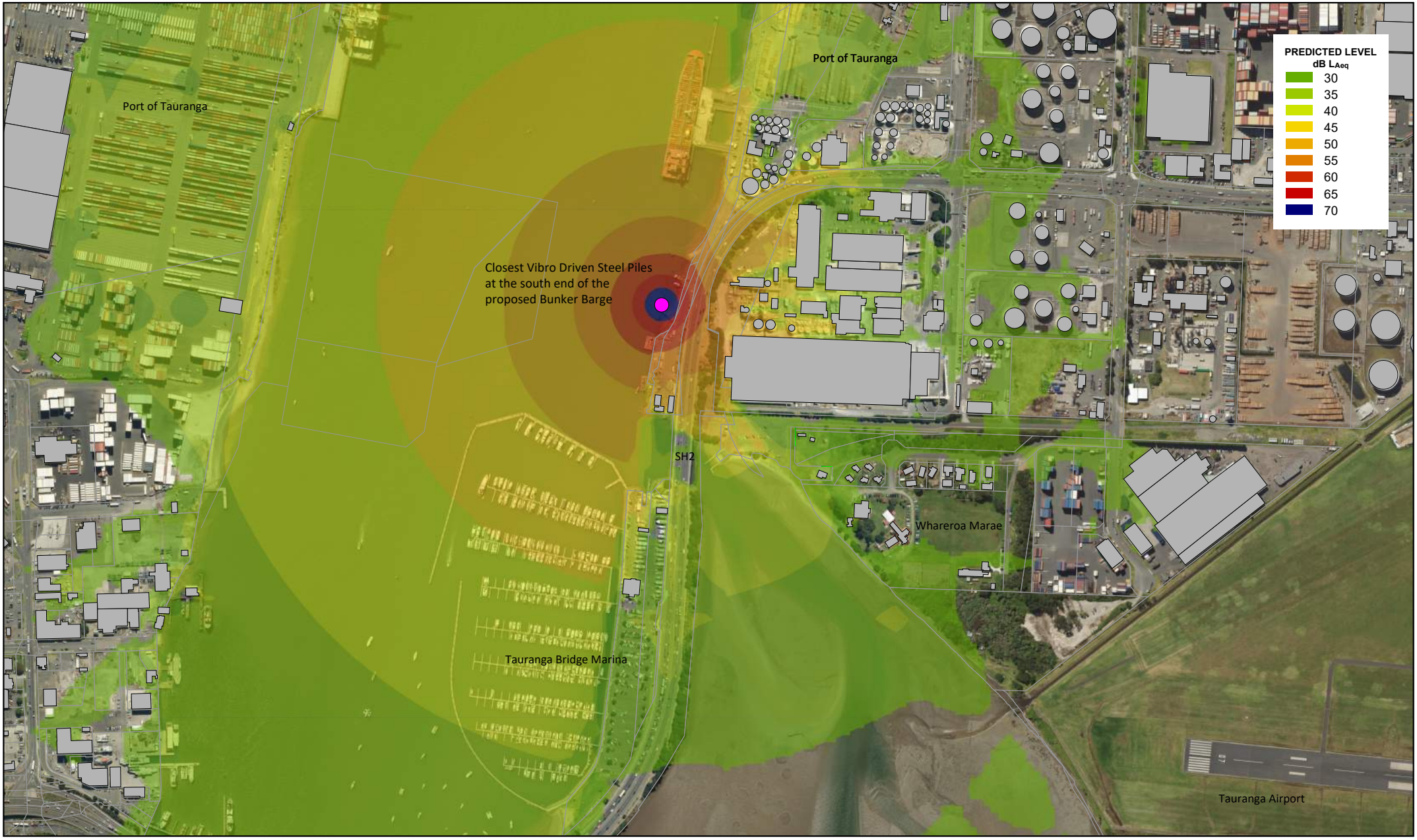
0 50 100 200 300 m

N

Figure 10: Bunker Barge piling

Impact driven steel piles

MARSHALL DAY Acoustics



LEGEND

- Vibro Piling
- Boundary
- Building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 22

File: Vibro Piling (steel) Bunker Barge GNM

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

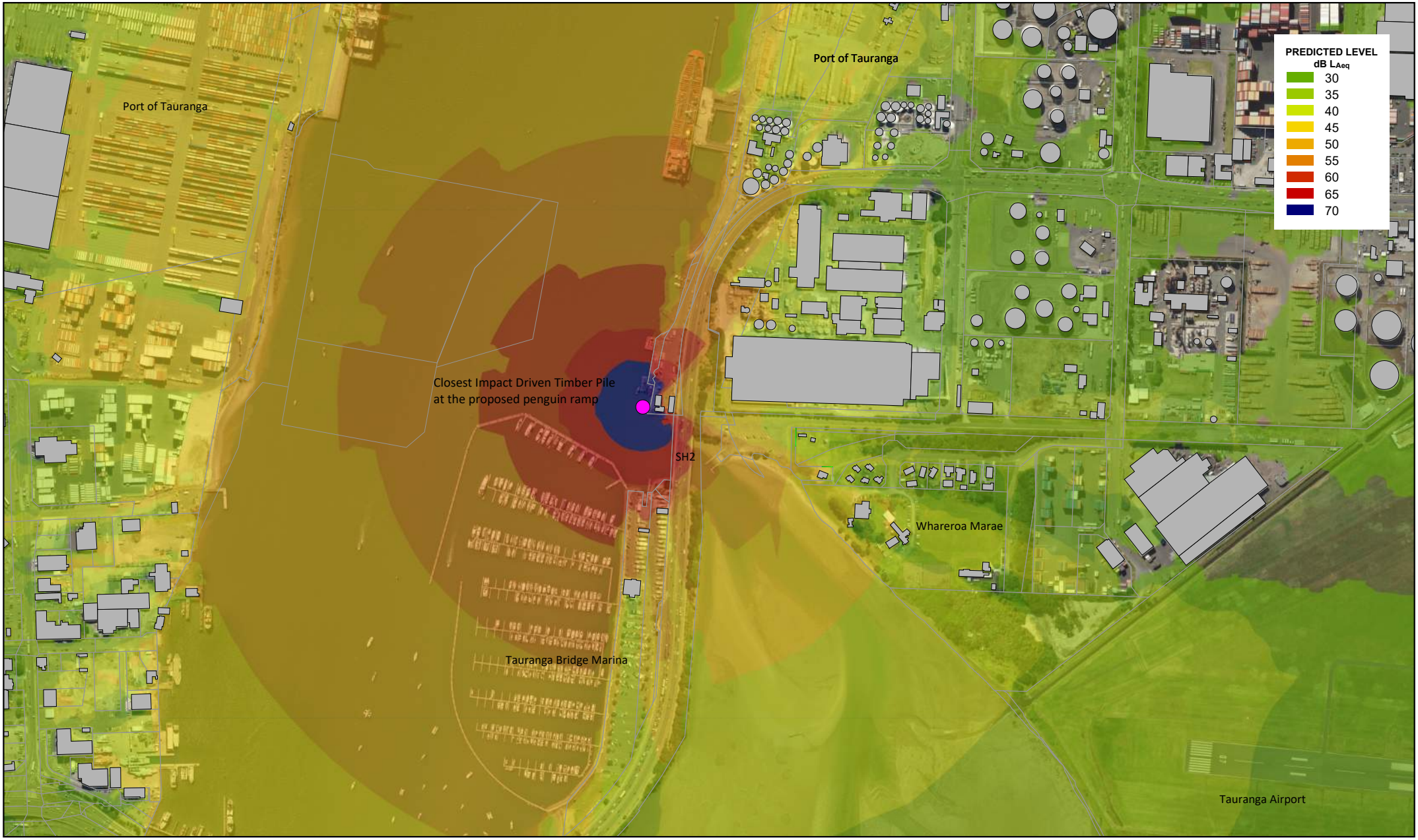
0 50 100 200 300 m

N

Figure 11: Bunker Barge piling

Vibro driven steel piles

MARSHALL DAY Acoustics



LEGEND

- Impact Piling
- Boundary
- Building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 32

File: Impact Piling (timber) penguin ramp GNM

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

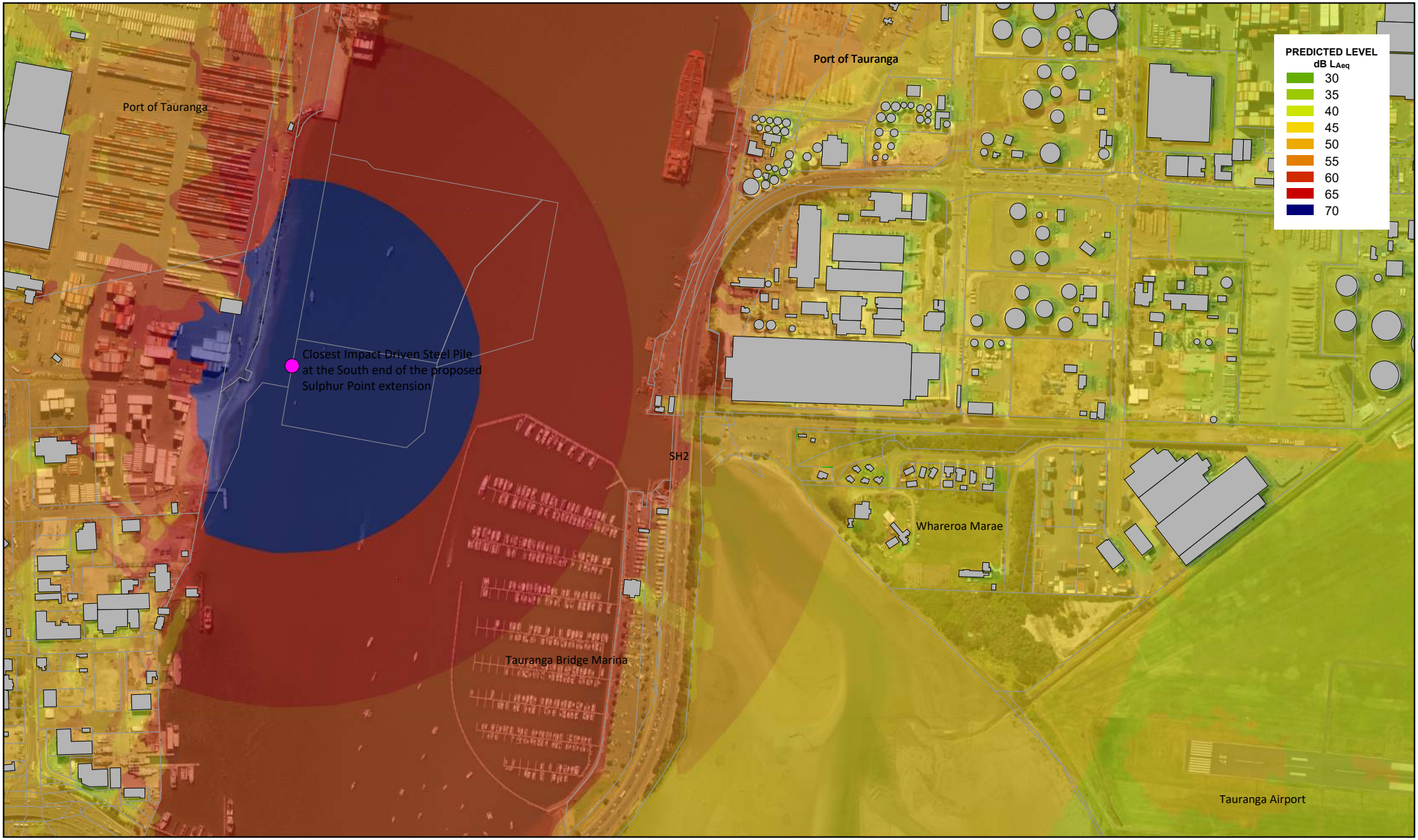
0 50 100 200 300 m

N

Figure 12: Penguin Ramp piling

Impact driven timber piles

MARSHALL DAY Acoustics



LEGEND

- Impact Piling
- Boundary
- Building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 52

File: Impact Piling (steel) Sulphur Point GNM

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

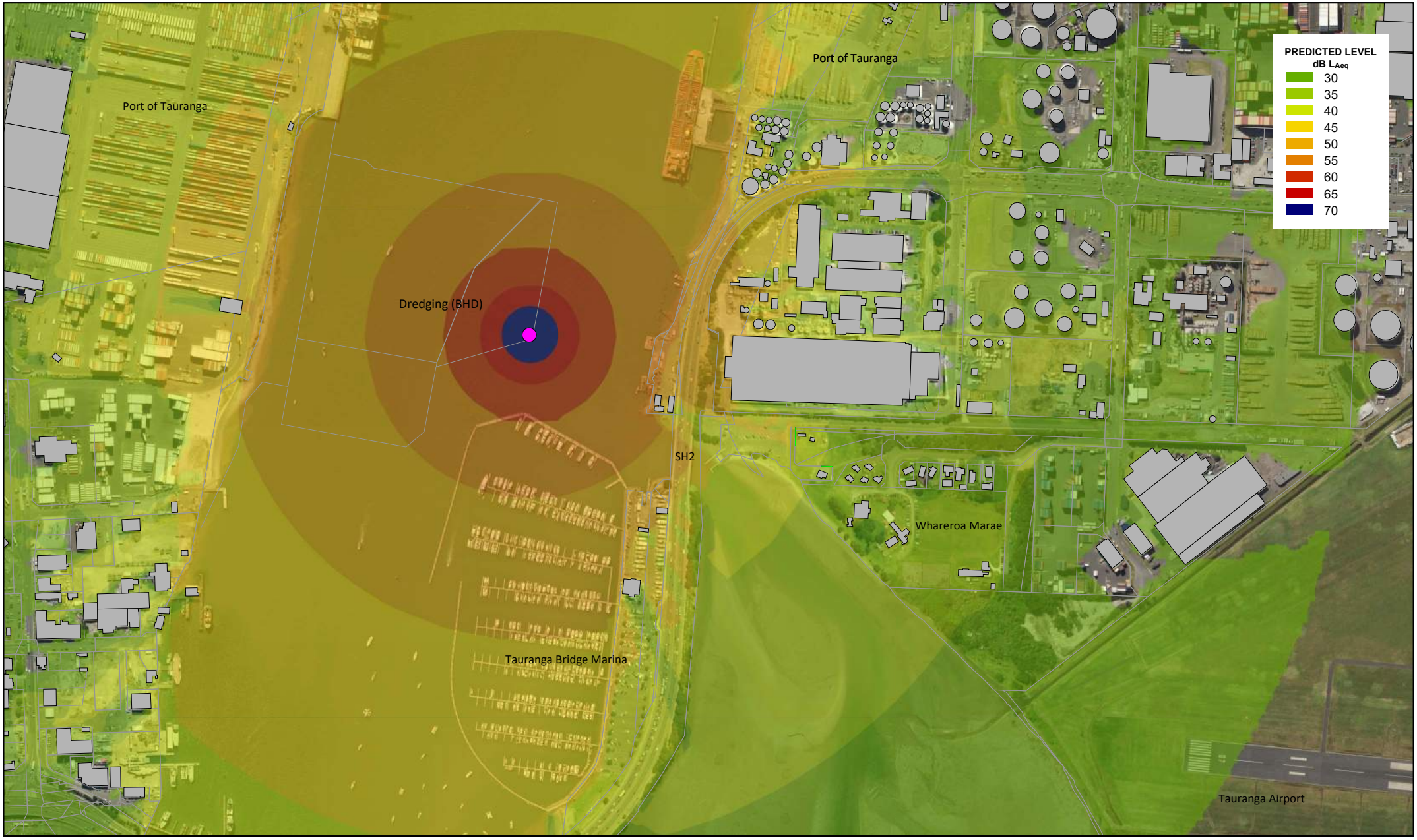
0 50 100 200 300 m

N

Figure 13: Sulphur Point piling

Impact driven steel piles

MARSHALL DAY Acoustics



LEGEND

- BHD dredge
- Boundary
- Building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 42

File: Stella Passage dredging

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

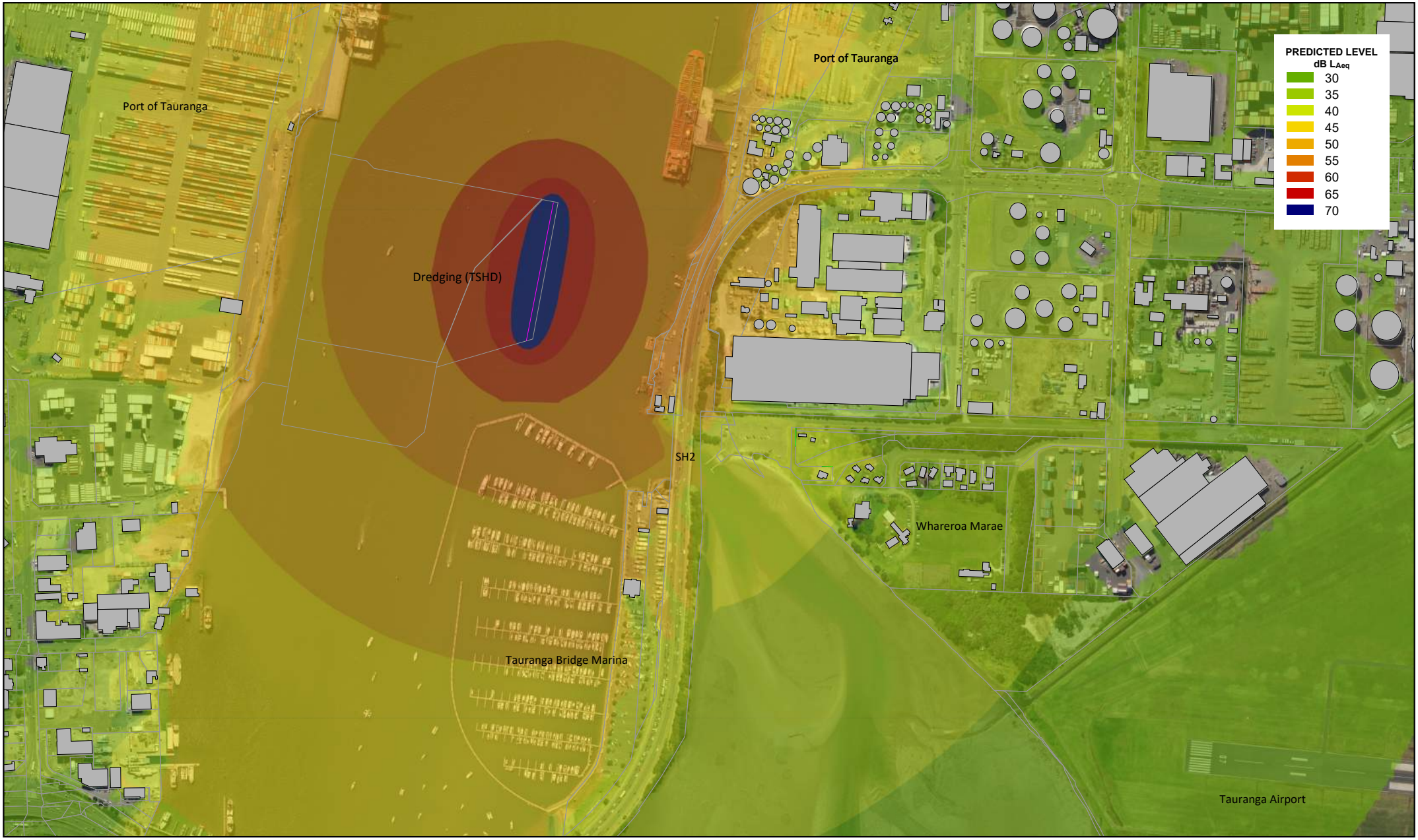
0 50 100 200 300 m

N

Figure 14: Stella Passage dredging (BHD)

Closest proposed location to Marae

MARSHALL DAY Acoustics



LEGEND

- TSHD dredge path
- Boundary
- Building
- Wall

Version: SoundPLAN 9.0

Prediction method: ISO9613-2:1996

Date: 25 Nov 2024

Run number: 62

File: Stella Passage dredging

Prediction Height: 1.5 m

Project: Port of Tauranga

Project number: 20240814

SCALE

0 50 100 200 300 m

N

Figure 15: Stella Passage dredging (TSHD)

Closest proposed pass to Marae

MARSHALL DAY Acoustics