

Before the Independent Hearing Panel
Appointed by the Southland Regional Council

Under the Resource Management Act 1991 (**RMA**)

In the matter of an application by **South Port NZ Limited** to dredge parts of
the Bluff Harbour

Statement of evidence of Jon Styles - Airborne noise

29 March 2022

Applicant's solicitor:

Michael Garbett
Anderson Lloyd
Level 10, Otago House, 477 Moray Place, Dunedin 9016
Private Bag 1959, Dunedin 9054
DX Box YX10107 Dunedin
p + 64 3 477 3973
michael.garbett@al.nz

**anderson
lloyd.**

Qualifications and experience

- 1 My full name is Jon Robert Styles. I am an acoustic consultant and director and principal of Styles Group Acoustics and Vibration Consultants. I lead a team of 7 consultants specialising in the measurement, prediction and assessment of environmental and underwater noise, building acoustics and vibration. I have approximately 21 years' experience in the industry, the first four as the Auckland City Council's Environmental Health Specialist – Noise, and the latter 17 as the Director and Principal of Styles Group.
- 2 I am a Council member, professional member and the immediate Past-President of the Acoustical Society of New Zealand (ASNZ). I completed two full terms as President of the ASNZ between 2016-2021 and four terms on the Council prior to that. I have recently been appointed as an Executive Member of the Australasian Association of Acoustical Consultants. My role is responsible for developing guidelines for acoustic assessments in New Zealand and Australasia.
- 3 I have extensive experience advising on the management of noise and vibration effects from a diverse range of land use activities, including the construction, maintenance and operational noise effects of major and strategic transport infrastructure (including port, road, air and rail) and the protection of strategic industry and transport infrastructure by achieving reasonable noise levels in the community.
- 4 I have been involved a significant number of resource consent applications, Notice of Requirements and plan reviews across New Zealand. I have provided advice on several resource consent and plan review processes for seaports and inland ports throughout New Zealand. These include channel deepening at Marsden Cove, various large-scale development work at Lyttelton Port Company and Eastland Port (Gisborne), construction work and dredging at Port of Napier, numerous projects at Ports of Auckland, Northport District Plan appeals and the comprehensive development of the Ruakura Inland Port.
- 5 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Involvement

- 6 Styles Group were engaged by South Port New Zealand Limited (South Port) in 2021 to assess the airborne and underwater noise effects arising from their capital dredging proposal (the Project) in Bluff Harbour.

- 7 I prepared the airborne noise assessment (the Assessment) and supplementary advice that respectively form Appendix 12 and 25 to the resource consent application and adopt these as part of my evidence.
- 8 I worked extensively with South Port through the project design process to determine the practicable options for the avoidance and/ or mitigation of noise from the Project. This included consideration of the machinery and options that are available to complete the specific tasks. The project team found no other practicable machines or methods that could complete the work at lower noise levels.
- 9 My colleague, Dr Matthew Pine, prepared the underwater noise assessment¹ relating to physiological effects on marine mammal and fish from blasting and rock drilling activities. Dr Pine's assessment and evidence describes the underwater noise modelling he undertook for the Project.

Scope of evidence

- 10 I have been asked to prepare evidence in relation to the airborne noise effects arising from South Port's Project. This evidence provides a summary of my Assessment, including:
 - (a) The Regional Coastal Plan for Southland (RCPS) criteria for the management of construction noise from capital dredging activities;
 - (b) The recommended guideline noise limits in NZS 6803:1999 *Acoustics- Construction noise*;
 - (c) The predicted noise levels from drilling, blasting and dredging activities;
 - (d) The basis for the proposed Project Noise Standards;
 - (e) The effects arising from night-time backhoe dredging activities in the harbour entrance channel; and
 - (f) Comments on the Section 42A Report and proposed conditions.

Executive summary

- 11 The Project will involve the following construction activities in the Bluff Port Zone:

¹ Appendix 11 to the resource consent application

- (a) Dredging in the swing basin and Island Harbour berths using a Trailing Suction Hopper Dredge vessel over a period of 6 weeks during the daytime period (“TSHD dredging”);
 - (b) Drilling and blasting in the harbour entrance channel during the daytime period. Blasting will take place on approximately 120 days (Monday to Saturday); and
 - (c) Dredging in the harbour channel using a backhoe loader (“backhoe dredging”). This activity will be undertaken over a 24-hour period, seven days per week over a period of 8 months.
- 12 My Assessment sets out the predicted noise levels of the above activities for comparison with the guideline noise limits for works of long-term duration prescribed under NZS 6803. NZS 6803 is adopted by Policy 5.3.20 *Manage construction noises in the coastal marine area* of the RCPS.
- 13 NZS 6803 specifies guideline construction noise limits for the reasonable protection of the community’s health and amenity. NZS 6803 recognises that the community will tolerate higher noise levels for short term projects and provides guidelines and criteria for the management of construction noise effects, including drilling and blasting activities.
- 14 My Assessment concludes that:
- (a) Noise levels from **drilling activities** will comply with the relevant daytime noise limit of 70dB L_{Aeq} by at least 10dB, and by a significantly greater margin at most receivers;
 - (b) The noise levels from **TSHD dredging** will comply with the day time noise limit of 70dB L_{Aeq} by a significant margin – greater than 20dB for most of the time;
 - (c) The air overpressure from **blast events** will comply with NZS 6803’s recommended limit of 120dBC by a significant margin;
 - (d) Noise levels from **backhoe dredging** will always be less than 45dB L_{Aeq} when meteorological conditions **impede** propagation towards Bluff. These noise levels may be experienced on at least 41% of the nights backhoe dredging may take place. When meteorological conditions impede propagation towards Bluff, the highest predicted noise level is 45dB L_{Aeq} at any dwelling. This level is predicted to be received at up to three receivers. The noise level at all other receivers may be less than 45dB L_{Aeq} ; and

- (e) Noise levels from **backhoe dredging** will be between 46dB L_{Aeq} and 50dB L_{Aeq} for various dredging positions when meteorological conditions **assist** propagation towards Bluff. Up to 23 dwellings will receive noise levels between 46dB L_{Aeq} and 50dB L_{Aeq} for various dredging positions. All other dwellings will experience noise levels no greater than 45dB L_{Aeq} . These noise levels may be experienced no more than approximately 59% of the total number of nights that backhoe dredging may take place.
- 15 I have recommended a set of Project Noise Standards that are consistent with the guideline noise limits and timeframes set out in NZS 6803, except that the night-time noise limit for harbour channel backhoe dredging works is proposed to be increased by 5dB, from 45dB L_{Aeq} to 50dB L_{Aeq} to allow for the meteorological conditions described in (e) above.
- 16 I have assessed the indoor noise effects likely to be experienced by Marine Parade residents during the “worst-case” scenario for noise level propagation toward the Bluff shore. I consider that an adequate level of acoustic amenity will be achieved in the community and expect that no sleep disturbance or amenity issues will be likely to arise.
- 17 I provided input to the proposed noise conditions in Appendix 1 to the application. I consider the proposed conditions represent the best practicable option to manage and minimise noise from the Project.
- 18 I have provided comment on the s42A Report’s proposed noise conditions and recommended several amendments to ensure the conditions are certain, effective and enforceable.
- 19 I consider that the project noise levels will be reasonable at all times, taking into account:
- (a) The predicted noise levels at the receivers. The noise levels from all daytime activities are predicted to comply with the guideline noise limits in NZS 6803 (and generally by a significant margin). I expect that receivers will not have sleep disturbance or amenity issues during the night-time. I consider that the noise levels will be reasonable for all receivers, at all times;
 - (b) The limited duration of the project. NZS 6803 recognises that construction noise is an inherent part of society, and communities will usually tolerate construction noise effects from limited-duration projects;

- (c) Proposed communications will provide residents with advance notice of the timing and duration of night work. The communications will explain that works will be audible in some meteorological conditions, and that closing bedroom windows will assist to reduce noise levels. NZS 6803 recognises that providing certainty to receivers can help to reduce adverse reactions to noise; and
- (d) The proposed implementation of all practicable options to reduce noise levels at source.

RCPS criteria

- 20 The Project will involve drilling, blasting and dredging activities inside the Bluff Port Zone (**BPZ**) of the RCPS.
- 21 The RCPS promotes the management of noise emissions from capital dredging projects through Policy 5.3.20². The policy and explanation to Policy 5.3.20 state:

“Policy 5.3.20 – Manage construction noises in the coastal marine area

Explanation: Even though levels of construction noise can be greater than levels of noise normally found in urban areas, the community will usually tolerate the noise if it is temporary or for a short duration and provided that reasonable efforts have been made to minimise its adverse effects. Such methods may include the use of warnings, barriers, baffles, mufflers, reflectors, or restricting the time of operation. Construction noise can be managed by imposing conditions on resource consents that incorporate the provisions of relevant New Zealand Standards, such as NZS6803P:1984.”

- 22 Policy 5.3.20 promotes the management of construction noise in the coastal marine area in accordance with the relevant, contemporary construction noise standard.
- 23 I consider that the language of the policy allows the adoption of the latest version of NZS 6803. NZS 6803P:1984 has been superseded by the current construction noise standard, NZS 6803:1999 *Acoustics-Construction noise (NZS 6803)*.

² There is no permitted activity standard or rule for noise emissions from capital dredging projects.

- 24 The current version of NZS 6803 provides the relevant guidelines and criteria for the management of noise effects from the Project, including drilling and blasting activities.

NZS 6803:1999 Acoustics- Construction noise

- 25 NZS 6803 specifies guideline noise limits for construction noise³ received by the community for the reasonable protection of health and amenity for works of limited duration. NZS 6803 specifically recognises that the community will tolerate higher noise levels for short term projects.
- 26 NZS 6803 sets out procedures for the measurement and assessment of noise from construction activities. The Standard provides guidance on several matters relevant to this project including:
- (a) Recommended noise limits based on project duration and hours of work;
 - (b) Air-overpressure limits for blasting activities; and
 - (c) Recommendations for communications with neighbours to reduce the likelihood of annoyance.
- 27 NZS 6803 provides recommended noise limits based on project duration, with lower noise limits for longer term projects. The capital dredging project will take between 6-8 months to complete and is defined as a “long-term duration” project. NZS 6803’s recommended limits for long-term projects are reproduced in Tables 1 and 2 below.

³ Capital dredging works fall within the definition of construction as defined by NZS 6803. Construction work is defined in section 3.1 of NZS 6803 as (emphasis added):

CONSTRUCTION WORK means any work in connection with the construction, erection, installation, carrying out, repair, maintenance, cleaning, painting, renewal, removal, alteration, dismantling, or demolition of:

*(b) Any road, motorway, **harbour or foreshore works**, railway, cableway, tramway, canal or aerodrome;*

Table 1 - NZS 6803 recommended upper limits for construction noise received in residential zones and dwellings in rural areas

Time of Week	Time Period	Long-term duration (dBA)	
		L _{eq}	L _{max}
Weekdays	0630-0730	55	75
	0730-1800	70	85
	1800-2000	65	80
	2000-0630	45	75
Saturdays	0630-0730	45	75
	0730-1800	70	85
	1800-2000	45	75
	2000-0630	45	75
Sundays and public holidays	0630-0730	45	75
	0730-1800	55	85
	1800-2000	45	75
	2000-0630	45	75

Table 2 - NZS 6803 recommended upper limits for construction noise received in industrial or commercial areas for all days of the year

Time Period	Long-term duration
	L _{eq} (dBA)
0730-1800	70
1800-0730	75

- 28 NZS 6803 requires construction noise levels to be assessed at any occupied building. There is no averaging or other adjustment over the day, night or week. The noise limits set out in NZS 6803 must be complied with for every 10 to 60 minute period during which works are undertaken.
- 29 Section 8.1.4 of NZS 6803 also provides guideline limits for air-overpressure from blasting activities. NZS 6803 recommends an airblast noise limit of 120dBC L_{Peak} when measured at a receiver.
- 30 Air-overpressure is the low frequency ‘woomph’ that is commonly perceived immediately following a traditional blast. The air-overpressure level is attenuated significantly when the blast is undertaken below water.

Project Noise Standards

- 31 The Project will involve the following activities in the Bluff Port Zone:
- (a) Dredging in the swing basin and Island Harbour berths using a Trailing Suction Hopper Dredge vessel over a period of 6 weeks during the daytime period (described as “TSHD dredging” throughout this report);
 - (b) Drilling and blasting in the harbour entrance channel during the daytime period⁴. Blasting will take place on approximately 120 days (Monday to Saturday); and
 - (c) Dredging in the harbour channel using a backhoe loader (described as “backhoe dredging” throughout this report). This activity will be undertaken over a 24 hour period, seven days per week over a period of 8 months⁵.
- 32 My Assessment recommends the adoption of Project Noise Standards that are based on the guideline limits for long term construction noise set out in Tables 1 (residential) and 2 (industrial/ commercial) of NZS 6803.
- 33 The Project Noise Standards adopt NZS6803’s guideline L_{Aeq} daytime noise limits and guideline L_{max} ⁶ noise limits (day and night) at all receivers, with modification.
- 34 The only modification to NZS6803’s guideline noise limits relates to the night time noise limit at residential or rural receivers. This limit is proposed to be increased by 5dB to allow for night time backhoe dredging activities during certain meteorological conditions. I address the reasons for and reasonableness of the 50 dB L_{Aeq} night time noise limit later in this evidence.

⁴ Between the hours of 07:30am and 6:00pm, Monday to Saturday

⁵ This timeframe includes an allowance for delays due to shipping movements and adverse weather conditions

⁶ This noise limit controls the intermittent impact noises commonly associated with construction that are most likely to generate sleep disturbance effects.

35 The Project Noise Standards form proposed condition 37 in Appendix 1 of the application and are reproduced below:

Time of Week	Time Period	Noise limits					
		Residential/ Rural Receivers		At the ICB		Industrial 1 and Business 2	
		L _{eq} (dBA)	L _{max} (dBA)	L _{eq} (dBA)	L _{max} (dBA)	L _{eq} (dBA)	L _{max} (dBA)
Weekdays (to 0730 Saturday morning)	0630-0730	55	75	55	75	70	85
	0730-1800	70	85	70	85		
	1800-2000	65	80	65	80		
	2000-0730	50	75	55	75		
Saturdays (to 0730 Sunday morning)	0730-1800	70	85	70	85	70	85
	1800-0730	50	75	55	75		
Sundays and public holidays (to 0630 Monday morning)	0730-1800	55	85	55	85	70	85
	1800-0630	50	75	55	75		

36 The Project Noise Standards control the maximum level of Project noise that can be generated at the Inner Control Boundary (ICB) of South Port. The Project Noise Standards are set 10 dB lower than the RCPS short-term noise limits in Rule 5.3.5.15 - *Bluff Port Zone Noise limits* of the RCPS and will ensure that the cumulative noise arising from the operation of the port⁷ and the project construction activities will not exceed⁸ the maximum permitted port noise levels authorised under Rule 5.3.5.15.

37 This approach is consistent with NZS 6803. NZS6803 recommends that where there is a relatively high background sound level from other sources, *“limits should be based on a determination of the existing level of noise in the area (a “background plus” approach)”*.

⁷ In a scenario where the operation of the Port is generating the maximum permitted noise levels authorised by the RCPS.

⁸ When two noise sources are 10dB apart, the quieter noise does not add to the level of the louder noise source.

Noise modelling and predictions

- 38 I supervised my colleague, Olivier Ghysel, to predict the airborne noise emissions of drilling and backhoe dredging activities using Brüel & Kjær Predictor computer noise modelling software.
- 39 The drilling noise model is based on noise measurements that my team obtained of the same model of drilling equipment that will be used⁹ in the Project.
- 40 The backhoe dredging noise model is based on noise measurements¹⁰ my team obtained from capital dredging activities at the Port of Napier in March 2021.
- 41 Noise level predictions of TSHD dredging activities in the swing basin and Island Harbour berths were predicted using published acoustical data for the vessel, taking into account separation distance to proximate receivers.
- 42 The noise modelling and noise level predictions demonstrated that daytime noise levels from all project activities including dredging of the swinging basin and Island Harbour berths using a TSHD vessel, drilling activities, and air-overpressure from blasting activities will readily comply with the guideline noise limits set out in NZS 6803 (and generally by a significant margin).
- 43 Backhoe dredging in the harbour entrance channel will be undertaken predominantly at night when lower noise limits apply. The noise modelling demonstrates that in a “worst-case scenario” where the dredge vessel is operating on the Bluff side of the channel in meteorological conditions that enhance noise level propagation towards Bluff, up to 23 dwellings along Marine Parade will experience noise levels between 46 dB and 50 dB L_{Aeq} .
- 44 I undertook a detailed analysis of NIWA wind rose data¹¹ for the South Port Channel beacon and Tiwai Point to understand the typical wind conditions in the Bluff Harbour and the likely percentage of nights when meteorological

⁹ Noise measurements were obtained in 2021 from a quarry site near Te Awamutu. The noise levels arising from drilling in the harbour will likely be slightly lower than what we have measured on land due to the additional attenuation that will be afforded by the water column.

¹⁰ The measurement data obtained from noise measurements was converted to a sound power level based on the L_{Aeq} metric.

¹¹ Our team undertook a detailed analysis of wind data to confirm the wind conditions during the night-time period (8:00pm- 06:30am) throughout the proposed works programme. We processed hourly wind data (wind direction and speed) for Tiwai Point EWS over a three-year period (2015-2018). The data was filtered to show the average wind speed in each wind direction, and the wind direction probability for all wind speeds greater than 1ms^{-1} .

conditions will either impede or assist propagation of noise toward the Bluff Shore.

45 My analysis concluded that:

- (a) Noise levels from **drilling activities** will comply with the relevant daytime noise limit of 70dB L_{Aeq} by at least 10dB, and by a significantly greater margin at most receivers;
- (b) The noise levels from **TSHD dredging** will comply with the day time noise limit of 70dB L_{Aeq} by a significant margin – greater than 20dB for most of the time;
- (c) The air overpressure from blast events will comply with the recommended limit of 120dBC by a significant margin;
- (d) Noise levels from **backhoe dredging** will always be less than 45dB L_{Aeq} when meteorological conditions **impede** propagation towards Bluff. These noise levels may be experienced on at least 41% of the nights backhoe dredging may take place. When meteorological conditions impede propagation towards Bluff, the highest predicted noise level is 45dB L_{Aeq} at any dwelling. This level is predicted to be received at up to three receivers. The noise level at all other receivers may be less than 45dB L_{Aeq} ; and
- (e) Noise levels from **backhoe dredging** will be between 46dB L_{Aeq} and 50dB L_{Aeq} for various dredging positions when meteorological conditions **assist** propagation towards Bluff. Up to 23 dwellings will receive noise levels between 46dB L_{Aeq} and 50dB L_{Aeq} for various backhoe dredging positions. All other dwellings will experience noise levels no greater than 45dB L_{Aeq} . These noise levels may be experienced no more than approximately 59% of the total number of nights that dredging may take place.

46 The noise level predictions are shown graphically in the appendices to my Assessment.

Backhoe dredging- night time noise effects

47 The effects of backhoe dredging activities on the Bluff receivers and reasonableness of the 50 dB L_{Aeq} night-time Project Noise Standard were carefully considered. I undertook a detailed analysis of the Project noise levels likely to be experienced inside Bluff dwellings, to determine whether the Project will be likely to give rise to potential sleep disturbance effects, particularly on calm nights.

- 48 The backhoe dredging at night-time on the Bluff side of the harbour channel will be undertaken between the cooler months between 1 April and 30 September. The average air temperature during these months ranges from 10°C in April, to 5°C in July and up to 8°C in September¹².
- 49 It is reasonable to assume that the Bluff dwellings will be likely to have their windows closed at night during the works. If windows were open, I would expect them to be open only slightly for ventilation purposes.
- 50 NZS 6803's recommended noise limit of 45dB L_{Aeq} is designed to ensure that noise levels indoors will not exceed approximately 30dB L_{Aeq} (when allowing 15dB for attenuation through a partially open window).
- 51 It is commonly accepted that the noise reduction (**NR**) from outside a dwelling to inside a room will be:
- (a) 10-12dB for a window that is open more than 150-200mm;
 - (b) Approximately 15dB for a window that is partially open for ventilation (approximately 50mm opening at the bottom of a top-hung window); and
 - (c) At least 20-25dB for a closed window in most homes. In our experience, many modern homes can achieve an NR of 25-30dB with windows closed.
- 52 When meteorological conditions assist propagation of backhoe dredging noise towards Bluff, the noise levels at the most exposed dwellings will exceed 45dB L_{Aeq} at approximately 23 dwellings and may at times reach 50dB L_{Aeq} .
- 53 If windows are slightly open, an NR of approximately 15dB will be achieved and the indoor noise level is likely to be approximately 35dB L_{Aeq} . If windows are closed, an NR of approximately 20-25dB will be achieved and the indoor noise level is likely to be approximately between 25-30dB L_{Aeq} .
- 54 The noise levels of backhoe dredging likely to be received **inside** the 23 most exposed Marine Parade dwellings are likely to be between 25 dB and 35dB L_{Aeq} . By way of context:
- (a) An internal noise level of 30dB L_{Aeq} is commonly regarded as providing a high level of amenity for a bedroom overnight; and

¹² <https://niwa.co.nz/static/Southland%20ClimateWEB.pdf>

(b) An internal noise level of 35dB L_{Aeq} is commonly regarded as providing an adequate level of amenity for bedrooms overnight. Many District Plans specify 35dB L_{Aeq} as a noise limit for inside bedrooms where dwellings are located in noisy areas.

55 I consider that internal noise levels of between 25 dB and 35dB L_{Aeq} will provide an adequate level of acoustic amenity to the Marine Parade residents, and that no sleep disturbance or amenity issues will be likely to arise.

56 My Assessment recommends that South Port provide the Marine Parade receivers with advance notice of night-time dredging works. This recommendation has been included in proposed condition 51¹³.

57 The communications required by proposed condition 51 will inform residents that closing bedroom windows will assist to reduce noise levels. Based on this advice, residents may choose to shut their windows at or before going to bed, to avoid disturbance later in the night. Notwithstanding, the noise level predictions demonstrate that a reasonable internal noise level will be achieved, even if residents elect to leave windows partially open for cooling / ventilation. I provide further comment on condition 50 later in this evidence.

58 I consider that the night time noise effects will be reasonable based on:

- (a) The dredging noise levels, and worst-case predicted internal noise levels at the closest receivers;
- (b) The limited duration of the project; and
- (c) Project communications provided to residents.

59 I provided input to proposed noise conditions in Appendix 1 to the application. I consider the above measures represent the best practicable option to minimise noise from the Project. I provide further comment on the proposed conditions in the following section.

Comments on Section 42A Report

60 I have reviewed the s42A Report's conclusions relating to airborne noise and vibration effects. Section 3.8.3 of the report states:

“In the absence of the acoustic testing, I am not 100% comfortable with the restricted operations

¹³ In Appendix 1 to the application.

being so generous, including for example Sunday mornings from 0730, when some residents typically expect quieter mornings. While no submissions have been received, this does not mean that Council will not receive complaints from residents, or campers (Argyle Campground in Gregory Street) if/when noise causes disturbances. Typical commercial or industrial working weeks do not normally include 0730 starts. I also recognize two religious organisations are located in proximity to the harbour, being St Marys Star of the Sea Ladies Group (194 Burrows Street) and Bluff Cooperating Church (56 Foyle Street), where typical congregations on Sunday mornings are most likely”.

- 61 NZS 6803 provides for noise levels up to 55 dB L_{Aeq} and 85 dB L_{AFmax} between 0730 and 1800 on Sundays (the “*Sunday noise limits*”). The s42A Report questions the reasonableness of NZS 6803’s recommended noise limits that apply from 0730 on Sundays, and suggest this limit is likely to give rise to complaints from residents and/ or the campsite and religious organisations.
- 62 I disagree, and consider that the Sunday noise limits are appropriate for the following reasons:
- (a) The Bluff residential receivers are zoned Residential 2 under the Invercargill District Plan. Standard NOISE-R2 of the Invercargill District Plan authorises noise levels of 55 dB L_{Aeq} and 80 dB L_{AFMAX} during the daytime period (between 07:00 and 22:00) for activities that are permitted in that zone;
 - (b) The Sunday noise limit is therefore consistent with the noise level that applies in this residential environment every day. This noise limit is set at a level that is designed to provide residential zones with an adequate level of acoustic amenity during the daytime period;
 - (c) The Sunday noise limit commences at 07:30, 30 minutes later the commencement of the 55dB L_{Aeq} daytime period in the District Plan daytime noise limits in NOISE-R2. The 0730 timing is not unreasonable; and
 - (d) Noise levels of 55 dB L_{Aeq} and 85 dB L_{AFmax} do not represent a level that would not conflict with religious services on Sundays. The Sunday noise limits are relatively low and are consistent with the A-weighted daytime noise limits that apply on any day of the year.
- 63 For these reasons, I disagree with the concerns in the s42A Report and I consider that the noise limits for Sundays are reasonable.

Conditions

- 64 I provided input to proposed noise conditions in Appendix 1 to the application (the “*proposed conditions*”). I refer to the noise conditions as they are numbered in the application for the purpose of comparison to the s42A Report. These proposed noise conditions include:
- (a) The project noise standards in proposed conditions 37 and 38;
 - (b) The air overpressure limits for blasting in proposed conditions 39 and 40;
 - (c) The impact noise minimisation requirements in proposed condition 45;
 - (d) The equipment maintenance requirements in proposed condition 42; and
 - (e) The project communication requirements in proposed condition 51.
- 65 I consider the above noise management measures represent the best practicable option to manage and minimise noise from the Project.
- 66 The s42A Report proposes several amendments to the proposed conditions that I have proposed. The updates are set out in Table 4 of Section 7.4 of the s42A Report. For the avoidance of doubt, I refer to this condition set as the “*s42A conditions*”.
- 67 In my view, the s42A amendments do not enhance the certainty, effectiveness or overall enforceability of the proposed noise conditions. In fact, in many instances I consider that the s42A amendments reduce the effectiveness and certainty of the conditions. In most cases, I recommend the noise conditions originally proposed by the applicant are reinstated. I address each of the conditions below.

Noise limit conditions

- 68 Proposed conditions 37 and 38 require:
- (a) Noise levels from drilling and dredging work to meet the Project Noise Standards provided in the table in paragraph 35 of this evidence. The table provides noise limits that must be met at residential/ rural receivers, the Inner Control Boundary of the Port, and at Industrial 1 and Business 2 receivers;

- (b) The table includes noise limits that must be achieved for all timeframes on weekdays, Saturdays, Sundays and Public Holidays; and
- (c) Proposed condition 38 requires compliance with the Project Noise Standards to be measured and assessed 1m from the façade of any building that is occupied when the noise is being generated, and requires all measurements and assessments to be conducted in accordance with NZS6803:1999.

69 The s42A version of conditions 37 and 38 simply require:

- 37. *The consent holder shall ensure that the noise emissions at residential and rural receivers does not exceed 50 dB L_{Aeq} during night-time hours (8pm to 6:30am)*
- 38. *The consent holder shall ensure that noise emissions at residential and rural receivers does not exceed 70 dB L_{Aeq} during day time hours (7.30am to 6:30am).*

70 The s42A versions of condition 37 and 38 lack the following essential components:

- (a) They do not control noise levels received at various assessment locations in Bluff other than in the residential and rural zones;
- (b) They do not specify the relevant assessment location for the measurement of noise, and the relevant standard (NZS 6803) that must be applied in the measurement and assessment of noise levels;
- (c) They do not include an L_{AFMax} limit;
- (d) The condition provides a noise limit of 70dB L_{Aeq} on Sundays which is significantly higher than the 55dB L_{Aeq} noise limit recommended by NZS 6803; and
- (e) The timeframes for day and night do not correspond with the guidance in NZS 6803 and there is no noise limit at all applying between 06.30am and 0730am, and between 6pm and 8pm.

71 I consider that proposed conditions 37 and 38 should be preferred. I consider that they provide a clear, accurate and certain set of controls to ensure that the noise levels are reasonable.

Proposed conditions 39 and 40- Blasting

72 Proposed conditions 39 and 40 require:

39. The air overpressure from blasting shall comply with a limit of 120dBC L_{peak} at any property containing a building with windows.

40. The Project Noise Standards and the noise limit in Condition 39 (blasting) do not apply at any property or building under the ownership or control of the consent holder or its entities or subsidiaries

73 These conditions are omitted from the s42A condition set. I consider the blast limits should be reinstated.

74 The s42A Report proposes new conditions *Trial Blasting* and *Blast Plan* that require:

(a) A trial blast to determine the charge weights required for the rock fragmentations and to validate the vibration attenuation; and

(b) A Blast Plan to be submitted to Environment Southland every four months (no less than twice) during the proposed 8 month blasting campaign.

75 I appreciate that these conditions may be deemed appropriate for other reasons, but I do not consider they are necessary from the perspective of airborne noise effects as the proposal is expected to comply with the air overpressure limits by a significant margin.

Impact noise management- barge lining

76 Proposed condition 39 / s42A condition 39 require the hopper barge to be lined with material (e.g., timber) to minimise noise from rocks impacting on the steel surface of the barge.

77 The s42A Report seeks clarification on the timber lining, and whether it will be fixed so as not to drop out. I understand that the lining will be fixed to the barge and will not be lost. In my view, the functional need for the lining to be fixed is inherent. No further modification to the condition is needed.

Maintenance of drilling/ dredging equipment

78 Proposed condition 42/ s42A condition 40 require regular maintenance of drilling and dredging equipment (i.e. e.g. lubrication and repair of winches,

generators to lessen above surface noise production). This condition has been retained in its original form.

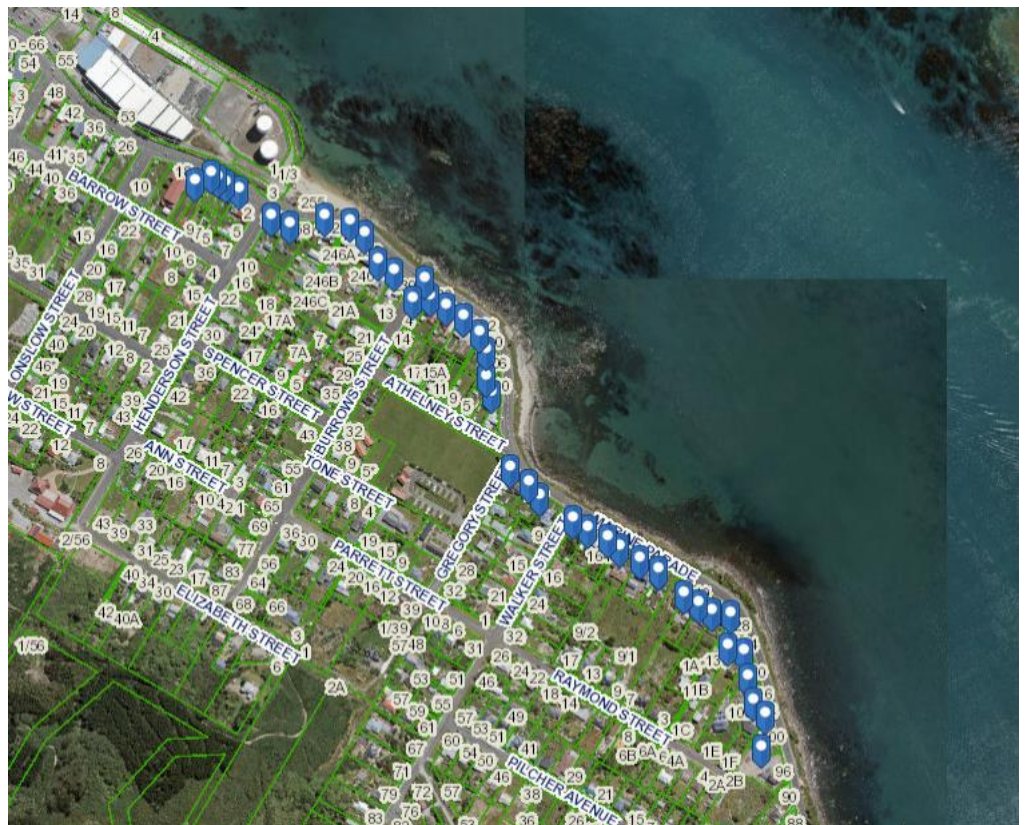
Communications with Bluff residents

79 Proposed condition 51 requires:

“The consent holder shall provide advance notice to the owners and occupiers of properties predominately on Marine Parade as to when night time dredging works is likely to occur. The communication should be designed to let the owners know about the timing and duration of night time works, that it will be audible in some meteorological conditions, and that closing bedroom windows will assist to reduce noise levels, particularly during certain meteorological conditions”

- 80 This condition forms the general basis of s42A condition 49; however the S42A Report recommends new condition 49B to achieve “*a wider reach of advanced notice*” through local media, websites and community notice boards. The author considers this approach is necessary as “*there maybe owners/ occupiers to side streets to Marine Parade who could be affected*”. S42A condition 49B would require broader notice of night works through local media, South Port’s website and community notice board(s).
- 81 I consider the focus of proposed condition 51/ s42A condition 49 should be to ensure those receivers that are predicted to receive noise levels between 45 dB L_{Aeq} and 50 dB L_{Aeq} are provided with advanced notice of the works. There is no evidence to suggest that such effects could extend beyond the properties I have identified in my Assessment.
- 82 Based on my experience of projects where similar notice of events has been required, the most effective and efficient way of communicating with residents is through a letter drop. This approach ensures that the receiver is not responsible for searching for information in a newspaper or listening to a radio to receive the information. In some cases where the receiver group is well defined, a specific email list has been created to reach all those potentially affected.
- 83 I agree that South Port’s website and community notice board could be a useful place for the community to seek and source project information, however there is no guarantee that radio announcements will reach the intended audience. In my view, proposed condition 51/ s42A condition 49 should be amended to provide clarification on the target audience to ensure the affected community receives the information, with no action required on their part.

- 84 The noise level predictions identify that the receivers likely to experience noise levels between 45 dB L_{Aeq} and 50 dB L_{Aeq} are quite localised. They are the waterfront Marine Parade dwellings between 116 Marine Parade and 262 Marine Parade. All other Bluff receivers are predicted to receive noise levels below 45 dB L_{Aeq} during all meteorological conditions. Receivers behind the waterfront row will benefit from screening provided by the intervening buildings and the increased distance.
- 85 The map below could be used to inform direct communications with the target audience in proposed condition 51/ s42A condition 49. This map shows the Marine Parade receivers identified through the noise modelling, with a buffer to include residential receivers between 2-12 Gore Street and as far south as 96 Marine Parade.



- 86 I recommend that s42A condition 49 is amended to require direct communications with the receivers in the map above.
- 87 I do not consider local media updates to be necessary in s42A condition 49. The construction noise levels predicted beyond the localised area above are consistent with the permitted noise levels in NZS 6803, and residents will not need to take any action (e.g. shutting windows) to minimise noise. It is my experience that wider communications are likely to reach a far greater audience and may inadvertently increase sensitivity.

- 88 Proposed condition 50 (s42A condition 48) requires that 24-hours advanced notice is provided to the wider public for all scheduled blast events. This includes communication channels such as UHF marine channels and the Coastguard channel, Bluff Fisherman's radio, LED signs, project information station at the port, emails and posters. Insofar as noise issues are concerned, I support this condition in its proposed form.

Complaint condition

- 89 Proposed condition 52 (s42A condition 50) requires a complaints register to be maintained. The S42A Report recommends this condition is updated to provide specific records on the location, date and time of the complaint, weather conditions, cause, and management actions undertaken to *address* the complaint. I agree with the updated version of s42A condition 50.

Condition 9 - restriction on work hours

- 90 Proposed condition 9 (s42A condition 9, with amendments shown as **bold**) requires:

Drilling, rock breaking and blasting activities and use of the trailer suction (TSHD) shall be limited to the hours between 7.30 and 6pm **and restricted to daylight hours*** when marine species are less active and to minimise disturbance to residential and rural receivers.

***Daylight hours can be defined as 30 minutes after sunrise to 30 minutes before sunset.**

- 91 I have reviewed this condition in terms of its objective to minimise disturbance to residential and rural receivers. Effects on marine species are addressed by others.
- 92 I understand that in June and July, sunrise and sunset in Bluff can occur as late as 08:32am and as early as 5:04pm. Proposed condition 9 would require works to commence after 9:02am and cease by 4:34pm on the shortest winter days.
- 93 I consider noise effects during the morning and evening period are adequately controlled through my proposed conditions 37 and 38. These conditions adopt NZS 6803's numerical noise limits for the period between 06:30am and 07:30am, the daytime period up to 6:00pm, and the evening period between 18:00 and 2000. NZS 6803's "shoulder" noise limits in the early morning and evening period have been designed to protect the aural sensitivity and amenity of receivers during these timeframes. The noise

limits vary based on the day of the week, with lower noise limits on weekends.

- 94 I understand that restricting the working hours to less than what I have recommended is likely to result in a longer construction period. I consider that the focus of the noise conditions should be to enable the works to be completed as efficiently as possible within reasonable noise limits that protect the sensitivity of receivers throughout the day and night.
- 95 In my view, the noise limits and working hours recommended in the proposed conditions strike the best balance between managing the airborne noise effects over the day and minimising the number of days where the higher effects are experienced.
- 96 Insofar as airborne noise effects are concerned, I recommend deleting the words, "and to minimise disturbance to residential and rural receivers" from s42A condition 9.

Submissions

- 97 There are no submissions relating to airborne noise effects on people.



Jon Robert Styles

29 March 2022