



Monthly compliance noise monitoring report

Glebe Island / White Bay

Port Authority of New South Wales

May 2024



The Power of Commitment

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1. Introduction

GHD Pty Ltd (GHD) has been engaged by Port Authority of New South Wales (Port Authority) to undertake compliance noise monitoring, as required by the *Port Noise Policy (Port Authority, 2020)*.

This report provides the details of the compliance noise monitoring for all vessels at berth during May 2024, as determined using the noise monitoring system. A detailed description of the permanent noise monitoring system including a map of monitoring locations is provided in the Noise Monitoring Plan, available on Port Authority's website.

2. Noise monitoring details and vessel schedule

Client	Company details	Noise monitor name	Noise monitor location	Noise monitor details / settings	Noise monitor serial numbers	Monthly calibration variance
Port Authority of New South Wales	GHD Pty Ltd Member of the Association of Australasian Acoustical Consultants (AAAC) Lead staff are Members of the Australian Acoustical Society (AAS)	L01	Grafton Street, Balmain	Meter details Norsonic Nor145 Sound Level Meter with Nor1297 Noise Compass Meter settings A-weighted Fast time response 15 minute intervals	14529646	Initial calibration level 90.7 dBA Min. deviation = 0.0 dB Max. deviation = 0.1 dB
		L02	Maintenance Building on White Bay		14529643	Initial calibration level 91.9 dBA Min. deviation = 0.3 dB Max. deviation = 0.3 dB
		L03	Adjacent to White Bay 2		14529645	Initial calibration level 92.5 dBA Min. deviation = 0.1 dB Max. deviation = 0.2 dB
		L04	Onsite at Glebe Island		14529640	Initial calibration level 93.9 dBA Min. deviation = -0.1 dB Max. deviation = 0 dB
Vessel name	Arrival date and time	Departure date and time		Berth location	Applicable noise monitoring location/s	
Bulk vessels						
Tawaki	April 28, 2024 / 22:54	May 2, 2024 / 12:11		GLB7	L03	
Kondili	May 2, 2024 / 22:54	May 5, 2024 / 6:04		GLB8	L03/L02	

Vessel name	Arrival date and time	Departure date and time	Berth location	Applicable noise monitoring location/s
Kondili	May 14, 2024 / 19:44	May 16, 2024 / 20:57	GLB8	L03
Tawaki	May 17, 2024 / 00:53	May 29, 2024 / 06:02	GLB7	L03
Pioneer ¹	May 28, 2024 / 07:58	May 31, 2024 / 07:18	WHT4	L02
Pioneer ¹	May 31, 2024 / 07:18	June 3, 2024 / 13:59	GLB 7	L03
Cruise vessels				
Pacific Adventure	May 6, 2024 / 16:41	May 7, 2024 / 00:04	WBCT	L01
Pacific Adventure	May 10, 2024 / 06:56	May 10, 2024 / 16:47	WBCT	L01/L02
Pacific Adventure	May 26, 2024 / 06:43	May 26, 2024 / 16:04	WBCT	L01

Note: 1) Sugar Australia carried out its container loading trial at WHT4 between 28/05/2024 and 31/05/2024. On 31/05/2024 at 07:18, the Pioneer moved from WHT4 to GLB7.

Note: 2) The Investigator arrived to White Bay 4 on May 31 and stayed until 7 June 2024. Given the majority of the visit was in June, the results of this visit will be reported in the June monthly report.

3. Compliance summary

3.1 Bulk vessels

Vessel	Dates at berth	Monitor location	Vessel Noise Level, dBA (inclusive of any modifying factor penalties)			Vessel Noise Trigger Levels, dBA			Compliance ¹	
			Day L _{Aeq} (15 hr)	Night L _{Aeq} (1 hr)	Night L _{Amax}	Day ² L _{Aeq} (15 hr)	Night L _{Aeq} (1 hr)	Night L _{Amax}	Day	Night
Tawaki	Apr 28 – May 2	L03	55	52	67	60	55	65	Yes	No ⁴
Kondili	May 2 – May 5	L02/L03	56	54	65	60	55	65	Yes	Yes
Kondili	May 14 – May 16	L03	56	52	70	60	55	65	Yes	No ⁵
Tawaki	May 17 – May 29	L03	55	57 ⁶	69	60	55	65	Yes	No ⁷
Pioneer	May 28 – May 31	L02	57	54	- ⁸	60	55	65	Yes	Yes
Pioneer	May 31 – June 3	L03	51	48	62	60	55	65	Yes	Yes

Note: 1) If non-compliance is detected, a detailed investigation of the results will be undertaken and reported separately if required

Note: 2) Daytime period (7 am to 10 pm) – 15 hour logarithmic average

Note: 3) Night-time (10 pm to 7 am) – loudest 1 hour period

Note: 4) A review of the data indicates the maximum noise exceedance is likely to be associated with the vessel, however a 1-2 dB exceedance of the criteria is considered negligible. This only occurred once, and all other maximum noise level events were below the vessel noise trigger level.

Note: 5) There was a large number of maximum noise level events during the period between 5:03 and 5:10 am. These were coming from the general direction of the vessel, however it isn't possible to determine whether they were directly associated with the vessel. An investigation into this noise should be undertaken to determine if the noise was from the vessel and implement and measures to avoid this occurring in the future. No other maximum noise level events exceeding the trigger level during this visit.

Note: 6) See discussion in Section 4.4.2.

Note: 7) At 4:54 am on May 25, there was one maximum noise level event of 69 dBA. The system indicated that this came from the direction of the vessel, however it could not be confirmed if the vessel was the source of noise. Given there was only one event above the maximum noise level criteria during this entire night time period, it is unlikely that this caused any adverse effects.

Note: 8) Due to extraneous noise, it was not possible to determine maximum noise levels from the vessel at this location. Based on previous visits at Glebe Island 7, it is unlikely that the vessel exceeded the maximum noise level trigger level.

3.2 Cruise vessels

Vessel	Dates at berth	Monitor location	Vessel Noise Level, dBA (inclusive of any modifying factor penalties)		Vessel Noise Trigger Levels, dBA		Compliance ¹	
			Day ² L _{Aeq} (15 hr)	Night ³ L _{Aeq} (9 hr)	Day ² L _{Aeq} (15 hr)	Night ³ L _{Aeq} (9 hr)	Day ⁴	Night
Pacific Adventure	May 6/7	L01	60	52	N/A	58	N/A	Yes
Pacific Adventure	May 10	L02	57 ⁵	-.5	N/A	58	N/A	-.5
Pacific Adventure	May 26	L01	58	-.6	N/A	58	N/A	-.6

Note: 1) If non-compliance is detected, a detailed investigation of the results will be undertaken and reported separately if required

Note: 2) Daytime period (7 am to 10 pm) – 15 hour logarithmic average

Note: 3) Night-time (10 pm to 7 am) – 9 hour logarithmic average

Note: 4) Port Authority provides attenuation to a defined area of residences where noise modelling indicates that current noise levels reach or exceed 55 dBA **at night** ('attenuation eligibility trigger'). Under the White Bay Cruise Terminal Noise Restriction Policy, cruise ship noise which causes further residences than those currently identified to exceed the attenuation eligibility trigger is considered to be Excessive Noise. Hence under the Noise Restriction Policy a day time trigger level does not apply. The area of residences currently offered attenuation (ie meeting the 'attenuation eligibility trigger') is based on a reference cruise vessel intrusive noise level of 58 dBA at the nearest residence, which sets the Vessel Noise Trigger Level for assessing compliance at night.

Excessive noise is defined as “any noise including but not limited to engine, generator or ventilation noise which causes further residences than those currently identified to exceed the attenuation eligibility trigger.”

Note: 5) L01 was not operational during this period. Location L02 was used to determine the approximate noise level during this visit. Note that the Pacific Adventure only arrived 4 minutes prior to 7 am, therefore a night-time noise level has not been provided.

Note: 6) The Pacific Adventure only arrived 17 minutes prior to 7 am, therefore a night-time noise level has not been provided.

4. Detailed results – bulk vessels

4.1 Tawaki (GLB7) – April 28 – May 2, 2024

4.1.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
April 28, 2024	Day	L03	L _{Aeq} , 15 hour ¹	-	-	-	60	-
	Night		L _{Aeq} , 1 hour ¹	52 ⁴	No	Yes	55	Yes
			L _{Amax}	59	-	-	65	Yes
April 29, 2024	Day	L03	L _{Aeq} , 15 hour ¹	55 ⁴	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	67 ⁵	-	-	65	No
April 30, 2024	Day	L03	L _{Aeq} , 15 hour ¹	54	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	61	-	-	65	Yes
May 1, 2024 ⁶	Day	L03	L _{Aeq} , 15 hour ¹	55	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	60	-	-	65	Yes

Notes

1) Daytime period (7 am to 10 pm) – 15 hours

Night-time period (10 pm to 7 am) – worst case 1 hour

2) Inclusive of any penalties for modifying factors

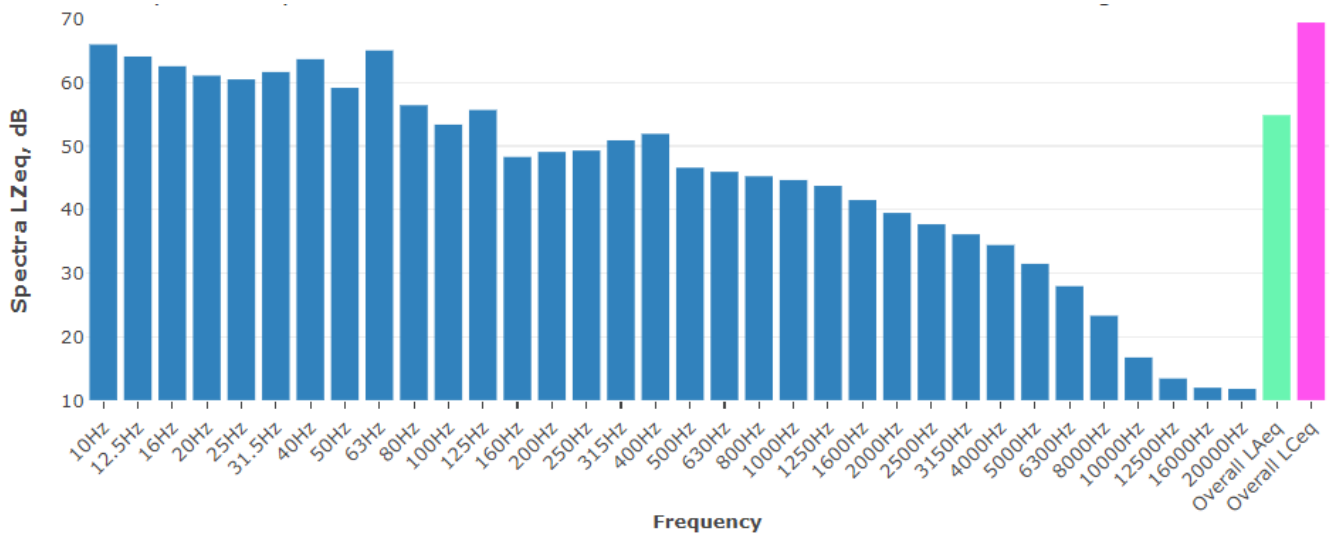
3) LFN = Low Frequency Noise

4) Measurements determined that noise was tonal at 6,300 Hz for periods during this period. A further review into the data determined that this was likely associated with extraneous noise in the area rather than the vessel. As such, no tonal correction has been applied.

5) A review of the data indicates this is likely to be associated with the vessel, however a 1-2 dB exceedance of the criteria is considered negligible. This only occurred once and all other maximum noise level events were below the vessel noise trigger level

6) Note that the system classifies May 1 as the period from 7 am on May 1 to 7 am on May 2. The Tawaki departed at 12:11 am on May 2, and has been incorporated in the data for May 1.

4.1.2 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.1 Typical vessel spectrum – noise level at L03

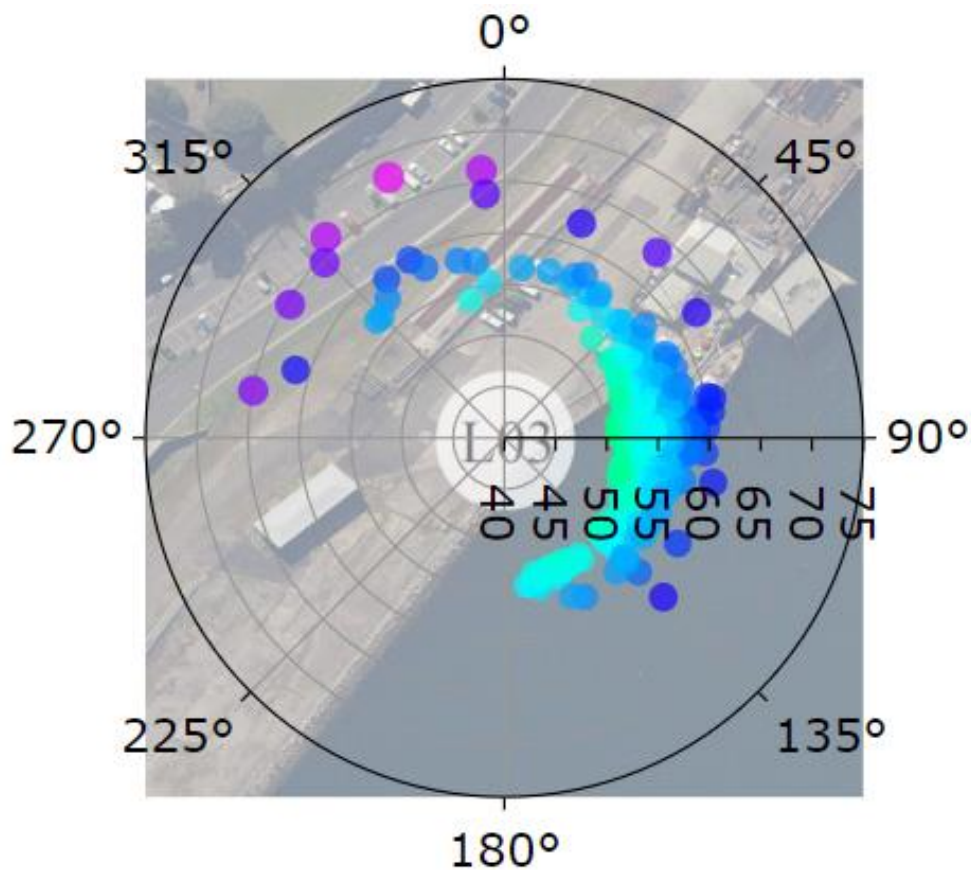


Figure 4.2 Typical vessel polar (directional) plot

4.2 Kondili (GLB8) – May 2 – May 5, 2024

4.2.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
May 2, 2024	Day	L03	L _{Aeq} , 15 hour ¹	-	-	-	60	-
	Night		L _{Aeq} , 1 hour ¹	54 ⁴	Yes	Yes	55	Yes
			L _{Amax}	65	-	-	65	Yes
May 3, 2024 ⁷	Day	L02 ⁷	L _{Aeq} , 15 hour ¹	56	No	Yes	60	-
	Night		L _{Aeq} , 1 hour ¹	54	No	Yes	55	Yes
			L _{Amax}	.5	-	-	.5	.5
May 4, 2024 ^{6,7}	Day	L02 ⁷	L _{Aeq} , 15 hour ¹	57	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	51	No	Yes	55	Yes
			L _{Amax}	.5	-	-	65	.5

Notes

1) Daytime period (7 am to 10 pm) – 15 hours

Night-time period (10 pm to 7 am) – worst case 1 hour

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

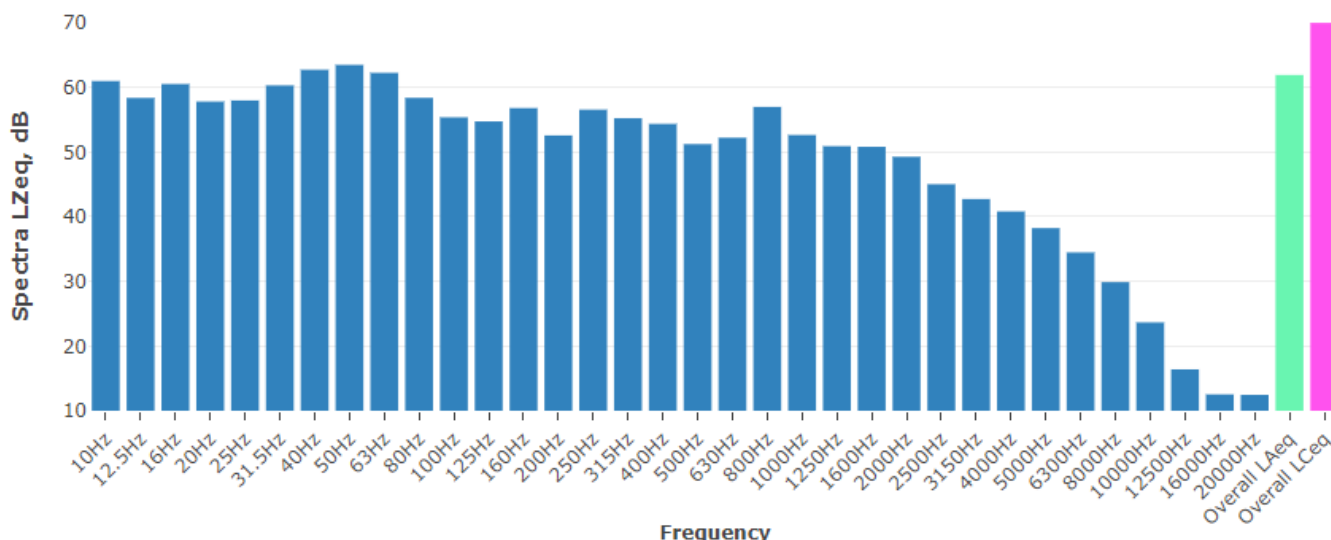
4) The level is inclusive of a 5 dB correction factor for tonality, as a tone was identified at 1000 Hz for one hour at 3 am. The measured level was 49 dBA.

5) Due to extraneous noise, it was not possible to determine maximum noise levels from the vessel at this location. Based on previous visits at Glebe Island 7, it is unlikely that any values exceeded the maximum noise level trigger level.

6) Note that the system classifies May 4 as the period from 7 am on May 4 to 7 am on May 5. The Kondili departed at 6:04 am on May 5, and has been incorporated in the data for May 4.

7) L03 was not operational on May 3-4. Location L02 was used to determine the approximate noise level during this period

4.2.2 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.3 Typical vessel spectrum – noise level at L03

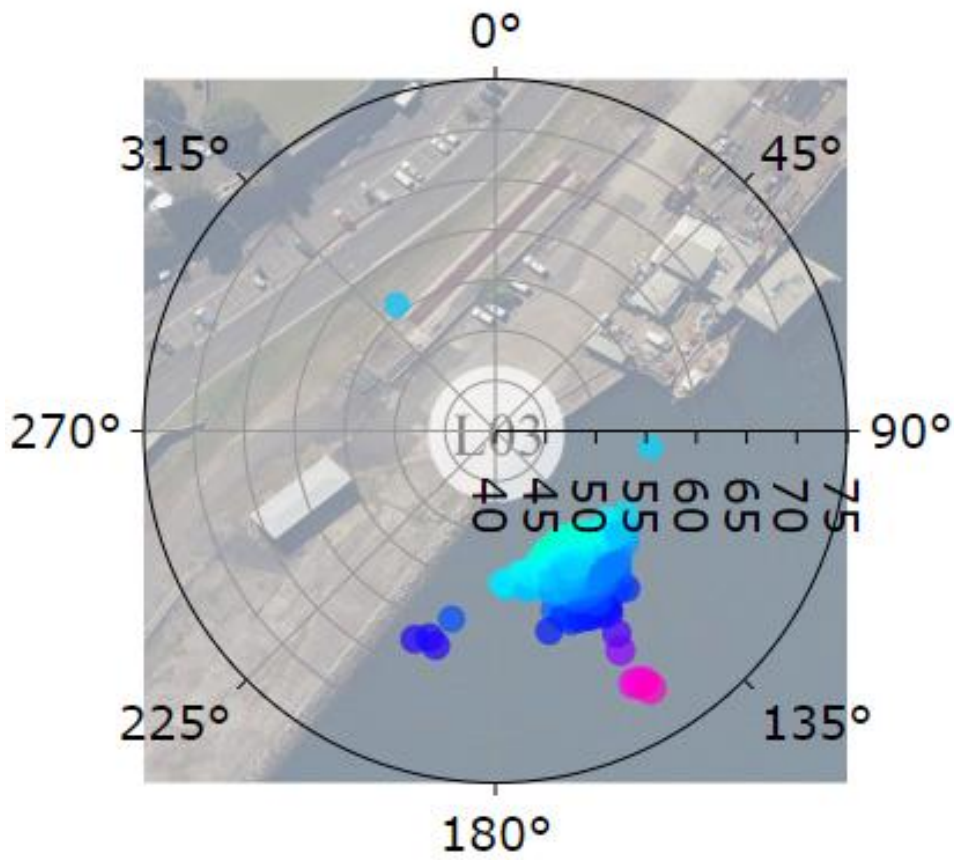


Figure 4.4 Typical vessel polar (directional) plot

4.3 Kondili (GLB8) – May 14 – May 16, 2024

4.3.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
May 14, 2024	Day	L03	L _{Aeq} , 15 hour ¹	53	-	-	60	Yes
	Night		L _{Aeq} , 1 hour ¹	51	No	No	55	Yes
			L _{Amax}	63	-	-	65	Yes
May 15, 2024	Day	L03	L _{Aeq} , 15 hour ¹	55	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	No	55	Yes
			L _{Amax}	70 ⁴	-	-	65	No
May 16, 2024	Day	L03	L _{Aeq} , 15 hour ¹	56 ⁵	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	-	-	-	55	-
			L _{Amax}	-	-	-	65	-

Notes

1) Daytime period (7 am to 10 pm) – 15 hours

Night-time period (10 pm to 7 am) – worst case 1 hour

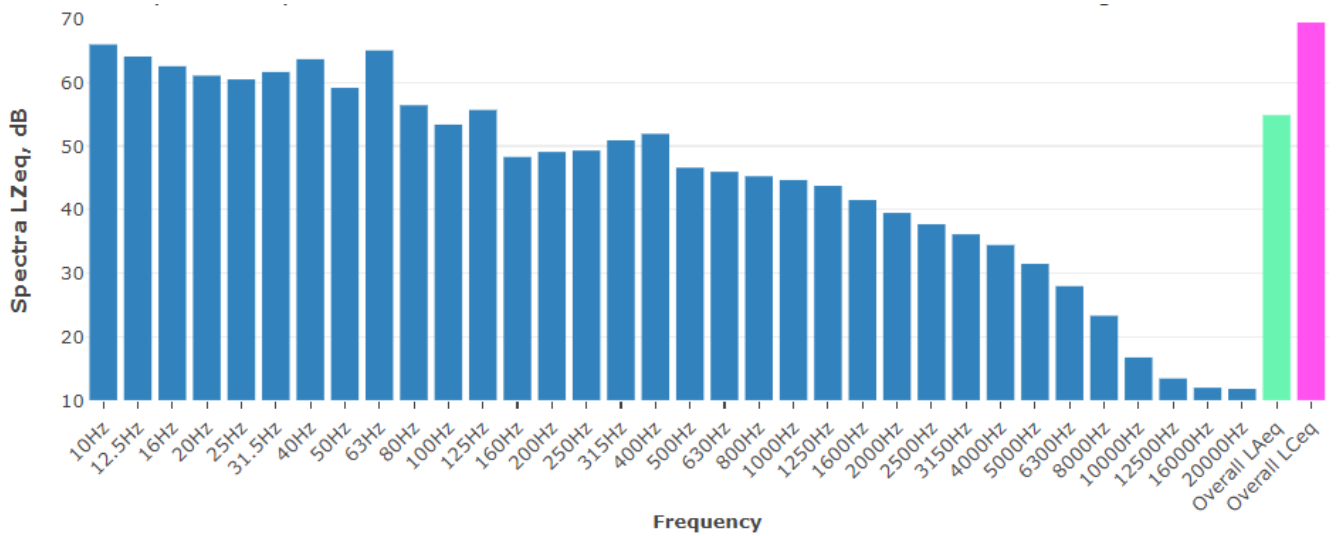
2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) There was a large number of maximum noise level events during the period between 5:03 and 5:10 am. These were coming from the general direction of the vessel, however it isn't possible to determine whether they were directly associated with the vessel. An investigation into this noise should be undertaken to determine if the noise was from the vessel and implement and measures to avoid this occurring in the future

5) Measurements determined that noise was tonal at 6,300 Hz for periods during this period. A further review into the data determined that this was likely associated with extraneous noise in the area rather than the vessel. As such, no tonal correction has been applied.

4.3.2 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.5 Typical vessel spectrum – noise level at L03

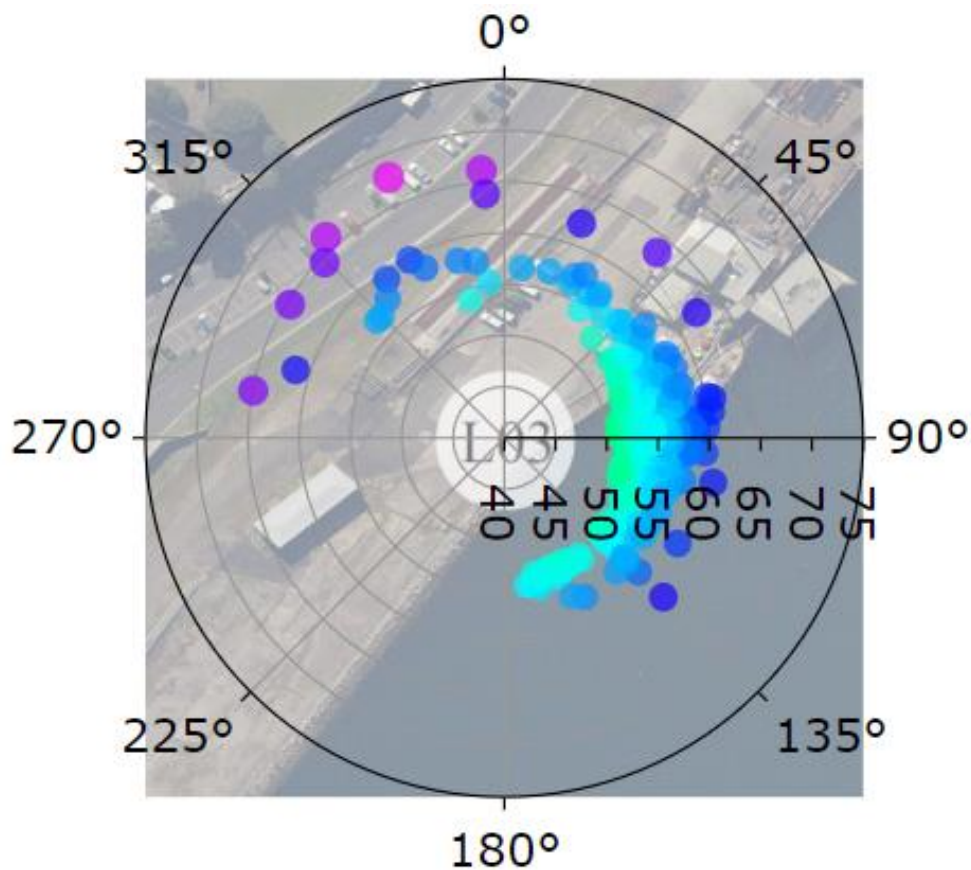


Figure 4.6 Typical vessel polar (directional) plot

4.4 Tawaki (GLB7) – May 17 – May 29, 2024

4.4.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
May 16, 2024 ⁴	Day	L03	L _{Aeq} , 15 hour ¹	-	-	-	60	-
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	61	-	-	65	Yes
May 17, 2024	Day	L03	L _{Aeq} , 15 hour ¹	53	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	53	No	Yes	55	Yes
			L _{Amax}	61	-	-	65	Yes
May 18, 2024	Day	L03	L _{Aeq} , 15 hour ¹	54	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	62	-	-	65	Yes
May 19, 2024	Day	L03	L _{Aeq} , 15 hour ¹	53	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	50	No	Yes	55	Yes
			L _{Amax}	59	-	-	65	Yes
May 20, 2024	Day	L03	L _{Aeq} , 15 hour ¹	54	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	55	No	Yes	55	Yes
			L _{Amax}	63	-	-	65	Yes
May 21, 2024	Day	L03	L _{Aeq} , 15 hour ¹	55	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	53	No	Yes	55	Yes
			L _{Amax}	61	-	-	65	Yes
May 22, 2024	Day	L03	L _{Aeq} , 15 hour ¹	52	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	63	-	-	65	Yes
May 23, 2024	Day	L03	L _{Aeq} , 15 hour ¹	51	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	51	No	No	55	Yes
			L _{Amax}	66 ⁵	-	-	65	No
May 24, 2024	Day	L03	L _{Aeq} , 15 hour ¹	55	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	69 ⁶	-	-	65	No
May 25, 2024	Day	L03	L _{Aeq} , 15 hour ¹	52	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	50	No	Yes	55	Yes
			L _{Amax}	60	-	-	65	Yes
May 26, 2024	Day	L03	L _{Aeq} , 15 hour ¹	50	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	52	No	Yes	55	Yes
			L _{Amax}	65	-	-	65	Yes
May 27, 2024	Day	L03	L _{Aeq} , 15 hour ¹	52	No	Yes	60	Yes
	Night		L _{Aeq} , 1 hour ¹	57 ⁷	No	Yes	55	No
			L _{Amax}	66 ⁵	-	-	65	No

May 28/29, 2024	Day	L03	L _{Aeq, 15 hour} ¹	51	No	Yes	60	Yes
	Night		L _{Aeq, 1 hour} ¹	51	No	Yes	55	Yes
			L _{Amax}	64	-	-	65	Yes
Notes 1) Daytime period (7 am to 10 pm) – 15 hours Night-time period (10 pm to 7 am) – worst case 1 hour 2) Inclusive of any penalties for modifying factors 3) LFN = Low Frequency Noise 4) The night time period of May 16 extends to 7 am on May 17. This represents the period from 12:53 am to 7:00 am on May 17. 5) These maximum level events only occurred once during the one hour period. Given it only occurred once and only a 1 dB above the maximum noise trigger level, this is not considered an adverse impact. The vessel was compliant with the night time vessel noise trigger level at all other times. 6) At 4:54 am on May 25, there was one maximum noise level event at 69 dBA. The system indicated that this came from the direction of the vessel, however it could not be confirmed if this was the source. Given there was only one event above the maximum noise level criteria during this entire night time period, it is unlikely that this caused any adverse effects. 7) See discussion in section 4.4.2 below								

4.4.2 Discussion regarding exceedance on 28 May

Between the hours of 6 am and 7 am on May 28 (which corresponds to 27 May in the table above), the system recorded a 2 dB exceedance of the night time criteria. This hour was significantly higher than all other values during this night time period, and also at least 4 dB higher than the hours following during the daytime period.

Detailed analysis showed an increase in noise levels between 6:30 am and 6:47 am, which increased the overall L_{Aeq, 1 hour} for that period. The analysis couldn't rule out that this noise was from the vessel given the noise was from the general direction of the vessel, however given the duration and the noise levels measured at all other times, it is possible that this increase was due to extraneous noise, however could be further investigated to determine whether there was something associated with the vessel that caused this exceedance.

Figure 4.7 below shows this period of increased noise levels.

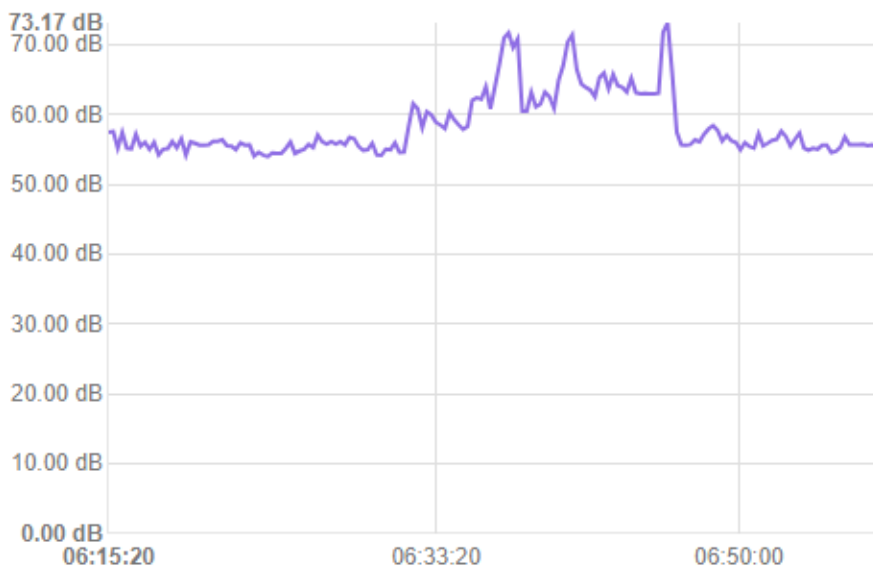
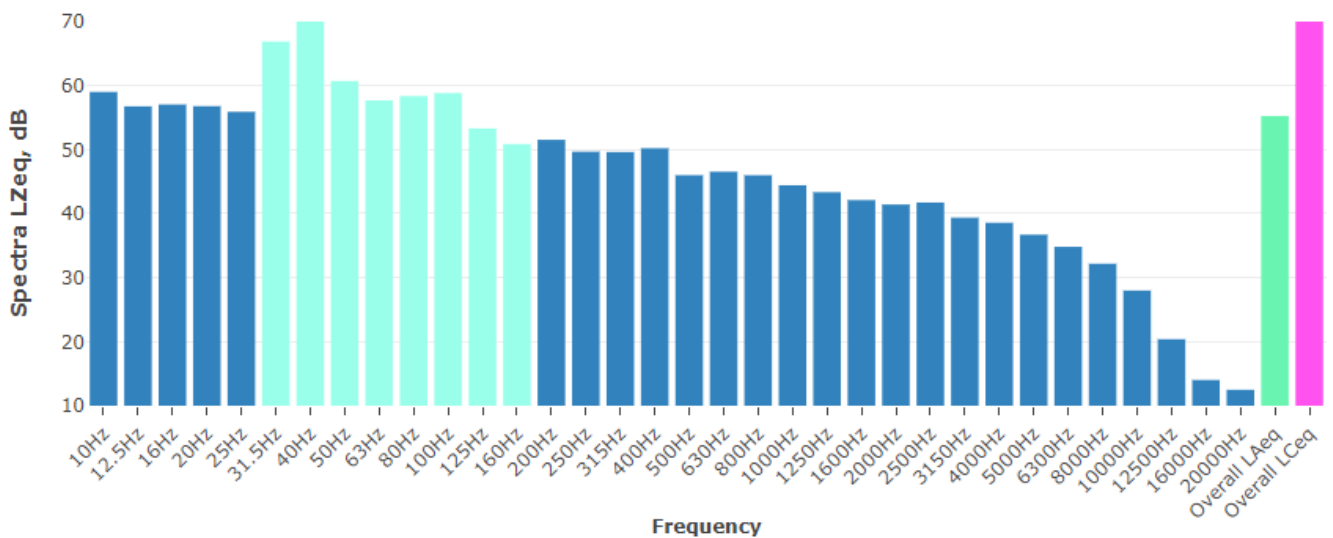


Figure 4.7 Noise level at L03 between 6:15 am and 7 am

4.4.3 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.8 Typical vessel spectrum – noise level at L03

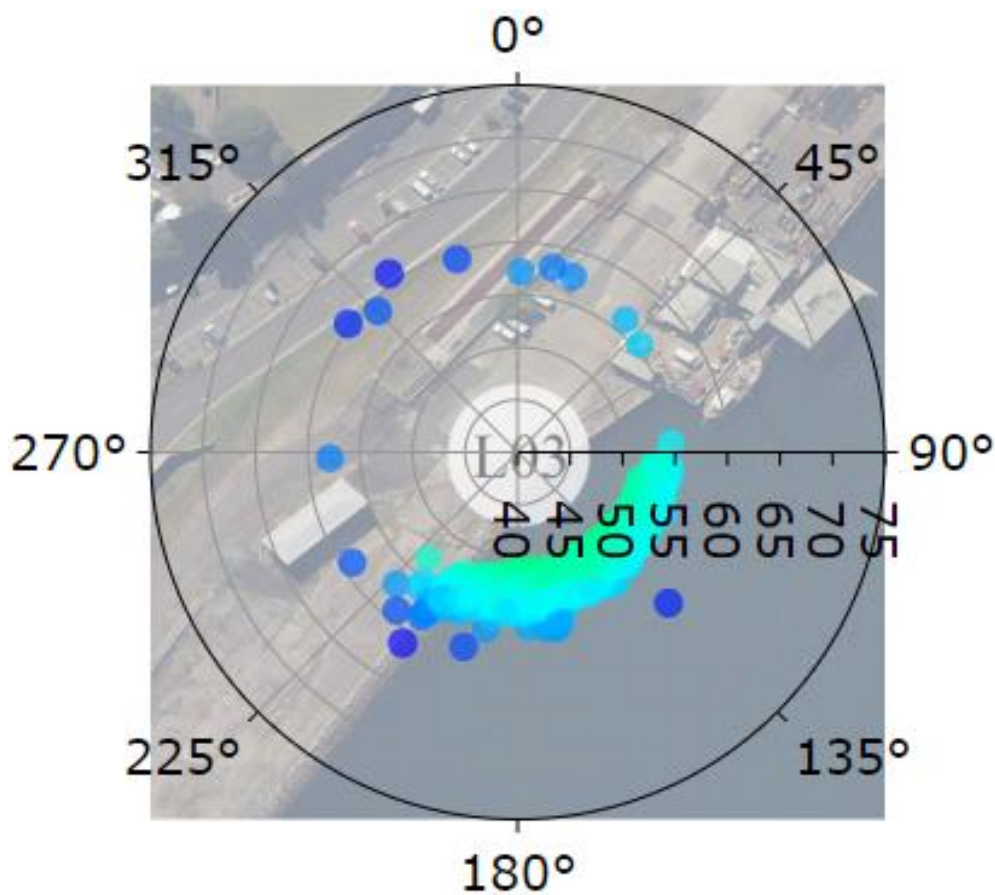


Figure 4.9 Typical vessel polar (directional) plot

4.5 Pioneer (WHT4) – May 28 – May 31, 2024

4.5.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
May 28, 2024	Day	L02	L _{Aeq} , 15 hour ¹	56	No	No	60	-
	Night		L _{Aeq} , 1 hour ¹	54 ⁴	No	No	55	Yes
			L _{Amax}	- ⁵	-	-	65	-
May 29, 2024	Day	L02	L _{Aeq} , 15 hour ¹	57	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	54	No	No	55	Yes
			L _{Amax}	- ⁵	-	-	65	-
May 30, 2024	Day	L02	L _{Aeq} , 15 hour ¹	56	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	53	No	No	55	Yes
			L _{Amax}	- ⁵	-	-	65	-

Notes

1) Daytime period (7 am to 10 pm) – 15 hours

Night-time period (10 pm to 7 am) – worst case 1 hour

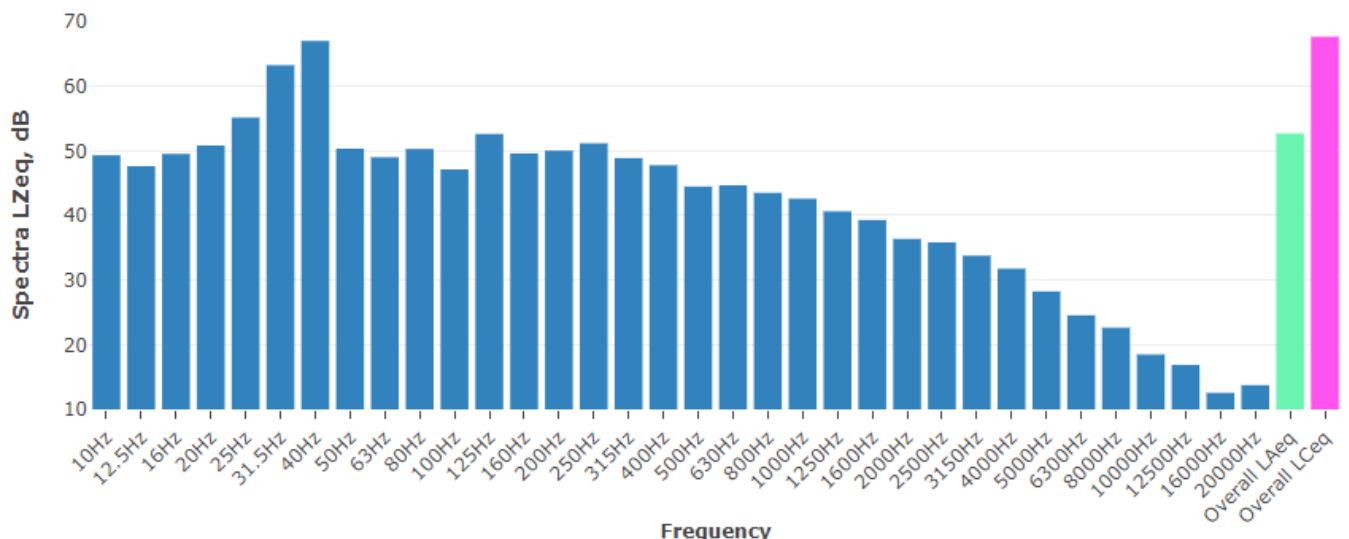
2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Due to extraneous noise at this location, L_{A90} values have been used to determine night time contribution from the Pioneer. Note that the L_{A90} is the level exceeded for 90 % of the time and is generally considered to be representative of the background or ambient noise level. The L_{A90} can also be used to determine the noise level of a relatively constant noise source (such as the noise from the vessel) when the measurement is impacted by intermittent extraneous noise, in this case other activity closer to the noise monitor.

5) Due to extraneous noise, it was not possible to determine maximum noise levels from the vessel at this location. Based on previous visits at Glebe Island 7, it is unlikely that any values exceeded the maximum noise level trigger level.

4.5.2 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.10 Typical vessel spectrum – noise level at L02

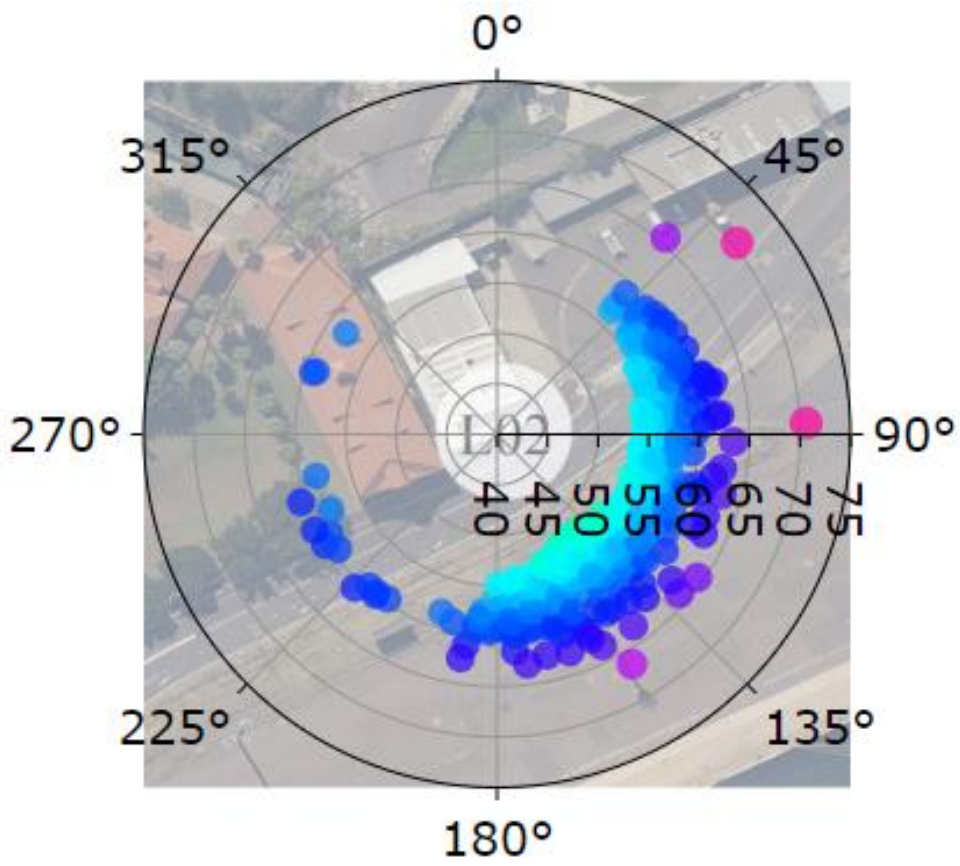


Figure 4.11 Typical vessel polar (directional) plot

4.6 Pioneer (GLB7) – May 31 – June 3, 2024

4.6.1 Daily noise monitoring results

Date	Time period ¹	Monitor location	Noise descriptor	Vessel noise level dBA ²	Tonal	LFN ³	Vessel Noise Trigger Levels, dBA	Compliance
May 31, 2024	Day	L03	L _{Aeq} , 15 hour ¹	51	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹	48	No	No	55	Yes
			L _{Amax}	62	-	-	65	Yes
June 1, 2024	Day	L03	L _{Aeq} , 15 hour ¹	Connectivity with the system was down during this period and therefore results were not processed.	No	No	60	Yes
	Night		L _{Aeq} , 1 hour ¹					
			L _{Amax}					
June 2, 2024	Day	L03	L _{Aeq} , 15 hour ¹					
	Night		L _{Aeq} , 1 hour ¹					
			L _{Amax}					
June 3, 2024	Day	L03	L _{Aeq} , 15 hour ¹					
	Night		L _{Aeq} , 1 hour ¹					
			L _{Amax}					

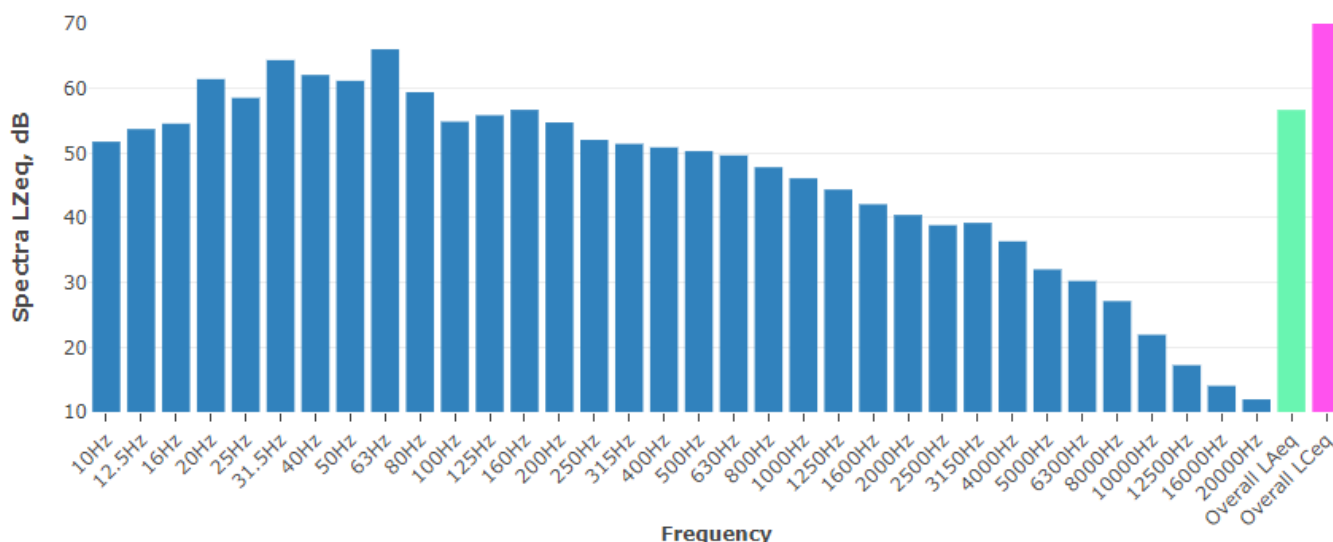
Notes

1) Daytime period (7 am to 10 pm) – 15 hours
Night-time period (10 pm to 7 am) – worst case 1 hour

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4.6.2 Additional information



Note: The overall frequency spectrum can be classified into low (≤ 160 Hz), medium (160-2000 Hz) and high (≥ 2000 Hz) frequencies. Where low frequency components are identified in the hourly spectra, the frequency bars are shaded in cyan. Where tones are identified in the hourly spectra, the frequency bars are shaded in red.

Figure 4.12 Typical vessel spectrum – noise level at L03

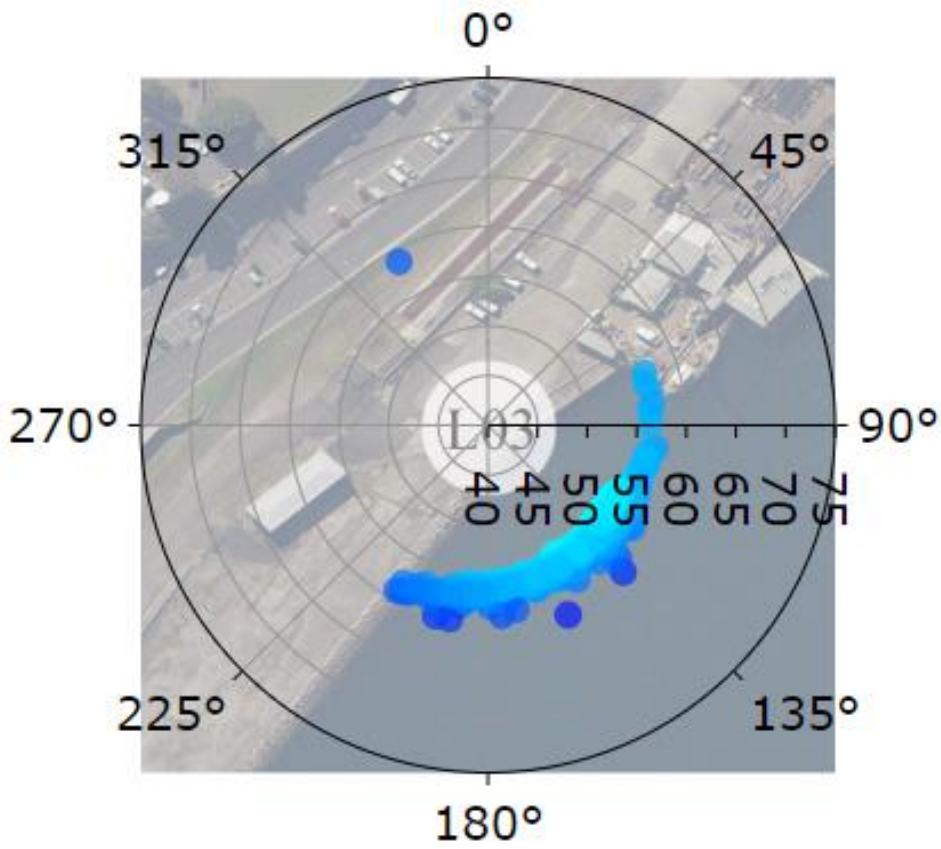


Figure 4.13 Typical vessel polar (directional) plot



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