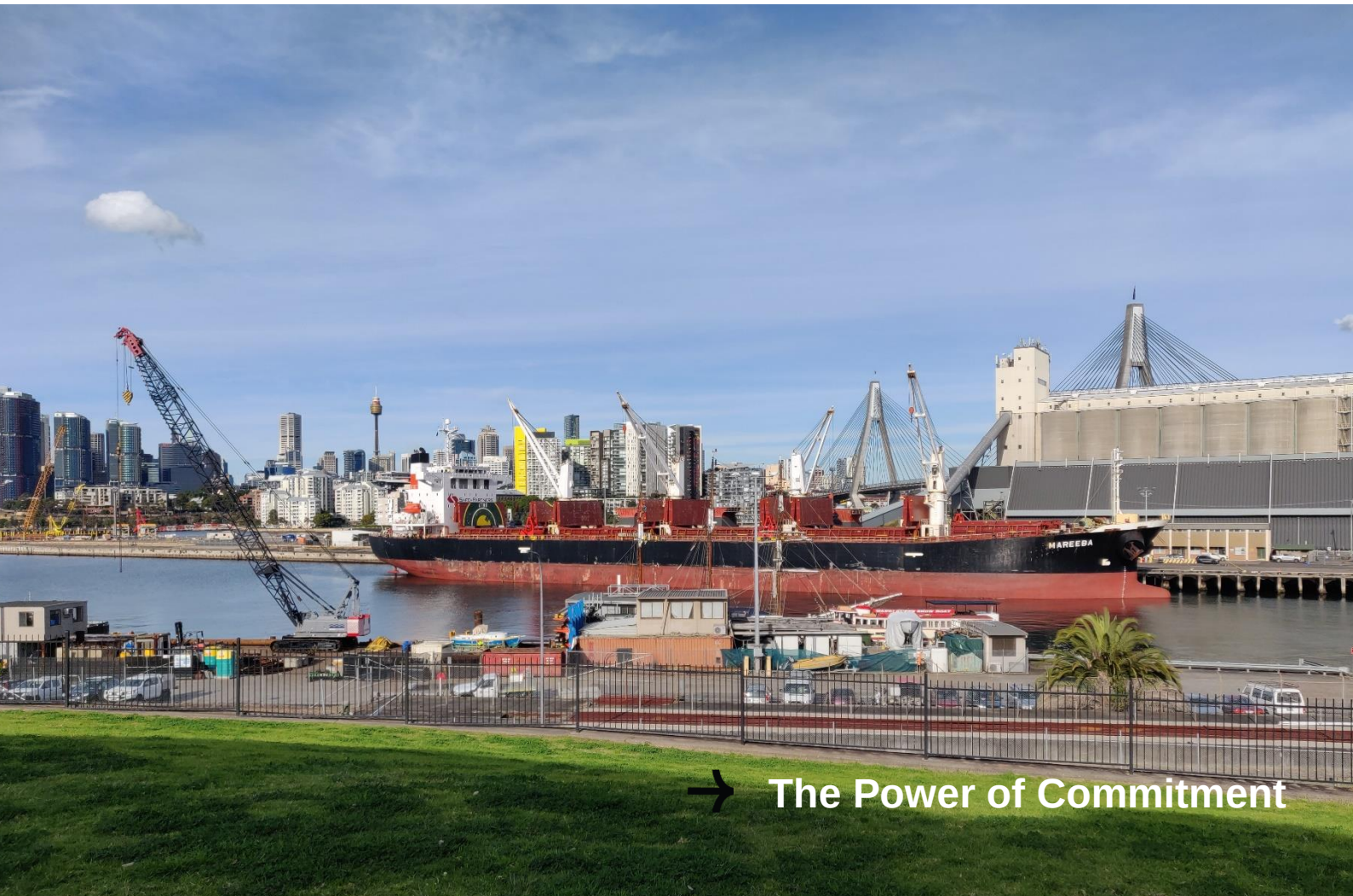
Monthly compliance noise monitoring report

Glebe Island / White Bay

Port Authority of New South Wales

March 2024



The Power of Commitment

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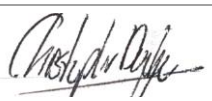
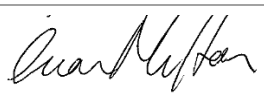
S4	2	C Gordon	C Doyle		E Milton		29/05/2024

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 March 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 = 0.0 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 = -0.1 dB

Vessel name	Arrival date and time	Departure date and time	Berth location	Applicable noise monitoring location/s
Bulk vessels				
Kondili	March 9 , 2024 / 03:09	March 11, 2024 / 14:09	GLB8	L03
Elanora	March 9, 2024 / 08:33	March 11, 2024 / 12:12	GLB7	L03

Vessel name	Arrival date and time	Departure date and time	Berth location	Applicable noise monitoring location/s
Bulk vessels				
AAL Nanjing	March 17, 2024 / 09:36	March 22, 2024 / 15:03	WHT4	L02
Pioneer[1]	March 19, 2024 / 14:18	March 24, 2024 / 08:19	GLB7	L03
Kondili	March 19, 2024 / 22:22	March 22, 2024 / 04:58	GLB8	L03
Pioneer	March 24, 2024 / 08:19	March 24, 2024 / 15:01	WHT4	L02
Akuna	March 24, 2024 / 12:00	March 26, 2024 / 13:58	GLB8	L03
Tawaki[2]	March 24, 2024 / 15:42	March 28, 2024 / 17:55	GLB7	L03
Cruise vessels				
Azamara Onward	February 29, 2024 / 08:05	March 2, 2024 / 23:20	WHT4	L02
Seven Seas Mariner	February 29, 2024 / 13:43	March 1, 2024 / 17:54	WBCT	L01
Volendam	March 2, 2024 / 08:00	March 3, 2024 / 17:09	WBCT	L01
Norwegian Spirit	March 4, 2024 / 05:34	March 4, 2024 / 17:25	WBCT	L01
Silver Muse	March 4, 2024 / 19:13	March 5, 2024 / 19:02	WBCT	L01
Europa 2	March 7, 2024 / 05:37	March 9, 2024 / 00:13	WBCT	L01
Noordam	March 9, 2024 / 04:56	March 9, 2024 / 22:30	WBCT	L01
Regatta	March 10, 2024 / 05:49	March 10, 2024 / 17:50	WBCT	L01
Pacific Adventure	March 17, 2024 / 06:45	March 17, 2024 / 16:15	WBCT	L01
Nautica	March 20, 2024 / 18:59	March 22, 2024 / 18:05	WBCT	L01
Norwegian Spirit	March 28, 2024 / 05:40	March 28, 2024 / 16:14	WBCT	L01
Pacific Adventure	March 29, 2024 / 07:30	March 29, 2024 / 16:22	WBCT	L01

Note: 1) After arriving at GLB7 on March 19, 2024 at 14:18, Pioneer moved to GLB1 on March 19, 2024 at 21:20. Then, it moved back to GLB7 on March 19, 2024 at 23:27.

On March 22, 2024, Pioneer moved to GLB1 at 05:10. Then, it moved back to GLB7 on March 22, 2024 at 06:25.

Note: 2) Tawaki moved to WHT4 on March 26, 2024 at 13:40. Then, Tawaki moved back to GLB7 on March 26 2024 at 16:28.

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[2] $L_{Aeq(15\ hr)}$	Night[3] $L_{Aeq(1\ hr)}$	Night[3] L_{Amax}	Day[2] $L_{Aeq(15\ hr)}$	Night[3] $L_{Aeq(1\ hr)}$	Night[3] L_{Amax}	Day	Night
Kondili[4]	Mar 9 – Mar 11	L03	55	52	62	60	55	65	Yes	Yes
Elanora[4]	Mar 9 – Mar 11	L03				60	55	65	Yes	Yes
AAL Nanjing	Mar 17 – Mar 22	L02	59	58	73	60	55	65	Yes	No
Pioneer[5]	Mar 19 – Mar 24	L03	51	55	58	60	55	65	Yes	Yes
Kondili	Mar 19 – Mar 22	L03	56	55	61	60	55	65	Yes	Yes
Pioneer	Mar 24	L02	53	-	-	60	55	65	Yes	-
Akuna[6]	Mar 24 – Mar 26	L03	56	52	64	60	55	65	Yes	Yes
Tawaki[6,7]	Mar 24 – Mar 28	L03	54	53	64	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) The Kondili and Elanora were berthed in Glebe Island 8 and Glebe Island 7 simultaneously, therefore individual noise levels could not be obtained. Noise levels were assigned to the Kondili during this visit, however the measured noise level is the cumulative level from both vessels. As all noise levels were compliant during these visits, a detailed noise assessment has not been undertaken. See detailed results in Section 4.1

Note: 5) After arriving at GLB7 on March 19, 2024 at 14:18, Pioneer moved to GLB1 on March 19, 2024 at 21:20. Then, it moved back to GLB7 on March 19, 2024 at 23:27.

On March 22, 2024, Pioneer moved to GLB1 at 05:10. Then, it moved back to GLB7 on March 22, 2024 at 06:25.

Note: 6) The Akuna and Tawaki were berthed in Glebe Island 8 and Glebe Island 7 simultaneously, therefore individual noise levels could not be obtained. Noise levels were assigned to the Akuna during this visit, however the measured noise

level is the cumulative level from both vessels. As all noise levels were compliant during these visits, a detailed noise assessment has not been undertaken. See detailed results in Section 4.5

Note: 7) Tawaki moved to WHT4 on March 26, 2024 at 13:40. Then, Tawaki moved back to GLB7 on March 26 2024 at 16:28.

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		Compliance1	
			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
Azamara Onward	Feb 29 - Mar 2	L02	57	55	N/A	58	N/A	Yes
Seven Seas Mariner	Feb 29 - Mar 1	L01	57	52	N/A	58	N/A	Yes
Volendam	Mar 2 – Mar 3	L01	56	52	N/A	58	N/A	Yes
Norwegian Spirit	Mar 4	L01	59	59	N/A	58	N/A	No
Silver Muse	Mar 4 – Mar 5	L01	52	49	N/A	58	N/A	Yes
Europa 2	Mar 7 – Mar 9	L01	55	54	N/A	58	N/A	Yes
Noordam	Mar 9	L01	56	52	N/A	58	N/A	Yes
Regatta	Mar 10	L01	54	50	N/A	58	N/A	Yes
Pacific Adventure	Mar 17	L01	58	-	N/A	58	N/A	-
Nautica	Mar 20 – Mar 22	L01	56	53	N/A	58	N/A	Yes
Norwegian Spirit	Mar 28	L01	59	57	N/A	58	N/A	Yes
Pacific Adventure	Mar 29	L01	58	-	N/A	58	N/A	-

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."

3.3 Discussion of exceedances

3.3.1 Norwegian Spirit – March 4

The Norwegian Spirit arrived at 5:34 am on March 4, 2024. Prior to 7 am is considered night period, therefore the assessment against the night vessel trigger noise level is applicable.

During this period, the average noise level for the vessel was 59 dBA, which is 1 dB above the vessel trigger noise level. Further, the noise level was consistently around 59 dBA throughout the day indicating that the noise from the vessel was relatively consistent during this visit.

3.3.2 Norwegian Spirit – March 28

The Norwegian Spirit arrived at 5:40 am on March 28, 2024. Prior to 7 am is considered night period, therefore the assessment against the night vessel trigger noise level is applicable.

During this period, the average noise level for the vessel was 57 dBA. Further, the noise level was consistently around 59 dBA throughout the day indicating that the noise from the vessel was relatively consistent during this visit.

4. Detailed results – bulk vessels

4.1 Kondili (GLB8) and Elanora (GLB7) – March 9 – March 11, 2024

The Kondili and Elanora were berthed in Glebe Island 8 and Glebe Island 7 simultaneously, therefore individual noise levels could not be obtained. Noise levels were assigned to the Kondili during this visit, however the measured noise level is the cumulative level from both vessels. As all noise levels were compliant during these visits, a detailed noise assessment has not been undertaken.

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
March 8, 2024[4]	Day	L03	$L_{Aeq, 15\ hour}$[1]	-	-	-	60	-
	Night		$L_{Aeq, 1\ hour}$[1]	52[5]	No	No	55	Yes
			L_{Amax}	62	-	-	65	Yes
March 9, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	55	No	No	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	51	No	No	55	Yes
			L_{Amax}	60	-	-	65	Yes
March 10, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	54	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	51[5]	No	Yes	55	Yes
			L_{Amax}	58	-	-	65	Yes
March 11, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	51	No	Yes	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

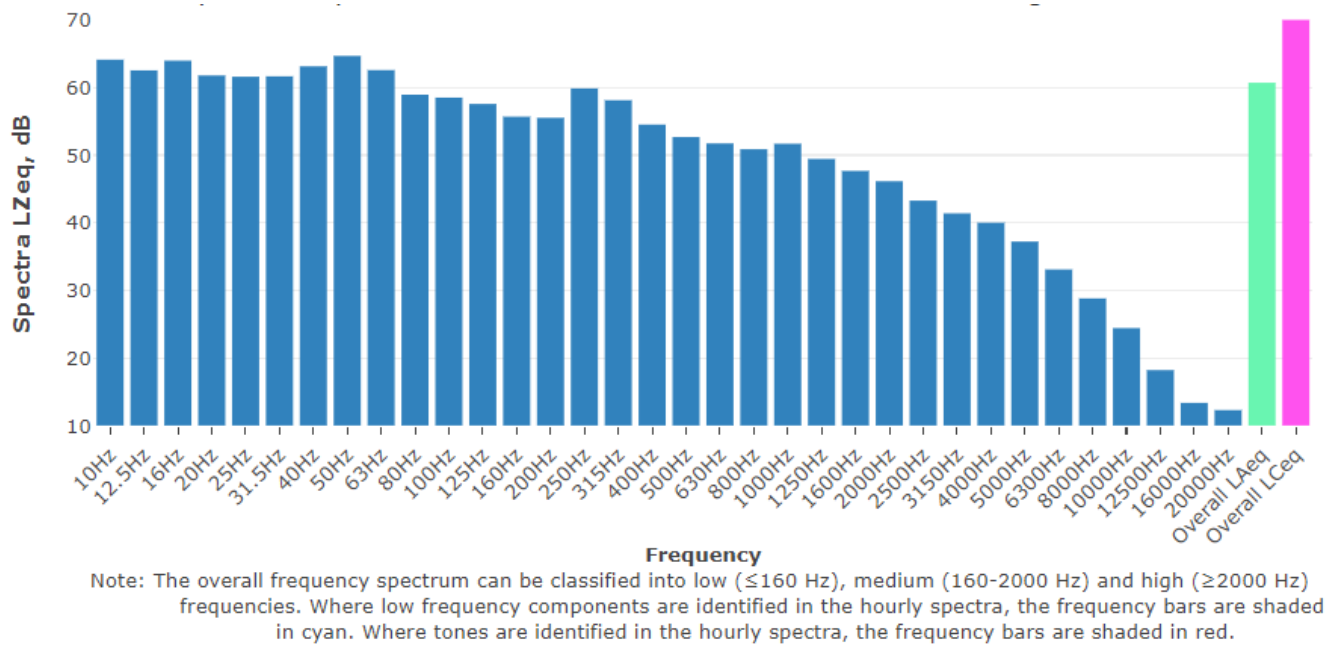
2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Kondili arrived at 03:09 am on March 9, which was captured in the system as night-time on March 8

5) Measurements determined that noise was tonal at 6,300 Hz for periods during this night time 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.

4.1.2 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

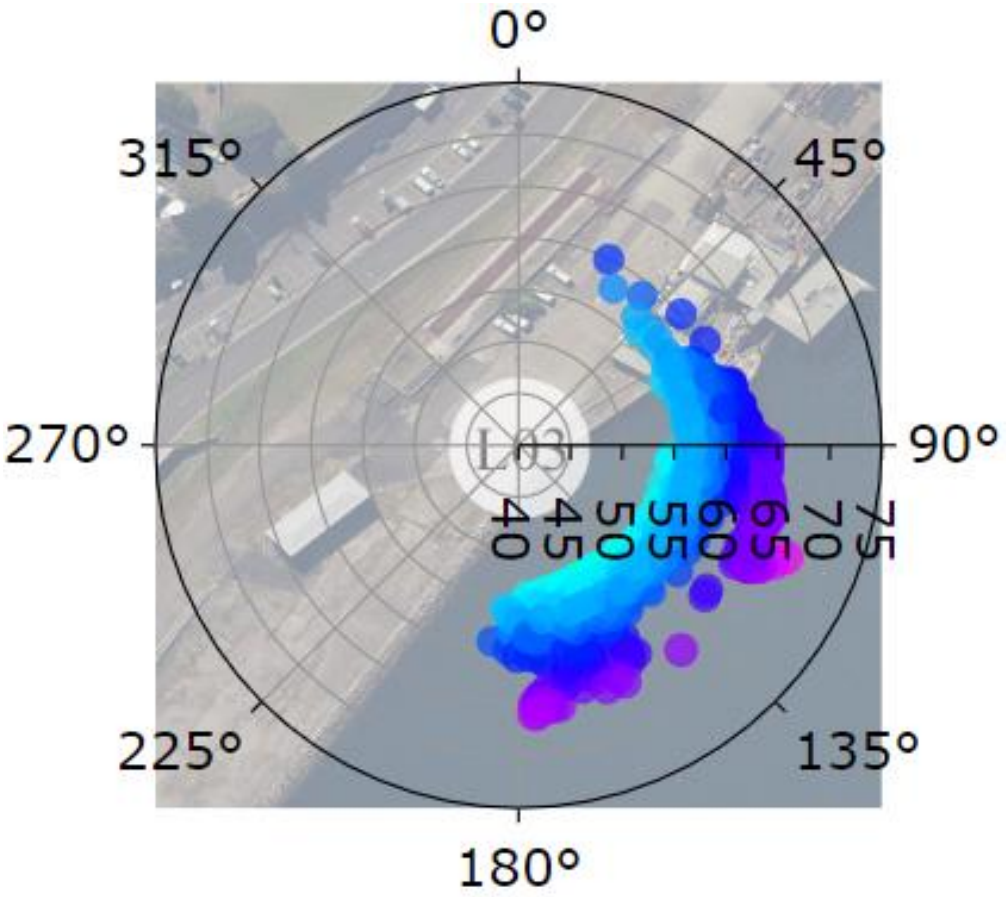


Figure 4.2 Typical vessel polar (directional) plot

4.2 AAL Nanjing (WHT4) – March 17 – March 22, 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
March 17, 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}	73[4]	-	-	65	No
March 18, 2024	Day	L02	$L_{Aeq, 15\ hour}$[1]	57	No	No	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	54[5]	No	No	55	Yes
			L_{Amax}	65	-	-	65	Yes
March 19, 2024	Day	L02	$L_{Aeq, 15\ hour}$[1]	59	No	No	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	58[5,6]	No	No	55	No
			L_{Amax}	67	-	-	65	No
March 20, 2024	Day	L02	$L_{Aeq, 15\ hour}$[1]	58	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	57[7]	No	Yes	55	No
			L_{Amax}	67[8]	-	-	65	No
March 21, 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}	70	-	-	65	No
March 22, 2024	Day	L02	$L_{Aeq, 15\ hour}$[1]	56	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) The noise monitoring system indicated that the maximum noise level during this period was 75 dBA, however on further analysis it was determined the maximum noise level from the AAL Nanjing was 73 dBA.

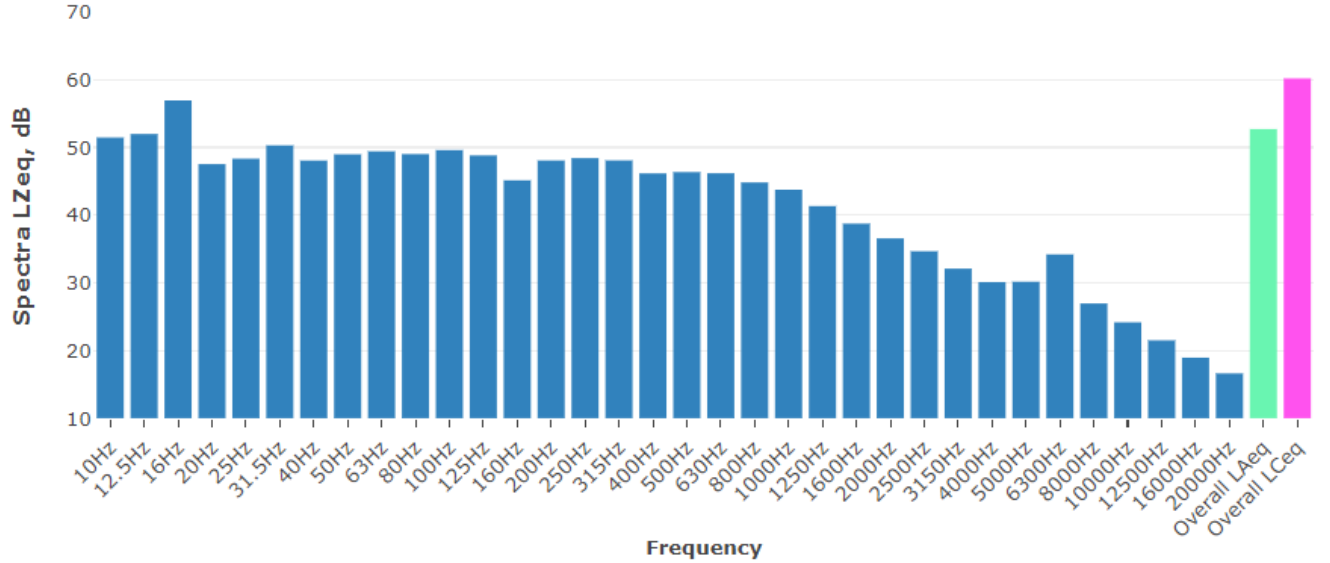
5) Measurements determined that noise was tonal at 6,300 Hz for 4 x one hour periods during this night time period. A further review into the data determined that this was likely associated with fauna in the area rather than the vessel. As such, no tonal correction has been applied.

6) This noise level occurred between 6 am and 7 am and may have been influenced by extraneous noise. Nevertheless, noise levels at other times during the night-time period were consistently between 56 dBA and 57 dBA and still non compliant.

7) This noise level occurred between 6 am and 7 am and may have been influenced by extraneous noise. Nevertheless, noise levels at other times during the night-time period were consistently between 54 dBA and 56 dBA and still non compliant.

8) The noise monitoring system indicated that the maximum noise level during this period was 70 dBA, however on further analysis it was determined the maximum noise level from the AAL Nanjing was 67 dBA.

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 L02

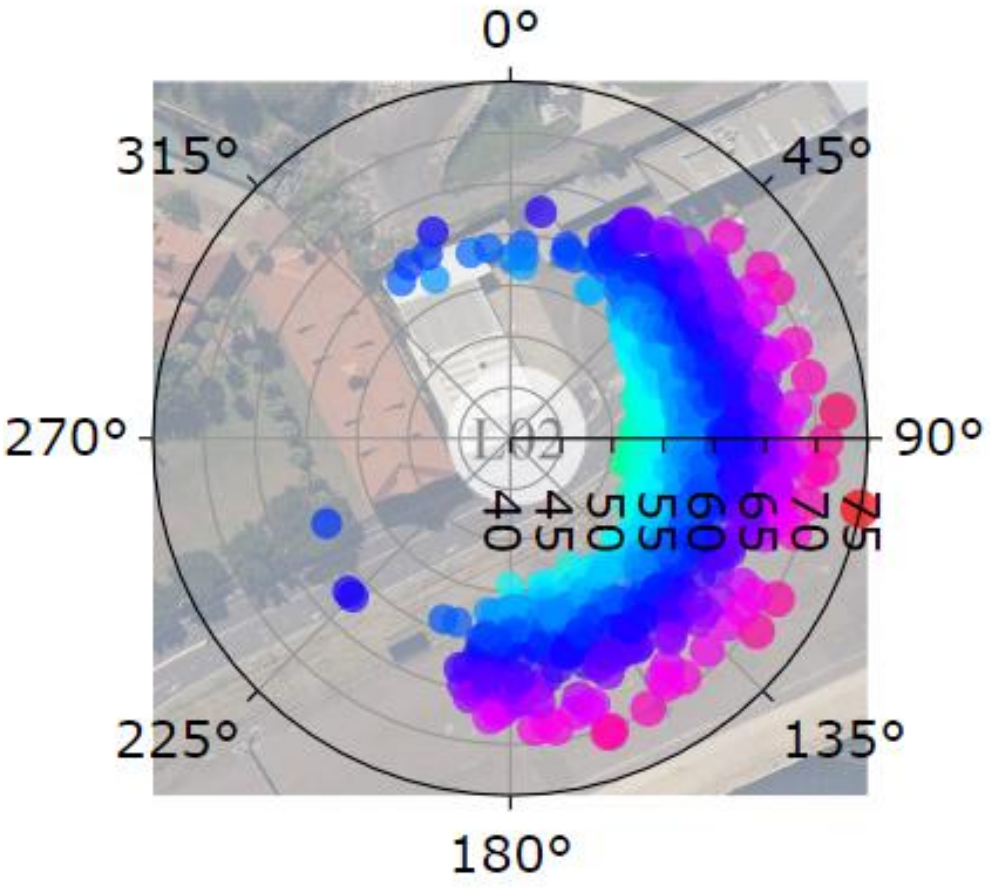


Figure 4.4 Typical vessel polar (directional) plot

4.3 Pioneer (GLB7/WHT4) – March 19 – March 24, 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
March 19, 2024[4]	Day	L03	$L_{Aeq, 15\ hour}$[1]	Pioneer and Kondili were berthed simultaneously at Glebe Island 7 and 8. Noise levels were assigned to the Kondili during this period. Note that noise from both vessels was compliant, therefore no further analysis has been undertaken.				
	Night		$L_{Aeq, 1\ hour}$[1]					
			L_{Amax}					
March 20, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]					
	Night		$L_{Aeq, 1\ hour}$[1]					
			L_{Amax}					
March 21, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]					
	Night		$L_{Aeq, 1\ hour}$[1]					
			L_{Amax}					
March 22, 2024[6]	Day	L03	$L_{Aeq, 15\ hour}$[1]	51	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	55[5]	Yes	Yes	55	Yes
			L_{Amax}	58	-	-	65	Yes
March 23, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	50	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	44	No	Yes	55	Yes
			L_{Amax}	-[7]	-	-	65	-
March 24, 2024	Day	L02	$L_{Aeq, 15\ hour}$[1]	53	No	Yes	60	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

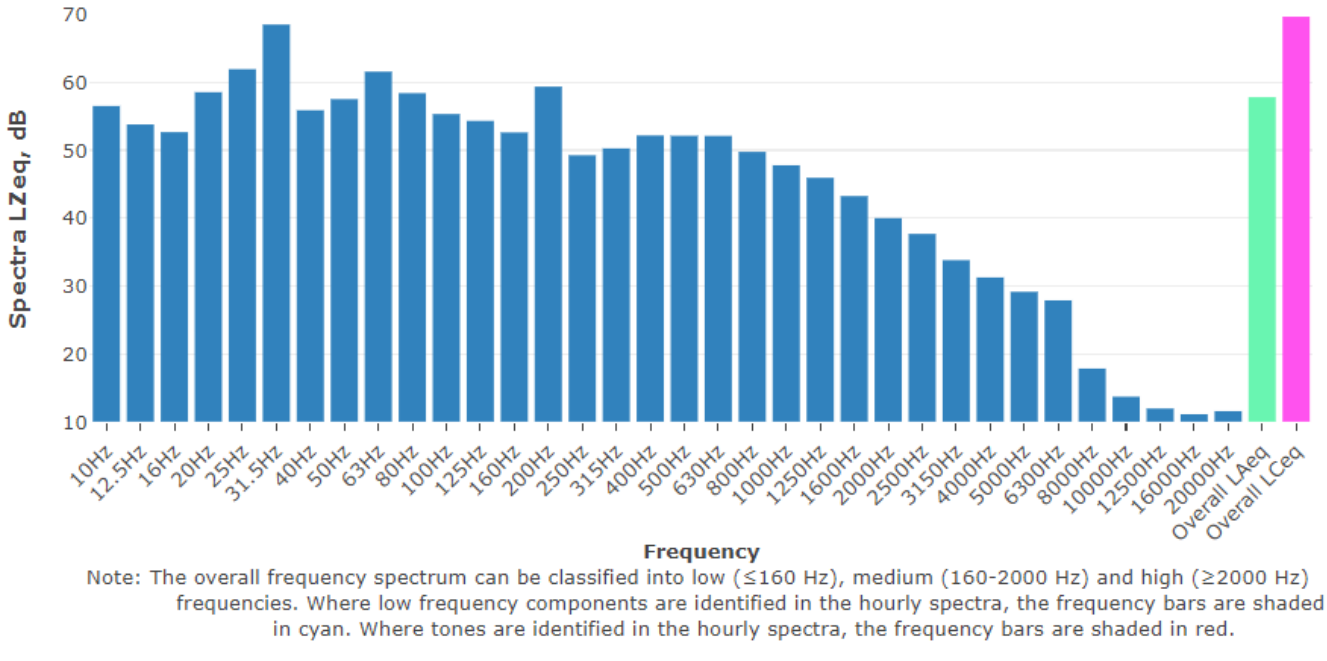
4) After arriving at GLB7 on March 19, 2024 at 14:18, Pioneer moved to GLB1 on March 19, 2024 at 21:20. Then, it moved back to GLB7 on March 19, 2024 at 23:27

5) The vessel was tonal at 200 Hz for 4 x one hour periods during this night time period. The measured level was 50 dBA, and a 5 dB correction factor has been applied in accordance with the Noise Policy for Industry.

6) On March 22, 2024, Pioneer moved to GLB1 at 05:10. Then, it moved back to GLB7 on March 22, 2024 at 06:25.

7) Maximum values for this period could not be obtained

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

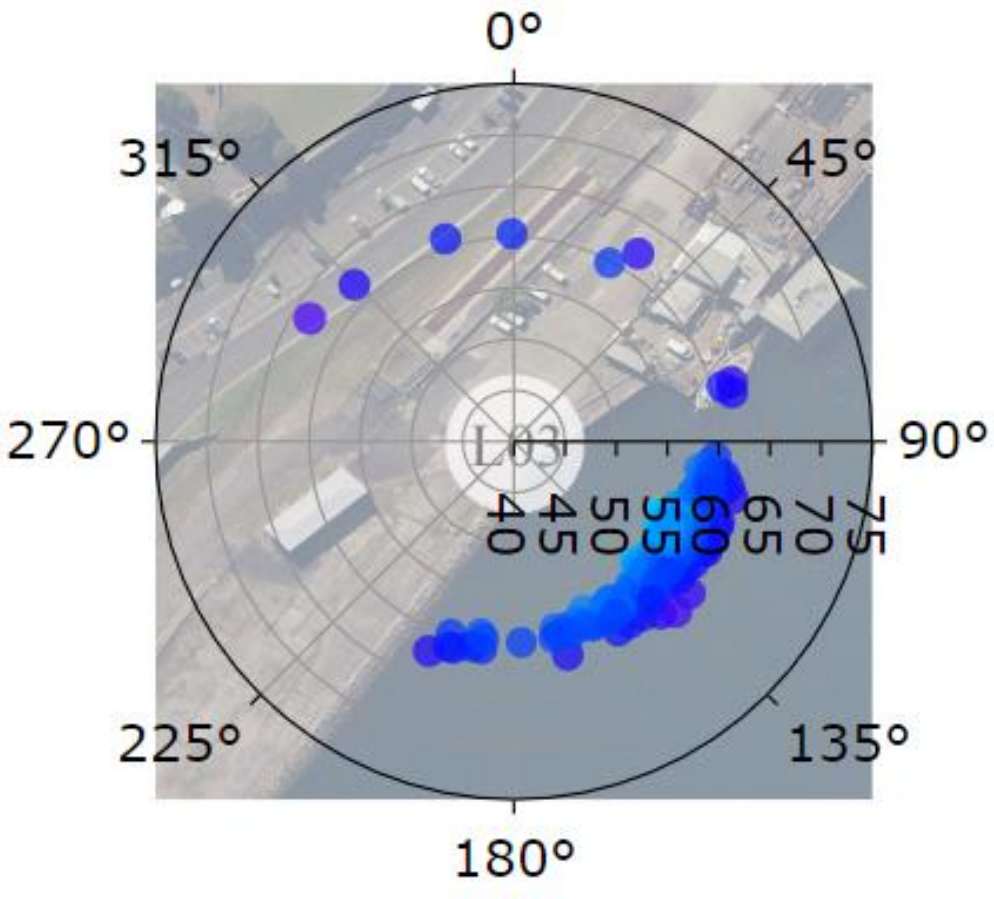


Figure 4.6 Typical vessel polar (directional) plot

4.4 Kondili (GLB7) – March 19 – March 20, 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
March 19, 2024	Day	L03	$L_{Aeq,\ 15\ hour}$[1]	-	-	-	60	-
	Night		$L_{Aeq,\ 1\ hour}$[1]	54[4]	No	No	55	Yes
			L_{Amax}	61	-	-	65	Yes
March 20, 2024	Day	L03	$L_{Aeq,\ 15\ hour}$[1]	56	No	Yes	60	Yes
	Night		$L_{Aeq,\ 1\ hour}$[1]	55	No	Yes	55	Yes
			L_{Amax}	65	-	-	65	Yes
March 21/22, 2024	Day	L03	$L_{Aeq,\ 15\ hour}$[1]	56	No	Yes	60	Yes
	Night		$L_{Aeq,\ 1\ hour}$[1]	53[4]	No	Yes	55	Yes
			L_{Amax}	61	-	-	65	Yes

Notes

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

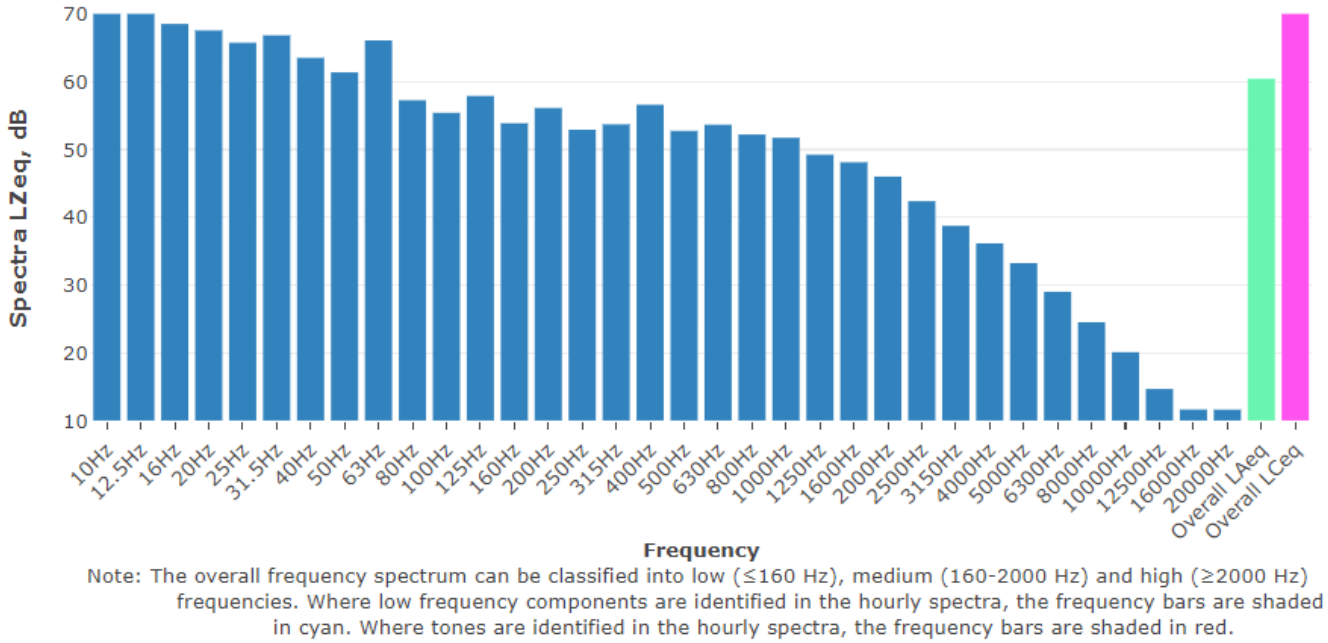
Night-time period (10 pm to 7 am) – worst case 1 hour

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 night time 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.

4.4.2 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 4.7 Typical vessel spectrum – noise level at L03

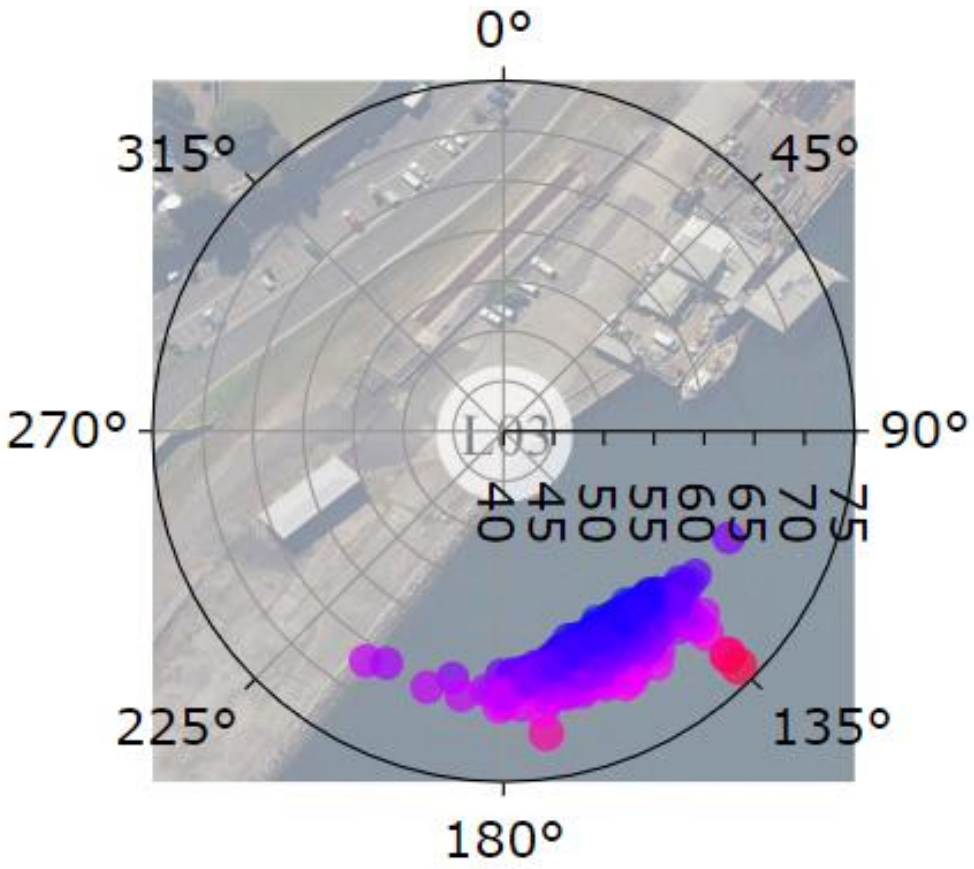


Figure 4.8 *Typical vessel polar (directional) plot*

4.5 Akuna (GLB8) – March 24 – March 26, 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
March 24, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	54[4]	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	52	No	Yes	55	Yes
			L_{Amax}	63	-	-	65	Yes
March 25, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	56	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	51[4]	No	No	55	Yes
			L_{Amax}	64	-	-	65	Yes
March 26, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	54	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	-	-	-	55	-
			L_{Amax}	-	-	-	65	-

Notes

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

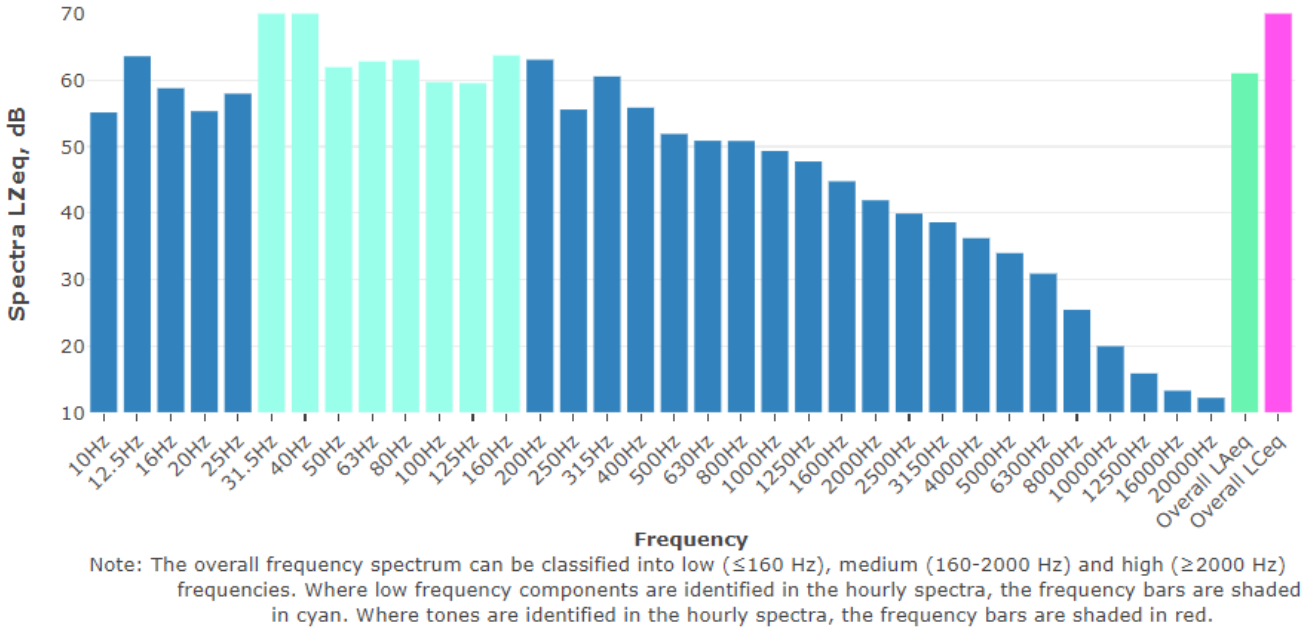
Night-time period (10 pm to 7 am) – worst case 1 hour

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Measurements determined that noise was tonal at 6,300 Hz for periods during this night time 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.

4.5.2 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 4.9 Typical vessel spectrum – noise level at L03

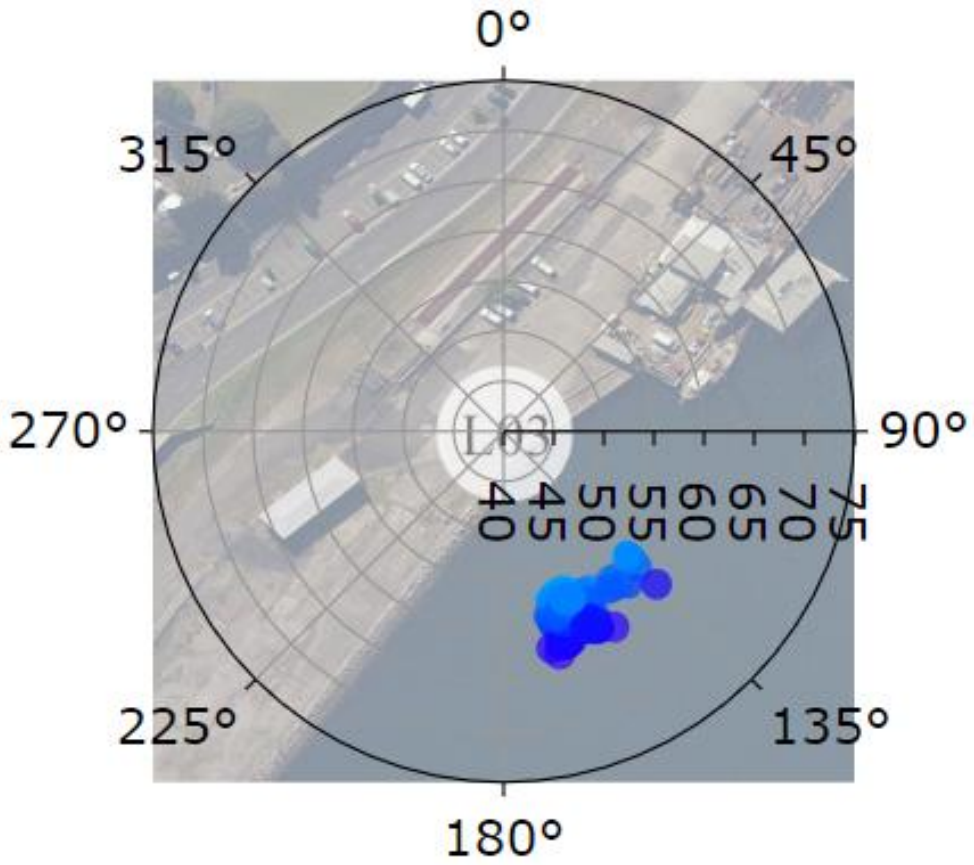


Figure 4.10 Typical vessel polar (directional) plot

4.6 Tawaki (GLB7) – March 24 – March 28, 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
March 24, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	Akuna and Tawaki were berthed simultaneously at Glebe Island 7 and 8. Noise levels were assigned to the Akuna during this period. Note that noise from both vessels was compliant, therefore no further analysis has been undertaken.				
	Night		$L_{Aeq, 1\ hour}$[1]					
			L_{Amax}					
March 25, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]					
	Night		$L_{Aeq, 1\ hour}$[1]					
			L_{Amax}					
March 26, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	54[4]	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	53[5]	No	Yes	55	Yes
			L_{Amax}	62	-	-	65	Yes
March 27, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	53	No	Yes	60	Yes
	Night		$L_{Aeq, 1\ hour}$[1]	53[5]	No	Yes	55	Yes
			L_{Amax}	64	-	-	65	Yes
March 28, 2024	Day	L03	$L_{Aeq, 15\ hour}$[1]	53	No	Yes	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

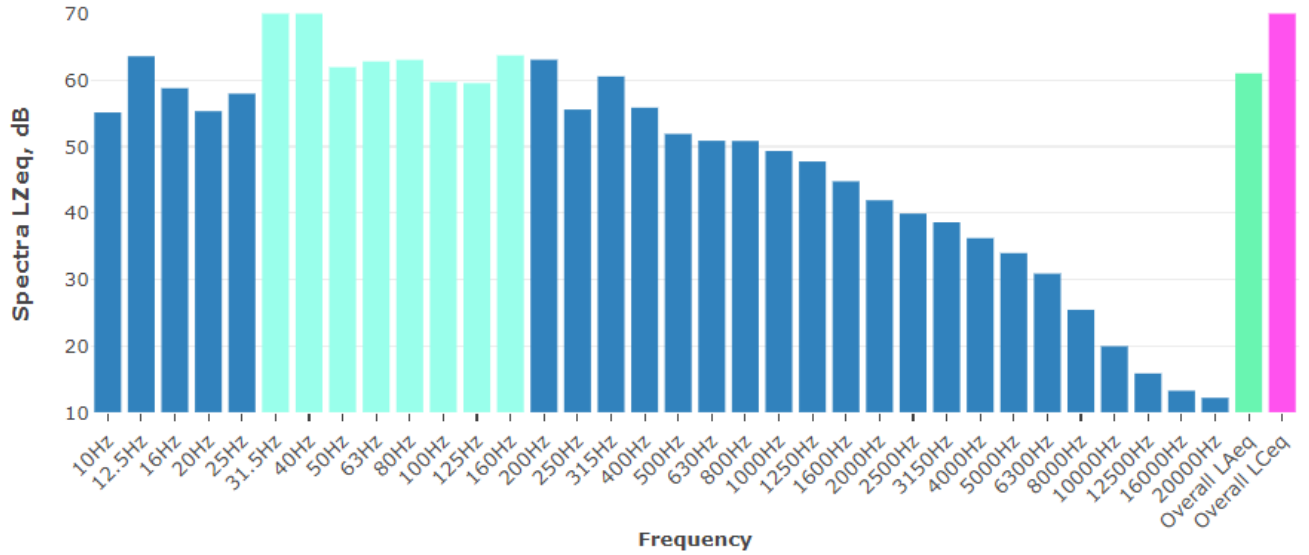
2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Tawaki moved to WHT4 on March 26, 2024 at 13:40. Then, Tawaki moved back to GLB7 on March 26 2024 at 16:28.

5) Measurements determined that noise was tonal at 6,300 Hz for periods during this night time 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.

4.6.2 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 4.11 Typical vessel spectrum – noise level at L03

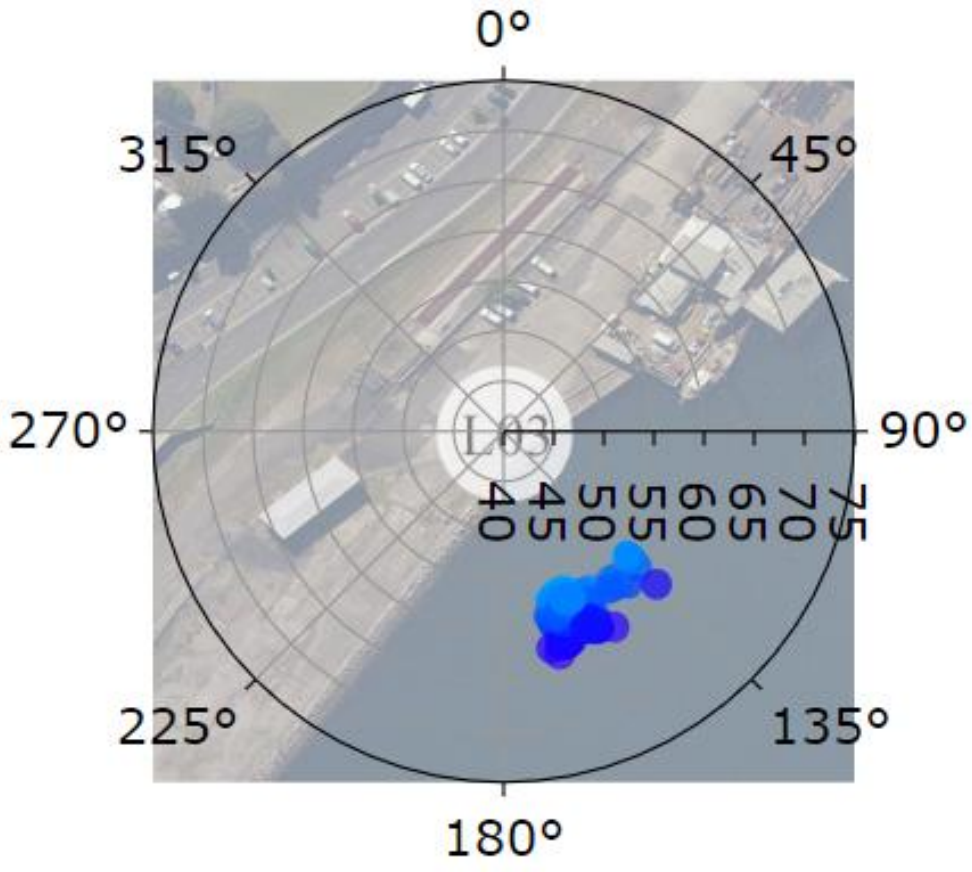


Figure 4.12 Typical vessel polar (directional) plot

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