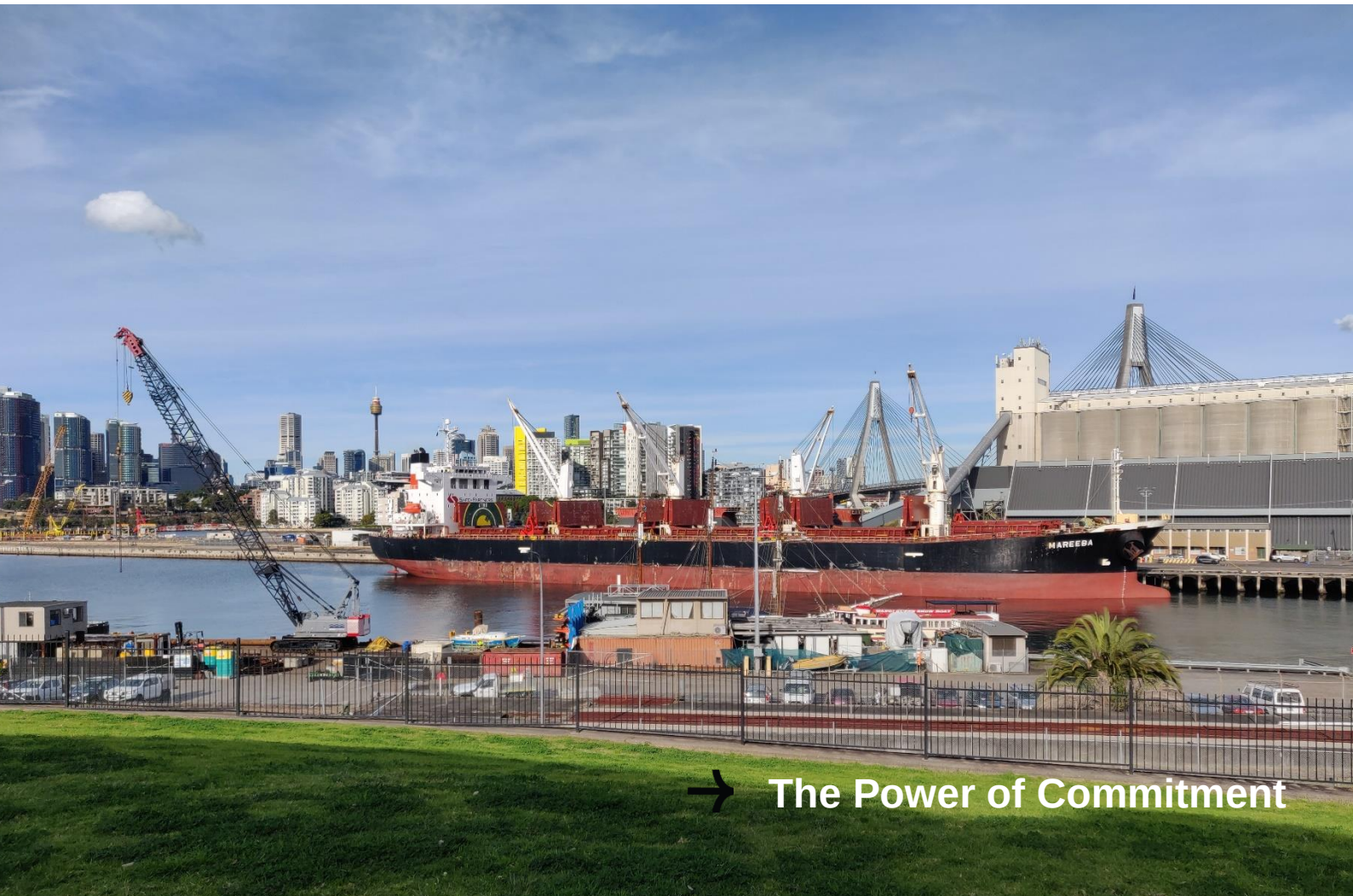
# Monthly compliance noise monitoring report

## Glebe Island / White Bay

Port Authority of New South Wales

November 2022



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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 November 2022, 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<br><br>Member of the Association of Australasian Acoustical Consultants (AAAC)<br><br>Lead staff are Members of the Australian Acoustical Society (AAS) | L01 | Grafton Street, Balmain | **Meter details**<br>Norsonic Nor145 Sound Level Meter with Nor1297 Noise Compass<br><br>**Meter settings**<br>A-weighted<br>Fast time response<br>15 minute intervals | 14529640 | **Initial calibration level 92.6 dBA**<br>Min. deviation = 0.2 dB<br>Max. deviation = 0.3 dB |
| | | L02 | Maintenance Building on White Bay | | 14529642 | **Initial calibration level 91.5 dBA**<br>Min. deviation = 0.2 dB<br>Max. deviation = 0.3 dB |
| | | L03 | Adjacent to White Bay 2 | | 14529643 | **Initial calibration level 91.7 dBA**<br>Min. deviation = -0.1 dB<br>Max. deviation = 0.2 dB |
| | | L04 | Onsite at Glebe Island | | 14529644 | **Initial calibration level 91.4 dBA**<br>Out of use during November due to damage |

| Vessel name | Arrival date and time | Departure date and time | Berth location | Applicable noise monitoring location/s |
|---|---|---|---|---|
| **Bulk vessels** | | | | |
| Elanora | November 7, 2022 / 19:59 | November 10, 2022 / 00:10 | GLB7 | L03 |
| Pioneer | November 10, 2022 / 09:25 | November 15, 2022 / 07:30 | GLB7 | L03 |
| Kondili | November 12, 2022 / 09:57 | November 15, 2022 / 09:08 | GLB8 | L03 |

| Vessel name | Arrival date and time | Departure date and time | Berth location | Applicable noise monitoring location/s |
|---|---|---|---|---|
| **Cruise vessels** | | | | |
| Pacific Adventure | November 7, 2022 / 06:12 | November 7, 2022 / 16:01 | WBCT | L01 |
| Westerdam | November 8, 2022 / 03:49 | November 9, 2022 / 03:20 | WBCT | L01 |
| Pacific Adventure | November 11, 2022 / 06:38 | November 11, 2022 / 16:05 | WBCT | L01 |
| Noordam | November 12, 2022 / 07:16 | November 12, 2022 / 17:20 | WBCT | L01 |
| Pacific Adventure | November 14, 2022 / 06:50 | November 14, 2022 / 16:08 | WBCT | L01 |
| Star Breeze | November 21, 2022 / 05:30 | November 22, 2022 / 06:03 | WBCT | L01 |

# 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 |
| Elanora | Nov 7 – Nov 10 | L03 | 57 | 55 | 64 | 60 | 55 | 65 | Yes | Yes |
| Pioneer | Nov 10 – Nov 15 | L03 | 56 | 55 | 65 | 60 | 55 | 65 | Yes | Yes |
| Kondili | Nov 12 – Nov 15 | L03 | 52 | 51 | 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) – worst case 1 hour period

## 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 | Night |
| Pacific Adventure | Nov 7 | L01 | 58 | 51 | 58 | 58 | Yes | Yes |
| Westerdam | Nov 7 – Nov 9 | L01 | 55 | 51 | 58 | 58 | Yes | Yes |
| Pacific Adventure | Nov 11 | L01 | 58 | - | 58 | 58 | Yes | - |
| Noordam | Nov 12 | L01 | 57 | - | 58 | 58 | Yes | - |
| Pacific Adventure | Nov 14 | L01 | 58 | - | 58 | 58 | Yes | - |
| Star Breeze | Nov 21 – Nov 22 | L01 | 50 | 49 | 58 | 58 | 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) – 9 hour logarithmic average

# 4. Detailed results – bulk vessels

## 4.1 Elanora – November 7 – November 9, 2022 (GLB7)

### 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 |
|---|---|---|---|---|---|---|---|---|
| November 7, 2022 | Day | L03 | $L_{Aeq,\ 15\ hour}$[1] | 50 | No | No | 60 | Yes |
| | Night | | $L_{Aeq,\ 1\ hour}$[1] | 55 | No | No | 55 | Yes |
| | | | $L_{Amax}$ | 63 | - | - | 65 | Yes |
| November 8, 2022 | Day | L03 | $L_{Aeq,\ 15\ hour}$[1] | 57 | No | Yes | 60 | Yes |
| | Night | | $L_{Aeq,\ 1\ hour}$[1] | 51 | No | No | 55 | Yes |
| | | | $L_{Amax}$ | 64 | - | - | 65 | Yes |
| November 9, 2022 | Day | L03 | $L_{Aeq,\ 15\ hour}$[1] | 56 | No | No | 60 | Yes |
| | Night | | $L_{Aeq,\ 1\ hour}$[1] | 46 | No | No | 55 | Yes |
| | | | $L_{Amax}$ | 47 | - | - | 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

### 4.1.2 Additional information

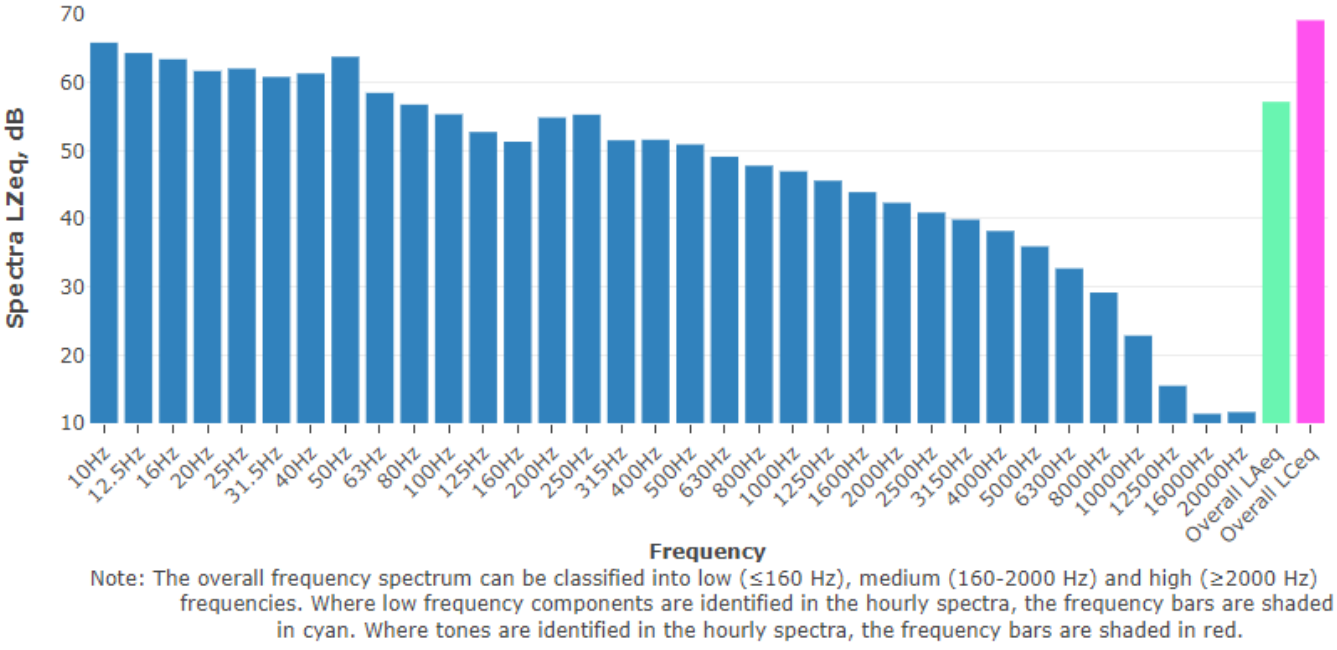



*Figure 4.1 Typical vessel spectrum – noise level at L03*

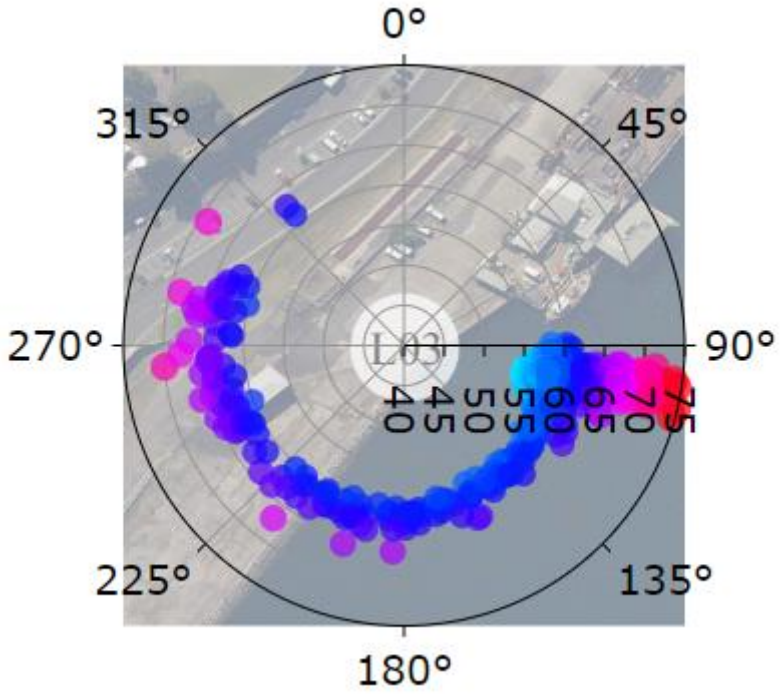



*Figure 4.2 Typical vessel polar (directional) plot*

## 4.2 Pioneer – November 10 – November 15, 2022 (GLB7)

### 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 |
|---|---|---|---|---|---|---|---|---|
| November 10, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | 56 | No | No | 60 | Yes |
| | Night | | $L_{Aeq, 1\ hour}$[1] | 54[4] | No | No | 55 | Yes |
| | | | $L_{Amax}$ | 65 | - | - | 65 | Yes |
| November 11, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | 56 | No | No | 60 | Yes |
| | Night | | $L_{Aeq, 1\ hour}$[1] | 53 | No | No | 55 | Yes |
| | | | $L_{Amax}$ | 58 | - | - | 65 | Yes |
| November 12, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | Pioneer (GLB7) and Kondili (GLB8) were both present at this time. See discussion in Section 4.4 below. Noise was attributed to the Pioneer at this time | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 13, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 14, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 15, 2022 | 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

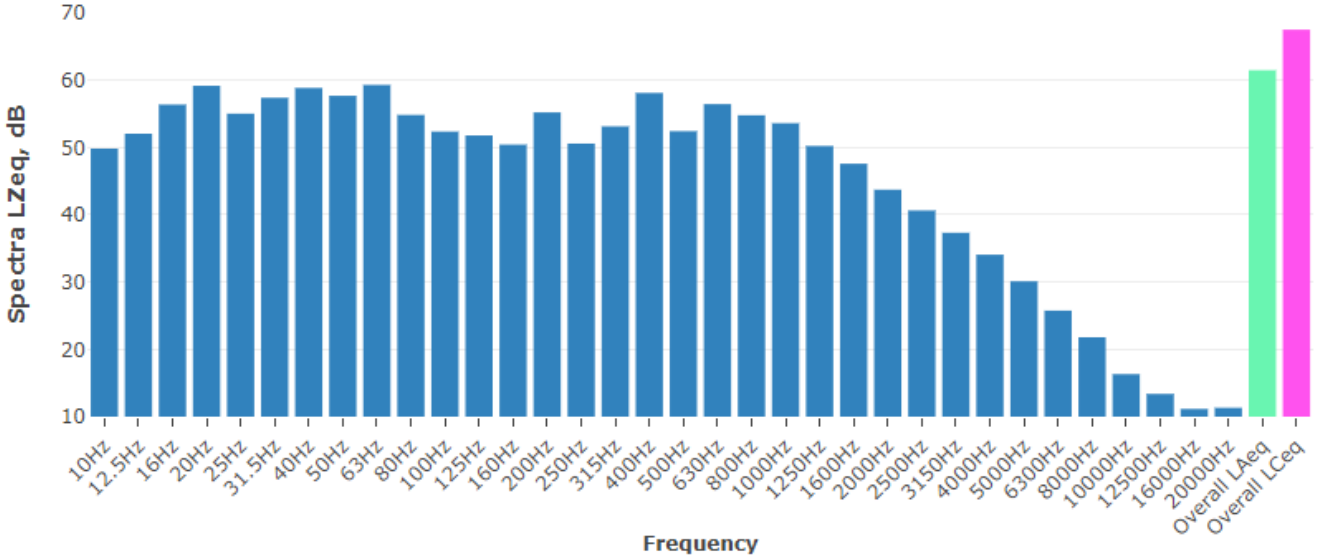
Night-time period (10 pm to 7 am) – worst case 1 hour

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) IMS noted a noise level of 56 dBA during the night time period on November 10. A review of this data indicates impacts from extraneous noise from the area adjacent to Glebe Island 8.

## 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*

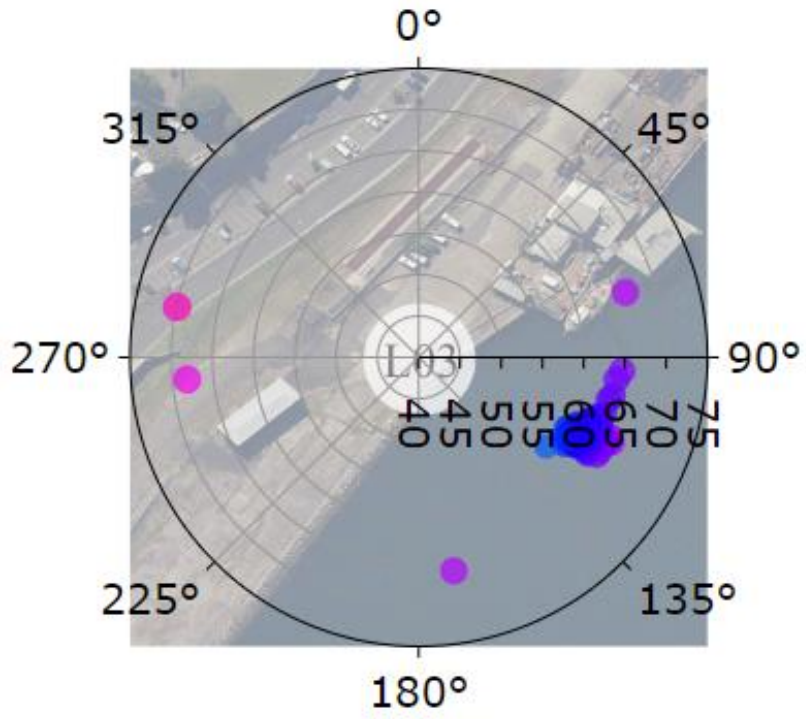



*Figure 4.4 Typical vessel polar (directional) plot*

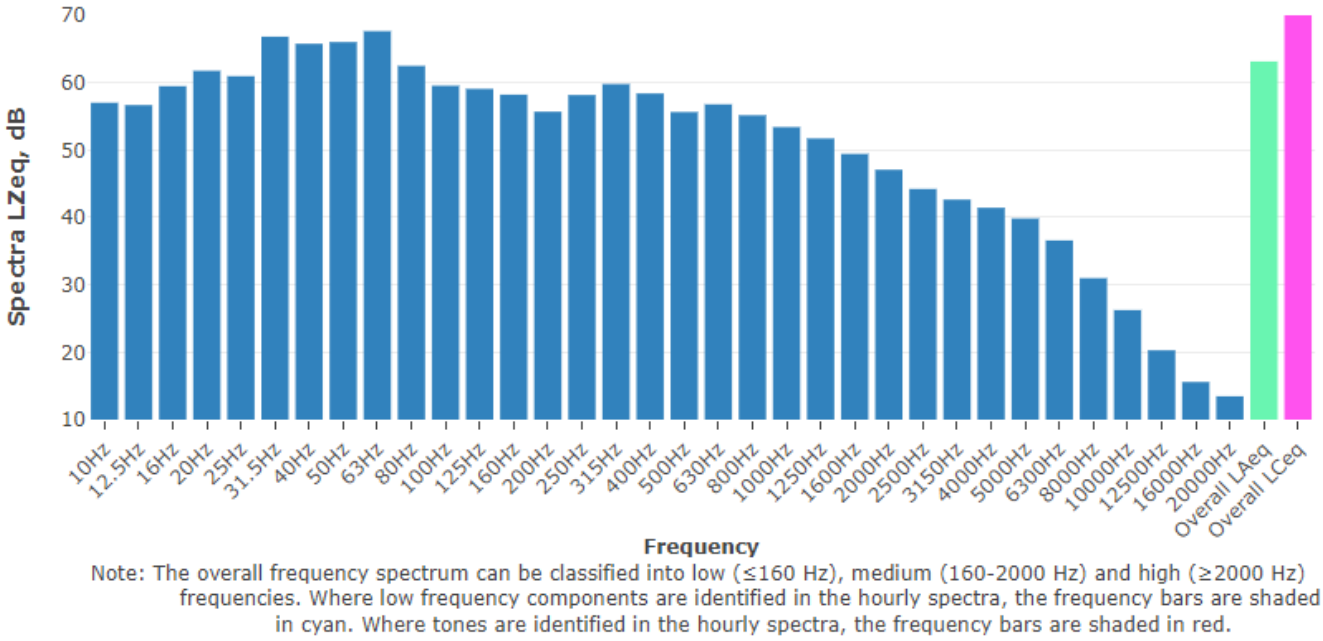
## 4.3 Kondili – November 12 – November 15, 2022 (GLB8)

### 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 |
|---|---|---|---|---|---|---|---|---|
| November 12, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | Pioneer (GLB7) and Kondili (GLB8) were both present at this time. See discussion in Section 4.4 below. Noise was attributed to the Pioneer at this time | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 13, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 14, 2022 | Day | L03 | $L_{Aeq, 15\ hour}$[1] | | | | | |
| | Night | | $L_{Aeq, 1\ hour}$[1] | | | | | |
| | | | $L_{Amax}$ | | | | | |
| November 15, 2022 | 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

### 4.3.2 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 (Pioneer and Kondili combined)*

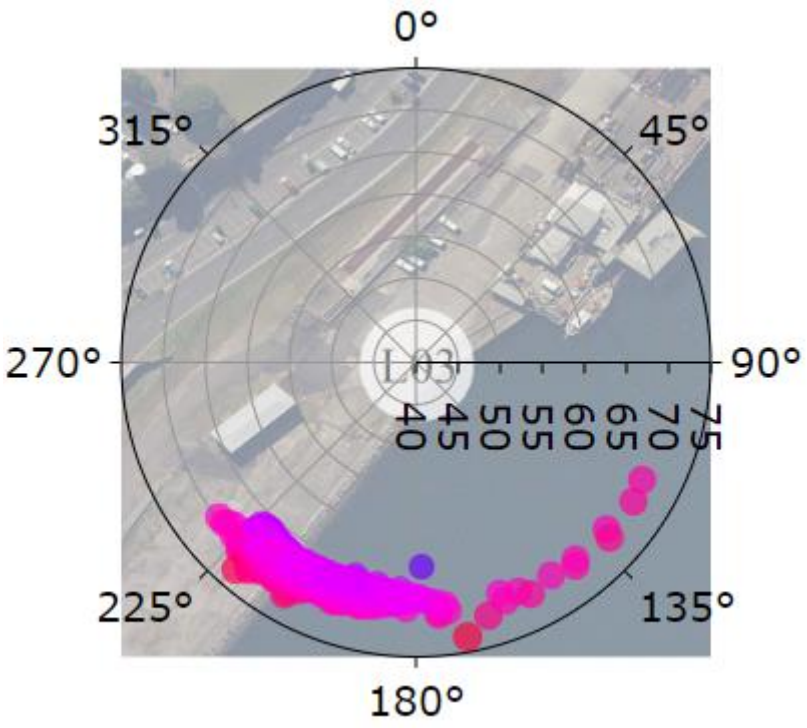



*Figure 4.6 Typical vessel polar (directional) plot (Pioneer and Kondili combined)*

## 4.4 Discussion regarding Pioneer and Kondili

Between November 12 and November 15, 2022, the Pioneer (GLB7) and Kondili (GLB8) were simultaneously at berth. During this period, the noise monitoring system attributed the measured noise levels to the Pioneer. The noise monitoring system indicated that there was a potential exceedance of the Vessel Noise Trigger Levels, therefore a detailed analysis was undertaken to determine the contribution from each vessel.

A review of the data was undertaken from this period, along with previously measured data. The contribution of each vessel has been estimated based on the following:

- Analysis of the measured noise levels from historical visits of the Pioneer, including prior to the Kondili arriving
- Analysis of the measured noise levels between 12 and 15 November 2022 when both the Pioneer and Kondili were berthed.

The estimated contributions are as follows:

| Vessel | Assessment period | Noise descriptor | Estimated contribution, dBA[2] |
|---|---|---|---|
| Pioneer | Day | $L_{Aeq,\ 15\ hour}$[1] | 53 |
| | Night | $L_{Aeq,\ 1\ hour}$[1] | 53 |
| Kondili | Day | $L_{Aeq,\ 15\ hour}$[1] | 52 |
| | Night | $L_{Aeq,\ 1\ hour}$[1] | 51 |

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

In addition to the above, IMS indicated exceedances of the night time maximum noise criteria of 65 dBA on the 12 and 13 November. A review of this data indicates impacts from extraneous noise from the area adjacent to Glebe Island 8 not associated with the vessels at berth.

# 5. Detailed results – cruise vessels

## 5.1 Pacific Adventure – November 2022 (WBCT)

### 5.1.1 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 |
|---|---|---|---|---|---|---|---|---|
| November 7, 2022 | Day | L01 | $L_{Aeq, 15\ hour}$[1] | 58 | No | No | 58 | Yes |
| | Night | | $L_{Aeq, 9\ hour}$[1] | - | - | - | 58 | - |
| November 11, 2022 | Day | L01 | $L_{Aeq, 15\ hour}$[1] | 58 | No | Yes[4] | 58 | Yes |
| | Night | | $L_{Aeq, 9\ hour}$[1] | - | - | - | 58 | - |
| November 14, 2022 | Day | L01 | $L_{Aeq, 15\ hour}$[1] | 58 | No | Yes[4] | 58 | Yes |
| | Night | | $L_{Aeq, 9\ hour}$[1] | - | - | - | 58 | - |

Notes

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

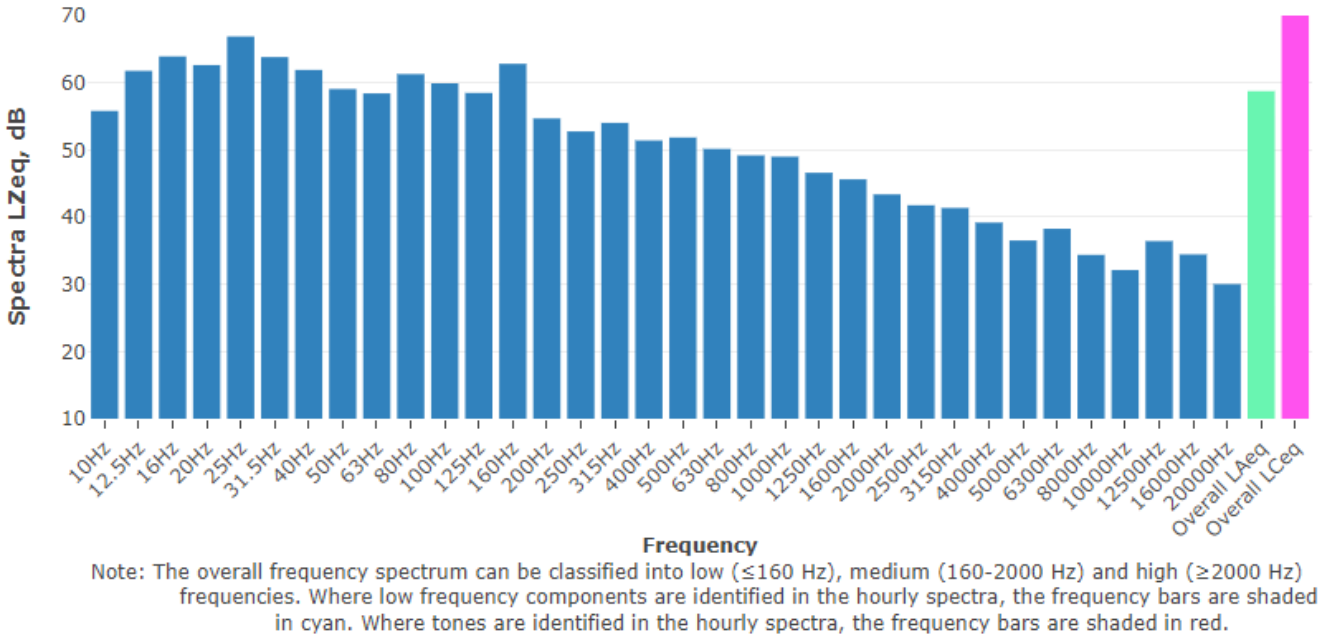
Night-time period (10 pm to 7 am) – 9 hours

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Note that the WBCT Noise Restriction Policy trigger level for excessive noise, which is based on the Noise Attenuation Program eligibility criteria, is inclusive of an assumption for low frequency noise for all cruise vessels. A 2 dB penalty for daytime and a 5 dB penalty for the evening/night-time period would apply when assessed in accordance with Fact Sheet 3 Corrections for annoying noise characteristics from the EPA's Noise Policy for Industry. Further investigation is currently being undertaken to determine impacts from low frequency noise from vessels.

### 5.1.2 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 5.1 Typical vessel spectrum – noise level at L01*

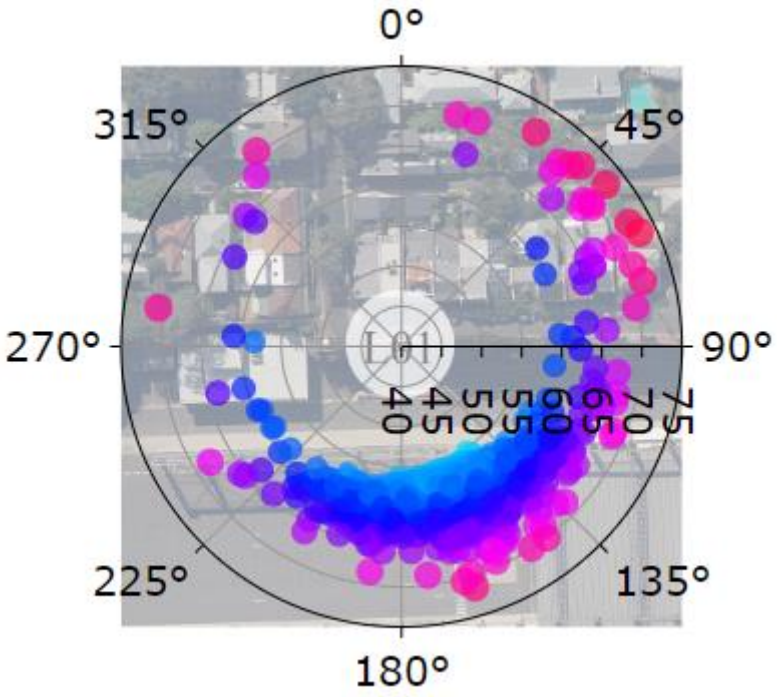



*Figure 5.2* *Typical vessel polar (directional) plot*

## 5.2 Westerdam – November 7 – November 9, 2022 (WBCT)

### 5.2.1 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 |
|---|---|---|---|---|---|---|---|---|
| November 7, 2022 | Day | L01 | $L_{Aeq, 15\ hour}$[1] | - | - | - | 58 | - |
| | Night | | $L_{Aeq, 9\ hour}$[1] | 51 | No | Yes[4] | 58 | Yes |
| November 8, 2022 | Day | L01 | $L_{Aeq, 15\ hour}$[1] | 55 | No | Yes[4] | 58 | Yes |
| | Night | | $L_{Aeq, 9\ hour}$[1] | 51 | No | Yes[4] | 58 | Yes |

Notes

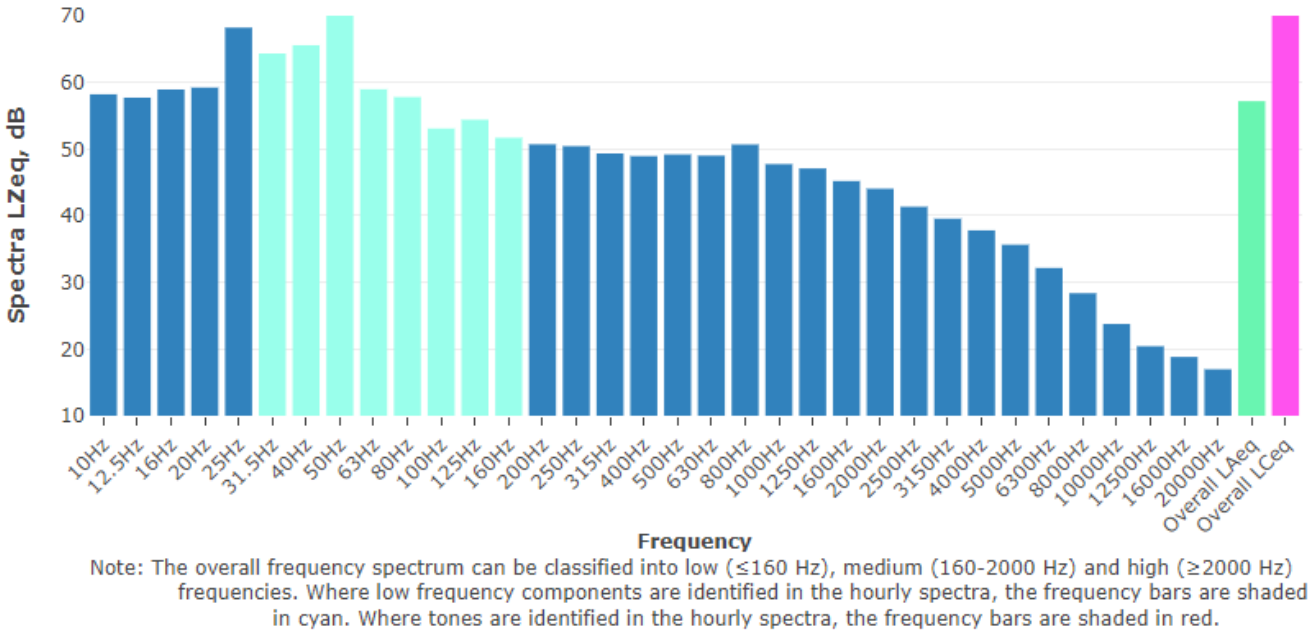
1) Daytime period (7 am to 10 pm) – 15 hours
Night-time period (10 pm to 7 am) – 9 hours

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Note that the WBCT Noise Restriction Policy trigger level for excessive noise, which is based on the Noise Attenuation Program eligibility criteria, is inclusive of an assumption for low frequency noise for all cruise vessels. A 2 dB penalty for daytime and a 5 dB penalty for the evening/night-time period would apply when assessed in accordance with Fact Sheet 3 Corrections for annoying noise characteristics from the EPA's Noise Policy for Industry. Further investigation is currently being undertaken to determine impacts from low frequency noise from vessels.

### 5.2.2 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 5.3 Typical vessel spectrum – noise level at L01*

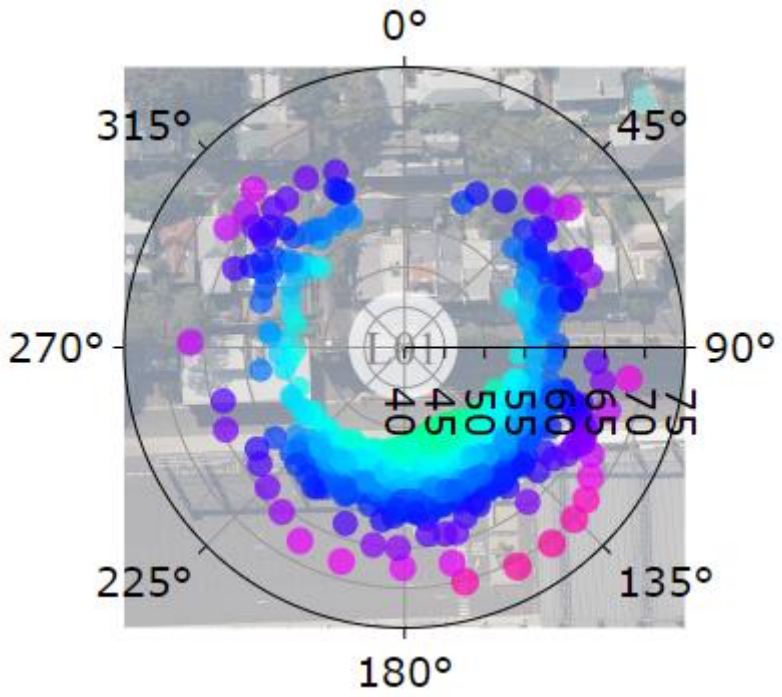



*Figure 5.4 Typical vessel polar (directional) plot*

# 5.3 Noordam – November 12, 2022 (WBCT)

## 5.3.1 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 |
|---|---|---|---|---|---|---|---|---|
| November 12, 2022 | Day | L01 | $L_{Aeq,\ 15\ hour}$[1] | 57 | No | Yes[4] | 58 | Yes |
| | Night | | $L_{Aeq,\ 9\ hour}$[1] | - | No | Yes[4] | 58 | - |

Notes

1) Daytime period (7 am to 10 pm) – 15 hours
Night-time period (10 pm to 7 am) – 9 hours

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Note that the WBCT Noise Restriction Policy trigger level for excessive noise, which is based on the Noise Attenuation Program eligibility criteria, is inclusive of an assumption for low frequency noise for all cruise vessels. A 2 dB penalty for daytime and a 5 dB penalty for the evening/night-time period would apply when assessed in accordance with Fact Sheet 3 Corrections for annoying noise characteristics from the EPA's Noise Policy for Industry. Further investigation is currently being undertaken to determine impacts from low frequency noise from vessels.

## 5.3.2 Additional information

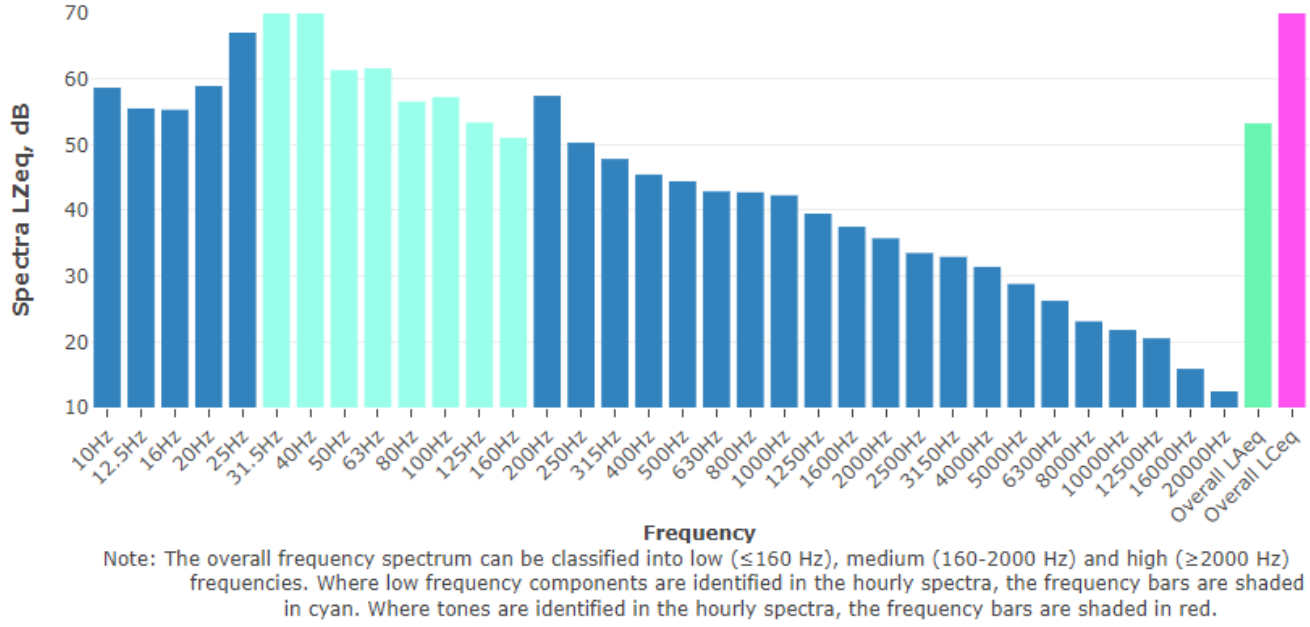



***Figure 5.5 Typical vessel spectrum – noise level at L01***

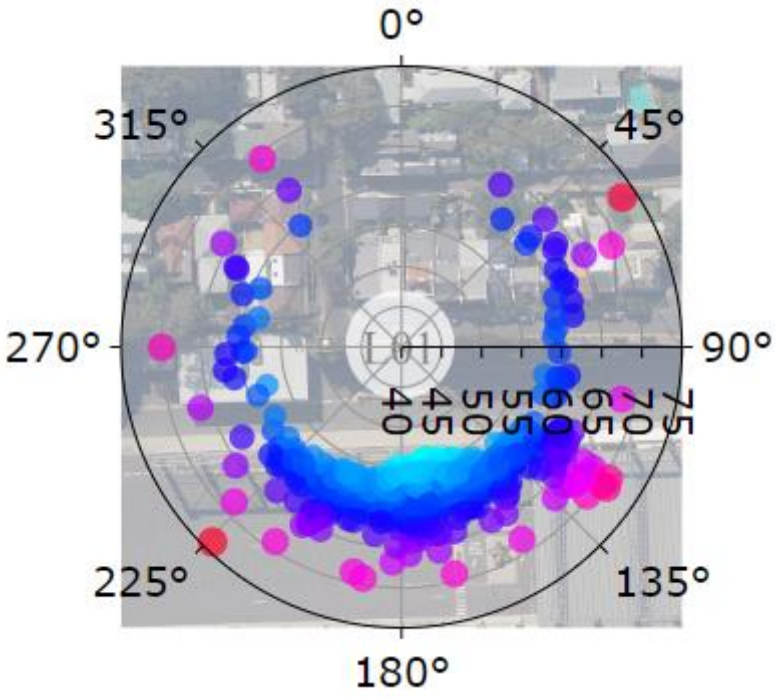



*Figure 5.6 Typical vessel polar (directional) plot*

## 5.4 Star Breeze – November 21 – November 22, 2022 (WBCT)

### 5.4.1 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 |
|---|---|---|---|---|---|---|---|---|
| November 21, 2022 | Day | L01 | $L_{Aeq,\ 15\ hour}$[1] | 50 | No | Yes[4] | 58 | Yes |
| | Night | | $L_{Aeq,\ 9\ hour}$[1] | 49 | No | Yes[4] | 58 | Yes |

Notes

1) Daytime period (7 am to 10 pm) – 15 hours
Night-time period (10 pm to 7 am) – 9 hours

2) Inclusive of any penalties for modifying factors

3) LFN = Low Frequency Noise

4) Note that the WBCT Noise Restriction Policy trigger level for excessive noise, which is based on the Noise Attenuation Program eligibility criteria, is inclusive of an assumption for low frequency noise for all cruise vessels. A 2 dB penalty for daytime and a 5 dB penalty for the evening/night-time period would apply when assessed in accordance with Fact Sheet 3 Corrections for annoying noise characteristics from the EPA's Noise Policy for Industry. Further investigation is currently being undertaken to determine impacts from low frequency noise from vessels.

### 5.4.2 Additional information

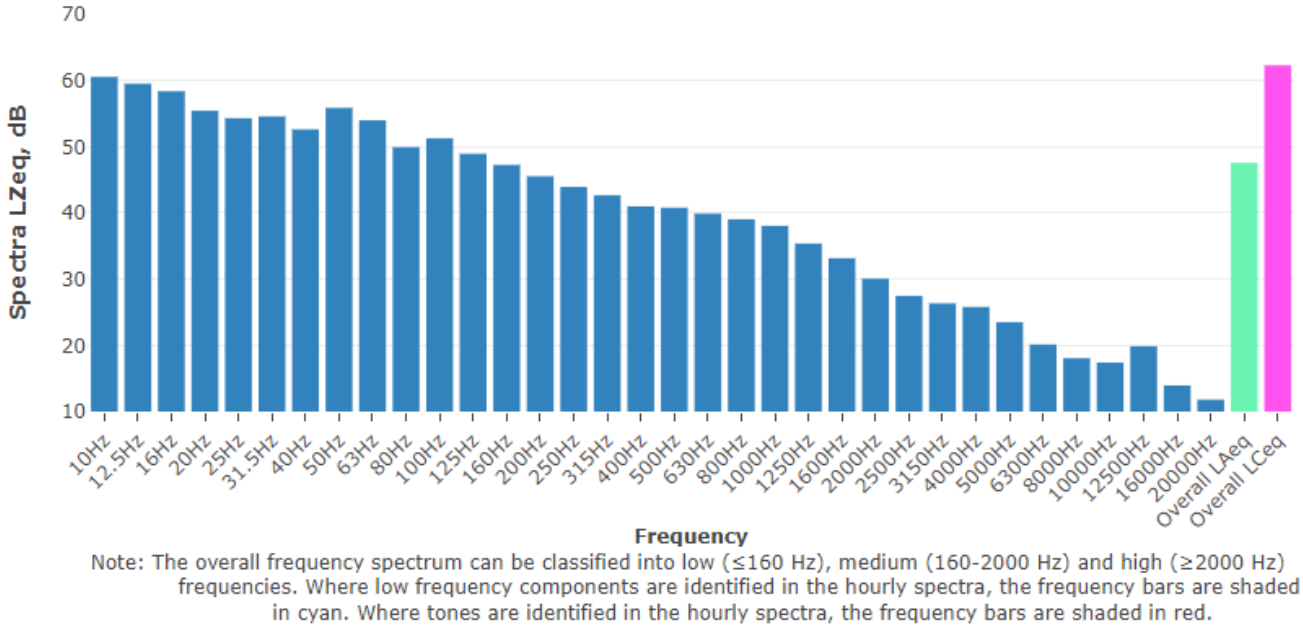



*Figure 5.7 Typical vessel spectrum – noise level at L01*

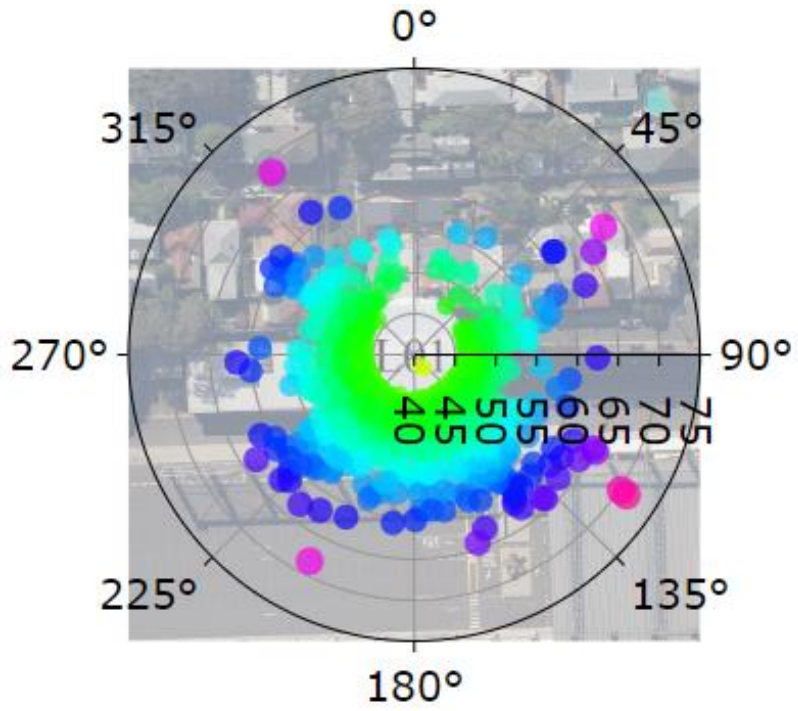



*Figure 5.8* *Typical vessel polar (directional) plot*

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The Power of Commitment