Pacific Explorer noise monitoring report – April to August 22

White Bay Cruise Terminal

Port Authority of New South Wales

April to August 2022

The Power of Commitment

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Client name	Port Authority of New South Wales
Document title	Pacific Explorer noise monitoring report – April to August 22
Revision version	Rev 0
Project number	12540862

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	C Gordon	V Lau		E Milton		21/11/2022
S4	1	C Gordon	V Lau		E Milton		1/12/2022

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 the Pacific Explorer at berth between April and August 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 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	14529640	**Initial calibration level 92.6 dBA** Min. deviation = 0.2 dB Max. deviation = 0.3 dB
		L02	Maintenance Building on White Bay		14529642	**Initial calibration level 91.5 dBA** Min. deviation = 0.2 dB Max. deviation = 0.3 dB

Vessel name	Arrival date and time	Departure date and time	Berth location	Applicable noise monitoring location/s
Pacific Explorer	April 19, 2022 / 12:58	May 7, 2022 / 12:50	WBCT	L01
Pacific Explorer	May 12, 2022 / 11:44	May 26 2022 / 17:30	WBCT	L01
Pacific Explorer	May 29, 2022 / 8:47	May 31, 2022 16:20	WBCT	L01
Pacific Explorer	June 4, 2022 / 6:39	June 4, 2022 / 17:11	WBCT	L01
Pacific Explorer	June 7, 2022 / 6:43	June 7, 2022 / 16:29	WBCT	L01
Pacific Explorer	June 11, 2022 / 7:43	June 11, 2022 / 17:11	WBCT	L01
Pacific Explorer	June 14, 2022 / 6:42	June 14, 2022 / 17:39	WBCT	L01
Pacific Explorer	July 1, 2022 / 6:41	July 1, 2022 / 16:18	WBCT	L01

Pacific Explorer	July 9, 2022 / 6:42	July 9, 2022 / 17:01	WBCT	L01
Pacific Explorer	July 18, 2022 / 6:27	July 18, 2022 / 18:10	WBCT	L01
Pacific Explorer	August 4, 2022 / 6:42	August 4, 2022 / 18:49	WBCT	L01

3. Compliance summary

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 Explorer	19 April – 7 May	L01	54	53	58	58	Yes	Yes
Pacific Explorer	12 May – 26 May	L01	55	58	58	58	Yes	Yes
Pacific Explorer	29 May – 31 May	L01	54	49	58	58	Yes	Yes
Pacific Explorer	4 June	L01	56	-	58	58	Yes	-
Pacific Explorer	7 June	L01	58	-	58	58	Yes	-
Pacific Explorer	11 June	L01	55	-	58	58	Yes	-
Pacific Explorer	14 June	L01	57	-	58	58	Yes	-
Pacific Explorer	1 July	L01	58	-	58	58	Yes	-
Pacific Explorer	9 July	L01	57	-	58	58	Yes	-
Pacific Explorer	18 July	L01	57	-	58	58	Yes	-
Pacific Explorer	4 August	L01	56	-	58	58	Yes	-
Pacific Explorer	5 August	L01	58	-	58	58	Yes	-
Pacific Explorer	23 August	L01	57	-	58	58	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

4.1 Pacific Explorer – April 19 – May 7, 2022 (WBCT)

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 19, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	50	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	45	No	Yes[5]	58	Yes
April 20, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	53	No	Yes[5]	58	Yes
April 21, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	Yes[5]	58	Yes
April 22, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	No	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	No	58	Yes
April 23, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	49	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[5]	58	Yes
April 24, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	49	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[5]	58	Yes
April 25, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	47	Yes[4]	Yes[5]	58	Yes
April 26, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	45	No	Yes[5]	58	Yes
April 27, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	43	No	Yes[5]	58	Yes
April 28, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	46	Yes[4]	Yes[5]	58	Yes
April 29, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	45	No	Yes[5]	58	Yes
April 30, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	50	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[5]	58	Yes
May 1, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	49	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	45	No	Yes[5]	58	Yes
May 2, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	47	No	Yes[5]	58	Yes
May 3, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	Yes[5]	58	Yes
May 4, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	53	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	Yes[5]	58	Yes

Date	Time period[1]	Monitor location	Noise descriptor	Vessel noise level dBA[2]	Tonal	LFN[3]	Vessel Noise Trigger Levels, dBA	Compliance
May 5, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	Yes[5]	58	Yes
May 6, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	53	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	46	No	Yes[5]	58	Yes
May 7, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	50	No	No	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) The vessel was determined to be tonal for short periods throughout the visit and as such, a 5 dB penalty has not been applied. Note that the Noise Restriction Policy does not specifically refer to a penalty for tonality.

5) 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.

4.2 Pacific Explorer – May 12 – May 26, 2022 (WBCT)

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 12, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	48	No	Yes[5]	58	Yes
May 13, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	46	No	Yes[5]	58	Yes
May 14, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	49	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	47	No	Yes[5]	58	Yes
May 15, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	Yes[4]	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	Yes[4]	Yes[5]	58	Yes
May 16, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	51	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[5]	58	Yes
May 17, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	48	No	Yes[5]	58	Yes
May 18, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	48	Yes[4]	Yes[5]	58	Yes
May 19, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	53	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[5]	58	Yes
May 20, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	55	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	55	No	Yes[5]	58	Yes
May 21, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	55	No	Yes[5]	58	Yes
May 22, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	53	No	Yes[5]	58	Yes
May 23, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	55	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	58	No	Yes[5]	58	Yes
May 24, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	55	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	54	No	Yes[5]	58	Yes
May 25, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	Yes[5]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	51	No	Yes[5]	58	Yes
May 26, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	57	No	Yes[5]	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) The vessel was determined to be tonal for short periods throughout the visit and as such, a 5 dB penalty has not been applied. Note that the Noise Restriction Policy does not specifically refer to a penalty for tonality.

Date	Time period[1]	Monitor location	Noise descriptor	Vessel noise level dBA[2]	Tonal	LFN[3]	Vessel Noise Trigger Levels, dBA	Compliance
5) 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.								

4.3 Pacific Explorer – May 29 – May 31, 2022 (WBCT)

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 29, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	54	No	Yes[4]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[4]	58	Yes
May 30, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	52	No	Yes[4]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	49	No	Yes[4]	58	Yes
May 31, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	53	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) The Port Noise Policy does not currently apply the Noise Policy for Industry (NPfI) method modifying factor for low frequency noise. 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. Note that the WBCT cruise ships Noise Restriction Policy trigger level which is based on the Noise Attenuation Program eligibility level is inclusive of an assumption for low frequency noise for all cruise vessels.

4.4 Pacific Explorer – June 2022 (WBCT)

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
June 4, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	56	No	Yes[4]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	-	-	-	58	-
June 7, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	58	No	Yes[4]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	-	-	-	58	-
June 11, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	55	No	Yes[4]	58	Yes
	Night		$L_{Aeq, 9\ hour}$[1]	-	-	-	58	-
June 14, 2022	Day	L01	$L_{Aeq, 15\ hour}$[1]	57	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) The Port Noise Policy does not currently apply the Noise Policy for Industry (NPfI) method modifying factor for low frequency noise. 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. Note that the WBCT cruise ships Noise Restriction Policy trigger level which is based on the Noise Attenuation Program eligibility level is inclusive of an assumption for low frequency noise for all cruise vessels.

6) Not that this non-compliance occurred during the day time period.

4.5 Pacific Explorer – July 2022 (WBCT)

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
July 1, 2022	Day	L02	$L_{Aeq,\ 15\ hour}$[1]	58	No	Yes[4]	58	Yes
	Night		$L_{Aeq,\ 9\ hour}$[1]	-	-	-	58	-
July 9, 2022	Day	L02	$L_{Aeq,\ 15\ hour}$[1]	57	No	Yes[4]	58	Yes
	Night		$L_{Aeq,\ 9\ hour}$[1]	-	-	-	58	-
July 18, 2022	Day	L02	$L_{Aeq,\ 15\ hour}$[1]	57	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

5) The Port Noise Policy does not currently apply the Noise Policy for Industry (NPfI) method modifying factor for low frequency noise. A 2 dB penalty for 4daytime 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. Note that the WBCT cruise ships Noise Restriction Policy trigger level which is based on the Noise Attenuation Program eligibility level is inclusive of an assumption for low frequency noise for all cruise vessels.

6) Not that this non-compliance occurred during the day time period.

4.6 Pacific Explorer – August 2022 (WBCT)

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
August 4, 2022	Day	L01	$L_{Aeq,\ 15\ hour}$[1]	56	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

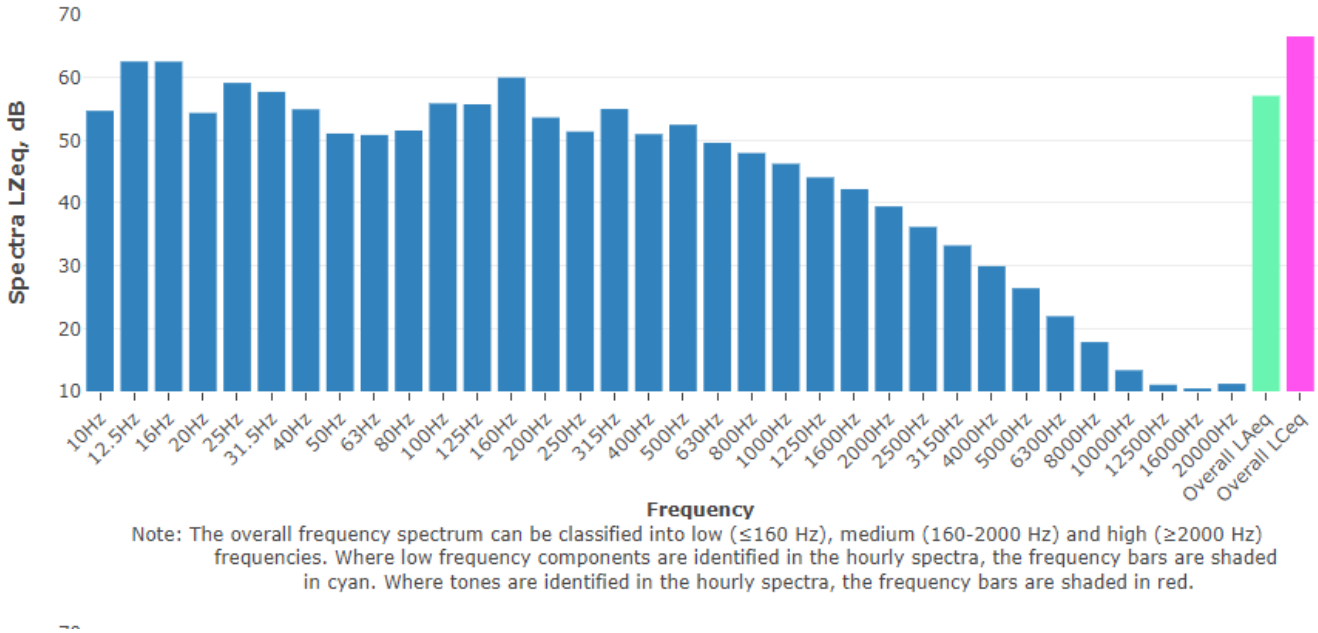
2) Inclusive of any penalties for modifying factors

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.

4.7 Additional information

4.7.1 Typical vessel spectrum and polar plot – WBCT



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 L01

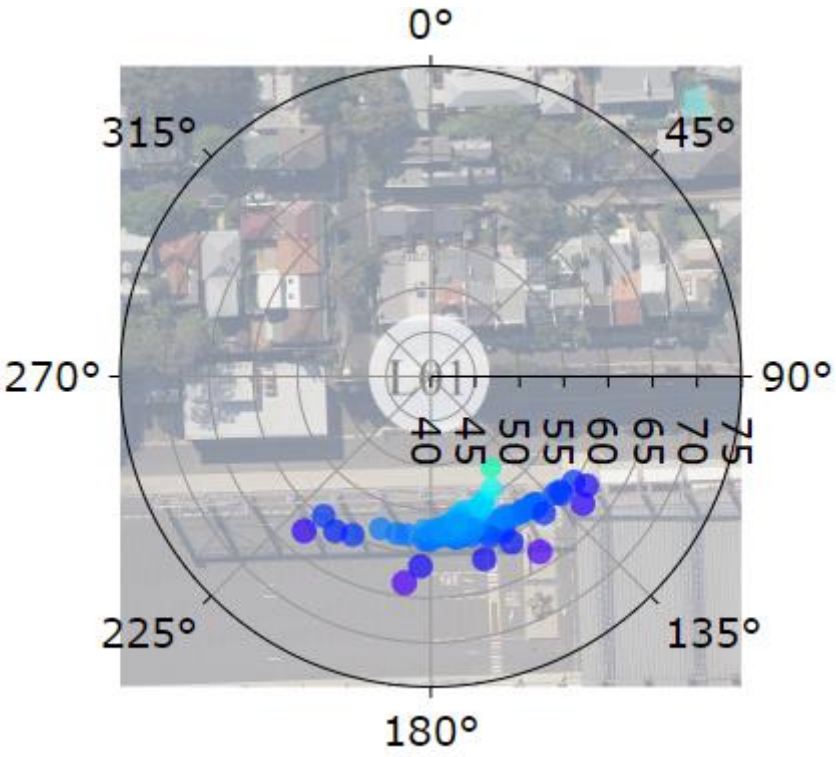


Figure 4.2 Typical vessel polar (directional) plot

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