

NOISE LEVEL CERTIFICATE

WHITE BAY CRUISE TERMINAL
DECEMBER 2018

M E A S U R E D N O I S E L E V E L S U M M A R Y

Representative vessel noise levels in December 2018 complied with the 58dBA reference level outlined in the White Bay Cruise Terminal (WBCT) Noise Impact Mitigation Strategy (NIMS). These noise levels are presented in the table.

During the period from 1 December to 31 December 2018 there were 19 cruise ship visits to WBCT. Noise levels were recorded for all 19 visits. In total 14 individual vessels visited the berths. The most regular were the Pacific Eden and Pacific Explorer with 5 and 4 visits respectively. Other vessels visited WBCT no more than twice in December. There were also 5 cruise ships visits to the berth at White Bay 4.

Table – Representative noise levels

Vessel Name	Representative L _{Aeq} noise level (dBA)	Arrival Time	Departure Time	Complies with 58dBA reference level
Astor	57	1/12/2018 9:44	1/12/2018 19:03	Y
Noordam	56	7/12/2018 6:47	7/12/2018 18:16	Y
Pacific Eden	52	9/12/2018 7:49	9/12/2018 16:39	Y
Pacific Explorer	57	10/12/2018 6:38	10/12/2018 16:18	Y
Seabourn Sojourn	52	10/12/2018 17:42	11/12/2018 18:12	Y
Aidaaura	50	12/12/2018 11:37	12/12/2018 22:40	Y
Regatta	52	13/12/2018 6:32	13/12/2018 18:15	Y
Pacific Eden	52	14/12/2018 8:01	14/12/2018 16:24	Y
Viking Orion	51	16/12/2018 6:14	17/12/2018 4:27	Y
Pacific Eden	54	17/12/2018 6:54	17/12/2018 16:22	Y
Pacific Explorer	57	18/12/2018 8:06	18/12/2018 16:05	Y
Seabourn Encore	54	20/12/2018 16:28	20/12/2018 23:09	Y
Maasdam	56	21/12/2018 6:48	21/12/2018 18:43	Y
Noordam	56	22/12/2018 6:17	22/12/2018 18:45	Y
Sun Princess	56	23/12/2018 6:54	23/12/2018 16:02	Y
Pacific Eden	54	27/12/2018 6:57	27/12/2018 16:14	Y
Pacific Explorer	57	28/12/2018 6:53	28/12/2018 16:12	Y
Pacific Eden	54	30/12/2018 7:16	30/12/2018 16:03	Y
Azamara Quest	53-55	31/12/2018 7:52	2/01/2019 14:59	Y

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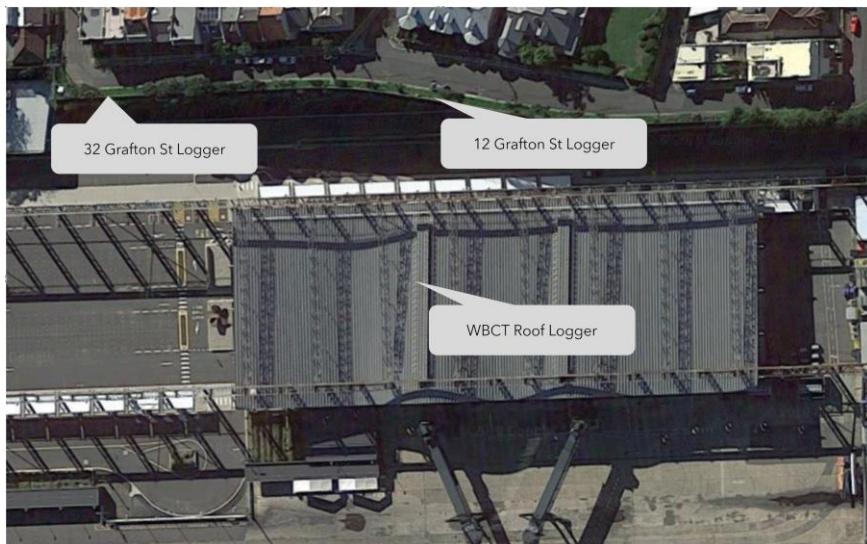
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MONITORING LOCATIONS

Noise logging was completed with three loggers. The loggers were positioned in the following locations:

- White Bay Cruise Terminal roof top.
- Opposite 32 Grafton Street above the cliff top
- Opposite 12 Grafton Street above the cliff top.

Figure – Logging locations



Source: Google Earth

MONITORING EQUIPMENT

Each of the three noise loggers were Class 1 Svantech type 977 noise and vibration analysers with current National Association of Testing Authorities, Australia (NATA) calibration certificates. Field calibration was also completed for each logger before and after each period of noise measurements with a Pulsar type 105 acoustic calibrator. The calibrator had a current NATA calibration certificate. The pre and post field calibration confirmed there was no significant change in logger calibration over the logging period and that results are representative.

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METHODOLOGY SUMMARY

The three noise loggers were used to correlate noise levels in the area and establish the representative noise level from each vessel in the absence of noise from other sources. Other sources of noise that can influence an L_{Aeq} (equivalent energy average) noise level include:

- Road vehicles (nearby and ANZAC Bridge)
- Resident's and council's contractors
- Other vessels
- Aircraft
- Natural ambient noise levels such as wild life and wind in nearby trees and palms.

ADDITIONAL OBSERVATIONS

Noise complaints were investigated for the following vessels at WBCT:

- Maasdam
- Azamara Quest

Representative noise levels from these vessels complied with the 58dBA reference level outlined in the White Bay Cruise Terminal (WBCT) Noise Impact Mitigation Strategy (NIMS). Both of these complaints occurred while a vessel was also berthed at the adjacent White Bay 4 berth.

The noise loggers at WBCT are not in a suitable location to accurately confirm noise levels from a vessel at White Bay 4. However, their data may be used to provide an indication of noise levels for vessels at White Bay 4 if noise levels are not influenced by a vessel at WBCT.

Data indicates that noise levels from the Seabourn Encore at White Bay 4, during the Maasdam's visit to WBCT, would be less than the NIMS reference noise level of 58dBA.

The Black Watch was at White Bay 4 during the Azamara Quest's visit to WBCT. Data indicates the Black Watch, when berthed at White Bay 4, may have been producing noise levels that approach or exceed the NIMS reference noise level of 58dBA if the Black Watch was berthed at WBCT.

Yours faithfully



Dr Simon Kean
Director

GLOSSARY

TERM	DESCRIPTION
Representative noise level	<p>A representative noise level is the typical noise level from a vessel during its visit and excludes short term events which may be louder.</p> <p>The typical noise level from a vessel occurs from a combination of ventilation, air conditioning systems and onboard power generators.</p> <p>Higher short term noise levels may occur during arrival/departure or due to a change in an operational procedure. These are not representative of the longer term noise exposure from the vessel while in port. Where they are unreasonable they may be addressed by amending the vessel's procedures.</p>
dBA	<p>The term dBA is an abbreviation which indicates the noise levels have been expressed in decibels (dB) using an A-weighting filter which approximates how the human ear perceives the loudness of complex noise sources with both low frequency (chugging of engines), medium (fans and engine exhaust flow) and higher frequency aspects.</p>
58dBA reference level	<p>The approval for the White Bay Cruise Terminal called for the use of feasible and reasonable noise mitigation to manage potential noise impacts. In response the Port Authority of NSW has developed a Noise Impact Mitigation Strategy which considers potential noise impacts for typical vessels with noise levels up to 58dBA.</p> <p>Based on the approach in the Noise Impact Mitigation Strategy, 58dBA has become the baseline or reference level against which all vessels are assessed.</p> <p>Representative noise levels of 58dBA and lower from a vessel are deemed acceptable as the Noise Impact Mitigation Strategy has approaches to manage these noise levels by mitigating houses.</p> <p>Representative noise levels above 58dBA are deemed unacceptable and the vessel operations are reviewed under the Port Authority's three strikes policy.</p>
L _{Aeq}	<p>In general, noise levels in any location vary continuously and any sound level meter will show this changing decibel level on the display. To make sense of the range in noise levels that may occur within a standard time period, various statistics are used in acoustics.</p> <p>The simplest are the L_{A90}, L_{A50} and L_{A10} descriptors. The number in each of these descriptors indicates the percentage of time that noise levels exceed the indicated value. For example an L_{A90} is the noise level that was exceeded 90% of the time, and L_{A50} is the noise level that was exceeded 50% of the time (also the median) and L_{A10} is the noise level that was exceeded 10% of the time.</p> <p>The L_{Aeq} is more complex to derive from changing noise levels and is an averaging process. The averaging process results in a single equivalent number for the measurement period that has the same total sound energy as the changing noise levels over the time period.</p>

GLOSSARY

TERM	DESCRIPTION
Adverse wind and rain	Conditions are described as adverse when noise levels from wind or rain are high enough to influence noise measurement. Adverse noise may result from direct noise generation on the microphone or from wind and rain impacting other items such as the ground, pavements, structures, vegetation etc.
Noise logger	A noise logger is an automated sound level meter which repeatedly saves noise statistics for defined noise sampling periods. In NSW statistics are usually obtained for every 15 minute period each day starting at midnight.
Class 1	Sound level meters are available with different levels of accuracy. A class 1 instrument is a high precision instrument suitable for acoustic measurement of noise levels at the White Bay Cruise Terminal. To achieve a Class 1 rating the meter must comply with Standard IEC61672. Most meters that are available through retail electronics stores (including smartphone apps with claimed calibration curves) are not accurate or stable enough to achieve a class rating. Testing by Spoke Acoustics has found that noise levels measured using smartphone apps may commonly be wrong by 8dBA or more.
NATA calibration certificate	The sound level meter must have a current calibration certificate issued by a National Association of Testing Authorities (NATA) accredited laboratory for noise measurements to be valid in Australia. The certificate confirms that the meter is in good working order and complies with Standard IEC61672 and others as relevant.
Field calibration	A field calibration is conducted with a hand held acoustic calibrator and confirms the meter is working correctly and also permits minor adjustments to account for significant changes in temperature and atmospheric pressure.
Acoustic calibrator	An acoustic calibrator is used to conduct a field calibration. For the calibration to be valid the calibrator must have a current calibration certificate issued by a National Association of Testing Authorities (NATA) accredited laboratory.