

8 February 2017

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Re: White Bay 6 - Operational noise compliance assessment 2017

1 Introduction

EMM Consulting Pty Limited (EMM) has been engaged by White Bay 6 Pty Ltd to complete an operational noise compliance assessment of the marine storage and refuelling facility (the site) at Berth 6, White Bay, NSW.

The purpose of the assessment is to address the requirements of the Minister's Condition of Approval (MCoA).

This report presents noise measurement data collected on 19 January 2017 and the results, findings and discussions of the compliance noise assessment.

The following material was referenced as part of this assessment:

- Minister's Condition of Approval (MP 06_0037) (MCoA); and
- Environmental Protection Authority 2000, *Industrial Noise Policy* (INP).

2 Minister's Condition of Approval (MCoA)

The Minister's Condition of Approval (MCoA) for the site was granted on 14 September 2009 and has been modified four times to date. The site is currently operating under restrictions during day, evening and night periods. Condition A7 of the MCoA summarises time restrictions that apply at the site.

Condition A7 - Hours of Operation

Activity	Day	Time
Mixed marine tenancies and commercial storage & work sheds & dry boat storage use	Monday – Saturday Sunday and Public Holidays	7:00 am to 6:00 pm 8:00 am to 6:00 pm
All activities on hardstand/lay down areas eg. Power tools, travel lifts, roll on roll off ramp, cranes forklifts		
Truck movements to and from the site		
General deliveries		
Disposal and collection of garbage including cans and bottles from vessels		
Recreational vessel arrivals, departures and mooring	Monday – Sunday	5:00 am to 10:00 pm

Condition A7 - Hours of Operation

Activity	Day	Time
Recreational vessel refuelling and grey water sewerage pump out *(refer to Condition F15)		
Commercial vessel arrivals, departures and mooring	Monday – Sunday	Anytime
Commercial vessel refuelling and grey water and sewerage		
Commercial offices		
Office buildings mechanical services e.g. A/C plant, compressors for chiller room etc.		

The MCoA summarises the sites noise contributions limits in Conditions F1, F2 and F3 as follows.

“Condition F1 - Noise Limits:

The use of any part of the premises including vessel refuelling and other activities, and the operation of the plant, machinery or other equipment on the site must not exceed the sound pressure (noise) limits presented in the table below

a) Noise limits – During operation of the facility

Residential location	Day	Evening		Night	
	<i>L_{Aeq}(15 minute)</i>	<i>L_{Aeq}(15 minute)</i>	<i>L_{Aeq}(15 minute)</i>	<i>L_{Aeq}(9 hours)</i>	<i>L_{A1}(1 minute)</i>
1 Grafton St, Balmain	54	48	48	45	59*
Datchett St, Balmain	49	44	44	41	54*
33 Adolphus St, Balmain	36	35	35	35	60*
2 Point St, Pyrmont	40	35	35	35	61

Notes: 1. *The sleep disturbance limits do not apply to trucks whilst engaged in movements on the access road to enter or leave the site.

b) For the purpose of clause (a) of this condition:

- Day is defined as the period from 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays;
- Evening is defined as the period from 6.00 pm to 10.00 pm; and
- Night is defined as the period from 10.00 pm to 7.00 am Monday to Saturday, and 10.00 pm to 8.00 am Sundays and Public Holidays.

Condition F2 – Noise measurements

- Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition F1 unless otherwise stated.
- Noise from the premises is to be measured at 1 metre from the dwelling facade to determine compliance with the LA1(1 minute) noise level in Condition F1.

- (3) *Where it can be demonstrated that direct measurement of noise from the premises is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the Industrial Noise Policy).*
- (4) *The modification factors presented in section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where practicable.*
- (5) *The noise emission limits identified in F1 apply under meteorological conditions of wind speed up to 3 metres per second at 10 metres above ground level, and temperature inversion conditions.*

Condition F3 – Noise Compliance Monitoring

A noise compliance assessment must be undertaken within three months of commencement of operations at the premises and submitted to the Director General. The assessment must be prepared by a suitably qualified and experienced acoustical practitioner and must assess compliance with noise limits in Condition F1.

Should the assessment indicate any non-compliance with the specified noise limits the Proponent must take appropriate measures to limit any impacts and must submit a further report upon the implementation of the measures. Further reporting must be undertaken every 12 months unless otherwise directed by the Director General.”

3 Assessment methodology

Attended noise measurements were completed on 19 January 2017 to quantify noise emissions from the site during the day period. Measurements were not taken directly at noise sensitive receivers because it was found during previous monitoring that existing ambient noise levels were generally too high to determine a noise contribution from the site. Measurements were taken at three points on the boundary of the site and at four locations off site, as shown in Figure 1. The site noise contribution at each noise sensitive location was determined as per condition F2(3) and Chapter 11 Section 11.1.2 of the INP, which states that where existing noise levels are too high to determine the individual contribution from an industrial site noise levels from the site may be measured at reference locations and then calculated back to the receiver.

The attended noise monitoring was carried out using a Brüel & Kjær Type 1 integrating sound level meter (serial number 3008201). The unit carries current manufacturer conformance certificates and complies with *Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters*. The sound level meter was calibrated in the field prior to and following the noise measurements. All measurements were taken in accordance with *AS 1055.1-1997 Acoustics - Description and measurement of environmental noise - General procedures*.

Based on site observations and experience from previous annual compliance monitoring, it was considered that the noise contribution from the plant and equipment operating during evening and night periods (refuelling only) would not be quantifiable over existing ambient noise levels at residential locations. Therefore for evening and night operations site noise predictions were made using onsite sound power measurements. The adopted calculation method for evening and night operations accounts for measured sound power levels (at source), distance from sources to receivers, air absorption and any shielding effects from terrain and building structures.

4 Noise measurements

Short-term 15-minute attended noise measurements were conducted on 19 January 2017 at the site boundaries and nearest representative noise sensitive receivers as shown on Figure 1.

The noise measurements were conducted in accordance with NSW Environmental Protection Authority's (EPA) 2000 *NSW Industrial Noise Policy* (INP) requirements. The weather conditions at the time of monitoring included a cloudy sky, no rain and very mild easterly winds (<3m/s).

All plant and equipment was operating during the measurement period, with most items operating concurrently. A worst case scenario was therefore measured, which is not considered typical.

The site activity at the time of measurements included the following items operating:

- two boat hoists;
- two marina bulls;
- one 3.5 tonne forklift;
- one compressor in shed;
- one gervi; and
- one compressor and fuel pumps.

Table 1 summarises the attended noise measurements.



Site locality and noise monitoring locations

White Bay 6

Operational noise compliance assessment

Figure I

Table 1 Attended noise measurements – 19 January 2016

ID	Location (Refer Figure 1)	Time ¹	Noise measurement, dB				Comments/noise source observations
			L _{Aeq}	L _{A90}	L _{Amax}	L _{Aeq,site} ²	
1	South east boundary of site	9:01	64	57	86	62	Boat docking (60 to 67 dB), intermittent hammering within site (60 to 65 dB), boat hoist transiting through site occasionally (59 to 63 dB), testing boat engine approx. 10 m away, infrequent (65 to 68 dB).
2	North east boundary of site	9:20	64	55	74	63	Boat hoist 7 m away operating intermittently (72 dB), occasional hammering at nearby boat (70 dB), distant transient/impact construction noise from Barangaroo (55 to 57 dB).
3	North-western boundary of site – representative of 1 Grafton Street, Balmain (site level)	9:50	57	55	67	55	Nearby boat hoist engine driving site contribution (55 dB), distant transient/impact construction noise from Barangaroo (55 to 57 dB).
4	Grafton St, Balmain	10:45	50	46	63	<48	Boat hoist from site audible occasionally (50 dB), cruise ship terminal hand tools intermittent (53 dB), old forklift audible from site occasionally (48 dB), new forklift noticeably quieter (39 to 42 dB), occasional aircraft noise.
5	Further west on Grafton St, Balmain	11:01	54	51	67	<40	Very low site hum audible (40 to 42 dB) but site generally inaudible over cruise terminal activity (48 to 52 dB), occasional resonance from hand tools at site (46 dB), occasional car pass-by Grafton St (50 to 54 dB).
6	Datchett St, Balmain	11:36	56	49	71	46	Boat cleaning/sanding hand tools intermittent (48 to 53 dB), otherwise site activity inaudible, constant surrounding bird noise (54 to 60 dB), occasional pedestrian pass by conversations (65 dB).
7	2 Point Street, Piermont	12:15	54	49	72	<40	Site noise occasionally audible but levels too low to quantify, surrounding ambient noise (pedestrians) and cruise terminal hum dominant, boats passing occasionally (42 to 48 dB), occasional aircraft pass-by (44 to 47 dB).

Notes: 1. All measurements were 15 minutes in duration.
2. The noise contribution from site only.

5 Noise compliance assessment

Table 2 summarises the measured and predicted site noise contributions. The predicted and measured site noise contribution satisfies the noise limits at all residential locations as listed in the MCoA.

Table 2 Noise compliance assessment, dB

Location	Criteria					Measurement	Calculated noise levels, dB ¹				Compliance		
	Day	Evening	Night			Day ²	Evening	Night			Day	Evening	Night
	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (9 hour)	L _{A1} (1min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (9 hour)	L _{A1} (1min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min) / L _{Aeq} (9 hour) / L _{A1} (1min)
1 Grafton St, Balmain	54	48	48	45	59	51 ²	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
Datchett St, Balmain	49	44	44	41	54	46	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
33 Adolphus St, Balmain	36	35	35	35	60	<36	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
2 Point St, Pyrmont	40	35	35	35	61	<39	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes

Notes: 1. Only refuelling activities included during evening and night-time periods.
2. Noise contribution from site determined by applying distance attenuation adjustments to reference measurements from Table 1.

6 Conclusion

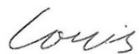
EMM has completed a noise compliance assessment for Berth 6 White Bay, Balmain. The assessment was completed in accordance with the requirements of the Minister's Conditions of Approval (MCoA) and the EPA's Industrial Noise Policy (INP).

Chapter 11 of the INP states that where existing ambient noise levels are too high, measurements may be taken at reference locations closer to the site and then calculated back to a specific location. This method has been adopted to determine the site noise contribution at residential locations listed in the MCoA.

The calculated and measured site noise contributions satisfied the MCoA noise limits at all residences outlined in the MCoA, for all periods.

We trust this information satisfies your requirements and if you require any further details please contact the undersigned.

Yours sincerely,



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Reviewed by: DW

Appendix A

Glossary of acoustic terms

Several technical terms are discussed in this report. These are explained in Table A.1.

Table A.1 **Glossary of acoustic terms**

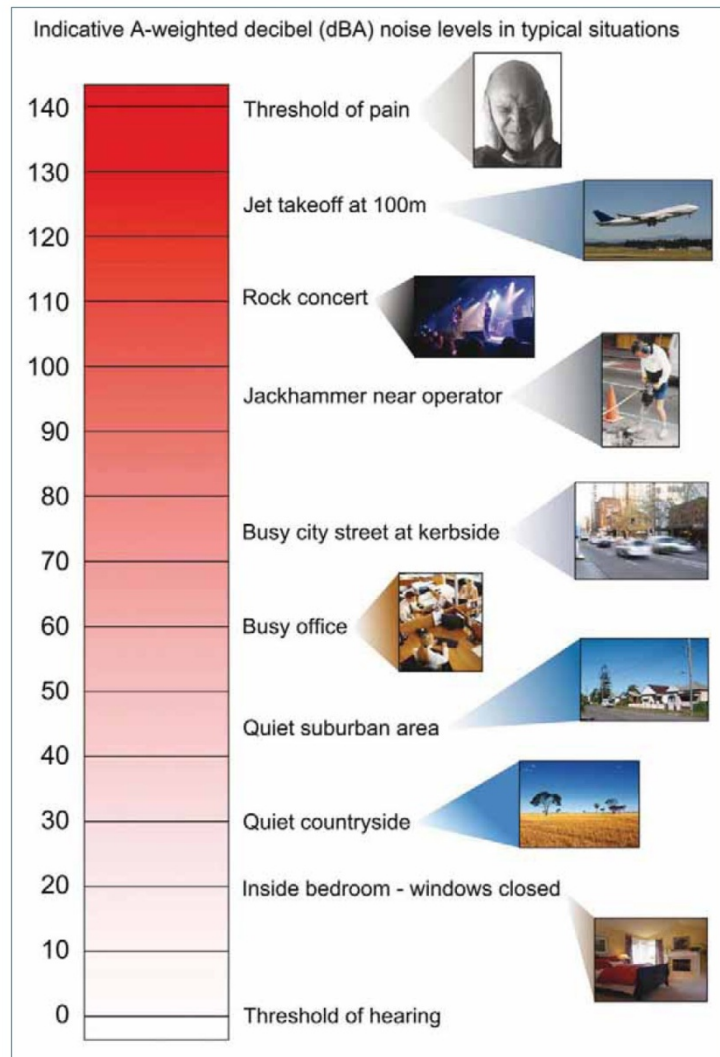
Term	Description
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L ₉₀	Commonly referred to as the background noise level. The noise level exceeded 90% of the time.
L _{eq}	The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The L _{eq(15min)} descriptor refers to an L _{eq} noise level measured over a 15 minute period.
L _{max}	The maximum root mean squared sound pressure level received during a measuring interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
0-2	Typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.



Source : RNP (Department of Environment, Climate Change and Water (DECCW), 2011)

Figure A.1 Common noise levels