

7 April 2020

WM Project Number: 15286-A
Our Ref: SZ07042020PT
Email: jake.burgess@sydneyzoo.com

Jake Burgess
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Dear Jake

Re: Sydney Zoo - Noise Verification Report

INTRODUCTION

Wilkinson Murray has been commissioned by Sydney Zoo to prepare a Noise Verification Report to confirm that the operation of the Sydney Zoo, located within the Western Sydney Parklands, complies with Conditions C32 and C32A of the Conditions of Consent.

Sydney Zoo was approved by the Planning Assessment Commission on 8 September 2017 (SSD 7228). The consent has been modified on four occasions and a further modification application (SSD 7228 MOD6) is currently under assessment by the Department of Planning and Environment. Wilkinson Murray Report 15286-N Version A dated November 2015 was a Noise and Vibration Impact Assessment (NVIA) prepared in support of the development and operation of Sydney Zoo. The assessment completed noise emission modelling and provides predicted noise levels at sensitive receivers.

Condition C32A makes reference to Condition B10 which stipulates the approved operating hours. All relevant Conditions are provided below:

Condition B10

Table 1: Hours of Operation

Activity Description	Hours of Operation
Public Opening Hours	December and January: 9.00am – 10.00pm February to November: 9.00am – 6.00pm
Maintenance activities conducted by staff of the Development including cleaning, animal curation, feeding and general maintenance activities	5.30am – 11.00pm
Emergency activities (including animal medical events)	24 hours, 7 days a week
Temporary and community events	December and January: 7.00am – 11.00pm February to November: 7.00am – 8.00pm
Delivery of goods, waste collection and specimen related services including animal and food delivery	December and January: 7.00am – 10.00pm February to November: 7.30am – 6.00pm
Private zoo experiences/small group tours	December and January: 7.30am – 10.00pm February to November: 7.30am – 6.00pm

Note: The operational noise limits specified in Condition C32 apply to all activities specified in Table 1: Hours of Operation

Condition C32

The Applicant shall ensure that noise generated by the operation of the Development does not exceed the noise limits in Table 3.

Table 3: Project Specific Noise Limits (dB(A))

Receiver Location	Day L _{Aeq,15min}	Evening L _{Aeq,15min}	Night L _{Aeq,15min}
Bungarribee, Eastern Creek	51	50	40
R1 (Great Western Highway)	57	50	40
S1 (Eastern Creek Primary School)	45	N/A	N/A

Condition C32A

Within six months of the commencement of operation of the Development, the Applicant must prepare a Noise Verification Report for the Development to the satisfaction of the Planning Secretary. The report must:

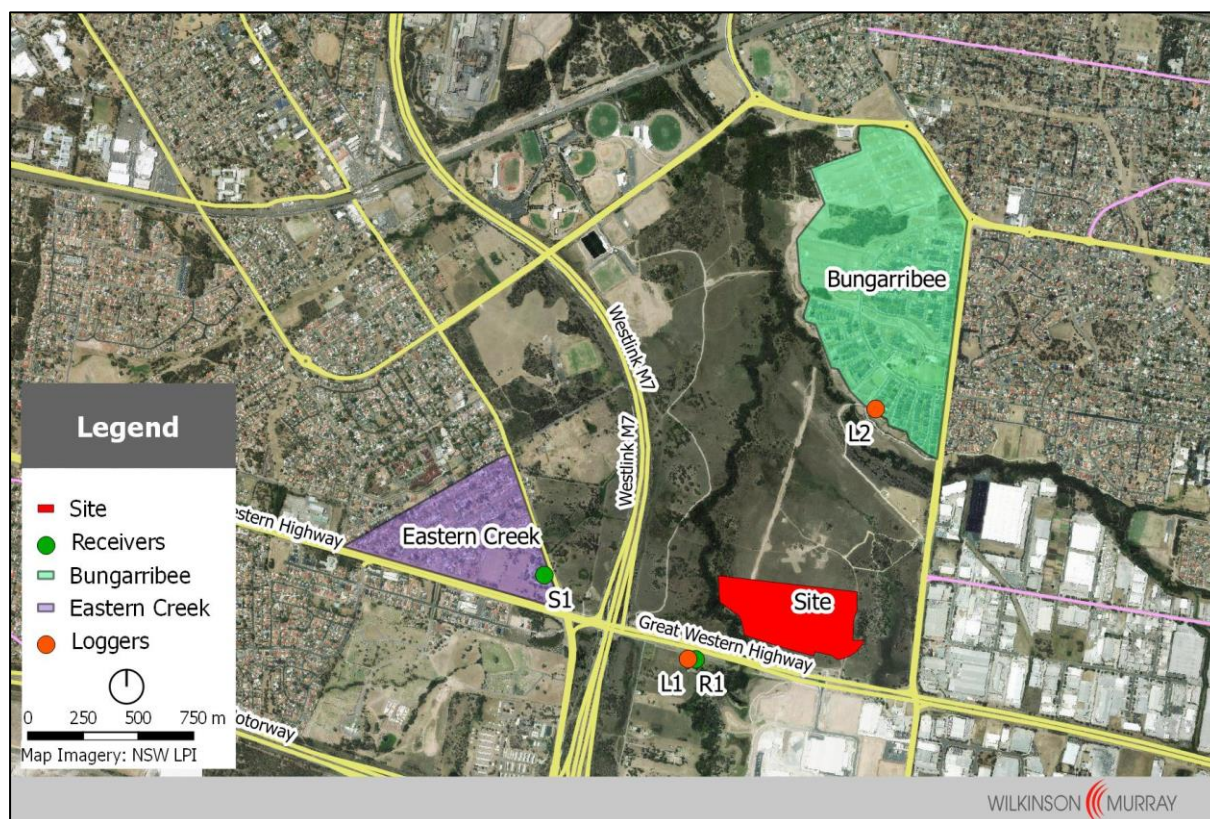
- Be prepared by a suitably qualified acoustic consultant, with qualifications and experience consistent with the technical eligibility criteria for membership to the Association of Australian Acoustical Consultants or the Australia Acoustical Society;
- Be prepared in consultation with Council;
- Include an analysis of compliance with the noise limits specified in Condition C32 for all activities specified in Condition B10;
- Include an outline of management actions to be taken to address any exceedances of the limits specified in Condition C32; and
- Describe contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

NOISE MONITORING

In order to assist with determining the operational noise emissions from Sydney Zoo, unattended and attended noise monitoring was completed. Noise monitoring was conducted at the same locations as the NVIA. The addresses for the two locations are:

- L1: 715 Great Western Highway, Eastern Creek.
- L2: 26 Velocity Parade, Bungarribee.

Figure 1 presents the location of monitoring relative to Sydney Zoo and surrounding receivers.

Figure 1 Noise Monitoring Locations

Unattended noise monitoring was conducted between 27 February 2020 and 6 March 2020.

The noise monitoring equipment used for this measurement consisted of ARL environmental noise loggers set to A-weighted, fast response, continuously monitoring in 15-minute intervals. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{Amax} , L_{A10} , L_{A90} and L_{Aeq} levels of the ambient noise. L_{A10} and L_{A90} are the levels exceeded for 10% and 90% of the sample time respectively (see Glossary of Acoustic Terms for definitions). The L_{Amax} is indicative of maximum noise levels due to individual noise events. This is used for the assessment of sleep disturbance. The L_{A90} level is normally taken as the background noise level during the relevant period.

Table 1 presents the results of noise monitoring and compares it against the measured noise levels from the initial background noise study. **Appendix A** presents the noise monitoring charts.

Table 1 Summary of Unattended Noise Monitoring

Location	Period	Day		Evening		Night	
		7.00am – 6.00pm		6.00pm – 10.00pm		10.00pm – 7.00am	
		L _{Aeq}	RBL	L _{Aeq}	RBL	L _{Aeq}	RBL
L1	15/09/2015 – 23/09/2015	59	52	58	51	58	48
	27/02/2020 – 06/03/2020	60	49	57	47	56	44
L2	15/09/2015 – 23/09/2015	54	46	51	45	52	45
	27/02/2020 – 06/03/2020	57	45	55	40	47	41

Attended noise monitoring was conducted on 27 February 2020 and 6 March 2020 to confirm the audibility of noise from Sydney Zoo and understand the current noise environment at these receiver locations.

All attended measurements were conducted using an NTi Type XL2 sound level meter (SLM). This SLM is a type approved system offering Class 1 performance according to IEC 61672-1:2013 *Electroacoustics – Sound level meters – Part 1: Specifications* and has current with National Association of Testing Authorities, Australia requirements (NATA) calibrated and has current with National Association of Testing Authorities, Australia requirements (NATA) calibrated to IEC 61672-3:2013 *Electroacoustics – Sound level meters – Part 3: Periodic tests*. The A-weighting filter of the meter was selected, and the time weighting was set to “Fast”. The field calibration of the meter was checked before and after the measurements with a Brüel & Kjær Type 4231 sound level calibrator (SLC) and no significant drift was noted. This SLC is a Class 1 calibrator according to AS IEC 60942-2004 *Electroacoustics – Sound calibrators* and has been calibrated to the same Standard.

The NTi Type XL2 and Brüel & Kjær Type 4231 hold current laboratory calibrations in accordance with NATA and our in-house Quality Assurance Procedures.

Table 2 presents the results and observations from attended noise monitoring.

Table 2 Summary of Attended Noise Monitoring

Location	Date	Time	L _{Amax}	L _{Aeq}	L _{A90}	Comments
L1	27/02/2020	11.07am	73	59	49	Sydney Zoo not audible. L _{Aeq} dominated road traffic noise on Great Western Highway. Some contribution from nearby insect and birds
	06/03/2020	10.15am	72	61	54	L _{A90} dominated by road traffic noise from M7.
L2	27/02/2020	11.48am	71	63	54	Sydney Zoo not audible. L _{Aeq} dominated by local bird/insect noise. M7 contributes to L _{A90}
	06/03/2020	10.45am	70	66	64	Sydney Zoo not audible. L _{Aeq} and L _{A90} dominated by nearby insect noise

NOISE ASSESSMENT

The attended noise monitoring surveys confirmed that noise from the operation of Sydney Zoo was not audible at Locations L1 and L2, and that the ambient noise environment at these locations was dominated by nearby insect and bird noise, and road traffic noise from the M7 and Great Western

Highway. Thus, the L_{Aeq} noise levels at these locations will not be appropriate to compare the noise impact from the opening and operation of Sydney Zoo.

The RBLs at these locations may be more appropriate but will be still quite conservative. When reviewing the results from the unattended noise monitoring, it can be seen that the RBLs have reduced by 1-2dB in the day period, 4-5dB in the evening period, and 4dB in the night period. This suggests that the opening and operation of Sydney Zoo has not has an impact on the immediate noise environment around these receivers.

This is consistent with the findings of the NVIA which determined that received noise levels from the operation of Sydney will be less than 40dBA at the nearest receiver, which is less than the measured background noise levels before the opening of Sydney Zoo.

Given that noise from Sydney Zoo was not audible at Location L1 (Receiver R1), it is reasonable to confirm that noise from Sydney Zoo will also be inaudible at Receiver S1, which is an additional 510m from Sydney Zoo.

On this basis, noise from the operation of Sydney Zoo complies with the Project Specific Noise Limits stipulated in Condition 32. No further management or contingency measures is recommended or required.

CONCLUSION

Wilkinson Murray has completed this Noise Verification Report to confirm that noise from the operation of Sydney Zoo complies with relevant noise limits and satisfies Condition 32 of the Conditions of Consent. This Noise Verification Report has been completed to satisfy Condition 32A of the Conditions of Consent.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully

WILKINSON MURRAY



Peter Thang
Engineer

Reviewed by:



John Wassermann MIEAust, MAAS
Director

Note

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Quality Assurance

Wilkinson Murray operates a Quality Management System which complies with the requirements of AS/NZS ISO 9001:2015. This management system has been externally certified by SAI Global and Licence No. QEC 13457 has been issued.

AAAC

This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.