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Car Park Noise Impact Assessment

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1 INTRODUCTION

This report presents environmental emission assessment for the car park at Royal Rehabilitation Hospital, Ryde.

The assessment is based on the requirements of Environmental Protection Authority (EPA) Industrial Noise Policy and the architectural provided to this office.

2 SITE DESCRIPTION

The proposed carpark is to be located to the south east of the existing hospital site. Site investigations have indicated that the nearest noise receivers are the single storey residential dwellings neighbouring the site to the south east. Detailed site map and noise receiver locations refer to Figure below.

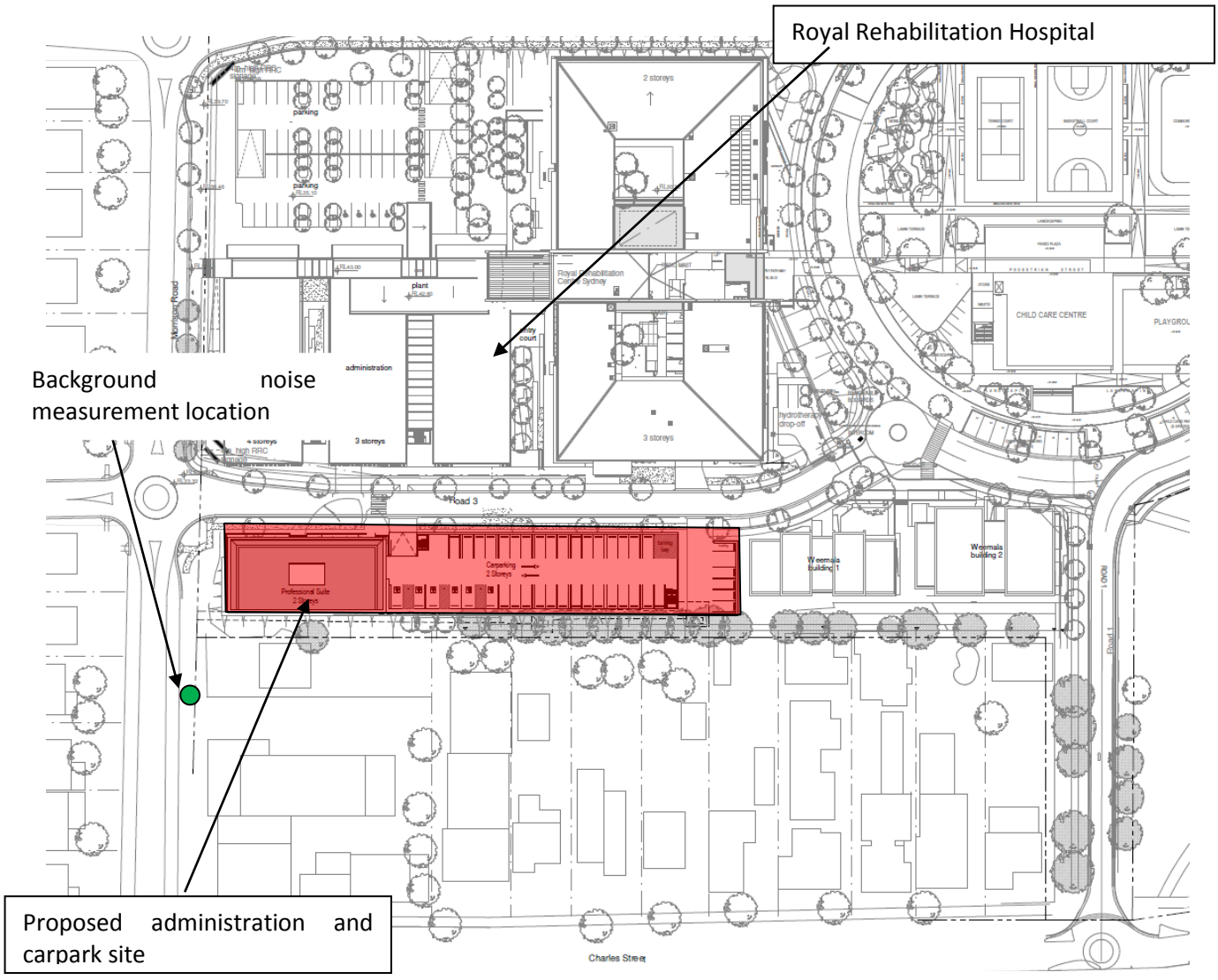

Figure 1 Site Map and Noise Receiver Locations

3 EXISTING BACKGROUND NOISE

Unattended noise measurement location was conducted at the site on the 16th April, 2013 athe the location detailed in Figure 1 above.

3.1 ENVIRONMENTAL NOISE LEVELS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including road traffic. Accordingly, a 15minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

The measured background noise levels from the attended monitoring are listed below in Table 1.

Table 1 –Rating Background Noise Level

PERIOD/TIME	MEDIAN L_{A90} (10th Percentile) BACKGROUND NOISE LEVEL dB(A)
Day	41
Evening	41

4 NOISE EMISSION LIMITS

4.1 EPA INP REQUIREMENTS

The NSW Environmental Protection Authority's (EPA) Industrial Noise Policy provides guidelines for assessing noise impacts from industrial developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The OEH Industrial Noise Policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion. In addition, the OEH in its Environmental Noise Control Manual states that noise controls should be applied with the general intent to protect residences from sleep arousal.

4.1.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

4.1.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all industrial noise sources to a level that is consistent with the general environment.

The OEH's Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Table 2 provides the recommended ambient noise levels for the suburban residential receivers for the day, evening and night periods. For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm; and
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

Table 2 – OEH Recommended Amenity Industrial Noise Levels

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) L_{eq}
Residential	Day	55
	Evening	45
	Night	40

4.1.3 Sleep arousal

To minimise the potential for sleep arousal the $L_{1\ (1\ minute)}$ noise level of any specific noise source does not exceed the background noise level (L_{90}) by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am. The L_1 noise level is the level exceeded for 1 per cent of the time and approximates the typical maximum noise level from a particular source. Where the typical repeatable existing L_1 levels exceed the above requirement then the existing L_1 levels form the basis for, sleep disturbance criteria.

4.1.4 Summary of Assessment Criteria

OEH Industry Policy requirements will be used as acoustic assessment criteria for this project. The intrusiveness, amenity and sleep arousal criteria for this project have been determined using these guidelines and the noise monitoring results. These are summarised below. We note that the formulation of the assessment criteria has been based on the lowest ambient levels determined from all monitoring data.

Table 3 – Noise Objectives for Residential Receivers near Proposed Development

Day time Noise Objective dB(A) L_{eq}	**Evening Noise Objective dB(A) L_{eq}**	**Night Time Noise Objective dB(A) L_{eq}**	**Noise Objective for Intermittent Activities dB(A) $L1_{(1min)}$ (Background + 15 dB(A))**
46	46	45	56

5 NOISE ASSESSMENT

The following noise sources have been assessed in this section:

- Car start noise.
- Vehicle manoeuvring within the carpark area.
- Door slamming noise.

5.1 NOISE DATA

The potential noise source associated with the carpark is listed in Table 4 along with the noise emission levels. The emission levels have been obtained from noise monitoring carried out at similar facilities. Noise measurements were obtained using a Norsonics SA 110 with (serial number 24692) or CEL-593 Type 1 sound level analysers (serial number C1. T 116962), set to fast response. The sound level analysers were calibrated before and after the measurements using a Rion NC-73 calibrator. No significant drift was recorded.

Table 4 – Noise Source Emission Levels

Noise Source	Sound Power Level dB(A)	Type of Noise Source
Car Manoeuvring	84	Quasi-Steady
Car Start	65 dB(A) L_1 @ 7m	Instantaneous
Door Slamming	68 dB(A) L_1 @ 7m	Instantaneous

5.2 NOISE EMISSION PREDICTION

FHWA programme was used for the carpark noise emission prediction. The Noise predictions were based on the following:

- Distance between the noise source and receiver, barrier or directivity effects (when present) and topography.
- Tabled noise emission levels above.
- At worst case scenario, 90 car movements in the 2 hour period.

The nearest noise receiver of the carpark is the residential dwelling located on Morrison Road. It shall be noticed that if the noise emissions complies at this location then it shall automatically comply all other locations along Morrison Road.

The predicted noise levels to the nearest residential boundaries are as below:

Table 5 – Carpark Noise Assessment

Noise Receiver	Time Period	Predicted Noise Level	Criteria	Compliance
Boundary of residential receiver	Day time	45dB(A)Leq	46dB(A)L_{eq}	Yes
	Evening Time	45dB(A)Leq	45dB(A)L_{eq}	Yes
	Night Time	45dB(A)Leq 52dB(A)L1	46dB(A)L_{eq} 56dB(A)L_1	Yes

6 CONCLUSION

The environmental emission assessment for the car park activities generated by the car park at Royal Rehabilitation Hospital, Ryde has been carried out and the results fully comply with the requirements of NSW EPA Industrial Noise Policy.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Ben White