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BUPA CARE HOME - ST IVES

Development Application Noise Assessment

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Bupa Care Home - St Ives

Development Application Noise Assessment

04/03/2014

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1 Introduction

WSP Acoustics have been appointed to provide an acoustic report as part of the development application for the new build BUPA Care Services at 238 Mona Vale Road, St Ives, NSW.

A noise impact assessment has been undertaken as part of the Development Application for the proposed development.

This report provides information on the following:

- Description of the proposed site and development
- Description of the relevant local noise criteria
- Considerations for noise emissions and mitigation measures
- Considerations for noise ingress and mitigation measures

1.1 Proposed site and development

The proposed development in St Ives, NSW, is a four storey aged care home consisting of residents' rooms, staff facilities, dining, and residents' common areas. The site is bounded by the heavily trafficked Mona Vale Road, Killeaton Street and Link Road, resulting in traffic noise as the primary source of noise to the site.

Figure 1-1 - 238 Mona Vale Road overview



2 Noise Survey

2.1 Methodology

The site location for the prevailing noise measurement was at number 238 Mona Vale Road, St Ives, NSW. The survey was undertaken from 12:00hrs on the 06/11/2012 to 12:00hrs on the 07/11/2012. Consideration was taken to place the sound level meters in locations to best represent the existing noise levels of the area.

The measurements of noise made during this visit were conducted in accordance with AS 1055 “*Acoustics—Description and Measurement of Environmental Noise*”. Class 1 sound level meters as described by IEC 61672-01:2002 were used.

Metrological conditions for the duration of the noise survey were conducive to the measurement of environmental noise, being dry and little wind.

Table 2-1 - Noise survey equipment

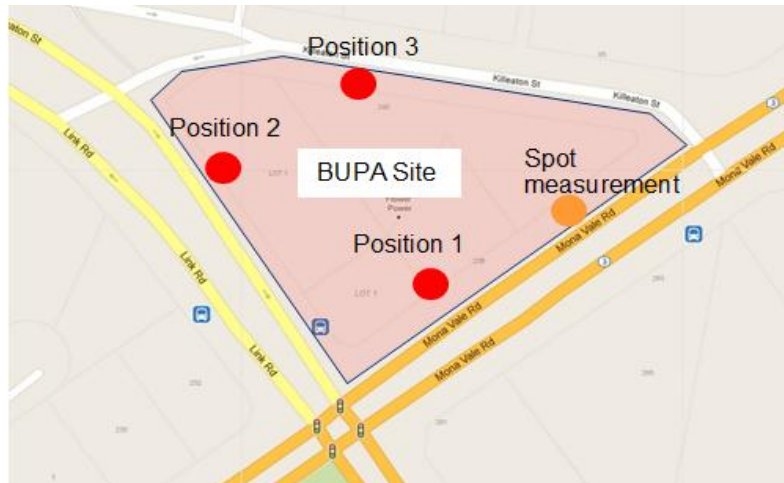
| Equipment Description | Manufacturer & Type No. | Serial No. | Calibration Due Date |
|----------------------------|-------------------------|------------|----------------------|
| Sound Level Meter | Norsonic – Nor140 | 1404791 | 21/10/2013 |
| Microphone | Norsonic - 1227 | 14105 | 21/10/2013 |
| Preamplifier | Norsonic – 1209 | 14105 | 21/10/2013 |
| Environmental Noise Logger | ARL – EL-316 | 16707006 | 20/09/13 |
| Microphone | - | 317149 | 20/09/13 |
| Preamplifier | - | 27974 | 20/09/13 |
| Environmental Noise Logger | ARL - EL-316 | 16707005 | 06/06/13 |
| Microphone | - | 313667 | 06/06/13 |
| Preamplifier | - | 27601 | 06/06/13 |
| Calibrator | ARL Calibrator | N219949 | 27/08/13 |

The sound level meter was fitted with a windshield during the survey and was calibrated prior to, and on completion of the survey with the associated acoustic calibrator listed above. No significant calibration drift occurred.

Due to Mona Vale Road being a busy 6 lane road, a spot measurement $L_{Aeq,15mins}$ was also made to validate the road as a primary noise source to the site.

The measurement locations are shown in Figure 2-1 below.

Figure 2-1 - Measurement locations



2.2 Results

Logger measurements

The following tables summarise the key results of the logged noise survey relevant to this Noise Assessment.

Note, L_{90} is generally considered to reflect the background noise level as it is the sound pressure level exceeded for 90% of the measurement period.

Table 2-2 - Position 1 - Mona Vale Road - Summary of results for assessment

| Classification | Time of Day | $L_{Aeq,T}$ (dB) | $L_{A90,T}$ (dB) | Period. T (hh:mm) |
|----------------|---------------------|------------------|------------------|---------------------|
| Day time | 0700 hrs – 1800 hrs | 64 | 57 | 00:15 |
| Evening | 1800 hrs – 2200 hrs | 61 | 54 | 00:15 |
| Night time | 2200 hrs – 0700 hrs | 58 | 49 | 00:15 |

Table 2-3 - Position 2 - Link Road - Summary of results for assessment

| Classification | Time of Day | $L_{Aeq,T}$ (dB) | $L_{A90,T}$ (dB) | Period. T (hh:mm) |
|----------------|---------------------|------------------|------------------|---------------------|
| Day time | 0700 hrs – 1800 hrs | 61 | 56 | 00:15 |
| Evening | 1800 hrs – 2200 hrs | 59 | 54 | 00:15 |
| Night time | 2200 hrs – 0700 hrs | 53 | 47 | 00:15 |

Table 2-4 - Position 3 - Killeaton Street - Summary of results for assessment

| Classification | Time of Day | $L_{Aeq,T}$ (dB) | $L_{A90,T}$ (dB) | Period. T (hh:mm) |
|----------------|---------------------|------------------|------------------|---------------------|
| Day time | 0700 hrs – 1800 hrs | 64 | 55 | 00:15 |
| Evening | 1800 hrs – 2200 hrs | 62 | 52 | 00:15 |
| Night time | 2200 hrs – 0700 hrs | 58 | 48 | 00:15 |

Spot measurement

A spot measurement was taken to verify the primary source of noise during the day time hours. Based on our measurements and observations the traffic noise was constant throughout the peak times and is considered to be the primary contributor to the prevailing noise environment.

The following table summarises the spot measurement results taken alongside the 6 lane Mona Vale Road.

Table 2-5 - Spot measurement

| | Time of day | Period (mins) | L _{Aeq} | L _{A90} | Location |
|------------------|-------------|---------------|------------------|------------------|--------------|
| Spot measurement | 1:06pm | 15 | 74dB | 63dB | 1m from curb |

3 Acoustic Criteria

Planning conditions for this development, in line with New South Wales and Ku-ring-gai Council requirements, have been drawn from the New South Wales Industrial Noise Policy and Australian Standards and are designed to protect the amenity of the new building occupants and the surrounding residences/community.

3.1 Noise intrusion to the proposed development

The criteria for internal ambient noise form the basis of the noise ingress analysis and are designed to protect the amenity of the building occupants.

In accordance with guidance contained within AS/NZS 2107:2000, the following indoor ambient noise levels will be targeted. Note that these are the combined levels from external noise ingress and any building services systems:

| Type of Residential Space | AS/NZS 2107 Recommended Noise Levels, dB $L_{Aeq,15min}$ | |
|--|--|---------|
| | Satisfactory | Maximum |
| Sleeping areas* | 30 | 40 |
| Living areas | 35 | 45 |
| Common rooms* (dining, lounge, activity, foyer) | 35 | 45 |

* Near major roads

3.2 Noise emissions from the proposed development

The following targets have been derived from the New South Wales Industrial Noise Policy: 2000 (INP) and are designed to protect the amenity of the surrounding residences and community. The Policy has two components that must be considered and the more onerous of these becomes the controlling criteria;

1. Controlling the **intrusive noise** impact on residences in the short term

Such that, the equivalent continuous noise level (L_{Aeq}) of the noise source/sources under consideration should be no more than 5dB over the background noise level.

$$L_{Aeq, 15 \text{ min}} \leq \text{rating background level plus } 5$$

2. Maintaining noise level **amenity** for particular land uses for residences and other land uses.

The site in question is bounded by main roads that have constant traffic flows during peak times. As such, the indicative noise amenity area is classed as 'Urban' and the receiver type, 'Residence'. Shown below are the relevant acceptable and maximum noise levels taken from 'table 2.1 Amenity criteria' of the INP. The following limits take into account the INP conditions set for areas of high traffic noise (section 2.2.3 of the document).

Table 3-1 Extract from 'Table 2.1 Amenity criteria' from NSW INP 2000

| Type of receiver | Indicative Noise Amenity Area | Time of Day | Acceptable Noise Level (L_{Aeq}) | Maximum Noise Level (L_{Aeq}) |
|------------------|-------------------------------|-------------|--------------------------------------|-----------------------------------|
| Residence | Urban | Day | 60 | 65 |
| | | Evening | 50 | 55 |
| | | Night | 45 | 50 |

3.2.1 Project specific criteria

Based on the results of the noise survey (section 2) and in accordance with the INP the intrusiveness criteria and the amenity criteria are determined below. The lower of the following two criteria (being the most onerous) then becomes the project-specific criteria:

Intrusiveness criteria:

$$\text{Day } L_{Aeq,15min} \leq 60 \text{ dB}$$

$$\text{Evening } L_{Aeq,15min} \leq 57 \text{ dB}$$

$$\text{Night } L_{Aeq,15min} \leq 52 \text{ dB}$$

Amenity criteria/Traffic:

As per Table 3.1 above and taking into account that, traffic noise has been identified as the dominant contributor to the noise level, the Amenity criteria are:

$$\text{Day } L_{Aeq,15min} \leq 51 \text{ dB}$$

$$\text{Evening } L_{Aeq,15min} \leq 49 \text{ dB}$$

$$\text{Night } L_{Aeq,15min} \leq 43 \text{ dB}$$

The project specific criteria:

As they are the more onerous, the project specific criteria are determined by the amenity criteria as follows:

$$\text{Day } L_{Aeq,15min} \leq \mathbf{51 \text{ dB}}$$

$$\text{Evening } L_{Aeq,15min} \leq \mathbf{49 \text{ dB}}$$

$$\text{Night } L_{Aeq,15min} \leq \mathbf{43 \text{ dB}}$$

4 Noise Impact Assessment

With appropriate equipment selections, façade design, ventilation systems design, and if required, mitigation methods, it is expected that the acoustic criteria outlined in section 3 will be achieved.

Noise Emissions

All noise emitting equipment on site will be designed to be no louder than the Project Specific Criteria stated in section 3.2.1 at the boundary. This will help to reduce the impact on the new building's occupants and the surrounding residences/community shown below in Figure 4-1.

It is expected that the majority of noise emitting equipment will be located on the roof. This will be achieved with careful consideration in the selection, design and placement of all mechanical equipment that emit noise.

The NSW Industrial Noise Policy: 2000 project specific criteria are considered to be reasonably high due to the high noise nature of the site and it is unlikely the outdoor plant will require significant treatment. However, where equipment is in excess of these criteria, acoustic mitigation will be necessary. These measures may include, but are not limited to;

- Attenuators
- Noise barriers
- Acoustic louvres
- Acoustic absorption

Figure 4-1 - BUPA site and surrounds



Noise Ingress

Due to the prevailing noise levels on site being mostly high traffic noise, design of ventilation and façade elements will be carefully considered in order to meet the targeted criteria in section 3.1. These will likely include but are not limited to:

- Providing sufficient ventilation to allow for closed windows
- Providing closable windows with appropriate frames and seals
- Selecting glazing and façade elements based on the prevailing noise level

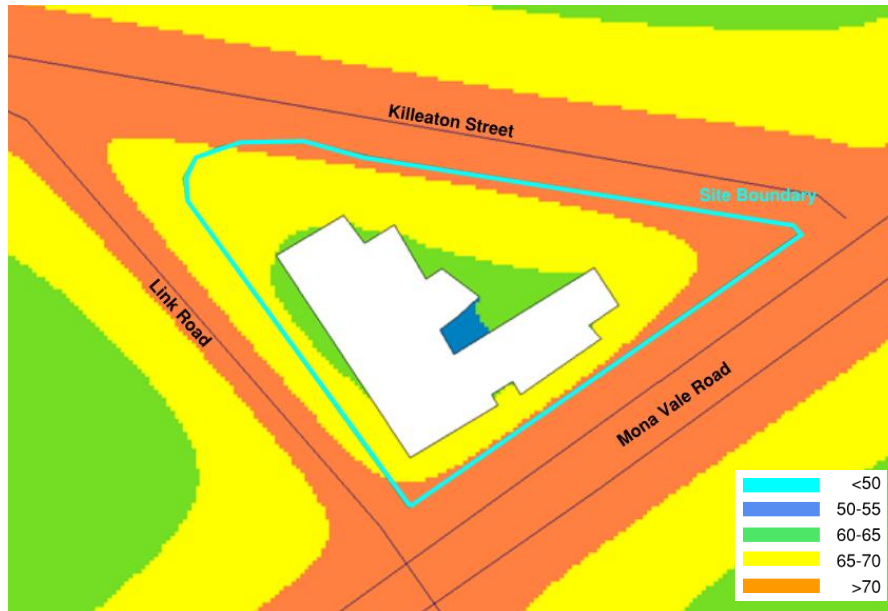
With the above considerations it is expected that the acoustic criteria determined in section 3.2 will be achieved.

Noise to external spaces

As the surrounding noise environment is heavily dominated by traffic, a noise map of the site has been developed to analyse the amenity of these areas during times of use. This has been validated using results from the noise survey (see section 2) for the periods 10:00 - 12:00 and 14:00 - 1600.

The noise expected within the external residents' areas at the east and west most corners of the site is expected to range between 70 and 60dBA L_{Aeq} (1 hour) during the hours of use when no treatment is in place.

Figure 4-2 - External noise - no screen



It is intended that acoustic screens constructed of a sheet material with a minimum mass of 10kg/m², (e.g. 6mm fibre cement) will be introduced around these areas. These screens will be built from the ground to a height of 2.5m this screen has been demonstrated in Figure 4-3 below. The screens shown below have been modelled as a proof of concept and the final location of the screen may vary.

It can be seen that the noise level in these areas is reduced to the range 60-65dBA, a 10dB drop in noise level. Subjectively, this is a big improvement, and can be quantified as a “halving” of perceived noise level.

Figure 4-3 - External noise – Indicative screened courtyards



5 Summary

WSP Acoustics have been appointed to provide an acoustic report as part of the Development Application for the new build BUPA Care Services at 238 Mona Vale Road, St Ives, NSW.

Noise logging and site observations were undertaken on November the 6th and 7th, 2012 to inform the building design and determine the planning conditions that will be imposed on the project.

Traffic noise has been identified as the primary noise source on site.

The noise emission limits at the boundary have been determined by the measured background noise levels and are as follows:

Project specific criteria:

Day $L_{Aeq,15min} \leq 51dB$

Evening $L_{Aeq,15min} \leq 49dB$

Night $L_{Aeq,15min} \leq 43dB$

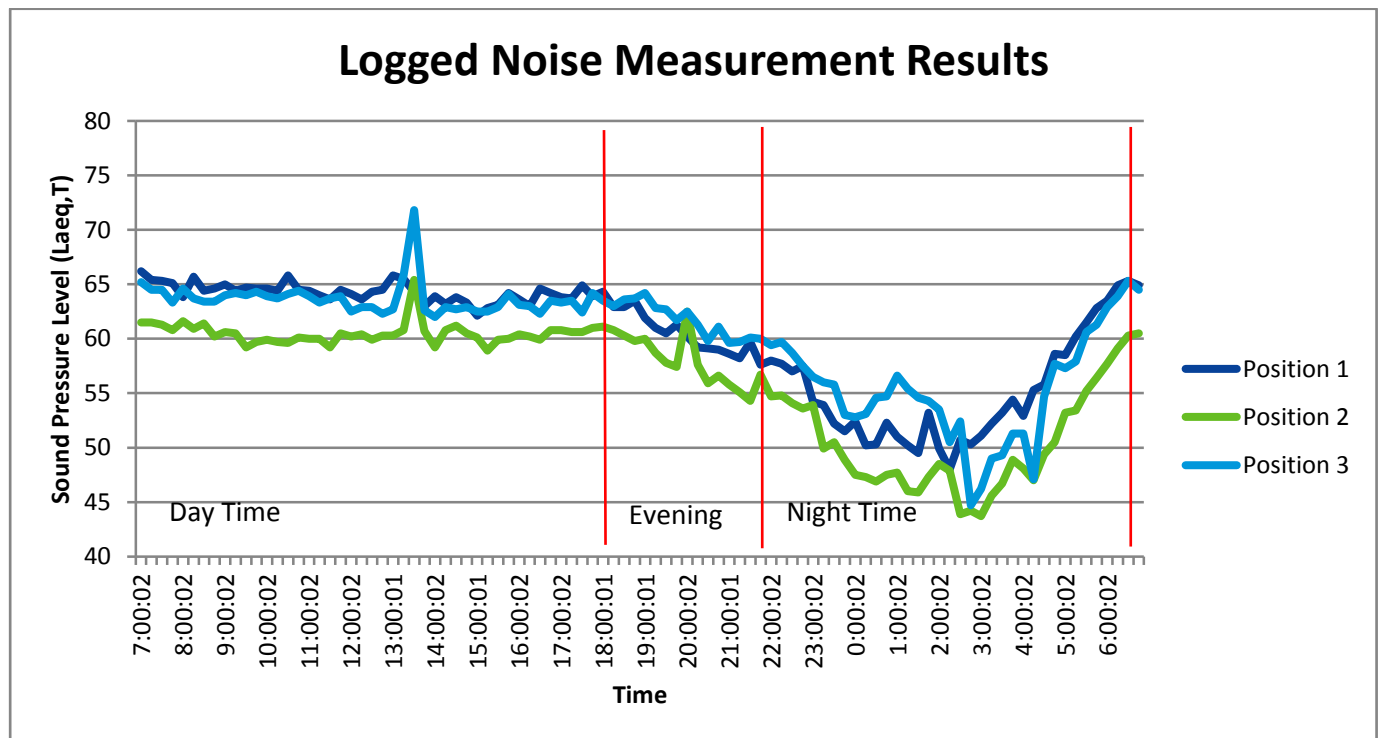
Noise emissions from mechanical services will be regulated to the above project specific criteria at the boundary line in order to meet council requirements. This will be done using appropriate equipment selections, and other mitigation methods in place, it is expected that this acoustic criteria will be achieved.

Noise ingress will be controlled through appropriate selection of façade and ventilation systems design in order to protect the amenity of the building's occupants in accordance with the Australian Standard AS/NZS 2107:2000.

Noise within resident's courtyards to the east and west of the building will be minimised through use of acoustic screens concealed in the landscaping design. This is expected to reduce the noise to these areas by 10dB. Subjectively, this is a big improvement, and can be quantified as a "halving" of perceived noise level

Appendix A Survey Results

Figure A-1- Twenty four hour measured L_{Aeq} results



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