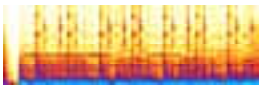
PENRITH HEALTH CAMPUS REDEVELOPMENT STAGE 3

NEPEAN INTEGRATED MENTAL HEALTH UNIT

PROJECT APPLICATION ACOUSTIC REPORT

Issued

September 2010



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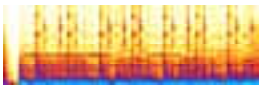

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Table of Contents

Executive Summary

A noise assessment has been carried out on the proposed new IMHU for the Nepean Hospital. The noise assessment covers demolition and construction noise, operational noise levels (which will be dominated by mechanical services noise from the air conditioning plant) and traffic noise.

The assessment methodology used in this study is aimed at protecting the acoustic amenity of the neighbouring residents located along Derby Street on the southern boundary of the site.

Long-term ambient noise monitoring has been recently carried out for the East Block development, which is located adjacent to the proposed site of the IMHU. The data from this monitoring is considered appropriate and relevant to this project, and has been used to establish the existing background noise levels at the Derby Street residences. Noise criteria have been established from these measured background noise levels for daytime, evening and night time periods.

Plant associated with the mechanical services and air conditioning of the IMHU will be controlled to comply with the most stringent night time criterion of 40 dB(A), L_{eq}. Treatment will include any or all of the following:

- Selection of quiet plant, including the correct selection of fans for their required duty.
- Location of plant to minimise noise emissions to the adjacent buildings.
- Minimisation of duct velocities.
- In duct attenuation as required.
- Noise enclosures as required.
- Noise barriers as required.

Demolition and construction noise has also been considered. The management of the impact of demolition and construction noise on the nearest residences will be the responsibility of the Contractor. The relevant standards and codes have been identified and a general approach to the management and control of construction noise has been described. General noise control methods have been listed in this report.

Traffic generation by the IMHU is considered to be insignificant compared to the existing traffic levels on the surrounding roads. No significant increase in traffic noise is considered likely.

1 Introduction

It is proposed to construct a new Mental Health Unit as part of the Penrith Health Campus Redevelopment Stage 3 at the Nepean Hospital. Acoustic Studio Pty Ltd has been commissioned to provide a quantitative assessment of the potential noise impacts likely to result from the project, including demolition, construction, operation and traffic.

This assessment forms part of the design process and addresses the acoustic issues pertinent to the development.

This report presents the findings of the assessment and the acoustic recommendations that follow from the findings. It has been prepared in support of the Project Application being made for the project.

2 Description of proposal

2.1 The building

The Inpatient Mental Health Unit (IMHU) will provide patient-centred recovery and support model of care with an interdisciplinary team approach involving the patient (consumer), carer and significant others in treatment and support.

The two and a half storey facility will be on the Nepean Hospital Site, near the main entrance in South Block.

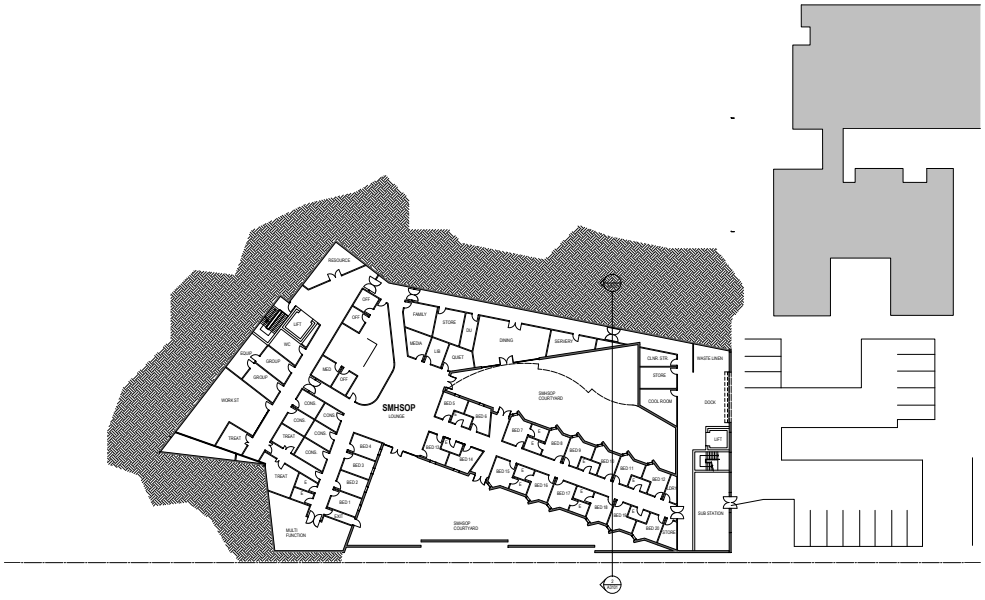
The facility will provide accommodation for the following services:

- 64 beds, made up of:
    - 20 High Dependancy Unit (HDU)
    - 24 Acute Care
    - 20 Special Mental Health Service of Older Persons (SMHSOPS)
- Consultation and Liaison team
- Access and Acute Care Team
- Western Cluster Mental Health Management Team.

The proposed facility will consist of 3 levels, accommodating a range of spaces including bedrooms, consulting rooms and associated clinical support areas, office areas including private and open plan offices and administrative support areas.

The buildings will be fully air-conditioned.

The proposed floor plans of facility are shown below in Figure 1.



WOODS BAGOT **HEALTH INFRASTRUCTURE PENRITH STAGE 3 MH LEVEL 1 FLOOR PLAN**

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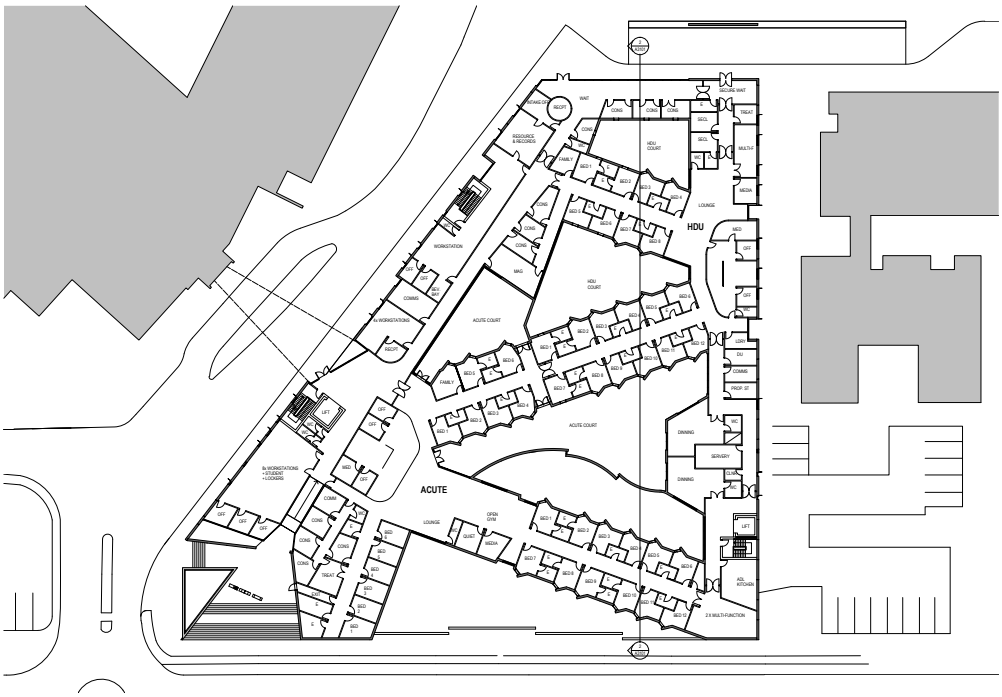

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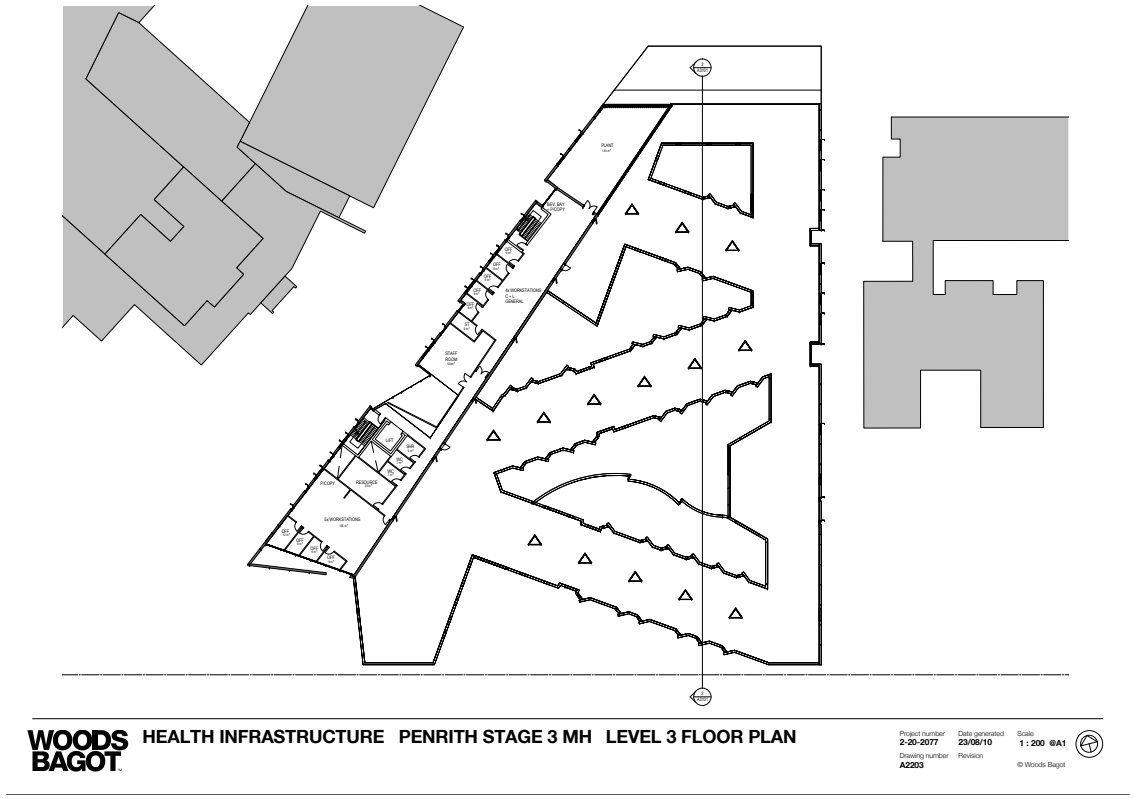

Figure 1: Floor plans of proposed IMHU

2.2 Location & description of surrounding area

The Nepean Hospital is located in Kingswood. It is bounded by The Great Western Highway to the north, Somerset Street to the east, Derby Street to the south, and Parker Street to west. Residential areas are situated to the east, south and west, whilst the area to the north, beyond the The Great Western Highway, is made up of light industrial properties.

The IMHU will be located midway along the southern boundary of the hospital, on a site currently occupied by an existing building (to be demolished) and a car park.

The nearest potentially affected residential locations to the site of the IMHU are located to the south along Derby Street, with the nearest residential boundary being approximately 18 m from the southernmost point of the IMHU.

Figure 2 shows the location of the Nepean Hospital, the IMHU, and the nearest residences along Derby Street.

Figure 2: Locality Plan showing site of proposed IMHU and nearest residences

The relationship between the proposed IMHU, the Nepean Hospital, and the nearest residences along Derby Street can be seen in greater detail in Figure 3.

Figure 3: Detailed Site Plan showing site of proposed IMHU and nearest residences

Nearest residences

Consulting rooms

3 Acoustic Issues

The acoustic issues addressed in this assessment include:

- The impact of noise from the demolition of the existing building on the site on the nearest residences and the existing hospital buildings (which will be subject to a separate application and approval process under the Infrastructure SEPP).
- The impact of noise from the construction of the IMHU on the nearest residences and the existing hospital buildings.
- The impact of noise from the operation of the IMHU on the nearest residences and the existing hospital buildings. It is anticipated that operational noise levels will be dominated by noise from air conditioning plant associated with the building.
- The impact of noise on the nearest residences from any additional traffic movements on the surrounding streets generated by the operation of the IMHU.

4 Existing Noise Environment

This report has been commissioned within a very tight timeframe that has not enabled an existing ambient noise survey to be carried out. However, a recent acoustic study has been carried out by Norman Disney and Young in support of the project application for the refurbishment of the ICU and new East Block building of the Penrith Health Hospital Campus redevelopment, the site of which is located immediately adjacent to the IMHU.

An existing ambient noise level survey was carried out between 13 and 21 May 2009 as part of this previous study, and the results presented in the acoustic report prepared in support of that project application.[1] This report is now publicly available.

It is considered that the results of that ambient noise survey are applicable to the IMHU, due to its immediate proximity to the new East Block building, and, for the purposes of this noise impact assessment, these results are reproduced below from the Norman Disney and Young report.

The local ambient noise is dominated by distant train and traffic noise. The level of background noise varies over the course of any 24-hour period, typically from a minimum at night (from 2:00am to 4:00am) to a maximum during morning and afternoon traffic peak hours (from 8:00 am to 10:00am and from 4:00pm to 6:00pm).

The NSW DECC Industrial Noise Policy (INP, Department of Environment and Climate Change) clarifies background and ambient noise for the daytime, evening and night time periods. The NSW DECC INP defines these periods as follows:

***Day**: is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays & Public Holidays.*

***Evening**: is defined as 6:00 pm to 10:00 pm, Monday to Sunday & Public Holidays.*

***Night**: is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.*

Noise monitoring has been undertaken at 28 Somerset Street, Penrith. This location was situated away from any mechanical plant and considered as representative from the area surrounding the site.

[1] Norman Disney and Young. *Schematic Design-Acoustic Services. Penrith Health Campus Redevelopment, Nepean Hospital*, for Hassell Pty Ltd, pp 7 – 8, 2 July 2009

These results have been used to establish the noise criteria at the boundary of the nearest residences so as to determine noise limits from the mechanical plant of the proposed new building.

The results of the site noise level monitoring are presented in Table 1.

	Average L_{Aeq} Noise Level - dB(A)			***Background Noise Level (L_{A90}) - dB(A)***		
	Day *(7.00 am – 6.00 pm)*	***Evening*** *(6.00 pm – 10.00 pm)*	***Night*** *(10.00 pm – 7.00 am)*	***Day*** *(7.00 am – 6.00 pm)*	***Evening*** *(6.00 pm – 10.00 pm)*	***Night*** *(10.00 pm – 7.00 am)*
Median Value	*56*	*51*	*49*	*51*	*49*	*47*

***Table 1**: Ambient & Background Noise Monitoring*

It is necessary to use a number of different noise indices to describe particular types of noise relevant to the differing issues described above. These indices are:

- The A-weighted equivalent continuous noise level (L_{Aeq}). An L_{Aeq} level can be considered as the subjective "average" noise level perceived at the measurement location over the measurement period. This index is used to describe the ambient noise levels affecting the site.
- The A-weighted background noise level (L_{A90}). The background noise level can be considered as the perceived "noise floor" of the noise environment on site. It is precisely defined as the L_{A90}, a statistically based index which describes the noise level exceeded 90% of the sample time. This index is used to assess the impact of noise from the development on the surrounding neighbourhood.

The so-called "A-weighting" is used to relate the measured noise to the sensitivity of the human ear. This is necessary because the sensitivity of the human ear varies with frequency.

5 Noise Criteria

5.1 Demolition and construction

The noise criteria and operational levels presented in this Section are for guidance only and do not form part of any legal obligation on the part of the project proponent. However, compliance with these criteria/limits is considered best practice.

The DECCW in its *Interim Construction Noise Guideline* suggests construction noise management levels that may minimise the likelihood of annoyance being caused to noise sensitive residential receptors. These are as follows:

- Within recommended standard hours.

  The $L_{Aeq,15min}$ level measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the background noise level by more than 10 dB(A). This noise level represents the point above which there may be some community reaction to noise.

  However, in the case of a highly noise affected area, the construction noise level ($L_{Aeq,15min}$) at the most exposed boundary of any affected residential receiver when the construction site is in operation should not exceed 75 dB(A). This level represents the point above which there may be strong community reaction to noise.

- Outside recommended standard hours.

  The $L_{Aeq,15min}$ level measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the background level by more than 5 dB(A).

  It is noted that a strong justification would be required for works outside the recommended standard hours.

The airborne construction noise criteria for the nearest residential receivers to the site of the IMHU are summarised below in Table 2.

Sensitive Residential Receivers	Airborne Construction Noise Criteria, L_{Aeq}	
	Within Standard Hours	Outside Standard Hours
Residences along Derby Street	51 + 10 = **61**	49 + 5 = **54**

Table 2: Construction noise criteria for residential receivers along Derby Street

Apart from the external construction noise management levels presented above, the DECCW guideline also recommends internal ground-borne noise maximum levels at residences affected by nearby construction activities. Ground-borne noise is noise generated by vibration transmitted through the ground into a structure and can be more noticeable than airborne noise. The ground-borne noise levels presented below are for evening and night-time periods only, as the objectives are to protect the amenity and sleep of people when they are at home.

- Evening: $L_{eq,15min}$ 40 dB(A) (internal)
- Night: $L_{eq,15min}$ 35 dB(A) (internal)

The internal noise levels are to be assessed at the centre of the most affected habitable room. It is noted that a strong justification would be required for works outside the recommended standard hours.

5.2 External Noise Criteria

The operation of the proposed building will contribute sound levels to the ambient environment. Typically, this will result from steady sound levels generated by plant associated with the building services (generally sound levels emitted by externally located plant, or air intakes or discharge zones on the building façade, such as fresh air intakes, etc).

The NSW Industrial Noise Policy (2000) is the relevant standard in this case. Norman Disney and Young have set external noise criteria for the East Block located adjacent to the IMHU site, and these criteria are also considered relevant to the nearest residences of this project. For consistency, the section of the Norman Disney and Young report[2] dealing with these external noise criteria is reproduced below.

[2] Norman Disney and Young. *Schematic Design-Acoustic Services. Penrith Health Campus Redevelopment, Nepean Hospital*, for Hassell Pty Ltd, pp14 – 15, 2 July 2009

The environmental noise criteria or project-specific noise level is calculated following the NSW DECC INP guidelines.

The calculation is based on the results of the ambient and background noise unattended monitoring, addressing two components:

- *Controlling intrusive noise into nearby residences (Intrusiveness Criteria)*
- *Maintaining noise level amenity for particular land uses (Amenity Criteria)*

Once both criteria are established the most stringent for each considered assessment period (day, evening, night) is adopted as the project-specific noise level.

Table 5: Project Specific Noise Levels (PSNL)

Period	***Descriptor***	***Project Specific Noise Level***
Location 1: *28 Somerset Street, Penrith*		
Day	$L_{Aeq,\ 15\ minutes}$	*46 dB(A)*
Evening	$L_{Aeq,\ 15\ minutes}$	*45 dB(A)*
Night	$L_{Aeq,\ 15\ minutes}$	*40 dB(A)*
Location 2: *46 Derby Street, Penrith*		
Day	$L_{Aeq,\ 15\ minutes}$	*46 dB(A)*
Evening	$L_{Aeq,\ 15\ minutes}$	*45 dB(A)*
Night	$L_{Aeq,\ 15\ minutes}$	*40 dB(A)*

As the mechanical plant located on the roof of the proposed new building will be operating 24 hours per day, the most stringent noise criterion to meet at the boundary of the nearest residence will be the night time criterion of 40 dB(A).

The night time Project Specific Noise Level of $L_{Aeq,\ 15\ minutes}$ 40 dB is considered appropriate for the nearest residences along Derby Street for operation noise levels generated by the IMHU. The PSNL shall be applied at the nearest residential boundary to the development.

5.3 Road Traffic Noise

Road traffic noise impact is assessed in accordance with the NSW Environmental Criteria for Road Traffic Noise (ECRTN, Environment Protection Authority 1999).

For the residences located along Derby Street, the appropriate traffic noise criteria are:

- Day: $L_{eq,1\ hour}$ 60 dB(A)
- Night: $L_{eq,1\ hour}$ 55 dB(A)

Where existing traffic noise levels exceed these limits, then a 2 dB(A) noise increase on existing noise levels is permissible, provided it can be shown that traffic noise mitigation is not feasible and practicable.

6 Noise Assessment and Control

6.1 Demolition and construction

General discussion

Any noise from construction activities carried out on the site must not result in the transmission of "offensive noise", as defined in the Protection of the Environment Operations Act 1997, to any place of different occupancy. To this end, the Contractor employed to undertake the demolition and construction works in accordance with the contract requirements is responsible for ensuring that any site noise and, in particular, any complaints regarding such, are monitored, investigated, managed and controlled.

It will be the responsibility of the Contractor to ensure all personnel employed by him are aware of their responsibilities in regard to the management of noise during demolition and construction.

It will be the responsibility of the Contractor to ensure procurement documents specify any particular requirements in relation to the management of noise.

The Contractor will be responsible for measuring and managing all noise impacts on receivers, in accordance with all relevant statutory requirements, including:

- Environment Protection Authority Environmental Noise Control Manual 1994
- Australian Standard AS 2436-1981, Guide to Noise Control on Construction, Maintenance & Demolition Sites
- Protection of the Environment Operations Act 1997

General approach to managing construction noise impacts on the community

The Contractor will be responsible for managing noise during the construction activities to:

- Prevent undue disturbance to noise-sensitive receivers adjacent to the site.
- Comply with statutory requirements relating to noise.

Control elements

As a general rule, prevention should be applied as a universal work practice at any time of day, but especially if any construction works are to be undertaken at critical times outside normal daytime/weekday periods. It is noted that the reduction of the noise at the source and the control of transmission path between the construction site and the receiver are the preferred options for noise minimisation.

Construction noise should be managed by implementing the strategies listed below:

- Plant and equipment
  - Use quieter methods.
  - Use quieter equipment.
  - Operate plant in a quiet and effective manner.
  - Maintain equipment regularly.

- On site noise management
  - Strategically locate equipment and plant.
  - Avoid the use of reversing alarms or provide for alternative systems.
  - Maximise shielding in the form of existing structures or temporary barriers.
  - Schedule the construction of barriers and structures so they can be used as early as possible.

- Consultation, notification and complaints handling
  - Provide information to neighbours before and during construction.
  - Maintain good communication between the community and project staff.
  - Have a documented complaints process and keep register of any complaints.
  - Give complaints a fair hearing and provide for a quick response.
  - Implement all feasible and reasonable measures to address the source of complaint.

- Work scheduling
  - Schedule activities to minimise noise impacts.
  - Ensure periods of respite are provided in the case of unavoidable maximum noise levels events.
  - Keep truck drivers informed of designated routes, parking locations and delivery hours.

Demolition and construction working hours

Working hours should be restricted to those set out as recommended standard hours of work in the DECCW *Interim Construction Noise Guideline* as follows:

- Monday to Friday — 7 am to 6 pm.
- Saturday — 8 am to 1 pm.
- Sundays and Public Holidays — No demolition, excavation or construction work.

6.2 IMHU operations and mechanical services noise control

All noise sources of the development are associated with air-conditioning or exhaust fans and other mechanical services plant.

Noise controls will be included to ensure the total noise output from the plant will be less than the external noise criteria of 40 dB(A) at the nearest residential boundary in Derby Street. These controls will include:

- Selection of quiet plant, including the correct selection of fans for their required duty.
- Location of plant to minimise noise emissions to the adjacent buildings.
- Minimisation of duct velocities.
- In duct attenuation as required.
- Noise enclosures as required.
- Noise barriers as required.

Compliance with the external noise criteria will be established with onsite measurements at the sites of the adjacent buildings with all plant operating normally.

6.3 Traffic noise

It is not anticipated that the IMHU will generate any significant additional traffic compared to:

- The current traffic flows on Derby Street, and the other surrounding local roads.
- The number of vehicles using the existing car parks within the hospital.
- The number of cars parking on Derby Street.

Consequently we do not expect any increases in the existing traffic noise level exposure of the nearest residences in Derby Street.

7 Conclusion

A noise assessment has been carried out on the proposed new IMHU for the Nepean Hospital. The noise assessment covers demolition and construction noise, operational noise levels (which will be dominated by mechanical services noise from the air conditioning plant) and traffic noise.

The assessment methodology used in this study is aimed at protecting the acoustic amenity of the neighbouring residents located along Derby Street on the southern boundary of the site.

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Traffic generation by the IMHU is considered to be insignificant compared to the existing traffic levels on the surrounding roads. No significant increase in traffic noise is considered likely.