

Wilga Wilson Precinct

Land Rezoning - Acoustic Assessment

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Wilga Wilson Precinct

Land Rezoning - Acoustic Assessment

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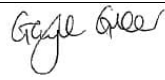
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1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) was commissioned by Mirvac Home (NSW) Pty Ltd to provide an acoustic assessment of the likely impact of road traffic noise on the proposed residential subdivision within Wilga Wilson Precinct, Ingleside, NSW.

This report presents an assessment of the likely impact of road traffic noise on the proposed subdivision including:

- Establishment of appropriate road traffic noise criteria;
- Details of forecast road traffic flows affecting the proposed subdivision;
- Details of the prediction method used to calculate the road traffic noise levels;
- The predicted levels of road traffic noise at sensitive receiver locations with the expected future (2027) road traffic volumes; and
- Provision of general acoustic recommendations where the established noise criteria are exceeded.

Acoustic terminology can be found in Appendix A.

1.2 Study objective

The purpose of this acoustic assessment is to support the Planning Proposal which will seek to rezone the project site to enable new residential and associated urban development. The acoustic assessment will investigate the existing and future noise environments and provide recommendations for the proposed development in accordance with Council and State Government requirements.

1.3 Study area

The study area for this investigation, shown in Figure 1, is located within Ingleside and currently consists of mostly residential receivers. The site is bound by Wilson Avenue and Powderworks Road to the north and east, Wilga Street to the south and the Monash Country Club to the west.

The Wilga Wilson Precinct concept masterplan layout is presented in Appendix B.

1.4 Policies and guidelines

The following policies and guidelines are relevant for this assessment:

- State Environment Planning Policy (Transport and Infrastructure), 2021
- Development Near Rail Corridors and Busy Roads – Interim Guideline, Department of Planning, 2008
- NSW Road Noise Policy (RNP), Department of Environment, Climate Change and Water, 2011
- Calculation of Road Traffic Noise, UK Department of Transport, 1988
- Road Noise Model Validation Guideline, Transport for NSW, 2022.

2.0 Existing Acoustic Environment

2.1 Noise measurement methodology

Ambient noise monitoring was previously undertaken for the Ingleside Precinct Masterplan at 240 Powderworks Road, Ingleside between Tuesday 3 December and Tuesday 10 December 2013. The results of the previous noise monitoring were presented in report reference 60312114-RPNV-01_M *Ingleside Precinct Noise and Vibration Impact Assessment* dated 21 October 2016. Traffic counting was also simultaneously conducted during the noise measurements.

The traffic counts and results of the previous noise measurements were used to understand the influence of road traffic at the existing site and validate the road traffic noise model.

The location of previous noise monitoring is shown in Figure 1.



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2.2 Noise measurement results

2.2.1 Unattended noise monitoring results

The unattended measured noise levels were extracted from the *Ingleside Precinct Noise and Vibration Impact Assessment* and are presented in Table 1.

Table 1 Ambient and background noise measurements

Noise logger	Ambient noise level dB(A)			Rating background level, dB(A)		
	Day (7am to 6pm) L _{Aeq,15 hour}	Evening (6pm to 10pm) L _{Aeq,4 hour}	Night (10pm to 7am) L _{Aeq,9 hour}	Day (7am to 6pm) L _{A90,15 min}	Evening (6pm to 10pm) L _{A90,15 min}	Night (10pm to 7am) L _{A90,15 min}
240 Powderworks Road, Ingleside	63	59	56	49	41	30

2.2.2 Short term attended noise measurements

The unattended measured noise levels were extracted from the *Ingleside Precinct Noise and Vibration Impact Assessment* and presented in Table 2.

Table 2: Attended noise measurements

Location	Date	Time	L _{Aeq} dB(A)	L _{A90} dB(A)	Comments
240 Powderworks Road	11/12/2013	09:44	61	53	Noise from traffic along Powderworks Road dominant. Birds and cicadas also noted.

2.3 Road noise monitoring results

The unattended traffic noise levels were extracted from logging data used in the *Ingleside Precinct Noise and Vibration Impact Assessment*. This 2013 logging data has since been reviewed and data unrelated to traffic noise has been excluded. The revised logging data is presented in Table 3.

Noise logging data from this location has been used to validate the road traffic noise model for the proposal.

These measured road traffic noise levels have been compared to the predicted noise levels from the validation noise model. It was found that the measured levels correlated well with the predicted levels. This provides confidence that the future road traffic noise levels can be accurately predicted for the operational noise assessment. Further information on the noise modelling and validation of noise model outputs is provided in Section 4.2.1.

Table 3 Existing road traffic noise levels

Noise logging location	Ambient road traffic noise level, dB(A)	
	Day ¹ (L _{Aeq,15 hr})	Night ¹ (L _{Aeq,9 hr})
240 Powderworks Road, Ingleside	61.8	55.9

Notes:

1. Day is defined as 7:00 am to 10:00 pm. Night is defined as 10:00 pm to 7:00 am.

2.4 Road traffic counts

The existing traffic counts conducted in 2013 were extracted from the *Ingleside Precinct Noise and Vibration Impact Assessment* and are represented in Table 4. The road traffic survey conducted between Wattle Road and Wilson Avenue.

Table 4 Existing road traffic volumes

Location	Direction	Daytime (7am – 10pm)		Night-time (10pm – 7am)		Vehicle speed, km/h
		Traffic volume	Heavy vehicle ratio	Traffic volume	Heavy vehicle ratio	
Powderworks Road	Eastbound	5,355	4%	423	4%	60
	Westbound	5,160	3%	792	5%	60

3.0 Noise criteria

3.1 Development Near Rail Corridors and Busy Roads – Interim Guideline

The NSW Government Department of Planning guideline, the *Development Near Rail Corridors and Busy Roads – Interim Guideline* provides additional information for the implementation of the SEPP (2021) will be referred to for assessing the impact of airborne noise. The airborne noise trigger levels contained within the guideline are provided in Table 5.

Table 5 Airborne (internal) noise trigger levels

Receiver	Time of day	Airborne Noise Criteria, L_{Aeq} dB(A)
Residential	Day (7 am – 10 pm)	40
	Night (10 pm – 7 am)	35
Schools, educational institutions, places of worship	When in use	40
Places of Worship	When in use	40

The guideline also states the following with regard to natural ventilation:

If internal noise levels with windows or doors open exceed the criteria by more than 10 dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

Assuming a reduction of 10 dB from external noise levels to indoors with windows and doors open, mechanical ventilation must be provided when external noise levels exceed 60 dB(A) during the day and 55 dB(A) at night.

3.2 State Environment Planning Policy (Transport and Infrastructure) 2021

Where residential development is on land adjacent to a road corridor with an annual average daily traffic volume of more than 20,000 vehicles the State Environment Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure)) applies.

The SEPP (Transport and Infrastructure) provides internal noise level criteria for residential developments impacted by road noise. The following road internal noise criteria were extracted from the SEPP (Transport and Infrastructure):

2.120 Impact of road noise or vibration on non-road development

- (1) *This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—*
 - (a) *residential accommodation,*
 - (b) *a place of public worship,*
 - (c) *a hospital,*
 - (d) *an educational establishment or centre-based child care facility.*
- (2) *Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.*

- (3) *If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—*
- (a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,*
- (b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time...*

Assuming a conservative 10 dB reduction through a partially open window the external noise criteria are listed in Table 6.

Table 6 External noise level criteria

Type of occupancy	External noise level dB(A)	Time period
Bedroom	55	10pm – 7am
Other habitable rooms	60	Any time

4.0 Road traffic noise modelling methodology

4.1 Road traffic modelling

Road traffic noise levels for future traffic volumes were calculated using SoundPLAN v8.2 software, which implements the Calculation of Road Traffic Noise (CoRTN) algorithm. The United Kingdom (UK) Department of Transport devised the CoRTN algorithm and with suitable corrections, this method has been shown to give accurate predictions of road traffic noise under Australian conditions.

Recently in NSW, adjustments have been used to CoRTN predictions to improve accuracy. This includes the use of three source heights for trucks (Tyres, engines and exhausts) in Australia compared with the UK, where CoRTN was developed.

As noted in the *Road Noise Model Validation Guideline* the objective of model validation is to demonstrate that the noise model is an accurate representation of the real world within the limitations of the algorithm. Validation of the existing noise model is presented in Section 4.2.1.

This noise model takes into account source directivity, terrain, shielding, location of buildings, air and ground absorption and distance attenuation. The modelling parameters which are included in the model are detailed in Table 7.

Table 7 Modelling noise parameters

Parameter	Comment		
Calculation search radius	2,000 metres		
Source heights and corrections	Four noise source heights were used in the model as follows:		
	Source	Height (m)	Correction (dB)
	Light vehicles engine and tyres	0.5	0.0
	Heavy vehicles tyres	0.5	-5.4
	Heavy vehicles engine	1.5	-2.4
	Heavy vehicles exhaust	3.6	-8.5
Existing road alignment	The existing roads were modelled using satellite imagery.		
Road gradient	The road gradient was calculated based on elevation information system (ELVIS) data.		
Existing pavement	The road pavements modelled were as dense grade asphalt (DGA). DGA pavement correction = 0 dB.		
L ₁₀ to L _{eq}	-3 dB correction		
Receiver heights	1.5 metres for single storey and 4.5 metres for double storey.		
Receiver locations	1 metre from the façade of receivers.		
Buildings, structures and walls	All buildings and structures were included where acoustically relevant.		
Ground absorption	A ground absorption factor of 0.75 was used for soft ground areas, and a ground absorption factor of 0.50 was used for urban-residential areas. A ground absorption factor of 0 would represent hard, reflective ground and a ground absorption factor of 1 would represent totally absorptive ground. High density vegetation is acoustically absorptive to an extent a factor of 0.75 is considered appropriate.		
Topography	1 metre interval data up to 2 kilometres either side of the proposal.		
Traffic volumes	Traffic volumes were obtained from traffic count data recorded on Powderworks Road, carried out close to the time noise monitoring was conducted. Future 2027 traffic volumes accounting for development growth were provided by PDC Traffic and Transport Consultants.		
Traffic speeds	For model validation, the speeds measured during the traffic counting and the posted speed limits were used.		
Buildings	The height of all buildings within the study area was determined through satellite imagery. Where building heights were unable to be determined, buildings were assumed to be one storey. The proposed new buildings generally comprised two storeys except for apartment buildings which comprised three storeys.		

4.2 Road traffic volumes

The year 2027 has been taken as the design year, when the residential subdivision has been fully developed. Predicted (2027) road traffic data (daytime and night-time flows) for Powderworks Road have been provided by the traffic consultant in order to determine future road traffic noise levels in the area. The future traffic volumes are presented in Table 8.

Table 8 Road traffic volumes (2027)

Location	Direction	Daytime (7am – 10pm)		Night-time (10pm – 7am)		Vehicle speed, km/h
		Traffic volume	Heavy vehicle ratio	Traffic volume	Heavy vehicle ratio	
Powderworks Road	Eastbound	6,819	10%	650	18%	60
	Westbound	6,811	5%	865	7%	60

The traffic speed on Powderworks Road has been assumed to remain at 60 km/h.

4.2.1 Validation noise model

An existing road traffic noise model was developed incorporating the existing traffic flows and alignment for validation with road traffic noise measurements. The model was validated in accordance with the *Road Noise Model Validation Guideline*. The *Road Noise Model Validation Guideline* provides guidance and procedures for validating road traffic noise models.

Provided below in Table 9 is a summary of the noise logger validation results. The results in Table 9 show that the noise model is performing within the acceptable limits of ± 2 dB(A), hence the noise model has been proven to be performing well and can be relied upon for this project.

Table 9 Noise logger validation

Address	Daytime $L_{Aeq,15hr}$, dB(A)			Night-time $L_{Aeq,9hr}$, dB(A)		
	Predicted	Measured	Difference	Predicted	Measured	Difference
240 Powderworks Road, Ingleside	63.1	61.8	+1.3	56.3	55.9	+0.4

5.0 Road traffic noise impact assessment

To assess the potential impacts of road traffic noise on the proposed residential land subdivision areas, future road traffic noise levels along Powderworks Road in 2027 have been modelled.

5.1 Road traffic noise impacts

Noise impacts from road traffic to the Wilga Wilson Precinct have been predicted and the results are presented as noise contour maps in Appendix C. The predicted noise levels indicate that the Road Traffic Noise Criteria presented in Section 3.0 are likely to be exceeded at some of the future proposed residential dwellings within the Ingleside subdivision. Noise mitigation measures which could be considered are detailed in the following sections.

5.2 Noise mitigation measures

Noise mitigation measures should be implemented in the following hierarchy:

- Treatment of noise at source: Integrated design measures such as road design and traffic management, as well as road surface treatment;
- Treatment of noise path: In-corridor barriers; and
- Treatment at receivers: At-property treatments and receiver building layouts.

Prioritising noise treatment in this order is the most efficient means of reducing impacts. Accordingly, noise mitigation measures that attenuate noise path and receivers should be considered as the design of the individual lots within the Wilga Wilson Precinct are further refined.

5.2.1 Treatment of noise at source

Treatment of road traffic noise at the source includes changes to gradients, alignments, road design, administrative controls and road surface treatment.

It is understood that changes to Powderworks Road are outside of the scope and are therefore not considered further.

5.2.2 Treatment of noise path

Noise path treatment involves the attenuation of noise paths between a source and receiver. This typically involves shielding of receivers with noise barriers.

5.2.2.1 Noise walls and barriers

Acoustic barriers provide immediate reductions in road traffic noise at the shielded properties. The acoustic effectiveness of a barrier depends on its density, height, length and location. The higher the barrier (compared to the direct line-of-sight from the source to the receiver) and the closer its location to either the source or the receiver, the greater the noise attenuation provided. The barrier also needs to have a sufficient length.

All residences adjacent to Powderworks Road appear to have access driveways on Powderworks Road only. Therefore, any noise wall will require gaps for driveways and as a result not provide sufficient noise reduction.

In addition, as residential buildings along the northern and eastern boundary of the site may be multiple storeys in height, standard noise barriers would only be effective to ground floor rooms within the residences. Noise intrusion to upper floor rooms (bedrooms) is the defining factor determining potential treatment to residences within the proposal area. As noise walls would not be effective to these areas, they may not prove to be an acceptable noise mitigation measure for this project.

5.2.2.2 Setbacks

Buffer zones and adequate set back areas may be utilised to distance road noise sources from receivers. Lots and internal roads may be arranged in order to create a sufficient buffer zone from noise sensitive receivers which can reduce the requirement for other mitigation types. Treatment at receivers.

5.3 Treatment at receivers

Noise mitigation measures implemented at receivers include planning layouts of buildings and rooms and treatment to building façades.

5.3.1.1 Property layout

Where residential properties are located adjacent to major roads, buildings should be oriented such that the buildings shield outdoor living areas such as courtyards and private open spaces.

The layout of the rooms within a building is important in determining individual noise exposure. Where possible the less noise sensitive rooms such as garages, bathrooms and laundries should be located closer to the noise source to provide a buffer zone to noise sensitive areas such as bedrooms and frequently used living areas.

5.3.1.2 Construction materials and methods

Windows and doors present acoustic weaknesses which control the overall sound transmission loss of the composite wall. Buildings should be constructed so that facades most exposed to the noise source have a minimum number of windows and doors to reduce the internal noise levels.

Where road traffic noise levels exceed the external noise criteria within habitable rooms fresh air must be provided to these rooms so windows can be left closed, in order to meet the SEPP (Transport and Infrastructure) internal noise criteria.

Table 10 presents the categories of façade construction required for each new residential and apartment building based on the noise traffic exposure level. Appendix C presents the required construction categories for each precinct building facade.

Table 10: Standard construction categories required for each precinct building

Precinct building No.	Construction category	Air-conditioning required?	Description
A1-A4	1	No	Minimum 3 storey apartment building
R1-161, R163-179,R181-185,R187-190,R192-R195,R197-205,R207-214,R216-223,R225-263,R265-278,R280-285,R287-295,R297-299,R301-302,R304-305,R307-310	1	No	Minimum 2 storey building
R162, R306	2	No	
R180,R186,R191,R196, R206, R215, R224,R296,R300,R303,R311,R312, R313,R314,R316,R317,R320	3	Yes	
R264,R279,R286,R315,R318,R319, R321,R322	4	Yes	

Table 11 presents the required construction for each category.

Table 11: Standard construction categories

Treatment type	Glazing system	Wall construction	Roof/ceiling system construction
Type 1	Standard Construction (4 mm glass)	Brick veneer construction consisting of single leaf of 110 mm brick, one layer of 10 mm standard plasterboard screw fixed to 90 mm timber stud or 92 mm steel stud frame spaced a minimum 20 mm off masonry or Alternative system with minimum R_w rating of 53	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10 mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity.
Type 2	6.38 mm laminated glass (R_w 32)		
Type 3	10.38 mm laminated glass (R_w 36)		Pitched concrete or terracotta tile or metal sheet roof with sarking, 1 layer of 13 mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.
Type 4	12.76 mm laminated glass (R_w 40)		

The above recommendations are based on provisional lot layouts and should be reviewed at the detailed design stage for construction requirements to achieve the internal noise criteria.

The recommendations have been based on the following assumptions:

- Lounges will have minimum room dimensions of 6 x 6 x 2.7 m and bedrooms will have minimum room dimensions of 4 x 3 x 2.7 m;
- Lounges and bedrooms may be located on either the ground floor, first floor or second floor;
- Lounges and bedrooms have been assessed assuming the facade has a maximum of 50% glazing;
- Rooms will include soft furnishings typical of the rooms usage, i.e. lounge or bedroom;
- External doors facing Powderworks Road will be solid core (and acoustically sealed) and achieve R_w 33;
- Window detailing will have gaps between the window frames and the house frame/masonry sealed with flexible mastic.
- Hinged or casement windows are preferred over sliding windows as the former two have more effective sealing mechanisms. The overall intent is to form an air-tight construction.
- Acoustic insulation such as polyester or rock wool/glass wool batts placed between the wall studs of brick veneer and timber framed buildings and in the roof cavity and will reduce the noise entering the building.
- Where external windows and doors are to remain closed to achieve the internal noise criteria (lots listed in Table 10), air conditioning or alternative ventilation systems should be provided.

6.0 Conclusion

AECOM Australia Pty Ltd (AECOM) was commissioned by Mirvac Homes (NSW) Pty Ltd to provide an acoustic assessment of the likely impact of road traffic noise on the proposed residential subdivision within Wilga Wilson Precinct, Ingleside, NSW.

Road traffic noise levels in 2027 were predicted and road traffic noise contours have been presented. The road traffic noise model considered traffic noise from Powderworks Road. It was noted that road traffic noise levels are likely to exceed the criteria presented in the State Environmental Planning Policy (Transport and Infrastructure) 2021, where proposed residential areas are in close proximity to Powderworks Road.

Indicative recommendations were provided which may be required to achieve the criteria. It is noted that residential development directly adjacent to Powderworks Road would provide acoustic shielding to development set back further from these roads. Recommendations should be confirmed at the detailed design stage for each lot.

Appendix A

Acoustic terminology

Appendix A Acoustic terminology

The following is a brief description of acoustic terminology used in this report.

<i>Sound power level</i>	The total sound emitted by a source																						
<i>Sound pressure level</i>	The amount of sound at a specified point																						
<i>Decibel [dB]</i>	The measurement unit of sound																						
<i>A Weighted decibels [dB(A)]</i>	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).																						
<i>Decibel scale</i>	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows: <table> <tr> <td>0 dB(A)</td><td>Threshold of human hearing</td></tr> <tr> <td>30 dB(A)</td><td>A quiet country park</td></tr> <tr> <td>40 dB(A)</td><td>Whisper in a library</td></tr> <tr> <td>50 dB(A)</td><td>Open office space</td></tr> <tr> <td>70 dB(A)</td><td>Inside a car on a freeway</td></tr> <tr> <td>80 dB(A)</td><td>Outboard motor</td></tr> <tr> <td>90 dB(A)</td><td>Heavy truck pass-by</td></tr> <tr> <td>100 dB(A)</td><td>Jackhammer/Subway train</td></tr> <tr> <td>110 dB(A)</td><td>Rock Concert</td></tr> <tr> <td>115 dB(A)</td><td>Limit of sound permitted in industry</td></tr> <tr> <td>120 dB(A)</td><td>747 take off at 250 metres</td></tr> </table>	0 dB(A)	Threshold of human hearing	30 dB(A)	A quiet country park	40 dB(A)	Whisper in a library	50 dB(A)	Open office space	70 dB(A)	Inside a car on a freeway	80 dB(A)	Outboard motor	90 dB(A)	Heavy truck pass-by	100 dB(A)	Jackhammer/Subway train	110 dB(A)	Rock Concert	115 dB(A)	Limit of sound permitted in industry	120 dB(A)	747 take off at 250 metres
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100 dB(A)	Jackhammer/Subway train																						
110 dB(A)	Rock Concert																						
115 dB(A)	Limit of sound permitted in industry																						
120 dB(A)	747 take off at 250 metres																						
<i>Frequency [f]</i>	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.																						
<i>Equivalent continuous sound level [L_{eq}]</i>	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.																						
L_{max}	The maximum sound pressure level measured over the measurement period																						
L_{min}	The minimum sound pressure level measured over the measurement period																						
L_{10}	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L_{10} .																						

<i>L₉₀</i>	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the L ₉₀ .
<i>Ambient noise</i>	The all-encompassing noise at a point composed of sound from all sources near and far.
<i>Background noise</i>	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The L ₉₀ sound pressure level is used to quantify background noise.
<i>Traffic noise</i>	The total noise resulting from road traffic. The L _{eq} sound pressure level is used to quantify traffic noise.
<i>Day</i>	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
<i>Evening</i>	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
<i>Night</i>	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
<i>Assessment background level [ABL]</i>	The overall background level for each day, evening and night period for each day of the noise monitoring.
<i>Rating background level [RBL]</i>	The overall background level for each day, evening and night period for the entire length of noise monitoring.
<i>Weighted sound reduction index [R_w]</i>	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 "Acoustics – Glossary of terms and related symbols", the EPA's Noise Policy for Industry and Road Noise Policy.

Appendix B

Wilga Wilson Precinct Concept Masterplan Layout

Appendix B Wilga Wilson Precinct Concept Masterplan Layout

MONASH
COUNTRY CLUB

- LEGEND
- Site Boundary
 - Mirvac's Land
 - Truslans' Land
 - Existing Building Footprint
 - Residential Lot - Detached Housing
 - Residential Lot - Front Loaded Terrace
 - Residential Lot - Apartment
 - Creek Line
 - Local Park
 - Buffer / Linear Open Space
 - Conservation Areas - Creek Corridor
 - Conservation Areas
 - Sensitive Vegetation
 - Indicative Basin Location

MIRBELIA PARADE

POWDERWORKS ROAD
WILSON AVENUE

WILGA STREET

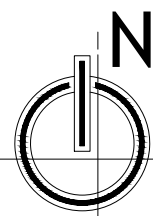
ELANORA
COUNTRY CLUB

POWDERWORKS ROAD
WILGA STREET

AREA/OWNERSHIP		DW No.			
		MIRVAC	TRUSLAN	OTHER	TOTAL
	Detached Housing	39	16	78	133
	Terrace Housing	46	57 *	107 *	210 *
	Apartment	74	119	0	193
TOTAL		159	192	185	536

NOTE(1)*: This number includes both Terrace Housing and Manor Housing with each site allocated for Manor Housing accommodating 4 dwellings.
NOTE (2) There is 1000 sqm of GBA Retail on Truslan's land (Apt Site C) equivalent to approx 5 Apt Units
NOTE (3) The Dwelling Number in Other's land includes the Existing Senior Housing

ver.	date	comment	drawn	pm	co-ordinate information	level information	scale (A1 original size)	notes
A	09.04.2025	DRAFT	JDU	PJA	CO-ORDINATE SYSTEM: MGA56 GDA2020	DATUM: N/A CONTOUR INTERVAL: N/A	A1 1:1500 0 30 60 75m A3 1:3000	
• project management • civil engineering • infrastructure • superintendency • social impact • town planning • surveying • development feasibility • visualisation • urban design								



CONCEPT MASTERPLAN

location: INGLESIDE AND ELANORA HEIGHTS, NSW
council: NORTHERN BEACHES COUNCIL
dwg ref: 300360-MP-012-V01
client:



central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohanson.com.au

Appendix C

Road Traffic Noise Contours and Mitigation Categories

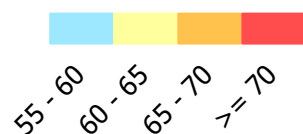
Appendix C Road Traffic Noise Contours and Mitigation Categories



Wilga Wilson Noise Contours - Day

- Existing Precinct Buildings
- Residential Detached Buildings
- Residential Terrace Buildings
- Apartment Buildings
- Site Boundary
- Project Layout

$L_{Aeq, 15hr}$ Day Sound Pressure Level, dB(A)



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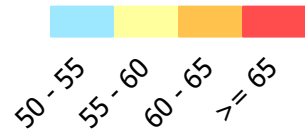
Source: NearMap 2024



Wilga Wilson Noise Contours - Night

- Existing Precinct Buildings
- Residential Detached Buildings
- Residential Terrace Buildings
- Apartment Buildings
- Site Boundary
- Project Layout

$L_{Aeq, 9hr}$ Night Sound Pressure Level, dB(A)



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Source: NearMap 2024

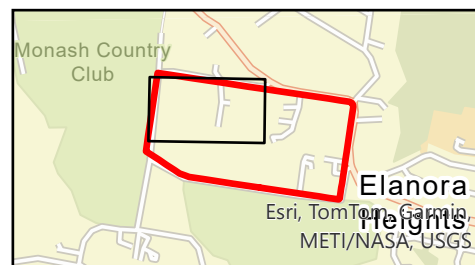


Wilga Wilson Construction Categories

Construction Category

- 1
- 2
- 3
- 4
- 5

- Residential Terrace Buildings
- Existing Precinct Buildings
- Residential Detached Buildings
- Apartment Buildings
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Source: NearMap 2024

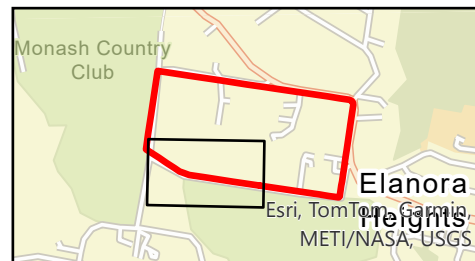


Wilga Wilson Construction Categories

Construction Category

- 1
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Source: NearMap 2024

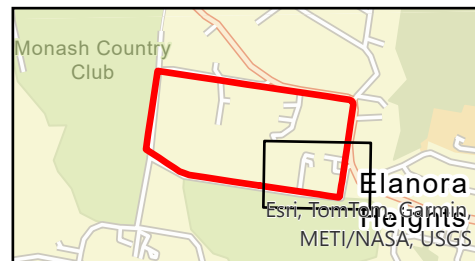


Wilga Wilson Construction Categories

Construction Category

- 1
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- Residential Terrace Buildings
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Source: NearMap 2024