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Gwynneville Rezoning Planning Proposal

Final Noise Assessment

February 2025

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Gwynneville Rezoning Planning Proposal
Final Noise Assessment

Homes NSW

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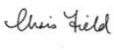
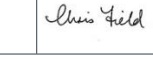
	Name	Date	Signature
Prepared by:	G Hopkins	21/02/2025	
Reviewed by:	C Field	21/02/2025	

Approved by:	C Field	21/02/2025	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

Table of contents

Project Summary

This report has been prepared by WSP Pty Ltd on behalf Homes NSW (formerly the NSW Land and Housing Corporation - LAHC) to support a planning proposal for urban renewal of land at Gwynneville, NSW.

The planning proposal was submitted to Wollongong City Council on 19 July 2024, which was then placed on preliminary notification for public and agency comment. Following this notification period, Council and Homes NSW worked together to establish key amendments to the proposal and master plan that formed the basis of the reporting to Council in November 2024. The planning proposal was unanimously approved by Council on 25 November 2024 to proceed to the next step in the approval process, i.e. Gateway Determination. The revised proposal and masterplan included revisions which relate to key sites and implementation, built form outcomes, and public open space delivery. This report has been updated to reflect the outcomes of the amended planning proposal and master plan, current as of February 2025.

Covering approximately 9 hectares in area, the Gwynneville precinct is located 2km north- west of the Wollongong CBD. The site sits immediately south of the University of Wollongong, and east of the Botanic Gardens. Irvine Street makes up the site's eastern boundary, with Murphy Avenue to the south. Refer Figure 1.1 below.

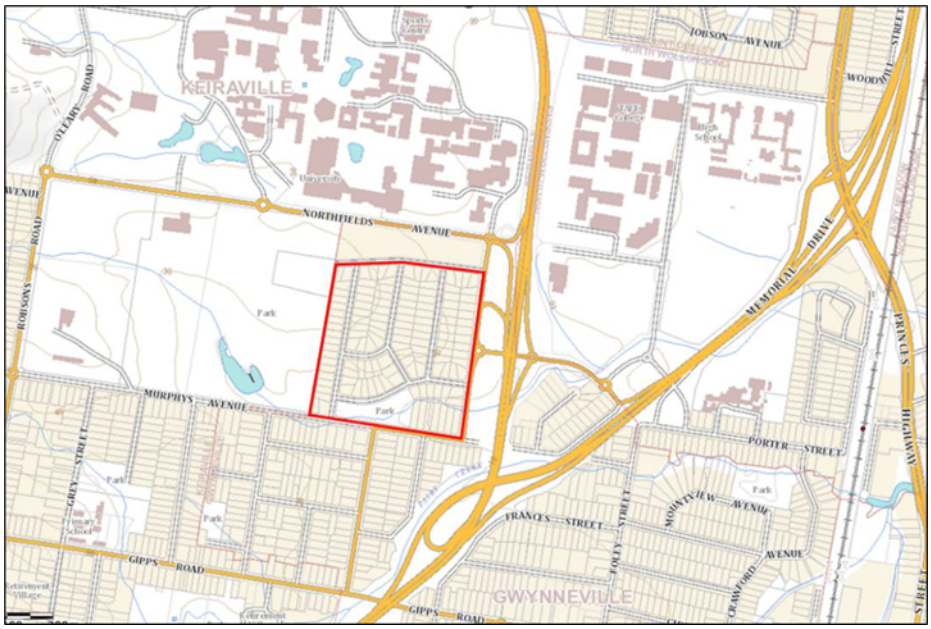


Figure 1.1 Project site

Source: SixMaps 2024

The Northfields Avenue Bus Interchange is approximately 150m northwest of the site, and North Wollongong Railway Station is approximately 1km to the east.

Many of the existing dwellings in Gwynneville were constructed by the NSW Government during the 1950s. The precinct is made up of predominantly single storey detached dwellings set in a modified grid-type street layout.

The Gwynneville precinct has been identified as a location capable of supporting more social, affordable and diverse private market housing for the Illawarra community, and to contribute to addressing NSW's housing crisis.

The site currently comprises approximately 131 residential lots, consisting of:

- A total of 79 social dwelling units on 75 individual lots owned by LAHC; and
- Approximately 56 privately owned dwelling units on 56 individual lots.

Over 60% of the homes in the precinct are owned by Homes NSW, providing an opportunity to consider additional density while taking into account key constraints such as traffic, views to and from Mount Keira as well potential to increase and embellish existing areas of open space.

Redevelopment of the Gwynneville precinct requires a formal rezoning process to confirm an amended land use zone; increased FSR and building heights, and result in improvements to the current street network, pedestrian connectivity, open space / parkland, and public amenity.

Homes NSW propose amending the Wollongong Local Environmental Plan 2009 (WLEP) to help deliver a diverse range of housing typologies which will include additional social and affordable housing, market housing products and seniors housing, as well as opportunities to develop build-to-rent, key worker housing and student accommodation.

The planning proposal intends to change the current zone of the land from R2 Low Density Residential to R4 High Density Residential, with new and expanded areas of RE1 Public Recreation. This will create the opportunity for more low to mid-rise apartments in the precinct.

The base FSR of 0.5:1 and the height control of 9m that currently applies to the precinct is not proposed change. However, building height and FSR incentives will facilitate site amalgamation to create lots more capable of accommodating increased density and providing amenity. Height and FSR bonuses will be contingent upon achieving design excellence outcomes, providing public benefits such as social and affordable housing, and increased public open space within the precinct.

Homes NSW aims to create a high-amenity, walkable residential neighbourhood with an increased density and choice of affordable and diverse housing options that provide for a broad range of community needs and family types - including students, people on low incomes, people with disability and seniors.

New residential development will enable increased housing choices within in a well-connected location benefiting from frequent free shuttle bus services operating between University of Wollongong, North Wollongong railway station and a multitude of destinations including the city centre and hospital.

Executive summary

WSP has conducted a noise assessment for the proposed Gwynneville Precinct, Wollongong NSW. The proposal aims to rezone a 9-hectare area, transforming single dwelling lots into a higher density mix of dwellings with increased building heights. A desktop assessment was conducted, focusing on potential noise impacts from the nearby M1 Princes Motorway.

Initial noise modelling results indicate that the majority of proposed dwellings fall under Category 2 of AS 3671-1989, requiring standard construction and closed windows, doors, and other openings. Five of the proposed dwellings located along Irvine Street, which are closest to the Princes Motorway to the east of the Precinct, fall under Category 3 of AS 3671-1989. This category requiring upgraded constructions and closed windows, doors, and other openings.

This noise assessment was conducted based on the relevant inputs received to date, which was limited to publicly available traffic data for the Princes Motorway and an urban design concept plan. It is likely that additional inputs, such as traffic data for other surrounding roads and the proposed building locations for the proposal, will have an additional impact on the residential lots. Therefore, further noise assessments should be carried out as part of the development phase.

Subsequent DA noise assessments should consider concept design and lot layout information to understand the noise reductions achieved beyond the first row of houses from intervening buildings. In addition, the potential impacts from the proposed commuter carpark near Wollongong University should also be considered as part of the subsequent DA noise assessment.

The revised concept plans as part of this revision of this document has not altered the recommendations and outcome of this report.

Recommendations

It is recommended to build the 4 to 6 storey residences along the first row (east of the proposal area) to act as a noise barrier against the M1 Princes Motorway. This needs further detailed investigation during future noise assessments. Acoustic treatments and design should follow AS/NZS 3671:1989 standards, minimizing doors and windows where possible on the most exposed sides of buildings and placing noise-sensitive rooms away from the motorway. Development Near Rail Corridors and Busy Roads guidelines should be used to determine noise reduction levels for different building parts, with advice from a suitably qualified acoustic consultant at the Development Application stage to ensure proper treatment. Ventilation needs should also be considered to maintain acoustic comfort inside the dwellings. If natural ventilation is planned, a thorough assessment is needed to meet internal noise criteria. Additionally, the impact of the proposed commuter carpark near Wollongong University on local traffic and noise should be addressed in future reports. These recommendations aim to effectively manage noise in the proposed development, ensuring compliance with standards and the well-being of future residents.

1 Introduction

WSP Australia Pty Ltd (WSP) has been commissioned by Homes NSW (formerly the NSW Land and Housing Corporation - LAHC) to conduct a noise assessment for the proposed redevelopment located at Gwynneville, Wollongong NSW (the proposal). This redevelopment proposal requires rezoning to achieve an amended land use zone and increased building heights of the existing site.

The redevelopment proposal is to follow a fast-tracked process through the Rezoning Pathways Program which requires a noise intrusion assessment for potential noise sources surrounding the existing site.

The aspects covered in this assessment:

- identify current and future noise sources and receivers and potential noise impacts to the proposal site.
- review and assessment of noise impact due to future traffic volumes on the proposal redevelopment area.

1.1 Scope of works

The purpose of this report is to conduct an assessment of potential noise impacts associated with the proposed Gwynneville redevelopment area to support a planning proposal to Wollongong Council.

The scope of the assessment includes the following:

- Review project information (including concept design and lot layout information) and publicly available information relevant to the proposal;
- Determine potential noise sources impacting on the proposal;
- Determine location of sensitive receivers surrounding the proposal;
- Establish design criteria for noise intrusion and emissions;
- Predict and assess traffic noise intrusion to the proposal based on future traffic volumes provided;
- Determine mitigation requirements to achieve the design criteria for the proposal and any measures for proposal emissions to the sensitive receivers surrounding the proposal.

1.2 Reference documents

This document has been prepared with reference to the following documentation:

- *Wollongong Development Control Plan 2009* (DCP)
- *NSW Road Noise Policy 2011* (RNP)
- *NSW Development near rail corridors and Busy Roads – Interim Guideline 2008* (DNRCBR)
- *State Environmental Planning Policy (Infrastructure) 2008* (SEPP)
- *Australian Standard AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction*
- *304000922 - Gwynneville Precinct Redevelopment - Gap Analysis V002*
- *M1 Princes Motorway Mount Ousley Interchange - Review of Environmental Factors – Noise and Vibration Impact Assessment (Report number: 610.16823-R01)* by SLR, 30 October 2017.
- *Gwynneville Precinct Study – Homes NSW, formerly NSW Government Land and Housing Corporation (April 2022 - Revision A.6)*

— *Gyde Consulting - Urban design concept plan* (July 2024)

1.3 Proposal description and site overview

This report has been prepared on behalf Homes NSW to support a planning proposal to amend the Wollongong Local Environmental Plan 2009 to accommodate urban renewal of land at Gwynneville, NSW.

The amended controls will facilitate the delivery of a diverse range of housing typologies which will include additional social and affordable housing, market housing products and seniors housing, as well as opportunities to develop build-to-rent and student accommodation The proposal will allow for approximately 1,250 dwellings, at least 30% of which will be social and affordable housing.

Covering approximately 9 hectares, the site is located 2km north-west of the Wollongong CBD. The site is immediately south of the University of Wollongong, and east of the Botanic Gardens. Irvine Street makes up the site's eastern boundary, with Murphy Avenue to the south (refer Figure 1.1). The Northfields Avenue bus interchange is approximately 150m northwest of the site, and North Wollongong railway station is approximately 1km to the east.

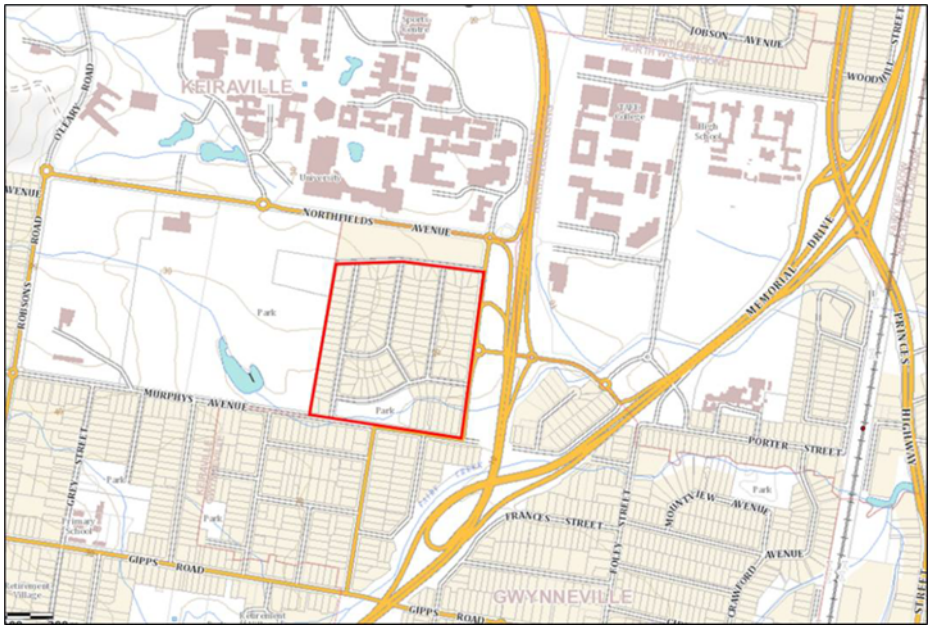


Figure 1.1 Proposed site location bounded in red

Source: SixMaps 2024

The site currently accommodates approximately 131 residential lots, consisting of:

- 79 social dwelling units on 75 residential lots (comprising 73 individual dwelling units on 73 lots; 2 dwelling units / apartments on 1 lot; and 4 dwelling units / apartments on 1 lot) owned by Homes NSW; and
- Approximately 56 privately owned dwelling units on 56 residential lots.

Most of the dwellings were constructed during the 1950s. The site is made up of predominantly single storey detached dwellings set in a modified grid-type street layout.

Redevelopment of the Gwynneville precinct will require rezoning to facilitate an amended land use zone; increased FSR and building heights, and result in improvements to the current street network, pedestrian connectivity, open space / parkland, and public amenity. The proposal will improve connections to the University of Wollongong Campus with an opportunity to incorporate student accommodation as part of the overall housing mix.

The site rises from a low point in the south-eastern corner to the west providing important vistas to and from the Botanic Gardens and further west to the escarpment.

The development is well positioned to support the NSW Government's affordable housing targets and increase housing supply in the Illawarra.

The proposal is supported by an urban design concept plan (refer Figure 1.2).

Figure 1.2 Urban design concept plan

Source: Gyde Consulting, 2024

The potential noise sources in the vicinity of the precinct include the M1 Princess Motorway located to the east of the site. The nearest existing receivers are located at the east of the precinct which are approximately 85m west of the M1 Princess Motorway. Note, the Wollongong University (north of site) and the Botanical Gardens (west of site) have not been flagged as significant noise sources. It is understood that an outdoor cinema proposed in Botanical Gardens is being managed and addressed under council legislation.

2 Assessment criteria

This section provides the relevant noise criteria for the proposal.

2.1 Wollongong Development Control Plan (DCP)

The following is extracted in Wollongong DCP, relating acoustic privacy for residential developments.

> *10 ACOUSTIC ASSESSMENT*
>
> *Objective*
>
> *(a) Ensure appropriate acoustic measures are planned for and provided for subdivisions which are subject to potential adverse noise impacts, in order to provide a pleasant acoustic environment for all residential lots within the subdivision.*
>
> *Development Controls*
>
> *1. Council will refer to NSW Roads and Maritime Services (RMS) and Department of Planning to determine if an acoustic assessment is required as outlined in "Development near Rail Corridors and Busy Roads – Interim Guidelines" (Department of Planning).*
>
> *2. When required, full details of the proposed acoustic mediation shall be submitted with the Development Application.*

2.1.1 Development Near Rail Corridors and Busy Roads – Interim Guideline (DNRCBR)

The DCP requires compliance with the standards for noise attenuation in accordance with the DNRCBR.

This document provides guidance for development near major rail corridors and busy roads, supporting the relevant provisions of the SEPP. It aims to protect the safety and integrity of key transport infrastructure from adjacent development, and ensure these developments maintain appropriate acoustic amenity by meeting internal criteria specified in the SEPP.

2.1.1.1 Road Noise

The DNRCBR classifies a major road as freeway, tollway or a transitway or any other road with an Annual Average Daily Traffic (AADT) volume of more than 40,000 vehicles, and that the consent authority considers is likely to be adversely affected by road noise or vibration. For roads with an AADT of 20,000 - 40,000 vehicles this guideline provides best practice advice.

Relevant criteria as applicable to the project sourced from Table 3.1 from the DNRCBR are reproduced in Table 2.1.

Table 2.1 Noise criteria for proposed road or residential land-use developments

Type of occupancy	Noise level dBA	Applicable time period
Sleeping areas (bedroom)	35	Night 10pm to 7am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)	40	At any time

Source: Department of Planning: Interim Guideline – Development Near Rail Corridors and Busy Roads

Section 3.5.2 of DNRCBR provides screening tests for single and dual occupancy residential dwellings which define relevant categories of noise control treatments required, depending on distance to the road and traffic volumes.

It is noted that M1 Motorway is generally signposted at 80km/h in the area adjacent to the proposal. The screening test for 100/110 km/h zones, as relevant to this assessment, is presented in Figure 2.1.

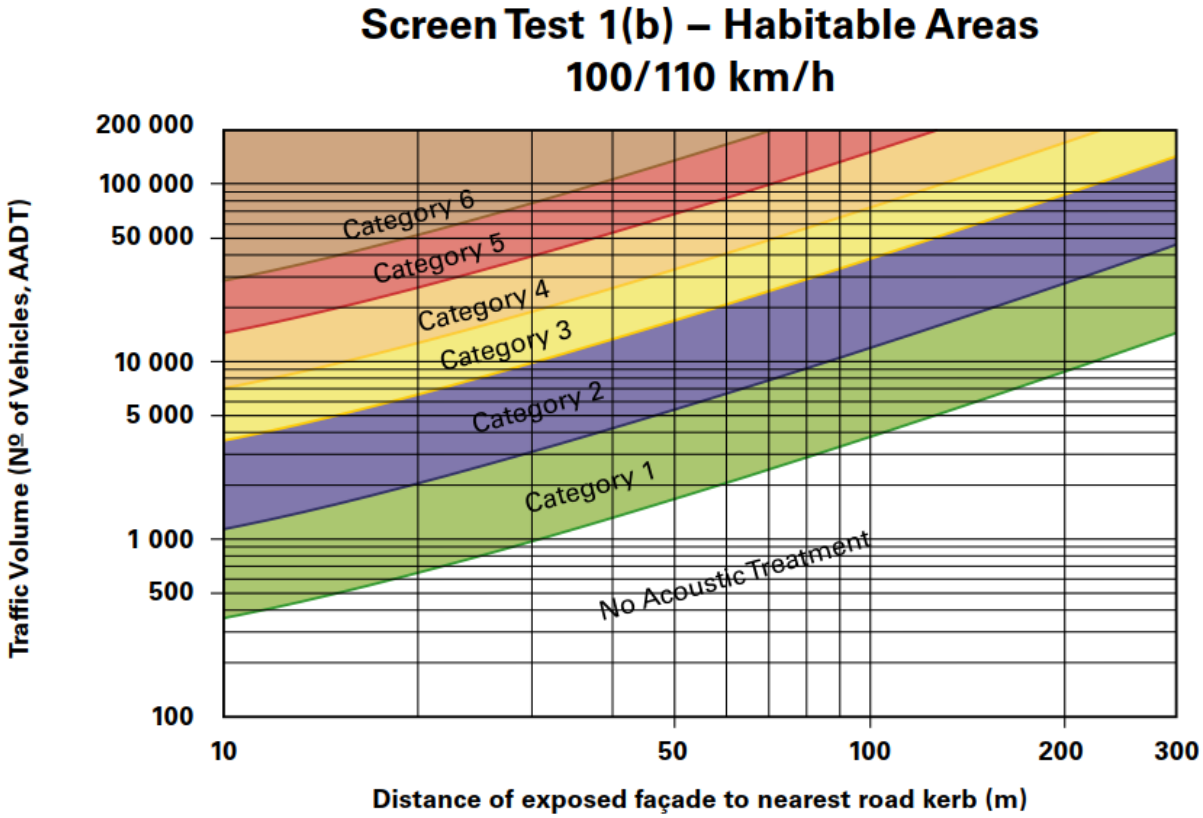


Figure 2.1 DNRCBR Screening test for habitable areas (if any exposed façade is direct line-of-sight)

Based on traffic information provided in *M1 Princes Motorway Mount Ousley Interchange*, the average daily traffic on The M1 Princes Motorway for the design year (2031) is 54,129 vehicles per day.

The closest residential lots with the precincts are approximately 85m away from the M1 Princes Motorway. Based on these inputs the closest dwellings in the development would require Category 3 treatment. As a result, dwellings within the development nearest the M1 Princes Motorway are considered likely to be adversely affected by road noise, and as a result, a more detailed acoustic assessment has been undertaken.

DNRCBR recommends that when undertaking a detailed assessment of road traffic noise, guidance on internal levels be sourced from AS 3671-1989 *Acoustics – Road traffic noise intrusion – Building siting and construction* (AS 3671).

2.1.2 Australian Standard AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction

Australian Standard AS 3671-1989 recommends various construction to achieve a required traffic noise reduction (TNR). For Category 2 and above that require windows to be closed mechanical ventilation would be required.

These TNR categories are summaries in Table 2.2 with reference to the corresponding internal design noise criteria outlined in the DNRCBR. Noise levels are then compared to relevant internal noise levels, assuming windows are partially open, based on a standard noise reduction from external to internal of 10dB.

Table 2.2 AS 3671 Traffic noise reduction categories

Category	TNR	External noise level $L_{Aeq\ 9hr\ (10pm - 7am)}$	Construction requirements
AS Category 1	≤ 10	≤ 45	Standard construction; openings, including open windows and doors may comprise up to 10% of the exposed facade
AS Category 2	11 - 25	46-60	Standard construction, except for lightweight elements such as fibrous cement or metal cladding or all-glass facades. Windows, doors and other openings must be closed
AS Category 3	26 - 35	61-75	Special construction, chosen in accordance with Clause 3.4[1]. Windows, doors and other openings must be closed
AS Category 4	≥ 36	≥ 75	Special acoustic advice required

(1) Clause 3.4 of AS 3671 provides guidance on calculations for each individual building element to achieve the required TNR.

2.2 NSW Noise Policy for Industry

Noise emissions from the proposed development to surrounding noise sensitive areas are required to comply with the requirements of the NSW Noise Policy for Industry 2017 (NSW NPfI). Noise emissions from the development and compliance with the NPfI are to be carried out in the Development Application phase of the proposal.

3 Road traffic noise assessment

This section outlines the methodology completed to assess the road noise intrusion impacts from the Princes Motorway into the proposal area and investigates potential noise mitigations for future residential dwellings.

Road traffic noise levels have been predicted and assessed against the relevant criteria. At this stage of the project, limited project specific is available, therefore traffic noise modelling was conducted using publicly available data using assumptions developed in collaboration with Homes NSW.

3.1 Traffic inputs

The Princes Motorway was identified in the Gaps Analysis (*304000922 - Gwynneville Precinct Redevelopment - Gap Analysis V002)* as being the dominant noise source with the potential to impact noise sensitive receivers within the proposal area. Modelling which assessed the future upgrade of the Princes Motorway as part of the Mount Ousley Upgrade was issued in 2017 and is included in SLR's Mount Ousley Interchange REF Noise and Vibration Impact Assessment report (*Report number: 610.16823-R01).*

Traffic data included both day (15-hour) and night (9-hour) average numbers, as well as heavy vehicle percentages. Traffic numbers were provided for the Princes Motorway in both directions only.

Traffic volumes on M1 Princes Motorway, sourced from the Noise and Vibration Impact Assessment for Mount Ousley Interchange dated 30 October 2017, are presented in Table 3.1.

Table 3.1 Traffic volumes – M1 Princes Motorway design year (2031)

Road	**Direction**	**Traffic Volumes**				
		15 Hour (Day)		9 Hour (Night)		Speed (km/h)
		Total Volume	Heavy Vehicle	Total Volume	Heavy Vehicle	Posted
M1 Princes Motorway	NB	21171	3019	4390	520	80
	SB	24102	2822	4466	488	80

Other sub arterial roads in the vicinity of the proposal have not been assessed at this stage, however, will be once data becomes available as part of the Development Application in future stages of work.

3.2 Modelling Methodology

The predicted noise impacts were calculated using the supplied information on the road alignment, traffic volume, traffic speed, and a number of conservative assumptions.

A noise model including nearby roads was created using the Calculation of Road Traffic Noise (CoRTN) (UK Department of Transport, 1988) as implemented in the SoundPLAN software (version 8.1). The model predicted the road traffic noise generated as a result of traffic volumes and composition, vehicle speed, road gradient, pavement surface, ground absorption and shielding, and reflections from topography.

This study has been conducted as a desktop study only, no noise monitoring or noise model verification has been undertaken for this assessment. The specific inputs into the noise model are summarised in Table 3.2.

The predictive model assumed two lanes of traffic in each direction on M1 Princes Motorway. Three source heights were used to represent the light and heavy vehicles passing along the M1 Princes Motorway.

Table 3.2 Noise modelling parameters

Item	Assumptions
Calculation method	CoRTN (1988) with variations as described in this report. Low traffic correction not used.
Ground topography	From existing topographical data provided by Intergovernmental Committee on Surveying and Mapping.
Pavement surfaces	Existing and proposed pavement surfaces DGA. No correction applied
Traffic volumes and mix	Referenced from *M1 Princes Motorway Mount Ousley Interchange - Review of Environmental Factors – Noise and Vibration Impact Assessment (Report number: 610.16823-R01) by SLR, 30 October 2017.*
Existing structures	Existing buildings defined from aerial photography and site surveys.
Sources heights and correction	Model assumes three source heights: Light vehicles at 0.5m with 0 dB correction Heavy vehicles at 0.5m with -5.5 dB correction, 1.5m with a -2.5 dB correction and at 3.6m with a -8.5 dB correction
Vehicle speeds	Proposed designs set at existing posted speeds (80 km/h).
Road gradient	Gradient calculated from supplied topographical and road design data
Ground absorption	Set at 75% soft ground for grass, wooded areas and park land Set at 50% soft ground for residential land use Set at 25% soft ground for commercial land uses
Receiver locations	Free-field receivers set at 10.5m (3 storey approximation) and 16.5m (5 storey approximation).
ARRB correction	-1.7 dB for façade noise levels and -0.7 dB for free-field noise levels
L_{10} to L_{eq} correction	-3 dB

3.3 Predicted traffic noise levels

Predicted road noise levels associated with the M1 Motorway were modelled for the proposal area. Preliminary results present unmitigated noise levels for night time period. Results are presented to provide a conservative estimate of potential impacts, allow comparison against relevant criteria and identify potential constraints.

Figure 3.1 and Figure 3.2 display the anticipated noise levels generated by M1 Princes Motorway across the proposal area. These predictions represent the noise reduction categories, as specified in Table 2.2, and do not incorporate any noise mitigation measures, such as noise barriers or shielding from nearby housing. The calculations for these noise levels were performed at heights of 10.5 m and 16.5 m above the ground, which approximates the height of the third and fifth levels of the proposed dwellings and represents the worst-case noise levels for the range of proposed dwelling types.

Results are presented to provide a conservative estimate of potential impacts, allow comparison against the categories of treatment outlined in Table 2.2 and noise goals and assess potential constraints.

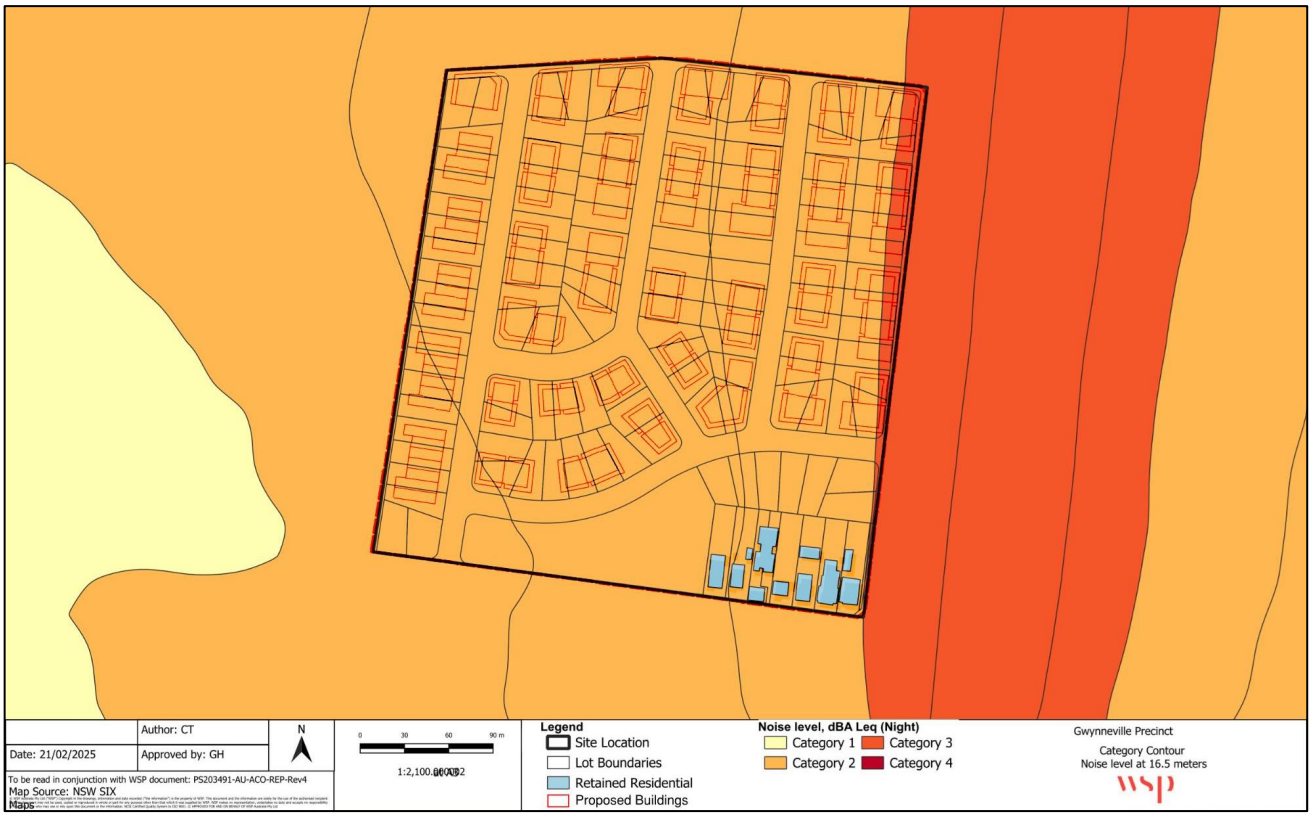


Figure 3.1 Gwynneville Redevelopment - AS3671 Traffic noise reduction category – Unmitigated (at fifth (5th) storey of proposed dwellings) – 10pm to 7am

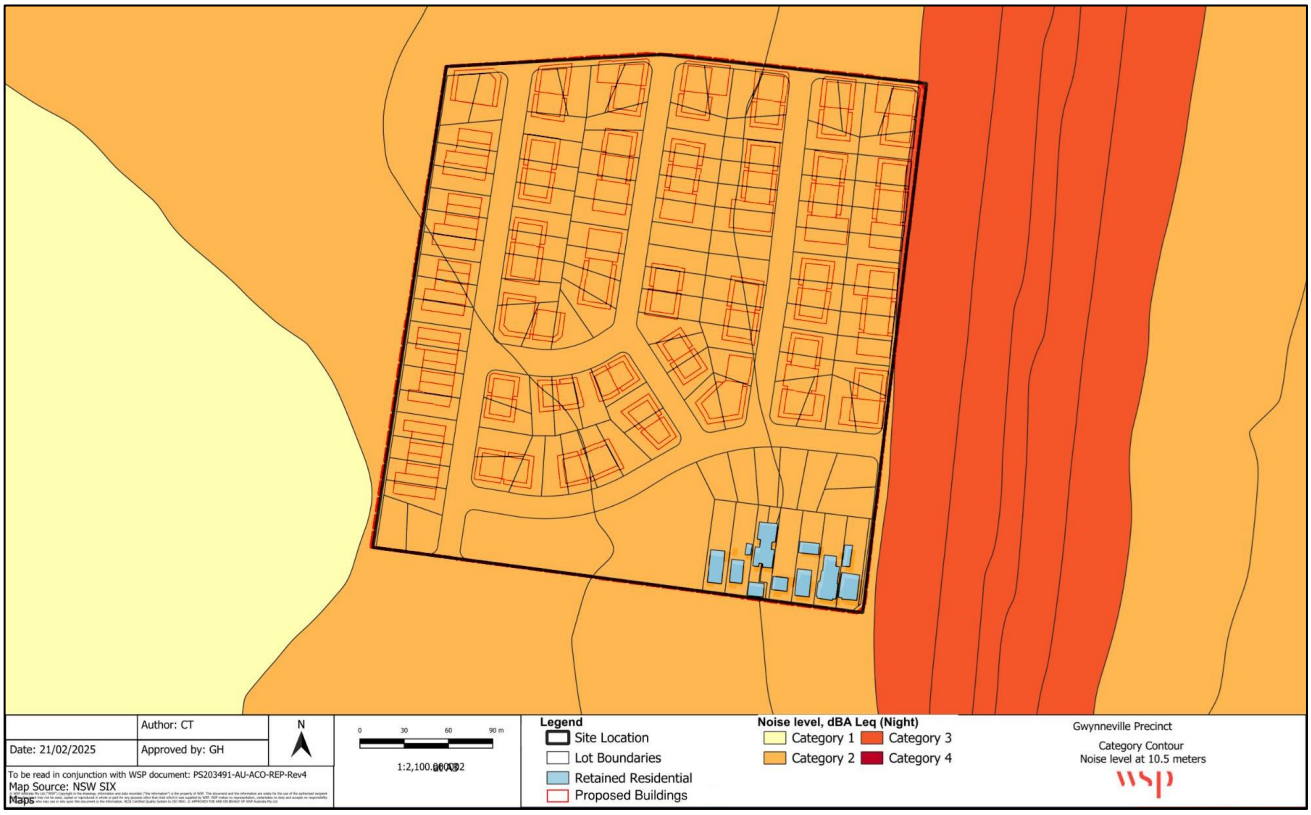


Figure 3.2 Gwynneville Redevelopment - AS3671 Traffic noise reduction category – Unmitigated (at third (3rd) storey of proposed dwellings) – 10pm to 7am

Noise modelling results indicate that the night-time period is likely to be most affected by road noise (when compared against noise criteria) and as such this period has been used as a conservative assessment of potential impacts.

Based on the $L_{Aeq\ 9hr(10pm\text{-}7am)}$ results the total number of residential lots that fall into each AS3671 TNR category is presented in Table 3.3.

Table 3.3 Number of residential lots per mitigation category

AS3671 TNR category	Noise exposure contours $L_{Aeq,\ 9\ hr(10pm\text{-}7am)}$	Number of lots (number of proposed dwelling units)
AS Category 1	≤ 45	0 (0)
AS Category 2	46-60	117 (74)
AS Category 3	61-75	14 (5)
AS Category 4	≥ 75	0 (0)

Initial noise modelling results indicate that without any mitigation, 14 lots are exposed to AS Category 3 noise levels due to traffic noise from the Princes Motorway. The remaining 117 lots fall into AS Category 2.

This assessment has indicated that noise levels from the Princes Motorway will vary based on proximity of residences to the alignment. Noise levels are predicted to exceed noise goals over the proposal area unless mitigation designs are implemented.

3.4 Noise Mitigation Requirements

The results of this assessment indicate that design and mitigation measures are required for consideration to achieve internal noise goals throughout the proposal area. A range of mitigation options have been investigated, to allow flexibility in the design of the proposal.

3.4.1 Recommended measures

Recommended mitigation measures include:

- Line of site measures
- Acoustic treatment and design considerations
  - Acoustic treatment of building facades.
  - Internal layout configuration

3.4.1.1 Line of site measures

Use of the built form as a barrier. Assuming construction of 4 to 6 storey residences along first row (east of proposal area) of houses to shield subsequent dwellings from M1 Princes Motorway.

This has not been investigated in detail in this assessment and would result in notable reductions to noise levels. These reductions should be investigated as part of subsequent DA subdivision noise assessments.

3.4.1.2 Acoustic treatment and design considerations

It is recommended that the future development include the following considerations:

- Dwelling layout and architectural treatment should be designed with consideration to AS/NZS 3671:1989 – Acoustics – Road Traffic Noise Intrusion – Building Siting and Construction.

- For a minimum of the first row of buildings, doors and windows on the most exposed facades of dwellings should be minimised (where possible).
- Noise sensitive rooms should be situated away from Princes Motorway, where possible.

In terms of acoustic treatment, DNRCBR provides details of typical noise reductions and construction types for various building elements based on the screening test categories as presented in Figure 2.1. These recommendations cannot be used directly with knowing the exact plans for a residential building, however, can be used as a guide for the expected types of construction that will be sufficient to meet internal noise requirements.

This assessment has required the consideration of noise against both AS3671 and the DNRCBR methodology. Each of these documents describes categories of noise treatment, however these are categories not analogous. Table 3.4 provides an approximate comparison between the TNR categories from AS 3671 and the mitigation categories described in DNRCBR as well as the number of lots that fall into each category. The individual building element noise reduction (R_W) as outlined in DNRCBR is presented in

Table 3.5. Further information on the types of construction for these DNRCBR categories is presented in Appendix A.

Specialist acoustic design advice should be sought at the Development Application stage as individual building elements could require different treatment categories based on the building design.

Table 3.4 Comparison of defined TNR categories (AS3671 vs DNRCBR)

AS 3671 Category	**AS 3671 TNR**	**DNRCBR Category**	**Number of lots (number of proposed dwelling units)**
AS Category 1	≤ 10	-	0 (0)
AS Category 2	11 - 25	DNRCBR Category 1 DNRCBR Category 2	117 (74)
AS Category 3	26 - 35	DNRCBR Category 3 DNRCBR Category 4	14 (5)
AS Category 4	≥ 36	DNRCBR Category 5 DNRCBR Category 6	0 (0)

Table 3.5 DNRCBR Acoustic Performance of Building Elements

Category of noise control treatment	**R_W of Building Elements (minimum assumed)**				
	Windows/sliding doors	**Frontage façade**	**Roof**	**Entry door**	**Floor**
DNRCBR Category 1	24	38	40	28	29
DNRCBR Category 2	27	45	43	30	29
DNRCBR Category 3	32	52	48	33	50
DNRCBR Category 4	35	55	52	33	50
DNRCBR Category 5	43	55	55	40	50

It is understood that the dwellings adjacent to Irvine St and Mandoline St are 4 to 6 storeys with the remaining dwellings of the proposal ranging from 3 to 5 storeys, refer to Figure 1.2. With reference to Figure 3.1 and Figure 3.2 the assessment conducted indicates that five of the proposed dwellings located along Irvine Street, which are closest to the Princes Motorway to the east of the Precinct, are predicted to fall under Category 3 of AS 3671-1989 noise reduction measures. The remainder of proposed dwellings are predicted to fall under Category 2.

Both Category 2 and Category 3 recommends that windows, doors, and other openings must remain closed to mitigate noise intrusion.

However, moving forward it is important to also consider ventilation requirements while ensuring the protection of amenity within the dwellings. If natural ventilation is proposed for the dwellings, a comprehensive assessment of natural ventilation should be conducted to meet internal noise criteria.

It is understood that a commuter carpark is proposed to the north of Wollongong University and will be addressed as part of the traffic report. This may have implications for local traffic volume/flows and should be considered in the subsequent deliverables of this proposal.

4 Conclusion

This noise assessment has been prepared to support the development application for the proposed Gwynneville Precinct.

The assessment investigates the potential noise intrusion and noise mitigation requirements for the future residential and areas in the proposal area, with particular reference to noise impacts from the Princes Highway.

The assessment has been conducted with reference to the following policy and guidance:

- *Wollongong Development Control Plan 2009* (DCP)
- *NSW Road Noise Policy 2011* (RNP)
- *NSW Development near rail corridors and Busy Roads – Interim Guideline 2008* (DNRCBR)
- *State Environmental Planning Policy (Infrastructure) 2008* (SEPP)
- *Australian Standard AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction*

Predicted traffic volumes for the Princes Highway have been assessed based on *M1 Princes Motorway Mount Ousley Interchange - Review of Environmental Factors – Noise and Vibration Impact Assessment (Report number: 610.16823-R01) by SLR, 30 October 2017.* Noise impacts from proposed sub-arterial roads have not been conducted at this stage. Sub-arterial and local roads should be revisited as part of subsequent investigations to ensure projected flows are reasonable for the proposal.

Noise contours were developed over the project area to graphically represent the noise impacts for the modelled assessment year (2031).

The initial results of the noise modelling conducted for the proposed site have indicated that the majority of the proposed dwellings fall under Category 2 of AS 3671 -1989, with the exception of five of the proposed dwellings along Irvine St. Due to the proximity of these five proposed dwellings to the Princes Motorway to the east of the Precinct, results indicate that they fall under Category 3 of AS 3671-1989.

Category 2 of AS 3671 -1989 requires standard construction, with the exception of lightweight elements such as fibrous cement or metal cladding or all-glass facades. Category 3 of AS 3671 -1989 requires upgraded construction to windows, doors and frontage façade, refer to Appendix A for standard construction details for each of the categories.

In addition, it is recommended windows, doors and other openings must be closed. Subsequent DA noise assessments should consider concept design and lot layout information to understand the noise reductions achieved beyond the first row of houses from intervening buildings.

Considering the proposed dwellings fall under either Category 2 or Category 3, future stages of the proposal should address ventilation strategies and their impact on the design, particularly if natural ventilation is required. Additionally, the potential impacts from the proposed commuter carpark near Wollongong University should be considered as part of the subsequent DA noise assessment.

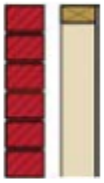
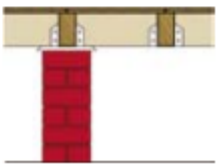
It is important to note that the noise modelling was conducted based on the relevant inputs received to date, which was limited to publicly available traffic data for the Princes Motorway and concept design lot boundary locations. It is likely that additional inputs, such as traffic data for other surrounding roads and the proposed building locations for the proposal, will have an additional impact on the residential lots. Therefore, further noise assessments should be carried out as part of the development phase.

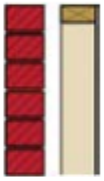
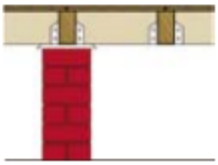
Appendix A

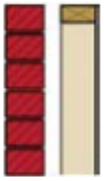
NSW Development near rail corridors and Busy Roads – Interim Guideline 2008

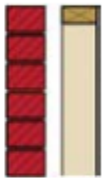
Acoustic performance of building elements

Category of Noise Control Treatment	R_w of Building Elements (minimum assumed)				
	Windows/Sliding Doors	Frontage Facade	Roof	Entry Door	Floor
Category 1	24	38	40	28	29
Category 2	27	45	43	30	29
Category 3	32	52	48	33	50
Category 4	35	55	52	33	50
Category 5	43	55	55	40	50

Category No.	Building Element	Standard Constructions	sample
1	**Windows/Sliding Doors**	Openable with minimum 4mm monolithic glass and standard weather seals	
	Frontage Facade	**Timber Frame or Cladding:** 6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally	
		Brick Veneer: 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally	
		Double Brick Cavity: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R1.5 insulation batts in roof cavity.	
	Entry Door	35mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	1 layer of 19mm structural floor boards, timber joist on piers	
		Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
2	**Windows/Sliding Doors**	Openable with minimum 6mm monolithic glass and full perimeter acoustic seals	
	Frontage Facade	**Timber Frame or Cladding Construction:** 6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally with R2 insulation in wall cavity.	
		Brick Veneer Construction: 110mm brick, 90mm timber stud frame or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	40mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	1 layer of 19mm structural floor boards, timber joist on piers	
		Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
3	**Windows/Sliding Doors**	Openable with minimum 6.38mm laminated glass and full perimeter acoustic seals	
	Frontage Facade	**Brick Veneer Construction:** 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 1 layer of 13mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	45mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
4	**Windows/Sliding Doors**	Openable with minimum 10.38mm laminated glass and full perimeter acoustic seals	
	Frontage Facade	**Brick Veneer Construction:** 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 2 layers of 10mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	45mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
5	**Windows/Sliding Doors**	Openable Double Glazing with separate panes: 5mm monolithic glass, 100mm air gap, 5mm monolithic glass with full perimeter acoustic seals.	
	Frontage Facade	**Double Brick Cavity Construction:** 2 leaves of 110mm brickwork separated by 50mm gap with cement render to the external face of the wall and cement render or 13mm plasterboard direct fixed to internal faces of the wall.	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 2 layers of 10mm sound-rated plasterboard fixed to ceiling joist using resilient mounts, R2 insulation batts in roof cavity	
	Entry Door	Special high performance acoustic door required - Consult an Acoustic Engineer	*Door to acoustic consultant's specifications*
	Floor	Concrete slab floor on ground	
6	**All**	Consult an Acoustic Engineer	