

Picton Road upgrade between Nepean River and Almond Street, Wilton

Review of Environmental Factors

Appendix J

Noise and Vibration
Impact Assessment

J





Picton Road upgrade between Nepean River and Almond Street, Wilton

Noise and Vibration Impact Assessment

Transport for NSW

January 2024



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Executive summary

Assessment overview

Purpose and approach

Transport for NSW (Transport) is proposing to upgrade Picton Road between the Nepean River and Almond Street in Wilton, NSW (the proposal). The proposal includes upgrading the Picton Road interchange with the M31 Hume Motorway.

The proposal is subject to assessment in the form of a review of environmental factors (REF) under Division 5.1 of *Environmental Planning and Assessment Act 1979* (EP&A Act).

This noise and vibration impact assessment report documents the results of the assessment of the potential noise and vibration impacts of constructing and operating the proposal to support the REF for the proposal.

The assessment has been undertaken in accordance with relevant guidelines, in particular:

- *NSW Road Noise Policy* (DECCW, 2011)
- *Construction Noise and Vibration Guideline (for roads and maritime works)* (Transport for NSW, June 2022)
- *Road Noise Criteria Guideline* (Transport for NSW, April 2022)
- *Road Noise Mitigation Guideline* (Transport for NSW, March 2022).

Existing environment

The proposal is located in an area consisting of suburban and rural residential areas. The existing noise environment is dominated by road traffic noise from vehicles travelling along Picton Road and the M31 Hume Motorway. Noise from local roads and natural sounds such as wind, birds and insects also contribute to the existing noise environment. The construction and operational study area was adopted to in accordance with relevant Transport noise assessment guidelines.

Sensitive receivers within the study area were identified, and mainly consist of rural residential and suburban residences (734 existing residences, future residential dwellings within Stage 1 of the Wilton Greens development and 14 non-residential receivers). Noise monitoring was undertaken at seven locations in October 2022 to quantify the existing background, ambient and road traffic noise environment of the study area.

Wilton Growth Area

The Wilton area has been subject to progressive development to deliver 15,000 new homes and a town centre in accordance with *Wilton 2040 – a Plan for the Wilton Growth Area* (DPE, 2018a). Sections of the six precincts within the Wilton Growth Area that have been rezoned are located within the study areas. These precincts are Bingara George, South East Wilton, North Wilton, South Wilton, West Wilton and the Wilton Town Centre.

Approved residential development applications (DAs) for individual lots (at the time of approval for the proposal) would be considered 'existing sensitive receivers' and could qualify for noise mitigation consideration.

For future development where there are no approved DAs for individual residential lots, developers and the relevant approval authorities would need to consider operational road traffic noise from Picton Road and the M31 Hume Motorway to ensure an adequate level of acoustic amenity can be achieved.

Stage 1 of development of the South East Wilton Precinct (referred in this report as Stage 1 Wilton Greens) has been approved for subdivision (involving 696 residential lots and associated works). DAs for residential development are being submitted to Wollondilly Shire Council (Council) with several DAs approved as of August 2023. This development is directly adjacent to the westbound lanes of Picton Road (east of M31 Hume Motorway) and includes acoustic requirements in the development consent to reduce road traffic noise levels to future residences within the development.

Assessment conclusions and recommendations

Construction impacts

Key findings

The construction noise assessment identified that impacts are likely to occur during all construction activities. The most-affected sensitive receivers are likely to experience highly intrusive noise levels at some stage during construction. The predicted noise levels are considered conservative, as they assume 'worst-case' conditions i.e., that the two loudest items of equipment are operating at the location nearest to each receiver.

Construction vibration impacts have the potential to occur at structures located within 25 metres of the construction work area. Up to 39 standard structures (nine existing residential structures and 30 future residential structures within the Stage 1 Wilton Greens development) and two heritage listed structures have been identified within the construction vibration impact area and therefore have the potential to be subject to some cosmetic damage impacts without adequate mitigation measures. Residents located within 100 metres of the construction work area have the potential to experience human comfort impacts due to construction vibration. A total of about 147 residences (50 existing and 97 future residences) fall within this buffer.

Recommended approach to mitigation and management

Additional noise and vibration management measures have been recommended to minimise the potential impacts associated with construction noise and vibration. These measures include recommendations of community notifications, property condition surveys and verification noise and vibration monitoring throughout construction.

Operational impacts

Key findings

Road traffic noise levels were assessed for the opening year (2031) and design year (2041). A summary of the results assuming no noise mitigation is provided as follows:

- **Built residential dwellings:** Up to eight residential dwellings that would qualify for mitigation consideration. The trigger for mitigation is generally due to an exceedance of the cumulative limit.
- **Place of worship buildings:** Both buildings at 1095 Argyle Street, Wilton would qualify for mitigation consideration (One heritage building and one modern building).
- **Stage 1 Wilton Greens development:** Up to 18 future residential dwellings (yet to be built/approved) could qualify for mitigation consideration (depending on the timing of the DA approval for the individual lot). The residential receivers located within the Stage 1 Wilton Greens development were identified as an area where additional noise mitigation (i.e., At-property treatments) would be considered.

Recommended approach to mitigation and management

The results of the noise modelling and assessment indicate that low noise pavements and noise barriers or mounds are not considered reasonable and feasible mitigation measures. As such, at-property treatments have been recommended for the eight existing residential dwellings and place of worship identified as qualifying for mitigation consideration. This mitigation approach would be confirmed as part of the Operational Noise and Vibration Review (ONVR), which would be undertaken as part of detailed design.

Stage 1 of the Wilton Greens subdivision was approved in 2019 by the Sydney Western City Planning Panel and the work is being carried out by a private developer (Walker Corporation Pty Ltd). The acoustic report prepared for the subdivision DA recommends a 3.6 metre high (1.8 metre mound plus a 1.8 metre acoustic fence) noise barrier along the site's frontage with Picton Road and 'deemed to comply' architectural treatment packages to reduce noise for the future residences fronting Picton Road. Council also requires noise monitoring and an acoustic report to be prepared for individual residential developments prior to the issue of a construction certificate to confirm the acoustic requirements of State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) can be achieved.

The modelling undertaken for the proposal indicates that residences within Wilton Greens could qualify for noise mitigation consideration (depending on the timing of their development applications) with consideration of the *Road Noise Mitigation Guideline* (Transport for NSW, March 2022). However, the architectural treatment packages that would likely be offered to these residential dwellings are consistent with the 'deemed to comply' architectural treatment packages required in the subdivision DA consent.

Given residential development for individual lots fronting Picton Road would need to be designed to comply with the T&I SEPP requirements, no additional at-property treatments have therefore been recommended for the proposal. Nevertheless, during detailed design, an ONVR would be developed and noise mitigation requirements would be reviewed and confirmed.

Development of an Operational Noise and Vibration Review

Operational mitigation measures would be confirmed as part of the ONVR. The ONVR process would include:

- consultation with Council to ensure the transport noise management process for future development within the Wilton Growth Area is clearly understood for the relevant stakeholders
- a land use survey of existing and approved developments that need to be considered in the noise modelling and assessment to capture any receivers not identified/included in the REF assessment
- a review of any proposal design changes or modelling/assessment assumptions that need to be reflected in the noise model
- façade acoustic testing to confirm (future/predicted) internal road traffic noise levels at:
 - 1095 Argyle Street, Wilton (heritage structures)
 - Heritage building (St Luke's Anglican Church, heritage structure) (Receiver ID: R0595 in this NVIA)
 - Wilton Anglican Church (modern building) (Receiver ID: R0592 in this NVIA)
- confirming the at-property treatment recommendations for the eight built residential dwellings that would qualify for mitigation consideration.

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Appendix B	Construction impact assessment
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1. Introduction

1.1 Background

Transport for NSW (Transport) is proposing to upgrade Picton Road between the Nepean River and Almond Street in Wilton, NSW (the proposal). The proposal includes upgrading the section of Picton Road from about 1.3 kilometres east of the bridge over the Nepean River to about 200 metres east of Almond Street, including the M31 Hume Motorway interchange.

The proposal forms the western section of the broader Picton Road upgrade, which involves upgrading about 30 kilometres of Picton Road between the Nepean River and the M1 Princes Motorway.

The proposal is subject to assessment by a review of environmental factors (REF) under Division 5.1 of *Environmental Planning and Assessment Act 1979* (EP&A Act). For the purposes of these works, Transport for NSW is the proponent and the determining authority under Division 5.1 of the EP&A Act.

1.2 The proposal

1.2.1 Proposal location

The site on which the proposal is located in Wilton, in the Wollondilly local government area (LGA). The proposal site, shown in Figure 1.1 and Figure 1.2, comprises the area that would be required to construct and operate the proposal, including ancillary facilities and operational infrastructure.

1.2.2 Key features of the proposal

Key features of the proposal include:

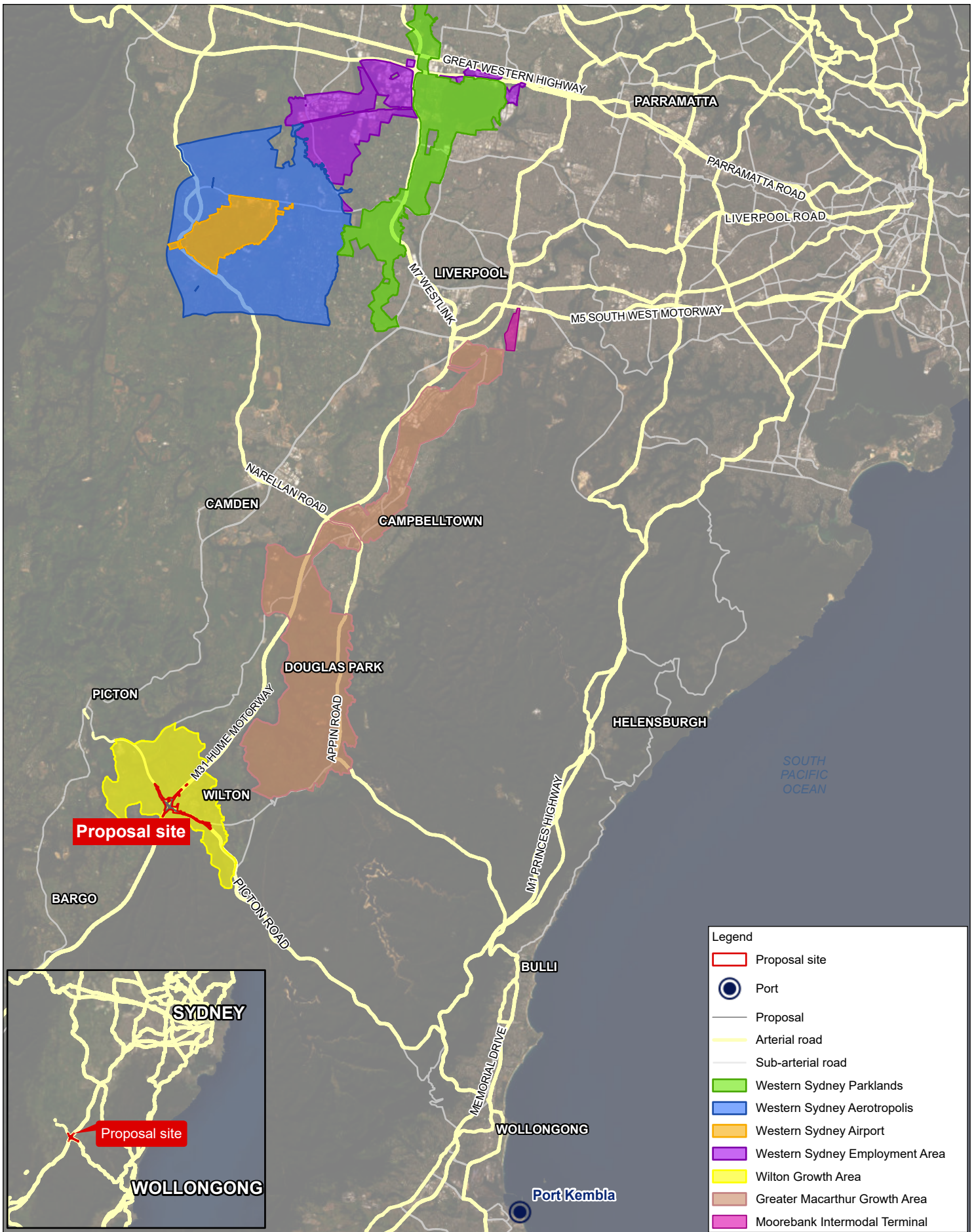
- widening and upgrading Picton Road for a distance of about five kilometres between the Nepean River and Almond Street to provide:
 - a minimum of two 3.5 metre-wide traffic lanes in each direction with a central median, increasing to three traffic lanes in each direction approximately between the Wilton Park Road and Aerodrome Drive intersection and the Pembroke Parade and Greenway Parade intersection
 - three-metre-wide shoulders on the left lane side in each direction
- upgrading the existing Picton Road and M31 Hume Motorway interchange into a diverging diamond layout, including:
 - removing the existing Picton Road bridge and constructing two new bridges over the M31 Hume Motorway
 - upgrading and realigning on and off ramp connections with the M31 Hume Motorway to suit the new interchange layout and to allow free flow of traffic between Picton Road and the M31 Hume Motorway
 - providing a new four-metre-wide shared user path along the southern bridge
 - removing the existing traffic signals on Picton Road and installing new traffic signals with more efficient phasing and more traffic capacity
- new and upgraded shared paths on Picton Road, including underpasses under the southbound on ramp connections to the M31 Hume Motorway and an overpass of the northbound off ramp connection from the M31 Hume Motorway, located:
 - adjacent to the westbound slow lane of the proposal from the western extent to around 420 metres west of Almond Street to connect with planned active transport infrastructure to be delivered as part of the South East Wilton development
 - adjacent to the eastbound slow lane between Aerodrome Drive and the western extent of the proposal and between Pembroke Parade and Almond Street

- reconfiguring the existing Picton Road intersections with Wilton Park Road, Aerodrome Drive, Janderra Lane and Almond Street into left in, left out only (the timing of delivery of the reconfigured Almond Street intersection is subject to confirmation of timeframes for delivery of other road works planned at the intersection as outlined in section 1.1.3 and chapter 3 of the REF)
- integration with new traffic signals and widening roadworks constructed in 2023 at the intersection of Picton Road and Pembroke Parade and Greenway Parade
- adjusting the posted speed from the western extent of the proposal, through the interchange and to the east of Pembroke Parade to 60 kilometres per hour (km/h).

Ancillary work and construction activities associated with the proposal includes:

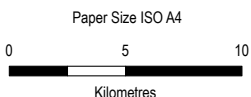
- property works including acquisition, adjustment to existing accesses and fencing
- civil earthworks and drainage works
- construction and adjustment of retaining walls, road pavement, and water quality devices
- tie-in work to adjoining sections of Picton Road, M31 Hume Motorway and other local roads
- installing and adjusting roadside furniture and delineation, such as safety barriers, kerb and gutter, fencing, lighting, signage, noise treatment and pavement markings
- installing new intelligent transport systems including, but not limited to, closed circuit television and variable message signs
- protecting, adjusting and relocating existing utilities and associated structures
- landscaping and rehabilitation of disturbed areas
- adjustment and provision of noise treatments, , and at-property noise treatments and noise mounds, as required
- establishment of temporary ancillary facilities to support construction including compound sites, site offices, stockpiles, access tracks, turning bays, median crossovers on the M31 Hume Motorway, and laydown areas
- site preparation works, including vegetation clearing and grubbing, site fencing, temporary drainage measures, traffic management and implementation of environmental management measures.

An overview of the proposal is provided in Figure 1.2. Further information is provided in chapter 3 of the REF.



Legend

- Proposal site
- Port
- Proposal
- Arterial road
- Sub-arterial road
- Western Sydney Parklands
- Western Sydney Aerotropolis
- Western Sydney Airport
- Western Sydney Employment Area
- Wilton Growth Area
- Greater Macarthur Growth Area
- Moorebank Intermodal Terminal



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

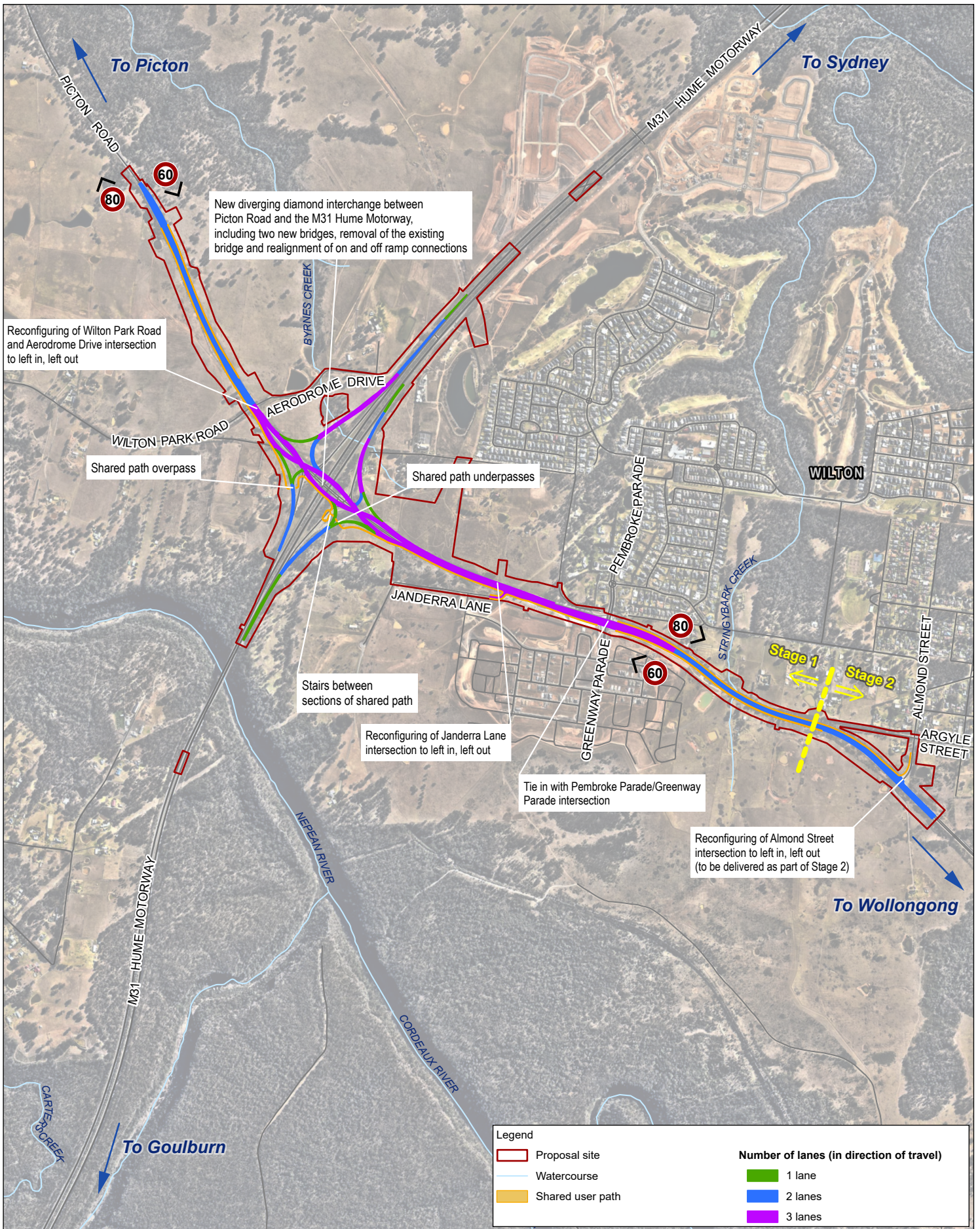


Transport for NSW
 Picton Road upgrade between
 Nepean River and Almond Street, Wilton –
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. 0
 Date 25/10/2023

Location of the proposal

FIGURE 1.1



Paper Size ISO A4
 0 250 500
 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



Transport for NSW
 Picton Road upgrade between
 Nepean River and Almond Street, Wilton –
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. 0
 Date 25/10/2023

The proposal

FIGURE 1.2

1.3 Purpose and structure of the report

This noise and vibration impact assessment report has been prepared by GHD Pty Ltd (GHD) on behalf of Transport. The purpose of this report is to document the results of the assessment of the potential noise and vibration impacts of construction and operation of the proposal. The report supports the REF for the proposal.

The assessment has been undertaken in accordance with relevant Transport noise and vibration guidelines. Further information on relevant guidelines and the scope and methodology is provided in sections 2 and 3.

The report provides the following information:

- **Section 1 (Introduction)** – provides an overview of the proposal and introduction to the report
- **Section 2 (Relevant policies and guidelines)** – provides an overview of the policies and guidelines referenced in this assessment
- **Section 3 (Methodology)** – provides an overview of the assessment methodology adopted to assess construction and operational noise and vibration impacts
- **Section 4 (Existing environment)** – provides an overview of the existing noise environment and sensitive receivers considered in this assessment
- **Section 5 (Construction impact assessment)** – assesses the potential noise and vibration impacts associated with construction of the proposal
- **Section 6 (Operational impact assessment)** – assesses the potential noise and vibration impacts associated with operation of the proposal
- **Section 7 (Recommended safeguards and management measures)** – provides an overview of the noise and vibration management measures during construction and operation of the proposal
- **Section 8 (Conclusion)** – provides a summary of the assessment methodology and identified impacts during construction and operation of the proposal.

2. Relevant policies and guidelines

2.1 Guidelines

This report has been prepared with reference to the guidelines in Table 2.1.

Table 2.1 Relevant assessment guidelines

Assessment	Guideline
Construction noise	<ul style="list-style-type: none"> – <i>Construction Noise and Vibration Guideline (Roads)</i> (Transport for NSW, June 2022) (CNVG) – <i>Interim Construction Noise Guideline</i> (DECC, 2009) (ICNG)
Construction vibration	<ul style="list-style-type: none"> – <i>Assessing Vibration: a technical guideline</i> (DEC, 2006) (AVTG) – <i>BS 7385-2:1993 Evaluation and measurement for vibration in buildings - Part 2</i> (British Standards, 1993) (BS7385) – <i>DIN 4150-3:2016 Vibration in Buildings – Part 3: Effects on structures</i> (German Standards, 2016) (DIN 4150-3)
Construction blasting	<ul style="list-style-type: none"> – <i>Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration</i> (ANZECC, 1990)
Operational road traffic noise	<ul style="list-style-type: none"> – <i>NSW Road Noise Policy</i> (DECCW, 2011) (RNP) – <i>Road Noise Criteria Guideline</i> (Transport for NSW, April 2022) (RNCG) – <i>Road Noise Mitigation Guideline</i> (Transport for NSW, March 2022) (RNMG) – <i>At-receiver Road Noise Treatment Guideline</i> (Transport for NSW, March 2022) (ARNTG) – <i>Road Noise Model Validation Guideline</i> (Transport for NSW, August 2022) (RNMVG)

Note should be made that there have been recent updates to several of the Transport for NSW road noise guidelines. This NVIA has been undertaken with reference to the guidelines in Table 2.1 as they were the current guidelines at the time of the assessment being completed. Future noise and vibration assessments should reference the documents in Table 2.2

Table 2.2 Updated Transport for NSW guidelines

Assessment	Guideline
Construction noise	<i>Construction Noise and Vibration Guideline (Roads)</i> (Transport for NSW, July 2023) (CNVG)
Operational road traffic noise	<ul style="list-style-type: none"> <i>Road Noise Criteria Guideline</i> (Transport for NSW, August 2023) (RNCG) <i>Road Noise Mitigation Guideline</i> (Transport for NSW, July 2023) (RNMG) <i>At-receiver Road Noise Treatment Guideline</i> (Transport for NSW, April 2023) (ARNTG)

2.2 Referenced documentation

The documents in Table 2.3 have been also referenced in the preparation of this report:

Table 2.3 Relevant assessment guidelines

Relevance	Referenced documentation
Assessment criteria	<ul style="list-style-type: none"> – <i>Environmental Impact Assessment Procedure: Preparing an Operational Traffic and Construction Noise and Vibration Assessment</i> (Transport for NSW, 2022) – <i>Noise Policy for Industry</i> (EPA, 2017) (NPfI) – <i>Guideline for Development Adjacent to the Upper Canal and Warragamba Pipelines</i> (WaterNSW, 2021)
Modelling prediction methods	<ul style="list-style-type: none"> – <i>Calculation of Road Traffic Noise</i> (UK Department of Transport, 1988) – <i>Evaluation of Calculation of Road Traffic Noise in Australia</i> (Peng et. al., 2017) – <i>Prediction and Assessment of Road Traffic Noise Impact</i> (Peng et. al., 2020) – <i>ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors</i> (ISO, 1996)

Relevance	Referenced documentation
	<ul style="list-style-type: none"> - <i>Transit Noise and Vibration Impact Assessment Manual</i> (FTA, 2018) - <i>AS 2187.2:2006 Explosives - Storage and use – Part 2: Use of explosives</i> (Austraian Standards, 2006) (AS2187.2:2006)
State planning policies / documentation	<ul style="list-style-type: none"> - <i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i> (T&I SEPP) - <i>Development Near Rail Corridors and Busy Roads – Interim Guideline</i> (DoP, 2008)
Wilton Growth Area Planning documentation	<ul style="list-style-type: none"> - <i>Wilton 2040 – A Plan for the Wilton Growth Area</i> (DPE, 2018a) - <i>Wilton South East Precinct Stage 1 Road and Rail Noise Planning Assessment</i> (Atkins Acoustics, 2018) - <i>Wilton Growth Area Development Control Plan 2021</i> (DPIE, 2021) - Sydney Western City Planning Panel DA number DD010.2018.00000339.001: <ul style="list-style-type: none"> • <i>Sydney Western City Planning Panel Council Assessment Report</i> (Wollondilly Shire Council, 2018) and Attachment 6 – Subdivision Plans • <i>Wilton Growth Area Land Zoning Map Sheet LZN_005</i> (DPE, 2018b)

3. Methodology

3.1 Study area

3.1.1 Assessment study area

3.1.1.1 Construction study area

The study area for the construction assessment includes the proposal site and a 600 metre buffer around the proposal site. The construction assessment study area and sensitive receivers considered in the construction assessment are shown in Figure 3.2.

3.1.1.2 Operational study area

The study area for the operational assessment has been identified in accordance with the guidance provided by the RNP and the RNCG. The RNP defines the study area width as *'600 metres from the centre line of the outermost traffic lane on each side of the subject road'*.

All buildings located within 600 metres on either side of the outermost traffic lanes of the proposal have been included in the assessment. The RNCG notes that this limit (i.e. 600 metres) is *'based on the limit of accuracy of currently approved road traffic noise models'*.

Structures corresponding to commercial and industrial receivers have been included in the modelling for shielding purposes. However, these structures have not been explicitly assessed as these receiver types are not considered sensitive receivers in accordance with the RNP.

The operational assessment study area and sensitive receivers considered in the operational assessment are shown in Figure 3.3.

3.1.2 Land use zoning

Land within the study area is zoned by either the Wollondilly Local Environmental Plan 2011 (Wollondilly LEP) or State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (SEPP (Western Parkland City)). Land use zones include:

- R2 Low Density Residential
- RU2 Rural Landscape
- SP2 Infrastructure (road, water supply and place of public worship uses)
- RU4 Rural Small Holdings
- C2 Environmental Conservation
- UD Urban Development.

3.1.3 Future developments

The study area includes sections of six precincts within the Wilton Growth Area (see Figure 3.1).

The inclusion of future planned development in a noise model requires a level of detail (i.e., lot boundary defined, building footprint, number of storeys and land use type) that is generally not known until the subdivision for the lots have been approved and the relevant approval authority (in this case, Wollondilly Shire Council (Council)) has also approved the development application (DA) for the individual lot.

A high-level review has been undertaken of the Wilton Growth Area precincts and the status of proposed future development within each precinct is summarised in Table 3.1 (including the assumptions regarding their inclusion in the noise modelling). Given residential development for individual lots has commenced within Stage 1 of Wilton Greens (see section 3.1.5), the noise model includes indicative building footprints for every lot within the development assuming they are two-storey houses as a worst-case. Figure 3.1 shows the location of key proposed developments with respect to the proposal site.

Table 3.1 Proposed future development within the Wilton Growth Area

Wilton Growth Area precinct	Rezoning status	Development and planning status	Noise assessment assumptions
Bingara Gorge	Rezoned by Council (was rezoned in Wollondilly LEP 2011 when gazetted)	Development largely completed or subject to development applications. Approval has been given for the following subdivisions and some residential development has commenced: <ul style="list-style-type: none"> – Stage 1 of Fairways North Precinct – Stage 1 of Fairways West Precinct – Stage 2 of Fairways North Precinct. Stage 2 of Fairways West Precinct has not yet been approved.	Existing (constructed) buildings within Bingara Gorge have been included in the noise modelling and assessment. The Fairways North and West developments are outside the operational study area and have not been included in the noise modelling and assessment.
South East Wilton	Rezoned under the Western Sydney City SEPP in 2018	Development has commenced with Stage 1 of the Wilton Greens development. Development within the remainder of the precinct would be consistent with the South East Wilton Structure Plan and would mainly consist of residential development.	Building footprints have been assumed for the entire Stage 1 of the Wilton Greens development (assuming two-storey houses as a worst case) and have been included in the noise modelling and assessment. A 1.8 metre high noise mound with a 1.8 metre high noise barrier along the northern boundary of the development has been included in the noise modelling. This is discussed further in section 3.1.5.
North Wilton	Rezoned under the Western Sydney City SEPP in 2018	Stages 1 to 3 of the Panorama development either approved or awaiting approval. Development within the remainder of the precinct would be consistent with the North Wilton Structure Plan and would mainly consist of residential development.	Stage 1 to 3 of the Panorama development are outside the operational study area and have not been included in the noise modelling and assessment.
Wilton Town Centre	Rezoned under the Western Sydney City SEPP in June 2023	Council has begun work on a master plan for the precinct.	Given this precinct is still in master planning stages and there are no approved subdivision DAs, building footprints have not been included in the noise modelling.
South Wilton	Yet to be rezoned	Development within the precinct would be consistent with the South East Wilton Structure and would mainly consist of residential development.	Given this precinct has not yet been rezoned and there are no approved subdivision DAs, building footprints have not been included in the noise modelling.
West Wilton	Yet to be rezoned	Precinct planning to be undertaken by Council.	Given this precinct has not yet been rezoned and there are no approved subdivision DAs, building footprints have not been included in the noise modelling.

Approved residential development applications for individual lots (at the time of approval for the proposal) would be considered 'existing sensitive receivers' and could qualify for noise mitigation consideration as part of the proposal.

For future development where there are no approved DAs for individual lots, developers and the relevant approval authorities would need to consider operational road traffic noise intrusion (from Picton Road and the M31 Hume Motorway) under the acoustic requirements of the T&I SEPP (as specified by section 2.120 (Impact of road noise or vibration on non-road development)) to ensure an adequate level of acoustic amenity can be achieved. Guidance on how this can be achieved is provided in the *Development Near Rail Corridors and Busy Roads – Interim Guideline*.

A land use assessment would be undertaken prior to the construction phase to confirm the status of sensitive receivers to inform the construction noise and vibration management plan (CNVMP) and the ONVR during detailed design (see recommended safeguards and management measures in section 7).

3.1.4 Noise catchment areas

Seven noise catchment areas (NCAs) have been defined across the study area to group areas based on the types of sensitive receivers present and acoustic environments. Descriptions of each NCA, including land zoning as described in Section 3.1.2, is provided in Table 3.2 and the NCAs are shown in Figure 3.4.

Table 3.2 NCA descriptions

NCA	Description
NCA01	NCA01 is located along Picton Road to the west of the M31 Hume Motorway. The NCA extends through the RU2 Rural Landscape land zone and is comprised of rural residential receivers. Ambient noise in this catchment area is dominated by road traffic noise along Picton Road and natural environmental noise.
NCA02	NCA02 is located on either side of the M31 Hume Motorway to the north and south of Picton Road. This catchment comprises predominantly of RU2 Rural Landscape land use and R2 Low Density Residential to the north of Picton Road and east of the M31 Hume Motorway. Ambient noise in this catchment area is dominated by road traffic noise along the M31 Hume Motorway and Picton Road. This catchment includes non-residential land uses, including Sydney Skydivers (Wilton Airport) and the Wilton Recycled Water Treatment Plant. These are both located to the north of Picton Road. One passive recreation land use (Golf Park) is located on Albatross Bend within Bingara Gorge to the north of Picton Road and east of the M31 Hume Motorway.
NCA03	NCA03 is located to the north of Picton Road and east of the M31 Hume Motorway. This catchment comprises predominantly of RU2 Rural Landscape land use and R2 Low Density Residential land uses. The catchment is representative of residential land uses located within 200 metres of Picton Road with no line of sight to the road due to an existing noise barrier. The existing noise barrier is about 350 metres long and located to the east of Pembroke Parade. Ambient noise in this catchment area is dominated by road traffic noise along Picton Road.
NCA04	NCA04 is located to the north of Picton Road and east of the M31 Hume Motorway. This catchment comprises predominantly of R2 Low Density Residential land uses and is accessed via Pembroke Parade. The catchment is representative of residential land uses located over 200 metres from Picton Road. Ambient noise in this catchment area is dominated by suburban sounds such as local road traffic noise, mechanical plant noise (air conditioners, pumps) and natural noise sources.
NCA05	NCA05 is located to the north of Picton Road and east of the M31 Hume Motorway. This catchment comprises predominantly of RU2 Rural Landscape land use and R2 Low Density Residential land uses. The catchment is representative of residential land uses located over 200 metres from Picton Road. Ambient noise in this catchment area is dominated by suburban sounds such as local road traffic noise and natural noise sources. This catchment includes non-residential land uses, including Wilton Anglican Church and commercial premises located along Argyle Street.
NCA06	NCA06 is located to the north and south of Picton Road and east of the M31 Hume Motorway. This catchment comprises predominantly of RU2 Rural Landscape land use and UD Urban Development land uses. The catchment is representative of residential land uses located within 200 metres of Picton Road and with a line of sight to the road. Ambient noise in this catchment area is dominated by road traffic noise along Picton Road. The catchment to the north of Picton Road comprises of sparsely spaced residences. Stage 1 Wilton Greens future residential development (currently under construction) is located to the south of Picton Road.

NCA	Description
NCA07	<p>NCA07 is located to the south of Picton Road and south-east of the M31 Hume Motorway. This catchment comprises UD Urban Development land use. The catchment is representative of future residential land uses located over 200 metres from Picton Road. The ambient noise environment is currently dominated by road traffic noise from Picton Road and natural sounds; however, it is likely to change once the Wilton Greens development has been completed.</p> <p>The catchment to the north of Picton Road comprises of sparsely spaced residences. Stage 1 Wilton Greens future residential development (currently under construction) is located to the south of Picton Road.</p>


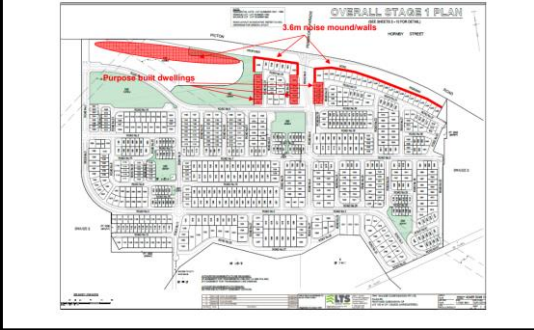
3.1.5 Stage 1 of the South East Wilton Precinct (Wilton Greens)

3.1.5.1 Subdivision development approval

The South East Wilton Precinct (also known as Wilton Greens) is a residential development comprising four stages. This precinct is located to the south of Picton Road and east of the M31 Hume Motorway. The development would be accessed via the recently upgraded intersection between Picton Road and Pembroke Parade.

Stage 1 of the development of the precinct was approved in 2019 by the Sydney Western City Planning Panel and the development is being carried out by a private developer. Council's assessment report states that a 3.6 metre-high noise barrier (a 1.8 metre mound plus a 1.8 metre acoustic fence) is required to be constructed in two locations by the developer to reduce noise for the future residences fronting Picton Road. These requirements are detailed in conditions 1.4, 2.6.1 and 5.18.1 of the general conditions of consent for DA DD010.2018.00000339.001 (see Table 3.3).

Table 3.3 Noise mounds and noise walls included in the noise modelling

Section view of Picton Road / noise mound / noise wall ¹	Extent of noise walls and noise mounds fronting Picton Road ¹
<p>Acoustic Walls</p> <p>The proposed development includes the provision of acoustic mounding and walls along the subject site's frontage with Picton Road as recommended in the Acoustic Report prepared by Atkins Acoustics. The mounding and walls are proposed to a maximum height of 3.6m comprising of 1.8m of mounding and a 1.8m acoustic wall, as detailed in Figure 1 below.</p>  <p>Figure 1 – Section of the Proposed Acoustic Wall (Source: Site Image Landscape Architects)</p> <p>Source: Section 5 of <i>Council Assessment Report for DD010.2018.00000339.001</i> (Wollondilly Shire Council, 2019)</p>	<p>ATTACHMENT 3. Picton Road Noise Mounds/Walls</p>  <p>Source: Attachment 3 of <i>Wilton South East Precinct Stage 1 Road and Rail Noise Planning assessment</i> (Atkins Acoustics, 2018)</p>
<p>Note 1: General conditions of consent (relevant to the noise mounds/walls):</p> <p>1.4 Development must take place in accordance with the recommendations of the following reports submitted in respect of Development Application No. 010.2018.00000339.001, except where varied by any of the following conditions of this consent:</p> <ul style="list-style-type: none"> • <i>Wilton South-East Precinct Stage 1 Road and Rail Noise Planning Assessment - Atkins Acoustics - 21 December 2018</i> <p>2.6.1 In relation to the provision of acoustic and noise abatement wall and earthwork infrastructure:</p> <ul style="list-style-type: none"> • the person or entity having the benefit of this consent must submit to the Certifying Authority, for approval, an <i>Acoustic Infrastructure Guideline</i> outlining the purpose, obligations and maintenance requirements of the infrastructure. <p>5.18.1 Acoustic mounds and planting of vegetation are to be installed along the Picton Road boundary in accordance with Sections and Elevations 08 Plans Job Number SM17248, Drawing Number:- DA308, Issue: B, provided by Site Image - Landscape Architects and dated 4 March 2019, prior to the release of any Subdivision Certificate.</p>	

3.1.5.2 Individual lot DA requirements

Council also requires noise monitoring and an acoustic report to be prepared for individual residential developments prior to the issue of a construction certificate to confirm that the acoustic requirements of the T&I SEPP can be achieved. It is understood that individual building plans are currently being lodged with Council.

Residential lots within the approved Stage 1 development (which are located in NCA06 and NCA07 and are referred to as Stage 1 Wilton Greens for the purpose of this report) have been included in the construction and operational noise assessments. However, it should be noted that the majority of individual residential buildings are not currently approved by Council. These residential buildings would be required to achieve the internal noise targets defined in section 2.120 of the T&I SEPP as the development is located adjacent to a road corridor with an annual average daily traffic volume of more than 20,000 vehicles.

It should also be noted that Control 4 in Section 3.12.2 (Odour, Noise and Air Quality) of the Wilton Growth Area Development Control Plan (DCP) (DPIE, 2021) states that:

DAs for noise impacted dwellings should detail siting considerations, design and architectural treatments with consideration to the design principles in Section 3.8 of the Development near Rail Corridors and Busy Roads – Interim Guideline (Department of Planning 2008) and include ventilation that meets the requirements of the Building Code of Australia where windows are required to remain closed to meet internal noise levels.

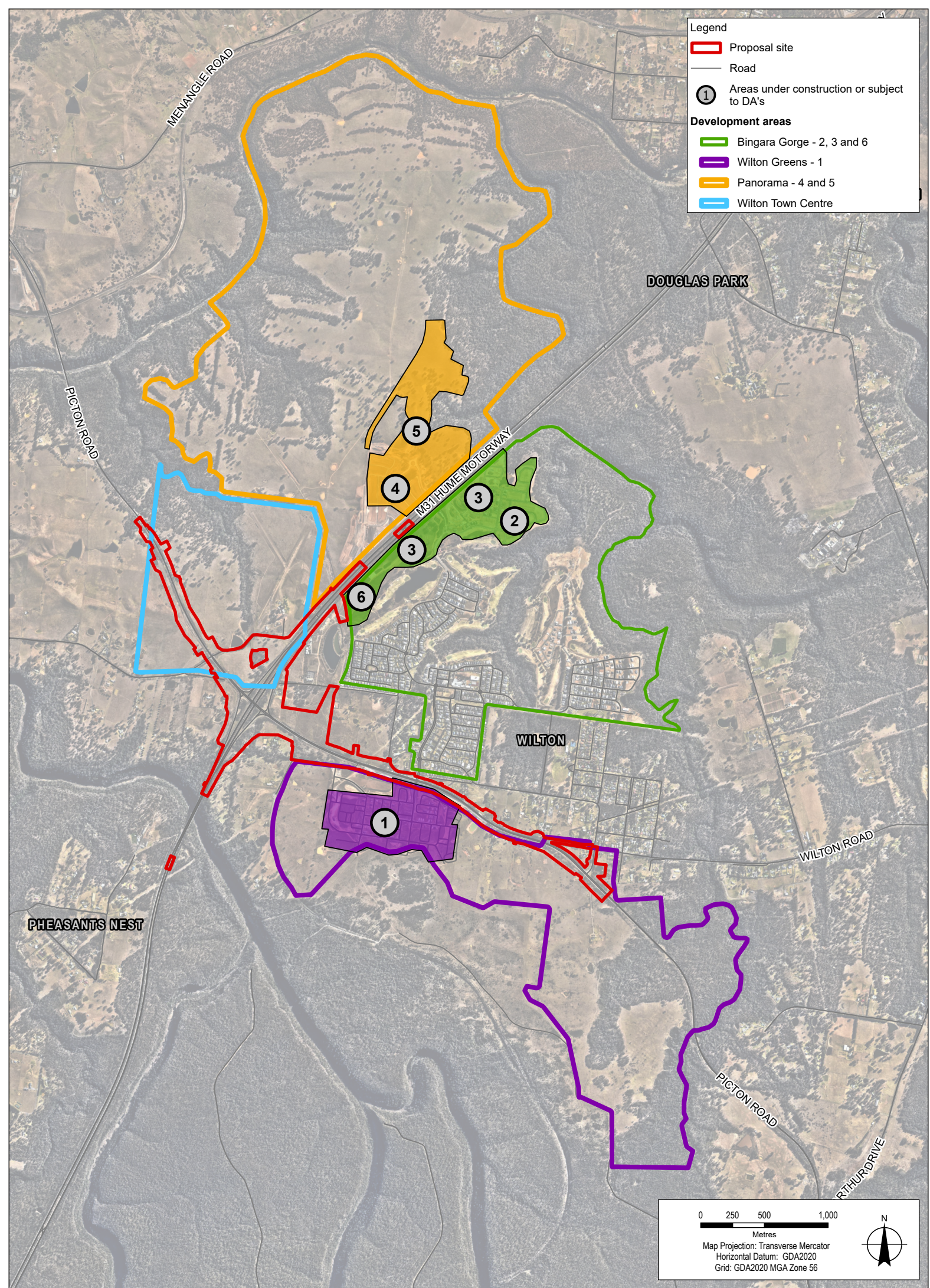
The *Development Near Rail Corridors and Busy Roads – Interim Guideline* provides guidance on how the acoustic requirement of the T&I SEPP can be met.

3.1.5.3 Noise modelling assumptions

As part of the operational noise assessment (see section 3.3), two 3.6 metre noise walls have been modelled in both the build (with the proposal) and no-build (without the proposal) operational noise scenarios. These noise walls are located along Picton Road with returns at the Pembroke Parade and Picton Road intersection. These noise walls were recommended by the *Wilton South East Precinct Stage 1 Road and Rail Noise Planning Assessment* (Atkins Acoustics, 2018), which was developed to inform the South East Wilton Precinct Stage 1 development application (see Table 3.3). The Atkins Acoustics assessment also provides 'deemed to comply' treatment packages for residential receivers fronting Picton Road. Further information is provided in section 6.5.

3.1.6 Future stages of the South East Wilton Precinct (Wilton Greens)

Stages 2 and 3 of the development are currently under review following the lodgement of the Draft Neighbourhood Plan. Subdivision of the rezoned land is not currently approved. Rezoning of Stage 4 has not been approved currently. Stages 2, 3 and 4 have not been considered in this assessment as the locations of the land parcels are unknown at this stage and potentially noise-affected future residential developers/owners would be required to implement noise mitigation as part of the DA process.



Legend

- Proposal site
- Road
- ① Areas under construction or subject to DA's

Development areas

- Bingara Gorge - 2, 3 and 6
- Wilton Greens - 1
- Panorama - 4 and 5
- Wilton Town Centre

0 250 500 1,000
Metres




Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

Figure 3-1 - Future development

Data source: Nearmap WMS Server; NSW SS-SDS, Topographic base data, 2023. Created by: akidea
N:\AU\Wollongong\Projects\23\12560200\GIS\Maps\12560200_PictonRoad_Stage1_ConceptDesign\12560200_REF_B.aprx
12560200_REFX013_ProposedFutureDevelopment_A4P. Print date: 25 Oct



Legend

-  Construction noise and vibration study area
-  Road design
-  Buildings



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 10/26/2023

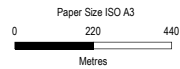
**Construction noise
 and vibration study area**

Figure 3.2



Legend

- Operational study area
- Road design
- Buildings



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

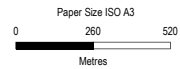
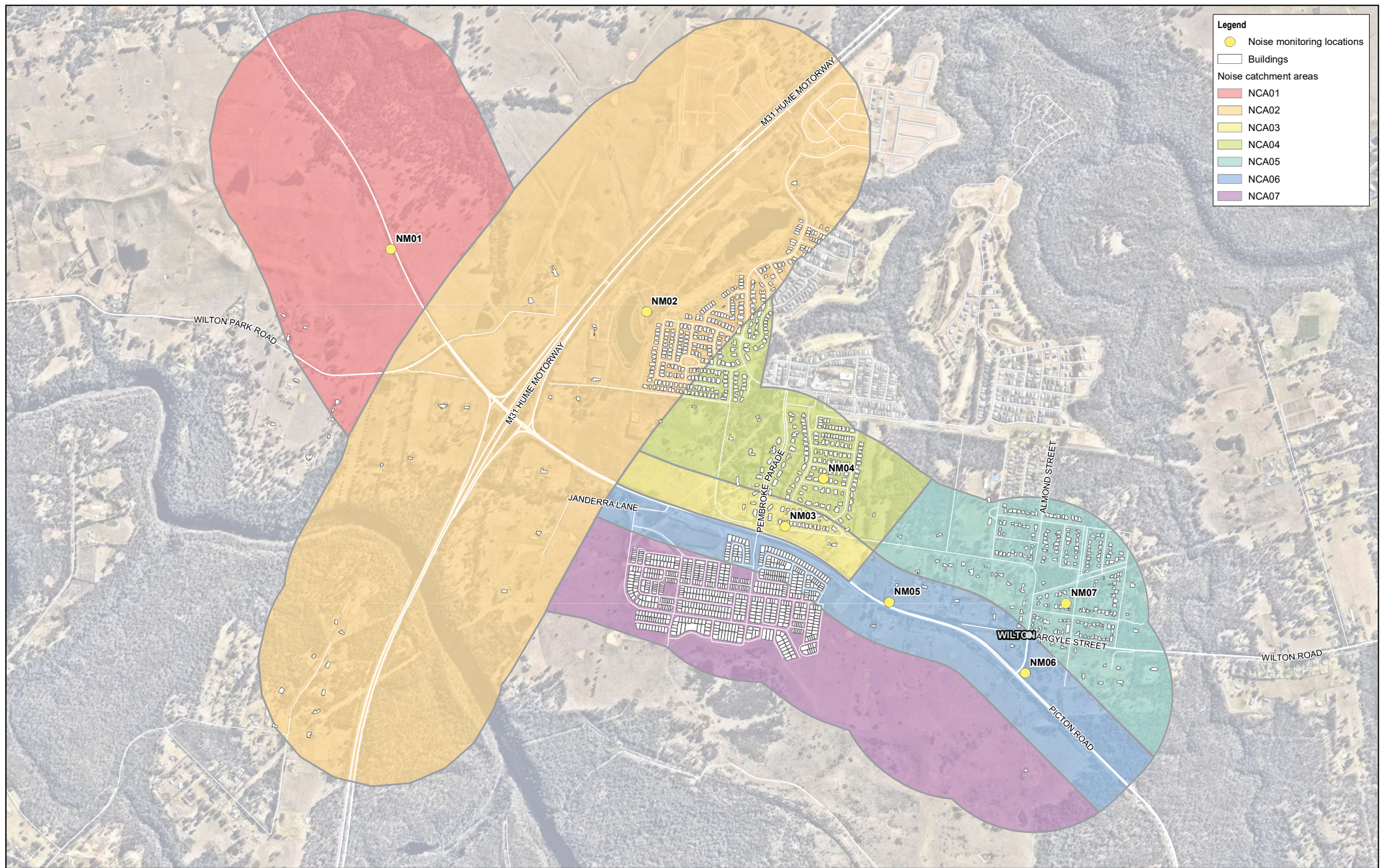


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Operational study area

Figure 3.3



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

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Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

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Noise monitoring locations and noise catchment areas

Figure 3.4

3.2 Construction assessment methodology

The construction assessment methodology is based on the procedures outlined in the ICNG and the CNVG.

The methodology presented in this section details the scenarios and noise model inputs adopted to assess construction noise and vibration impacts.

3.2.1 Construction work hours

Construction works have the potential to result in impacts on areas where projects are undertaken. To minimise the potential noise and vibration amenity impacts, construction works are generally undertaken during the following ICNG recommended standard working hours:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- no works on Sundays or public holidays.

The recommended standard hours for blasting as per the ICNG are:

- Monday to Friday: 9 am to 5 pm
- Saturday: 9 am to 1 pm
- Sunday or public holidays: no blasting.

As described in section 3.3 of the REF, general construction work for the proposal would be carried out during recommended standard working hours. To minimise disruption to traffic, disturbance to the surrounding community and for the safety of the construction workforce, it would be necessary to carry out work outside of these hours (known as out-of-hours work (OOHW), see section 3.3 of the REF for more detail).

The construction work periods defined in the CNVG for construction activities are provided in Table 3.4.

Table 3.4 Transport for NSW construction hours

Hour commencing	12 am	1 am	2 am	3 am	4 am	5 am	6 am	7 am	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm
Monday	OOHW Period 2 (Night)							Standard construction hours							OOHW Period 1 (Evening)									
Tuesday	OOHW Period 2 (Night)							Standard construction hours							OOHW Period 1 (Evening)									
Wednesday	OOHW Period 2 (Night)							Standard construction hours							OOHW Period 1 (Evening)									
Thursday	OOHW Period 2 (Night)							Standard construction hours							OOHW Period 1 (Evening)									
Friday	OOHW Period 2 (Night)							Standard construction hours							OOHW Period 1 (Evening)									
Saturday	OOHW Period 2 (Night)							OOHW Period 1 (Day)				OOHW Period 2 (Night)												
Sunday	OOHW Period 2 (Night)							OOHW Period 1 (Day)											OOHW Period 2 (Night)					

3.2.2 Indicative construction scenarios

The indicative construction work methodology, which is described in section 3.3 of the REF, involves five main construction activity groups (see Table 3.5). A total of 17 indicative construction scenarios have been modelled based on the construction activities that require equipment operating in the same general location or work area.

These construction activity groups and scenarios are not the same as the five construction stages of the proposal, as described in section 3.3 of the REF. These activity groups represent all the likely noise generating activities that will occur throughout the five construction stages of the proposal, for the purposes of the construction noise assessment.

This assessment approach assumes ‘worst-case’ noise impacts, assuming that the works are located at the nearest location between the construction area and each receiver location as shown in Figure 3.5. This approach has been used to identify where noise impacts could be a concern and to determine appropriate mitigation measures to be implemented. For the majority of the time, noise levels would be lower than those presented in the noise modelling predictions.

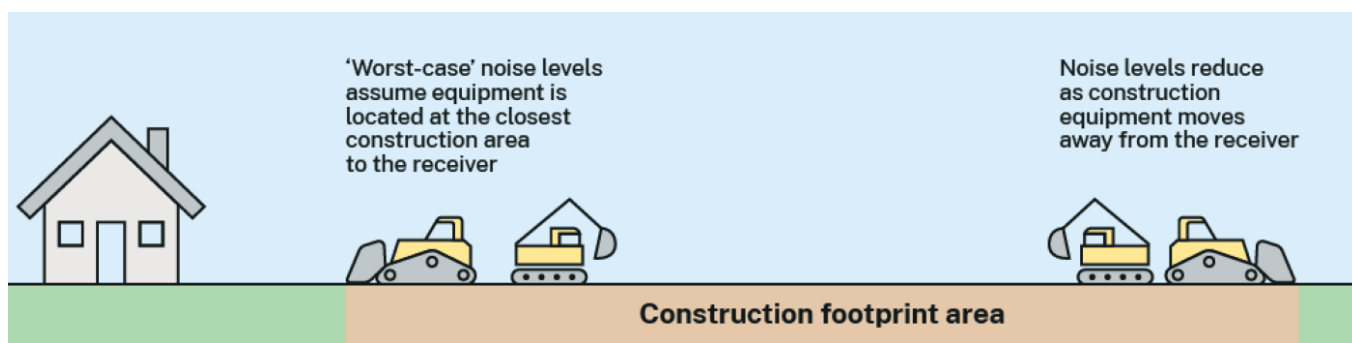


Figure 3.5 Worst-case noise levels for the construction footprint

The construction scenarios used for the assessment are outlined in Table 3.5 along with the relevant activity group (AG) and an indication where there is the potential for OOHW as described in Section 3.2.1.

Table 3.5 Construction scenarios

Activity group (AG)	Construction scenario ID	Description of key activities	Construction hours	
			Recommended standard working hours	OOHW (day, evening and night)
AG1: Site establishment and earthworks	CS01	Site establishment	✓	✓
	CS02	Vegetation clearing, installation of erosion and sedimentation controls	✓	✓
	CS03	Properties adjustments and demolition works	✓	✓
	CS04	Earthworks, clearing and topsoil stripping	✓	✓
AG2: Utilities and drainage	CS05	Utilities relocation, traffic control system installations	✓	✓
	CS06	Drainage works	✓	✓
AG3: Bridge works	CS07	Bridge works – drainage and structures construction	✓	✓
	CS08	Bridge works – Piling works	✓	✓
	CS09	Bridge works – Pavement works	✓	✓
AG4: Bridge demolition and pavement works	CS10	Demolition of existing bridge	✓	✓
	CS11	Pavement works	✓	✓
AG5: Finishing works	CS12	Line marking	✓	✓
	CS13	Road furniture installations	✓	✓
CC: Construction compounds	CS14	Haul route turning bay and crossovers	✓	✓
	CS15	Compound 1	✓	✓
	CS16	Compound 2	✓	✓
	CS17	Laydown, materials storage	✓	✓

The work methodology for the proposal would be refined during the detailed design phase. Subject to approval and construction funding, it is anticipated works (including early works) would commence in 2026 and be completed by 2031. The indicative work methodology is outlined in Section 3.4 of the REF and is based on the

concept design. A detailed program of work would be determined by the construction contractor, after completion of the detailed design and in consultation with Transport.

3.2.3 Construction equipment

3.2.3.1 $L_{Aeq(15min)}$ noise levels

The equipment list and construction activities are based on workshops with the project team and are indicative only. The activity sound power levels are based on the loudest two items of equipment operating simultaneously. The operation for each equipment has been corrected based on the expected operation during a worst-case 15-minute period. It is anticipated that the worst-case receiver noise levels would be captured in the modelling and is an adequate approach to inform the mitigation measures for the proposal.

Indicative construction equipment that would be used and the activity sound power level for each construction scenario are provided in Table 3.6. Equipment sound power levels (SWL) are sourced from Appendix F of the CNVG.

3.2.3.2 L_{AFmax} noise levels

Potential sleep disturbance impacts have been assessed and identified for all construction scenarios, as Table 3.5 indicates the possibility of night works (OOHW night) during every scenario. The L_{AFmax} levels, equivalent to the $L_{AF1(1\text{ minute})}$, used to assess potential sleep disturbance are based on the loudest item of equipment for each scenario. Where L_{AFmax} noise levels were not available in the CNVG, the following assumptions have been made to estimate the L_{AFmax} noise level:

- for continuous heavy machinery noise sources (e.g. compressors and generators), the L_{AFmax} noise level has been assumed to be 3 dB greater than the $L_{Aeq(15min)}$ noise level
- for all other equipment, L_{AFmax} noise level has been assumed to be 8 dB greater than the $L_{Aeq(15min)}$ noise level.

The activity maximum L_{AFmax} sound power levels for the sleep disturbance assessment and corresponding noise intensive equipment are provided in Table 3.7.

3.2.3.3 Construction planning

The exact details of the construction methodology, plant or equipment for the proposal, such as the intensity of works, sound power levels or operating duration are not yet known, therefore this assessment is based on a number of conservative assumptions. This information would be refined during the design development process and construction planning where a Construction Noise and Vibration Impact Statement (CNVIS) would be prepared to determine mitigation measures to be implemented. The CNVIS would be consistent with the NVMP prepared for the proposal (see section 7).

Other equipment or alternative construction methodologies may be used; however, it is anticipated that they would produce similar net noise emissions when used concurrently with the equipment listed.

The activity sound power levels have been used to determine likely worst-case noise impacts during construction and assumes that equipment would operate at full power. In reality, construction equipment would move around the construction footprint which would change the level of noise impact as construction progresses.

Table 3.6 Construction equipment and sound power levels, dBA

Equipment	SWL ¹	Construction scenario																
		CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
Activity sound power level		109	117	122²	116	118²	113	118²	110	102	122²	118²	106	106	105	111	111	111
Asphalt truck and sprayer	103	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-
Backhoe	111	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Bulldozer	116	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Chainsaw	114	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressor	109	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓	✓
Concrete saw	118	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Concrete truck	109	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-
Excavator – 35 tonne	110	-	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-
Franna crane	98	✓	-	-	-	-	✓	✓	✓	-	✓	-	-	-	-	✓	✓	✓
Front end loader	112	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓
Generator	103	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓	✓
Grader	113	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Light vehicles	88	✓	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
Lighting – daymaker	98	✓	-	-	-	✓	-	-	-	✓	-	✓	-	✓	✓	✓	✓	✓
Line marking truck	108	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Pavement laying machine	114	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Piling rig – bored	112	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Pneumatic hammer	113	-	-	✓	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-
Roller – large pad foot	109	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-
Roller – vibratory	109	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-
Scissor lift	98	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-
Scraper	110	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-

Equipment	SWL ¹	Construction scenario																
		CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
Activity sound power level		109	117	122²	116	118²	113	118²	110	102	122²	118²	106	106	105	111	111	111
Truck – dump	110	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-
Truck – medium rigid	103	✓	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
Truck – road truck	108	✓	-	-	-	-	✓	-	✓	-	-	✓	-	-	✓	✓	✓	✓
Tub grinder/mulcher	116	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vacuum truck	109	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-
Water cart	107	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-
Welding equipment	105	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	✓	✓

Notes: 1. Equipment sound power levels (SWL) listed are unadjusted values from the CNVG
2. 5 dBA penalty applied to SWL due to special audible characteristics as per the ICNG.

Table 3.7 Modelled activity maximum sound power levels for sleep disturbance assessment, dBA

Activity Group	Constructi on scenario ID	Description of key activities	Activity maximum SWL Lmax, dBA	Noise intensive equipment (highest SWL)
AG1	CS01	Site establishment	112	Compressor
	CS02	Vegetation clearing, installation of erosion and sedimentation controls	123	Excavator - 35 tonne
	CS03	Properties adjustments and demolition works	126	Concrete saw
	CS04	Earthworks, clearing and topsoil stripping	123	Excavator - 35 tonne
AG2	CS05	Utilities relocation, traffic control system installations	123	Excavator - 35 tonne
	CS06	Drainage works	123	Excavator - 35 tonne
AG3	CS07	Bridge works – drainage and structures construction	116	Pneumatic hammer
	CS08	Bridge works – Piling works	115	Piling rig - bored
	CS09	Bridge works – Pavement works	106	Truck - medium rigid
AG4	CS10	Demolition of existing bridge	126	Concrete saw
	CS11	Pavement works	117	Roller - vibratory
AG5	CS12	Line marking	116	Line marking truck
	CS13	Road furniture installations	108	Welding equipment
CC	CS14	Haul route turning bay and crossovers	114	Compressor
	CS15	Compound 1	114	Compressor
	CS16	Compound 2	114	Compressor
	CS17	Laydown, materials storage	114	Compressor


3.2.4 Noise model inputs

Noise modelling was undertaken using SoundPLAN Version 8.2. SoundPLAN Version 8.2 is a computer program used for the calculation, assessment, and prognosis of noise exposure. SoundPLAN Version 8.2 calculates environmental noise propagation according to *ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'*.

The noise model inputs and assumptions used for this assessment are provided in Table 3.8.

Table 3.8 Construction noise modelling parameters

Modelling component	Assumption
Noise model	SoundPLAN Version 8.2
Prediction algorithm	<i>ISO 9613 – 2 Acoustics – Attenuation of sound during propagation outdoors</i>
Terrain	<i>NSW Spatial Services 1m Digital Elevation Model</i>
Modelling period	Typical worst case 15-minute period of operation where each item of equipment is running at full power at the same location.
Construction work areas	Developed in collaboration with the project team and based on the indicative construction activity footprints as of March 2023.
Meteorology	ISO 9613 considers the presence of a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights or 'downwind' conditions which are favourable to sound propagation.

Modelling component	Assumption
Ground absorption coefficient	G = 0.75 for land
Atmospheric absorption	Based on an average minimum temperature of 10°C and an average humidity of 70%.
Receiver heights	1.5 m above building ground level (ground floor). +3.0 m for each additional floor.
Shielding	Modelled scenarios consider the shielding effect from surrounding buildings and structures on and adjacent to the site.
Noise barriers	<p>The following noise barriers, assumed to be in place prior to construction works, have been included in the construction noise model:</p> <p>Existing noise barrier:</p> <p>One 3.6 m high noise barrier along the eastbound Picton Road carriageway to the east of Pembroke Parade (shown as the blue line in the image below). Either a section or the whole of this barrier would be relocated as part of the proposal. It is assumed for the noise model that the whole barrier would be relocated during the early stages of the construction period (modelled two metres north of the existing location to allow for the proposal) and would remain in place for the remainder of the construction period.</p> <p>Barriers to be built by the Stage 1 Wilton Greens developer:</p> <p>Two 3.6 m high noise barriers along the westbound Picton Road carriageway. This has been included as part of the Stage 1 Wilton Greens development consent conditions and would be built by the developer (shown as the red lines in the image below).</p> <p>Noise barrier locations:</p> 

3.2.5 Construction vibration assessment

Energy from equipment is transmitted into the ground and transformed into vibration, which attenuates with distance. The magnitude and attenuation of ground vibration depends on the following:

- efficiency of the energy transfer mechanism of the equipment (i.e. impulsive, reciprocating, rolling or rotating equipment)
- frequency content
- impact medium stiffness
- type of wave (surface or body)
- ground type and topography.

Construction works have the potential to generate human comfort impacts and/or cosmetic damage impacts to structures. Potential vibration generating activities identified include:

- piling, rock breaking and compaction works using a vibratory roller
- construction traffic movements.

Minimum working distances from the CNVG are outlined in Table 3.9. Vibration intensive equipment would generally only operate outside the minimum working distances for cosmetic damage. Where this is not possible, safeguards would be expected to be put in place to avoid or minimise impacts on buildings and other structures. Structures that may be impacted by construction vibration have been determined using a vibratory roller (> 18 tonnes). This plant item is expected to generate the highest levels of vibration and has been used to provide a conservative assessment.

The minimum working distances for vibration are indicative and would vary depending on the particular item of plant, local geotechnical conditions and the dominant frequency of the construction vibration levels. They apply to the cosmetic damage of typical light-framed residential buildings and heritage/fragile buildings and assume that construction vibration could include low frequency content which is associated with an increased risk to cosmetic damage.

Table 3.9 Construction vibration minimum working distances

Plant	Approximate size	Minimum working distances (metres)		
		Cosmetic damage (BS 7385) Light-framed structures	Cosmetic damage (DIN4150) Heritage and other sensitive structures	Human comfort (EPA's vibration guideline)
Vibratory roller	1-2 tonnes	5	14	15 to 20
	2-4 tonnes	6	16	20
	4-6 tonnes	12	33	40
	7-13 tonnes	15	41	100
	13-18 tonnes	20	54	100
	> 18 tonnes	25	68	100
Small hydraulic hammer	300 kg – 5 to 12 tonne excavator	2	5	7
Medium hydraulic hammer	900 kg – 12 to 18 tonne excavator	7	19	23
Large hydraulic hammer	1600 kg – 18 to 34 tonne excavator	22	60	73
Vibratory pile driver	Sheet piles	2 m to 20 m	50	20
Piling rig – bored	≤ 800 mm	2 m (nominal)	5	4
Jackhammer	Handheld	1 m (nominal)	2	2

3.2.6 Construction blasting assessment

Limited blasting may be required during construction near Almond Street and Wilton Park Road, due to the potential for very high strength rock to be encountered during excavation activities. Blasting details, such as explosive charge mass, are not known at this stage of the proposal. A general blasting assessment has been carried out in accordance with *AS2187.2 Explosives – storage and use*, which provides site exponents for 'average' meteorological attenuation and ground conditions. Once the construction methodology is confirmed, a proposal-specific blasting assessment would be completed as part of the NVMP. Site constants, blast chargers and other assumed values would be confirmed through this process by the selected blast contractor to ensure the requirements of the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990) are achieved.

3.2.6.1 Airblast calculations

Airblast is the pressure wave produced by a blast and transmitted through the air. This may be audible if it contains energy within the audible frequency range between 20 Hz to 20 kHz. The energy in an airblast may be below the human range of hearing and in the frequency range between 2 Hz and 20 Hz. The low frequency pressure wave can create secondary audible effects from rattling windows and sliding doors.

The airblast overpressure generated from a blast can be estimated using the following equation outlined in Appendix J7.2 of AS2187.2:2006:

$$P = K_a \left(\frac{R}{Q^{\frac{1}{3}}} \right)^a$$

Table 3.10 summarises the constants in the equation and the values that have been assumed to estimate airblast levels. Appendix J7.2 of AS2187 states that ‘when using a site exponent of 1.45, the site constant (K_a) is commonly in the range of 10 to 100’. In the absence of existing blast monitoring data in the area, an intermediate site constant of K_a 50 has been assumed. However, this site constant would be refined through trial blasting carried out by the blast contractor to refine the airblast overpressure calculations.

Table 3.10 Airblast parameters

Parameter	Definition	Assumed value
P	Pressure, kPa	Calculated
Q	Explosive charge mass per hole, kg	5 to 100
R	Distance from charge, metres	Range: 100 m to 500 m
a	Site exponent	-1.45
K_a	Site constant	50

3.2.6.2 Ground vibration calculations

Ground vibration is the pressure wave produced by a blast and transmitted through the ground. The ground vibration that is transmitted is complex and can propagate at different velocities depending on the medium it is travelling through.

Appendix J7.3 of AS2187.2:2006 states that ‘When blasting is to be carried out to a free face in average field conditions, the following equation may be used to estimate the mean (50% probability of exceedance) vector peak particle velocity’:

$$V = K_g \left(\frac{R}{Q^{\frac{1}{2}}} \right)^{-1.6B}$$

Where: $K_g = 1140$ and $B = 1.6$

Table 3.11 summarises the constants in the equation and the values that have been assumed to estimate ground vibration levels. In the absence of existing blast monitoring data in the area, the assumed site constants in AS2187 have been adopted. These site constants would be refined through trial blasting carried out by the blast contractor to refine the ground vibration calculations.

Table 3.11 Ground vibration parameters

Parameter	Definition	Assumed value
V	Ground vibration in vector peak particle velocity, m/s	Calculated
Q	Maximum charge mass, kg	5 to 100
R	Distance from charge, metres	Range: 100 m to 500 m
K_g	Site constant	1140
B	Rock properties	1.6

3.3 Operational assessment methodology

The operational assessment methodology is based on the procedures outlined in the RNCG and the RNMG. These guidelines outline the approach that Transport adopts to implement the objectives of the RNP.

The methodology presented in this section describes the scenarios and noise model inputs adopted to assess operational noise and vibration impacts after the completion of the proposal.

3.3.1 Assessment scenarios

The road traffic noise impact assessment years are provided in Table 3.12. For each assessed year, noise levels are determined for the following scenarios:

- **‘No build’ option:** road traffic noise levels that would occur if the proposal does not proceed.
- **‘Build’ option:** road traffic noise levels that would occur if the proposal proceeds.

Table 3.12 Assessment timeframes

Timeframe	Description	Adopted year for assessment
Opening year	The planned year of completion of the proposal and opening to traffic	2031
Design year	Ten years after the completion of the proposal and opening to traffic	2041

Assessment during the opening year is undertaken to determine the potential for noise issues arising from opening of the road proposal.

Assessment during the design year is undertaken to determine the potential for long-term noise issues once the surrounding road network has stabilised. Noise mitigation is considered based on the noise impacts predicted during the design year.


To ensure an adequate level of accuracy in the noise predictions for the assessment scenarios (2031 and 2041), existing (measured) noise levels have been compared against the modelled noise level predictions for the baseline scenario (2022). The results of the noise model validation are discussed in section 6.2.

3.3.2 Noise model inputs

The noise model inputs and assumptions for the existing, 2031 and 2041 No build and Build scenarios are presented in Table 3.13.

Table 3.13 Operational noise model inputs and assumptions

Input / assumption	Description
Software	SoundPLAN Version 8.2
Prediction algorithm	<p>United Kingdom Department of Transport Calculation of Road Traffic Noise (CoRTN) based on the application of the four-source height method.</p> <p>The six-category heavy vehicle method was adopted due to high heavy vehicle proportions along Picton Road and the M31 Hume Motorway.</p> <p>An equivalent heavy vehicle correction was calculated based on the measured/projected volumes and speeds for each heavy vehicle category (see Appendix C-2).</p>
Model inputs	
Topography	Based on LiDAR data and the South East Wilton Precinct (Wilton Greens) development design.
Road elevations	Based on the following 80 per cent concept design drawings.
Buildings	<p>Based on building footprints provided by Geoscape.</p> <p>Additional buildings have been identified and integrated into the model based on aerial imagery.</p>

Input / assumption	Description
Receiver location	One metre from the building façade.
Receiver height	Ground floor: 1.5 m above ground First floor: 4.5 m above ground
Ground absorption	0.75
Input parameters	
Validation model road surface adjustment	Dense Graded Asphalt (DGA) +0 dBA Open Graded Asphalt (OGA): -2 dBA
Validation model traffic volumes	Based on measured traffic count data surveyed between 22 October and 11 November 2022. Traffic count data was processed to obtain the light vehicle and heavy vehicle volumes for modelling. Measured volumes are provided in Appendix C-2-1 and Appendix C-2-2.
Validation model traffic speeds	Based on measured traffic count data. Measured speeds are provided in Appendix C-2-1 and Appendix C-2-2.
No-build road surface adjustments	DGA: +0 dBA OGA: -2 dBA
Build road surface adjustments	DGA: +0 dBA OGA: -2 dBA
No-build and build traffic volumes	Discussed in section 3.3.5. Opening year (2031) volumes are provided in Appendix C-2-3 to Appendix C-2-6 Design year (2041) volumes are provided in Appendix C-2-7 to Appendix C-2-10
No-build and build traffic speeds	Opening year (2031) speeds are provided in Appendix C-2-3 to Appendix C-2-6. Design year (2041) speeds are provided in Appendix C-2-7 to Appendix C-2-10
Noise barriers	<p>The following noise barriers, assumed to be in place prior to the opening of the proposal, have been included in the operational noise model:</p> <p>Existing noise barrier:</p> <p>One 3.6 m high noise barrier along the eastbound Picton Road carriageway to the east of Pembroke Parade (shown as the blue line in the image below). Either a section or the whole of this barrier would be relocated as part of the proposal. It is assumed for the noise model that the whole barrier would be relocated and has been modelled approximately two metres to the north of the existing location to allow space for the proposal for during construction and operation. It assumed to be installed at the same height of the existing barrier (3.6 metres).</p> <p>Barriers to be built by the Stage 1 Wilton Greens developer:</p> <p>Two 3.6 m high noise barriers along the westbound Picton Road carriageway. This has been included as part of the Stage 1 Wilton Greens development consent conditions and would be built by the developer (shown as the red lines in the image below)</p> <p>Noise barrier locations:</p> 

Input / assumption	Description
Corrections	
Façade correction	+2.5 dBA
CoRTN conversion factor	- 3 dBA for conversion between L _{A10(1 hour)} levels and L _{Aeq(1 hour)} levels
Source height and correction	Cars: 0.5 m, +0 dBA correction Truck tyres: 0.5 m, -5.4 dBA correction Truck engines: 1.5 m, -2.4 dBA correction Truck exhausts: 3.6 m, -8.5 dBA correction
Heavy vehicle corrections	The six-category heavy vehicle method was adopted due to high heavy vehicle proportions along Picton Road and the M31 Hume Motorway. Additional detail is provided in section 3.3.5 and the adopted corrections are provided in Appendix C-2.
Calculation settings	
Low traffic flow correction	Disabled
Search radius	3000 m
Contour grid spacing	20 m
Contour grid height	1.5 m above ground

3.3.3 Identified roads

Project and non-project roads were identified for the operational road traffic noise assessment. Project roads are defined as roads where there are design or engineering changes proposed as part of the proposal. Roads with no changes are considered non-project roads.

A road is considered a project road when a segment of the road fits the description for a new or redeveloped road. Details on new and redeveloped roads are provided in section 5 of the RNCG.

The project and non-project road locations are provided in Appendix C-1.

3.3.3.1 Project roads

For this assessment, the project roads and road classifications in Table 3.14 have been adopted. Existing roads which have been substantially realigned are considered new roads. The RNCG defines a substantial realigned road as 'A road will be substantially realigned when the new carriageway in the road project is more than approximately six times the total existing lane width from the edge of the existing road corridor'.

Table 3.14 Project roads and classification

Road name	Functional class of road		Substantially realigned	Type of road project (as per NCG)
	Before proposal is undertaken	After proposal is undertaken		
Picton Road	Arterial	Arterial	No	Redeveloped
M31 Hume Motorway northbound/Picton Road interchange ramps	Arterial	Arterial	Yes	New
M31 Hume Motorway southbound/Picton Road interchange ramps	Arterial	Arterial	No	Redeveloped

3.3.3.2 Non-project roads

Significant side roads that link with the project roads have been included for the assessment. These roads are considered non-project roads and have been provided in Table 3.15.

Non-project roads have been included in the assessment to assist in determining the applicable assessment criteria in addition to determining the appropriate noise mitigation where relevant.

Table 3.15 Non-project roads and classifications

Road name	Functional class of road	
	Before proposal is undertaken	After proposal is undertaken
Almond Street / Argyle Street / Wilton Park Road	Sub-arterial	Sub-arterial
M31 Hume Motorway	Arterial	Arterial
Pembroke Parade	Collector	Collector

3.3.4 Pavement surfaces

The modelled pavement surfaces for the project and non-project roads considered in this assessment are outlined in the following tables:

- project road pavement surfaces: Table 3.16
- non-project road pavement surfaces: Table 3.17.

The non-project roads are existing roads and no change to the road surface are proposed as part of the proposal.

Table 3.16 Modelled project road pavement surface

Road	Pavement surface	Pavement correction
Picton Road	DGA	+0 dBA
M31 Hume Motorway / Picton Road interchange ramps	DGA	+0 dBA

Table 3.17 Modelled non-project road pavement surface

Road	Pavement surface	Pavement correction
M31 Hume Motorway	OGA	-2 dBA
Almond Street / Argyle Street / Wilton Park Road	DGA	+0 dBA
Pembroke Parade	DGA	+0 dBA

3.3.5 Traffic data

A modified CoRTN approach was adopted for the proposal due to high heavy vehicle (HV) proportions along Picton Road and the M31 Hume Motorway. The modified approach adopts six heavy vehicle categories to assess road traffic noise levels instead of a single heavy vehicle category. These heavy vehicle categories are based on the approach outlined in the *Evaluation of Calculation of Road Traffic Noise* (Peng et. Al, 2017) and the *Prediction and Assessment of Road Traffic Noise Impact* (Peng, 2020).

The six heavy vehicle categories are provided in Table 3.18 and are based on groupings of vehicle classes defined using the Austroads vehicle classification system. Light vehicles (LV) have been included in this table for reference.

The existing and future traffic flows have been categorised based on these vehicle groups.

Table 3.18 Vehicle groups

Vehicle type	Austrroads classification	Group
Light vehicles	C1, C2	LV
2 axle rigid trucks	C3	HV1
3, 4 axle rigid trucks	C4, C5	HV2
3, 4, 5 axle articulated trucks	C6, C7, C8	HV3
6 axle articulated trucks	C9	HV4
9 axle B-doubles, heavy truck and trailer	C10	HV5
12 axle B-triples, road trains or equivalent	C11, C12	HV6

3.3.5.1 Existing traffic flows

Existing traffic volumes along Picton Road and the M31 Hume Motorway were measured by TTM Traffic as part of the noise model validation process using automatic traffic counters (ATC) between 12 October and 11 November 2022 at the eight locations listed in Table 3.19.

Noise monitoring locations NM4 and NM7 are excluded from the table below as the intent of these locations was to determine existing background noise levels in the study area rather than the road noise level contributions from Picton Road.

Table 3.19 Traffic count locations

Location ID	Location	Closest noise monitoring location
ATC1	M31 Hume Motorway (south of Picton Road)	NM01
ATC2	M31 Hume Motorway northbound on-ramp	NM02
ATC3	M31 Hume Motorway southbound off-ramp	NM02
ATC4	M31 Hume Motorway (north of Picton Road)	NM02
ATC5	Picton Road (west of the M31 Hume Motorway)	NM01
ATC6	Picton Road (between the M31 Hume Motorway and Pembroke Parade)	NM02
ATC7	Picton Road (east of Pembroke Parade)	NM03 / NM05
ATC8	Picton Road (west of Pembroke Parade)	NM05 / NM06

Measured existing traffic volumes are summarised in Appendix C-2-1 and include the following data for the day (15 hour) and night (9 hour) time assessment periods:

1. Measured light vehicle volumes.
2. Measured light vehicle speeds.
3. Measured overall heavy vehicle volumes.
4. Measured overall heavy vehicle speeds.
5. A heavy vehicle correction calculated based on the measured traffic volumes and speeds for each heavy vehicle category provided in Table 3.18. This correction has been normalised to account for the difference between the overall heavy vehicle speed (item 4 above) and the individual heavy vehicle speeds for each category.

3.3.5.2 Future traffic flows

Projected no-build and build traffic volumes in 2031 and 2041 are based on traffic modelling undertaken as part of the concept design process. The traffic modelling provides projected light vehicle, trucks (rigid vehicles) and heavy trucks (articulated vehicles) for the years 2031 and 2046 and also categorised into 15 hour (day) and 9 hour (night) periods. Traffic volumes in the year 2041 were estimated based on linear growth between 2031 and 2046.

The six category heavy vehicle volumes were determined based on the proportions provided in Table 3.20. These heavy vehicle proportions are based on the averaged proportions from existing traffic volumes across the eight traffic count locations provided in Table 3.19.

The future traffic volumes used in the operational noise model are provided in Appendix C-2-3 to Appendix C-2-6 for the opening year (2031) and Appendix C-2-7 to Appendix C-2-10 for the design year (2041).

Table 3.20 Heavy vehicle proportions

Time period	Trucks (rigid vehicles)		Heavy trucks (articulated vehicles)			
	HV1	HV2	HV3	HV4	HV5	HV6
Day	0.84	0.16	0.20	0.37	0.39	0.04
Night	0.81	0.19	0.15	0.38	0.43	0.04

3.3.6 Maximum noise level assessment

Changes to maximum noise levels have been based on the following methodology described in Appendix A of the RNCG:

- Model the existing maximum noise levels based on noise emission from the current road alignment.
- Model the future maximum noise levels based on noise emission from the future road alignment.
- Identify the number of buildings with predicted maximum noise levels above 65 dBA.
- Identify the frequency of maximum noise level events based on measured road traffic noise levels.

The noise model inputs and assumptions for the maximum noise level assessment are presented in Table 3.21. The likely source of potential maximum noise levels is due to exhaust noise generated during heavy vehicle acceleration or braking (i.e. heavy vehicle pass-bys and compression braking, respectively).

Table 3.21 Maximum noise level model inputs

Input / assumption	Description
Software	SoundPLAN Version 8.2
Prediction algorithm	ISO 9613:1996
Model inputs	
Model inputs	As detailed in Table 3.13
Input parameters	
Sound power level	130 dBA (compression braking) 114 dBA (heavy vehicle pass-by)
Source height	Truck exhaust: 3.6 m

3.3.7 Operational noise mitigation

3.3.7.1 Overview

The operational noise mitigation assessment procedure described in the following section is based on the RNMG. The RNMG recommends that mitigation measures would be implemented where they are considered reasonable and feasible. Noise barriers, noise mounds and quieter pavement surfaces would only be considered reasonable in locations where there are four or more closely spaced receivers that exceed the road traffic noise criteria. Receivers are considered closely spaced where:

- façades are separated by less than 20 metres
- they are part of an isolated group of closely spaced residences where the façades are separated by between 20 and 100 metres.

At-property treatments would be considered where other noise mitigation measures are not reasonable or feasible.

Potential noise mitigation treatments have been assessed in accordance with the RNP (DECCW, 2011). Sections 3.3.7.2 to 3.3.7.4 provide further information about some of these potential treatments.

3.3.7.2 Pavement treatments

Quieter pavement surfaces, such as stone mastic asphalt (SMA) surfacing, are the preferred form of noise mitigation as it reduces source noise levels and has a low visual impact. This provides noise benefits to outdoor recreational areas in addition to reducing internal road traffic noise levels.

In general, quieter pavements may provide noise benefits to receivers at greater distances than noise barriers. This may occur where receivers at greater distances already have shielding from rows of houses near roads or topography.

3.3.7.3 Noise barriers

Noise barriers reduce noise levels by changing the transmission path of noise from the road. These have similar benefits to quieter pavement surfaces as they have the potential to reduce both external and internal noise levels.

The process to optimise the noise barrier height is described in the RNMG and summarised as follows:

- Identify the most affected façade of a receiver based on results from the no-mitigation scenario. Noise levels are only calculated for the first two floors of a receiver.
- Identify the maximum barrier height that results in the RNCG criteria being met at all receivers. Where there are residual exceedances at a barrier height of 8.0 metres, then the maximum barrier height is set at 8.0 metres.
- Calculate the maximum number of receivers that no longer require at-property treatments by considering the number of treatments required in the no barrier case and the maximum barrier height case.
- Determine the initial design height by identifying the barrier height where two-thirds of the receivers no longer exceed the criteria.
- Apply weightings to each 0.5 metre incremental barrier height to determine the weighting curve. The weighting curve takes into consideration the size of the barrier, the number of residual at-property treatments that would be considered and the level of exceedances above the World Health Organisation (WHO) threshold levels.
- Determine the optimised design height using the calculated weighting curve.

Once the optimised height has been identified, consideration to whether the noise barrier is considered feasible and reasonable would be taken into account. In general, the noise barrier would be considered a reasonable option if it is capable of providing a level of noise mitigation (insertion loss) of:

- 5 dBA at receivers for heights up to five metres high
- 10 dBA at receivers for barrier heights above five metres and up to eight metres.

In addition, a barrier can be designed to achieve an insertion loss of less than 5 dBA if the barrier is able to reduce the number of receivers that qualify for at-property treatments by at least two-thirds.

Further assessment would be undertaken once the optimised height has been identified as part of the detailed design process to determine whether a barrier is considered reasonable and feasible to implement.

3.3.7.4 At-property treatments

At-receiver noise mitigation would be investigated for receivers that still qualify for consideration of additional noise mitigation following implementation of source and path controls. Where residual impacts are predicted, the ARNTG specifies that type of treatment that may be offered based on the level of exceedance above the RNCG criteria.

The treatment packages, outlined in Table 3.22 are specified in the ARNTG. The packages are based on the level of exceedance above the criteria following any noise reduction from quieter pavements and noise barriers. Details of the treatment packages are provided in the ARNTG and are dependent on the building construction material.

Table 3.22 Architectural treatment packages

Treatment package	Exceedance of criteria, dBA
Type 1	1-5
Type 2	6-8
Type 3	9-11
Type 4	12-14
Type 5	>14

Acoustic treatments provided by Transport typically include:

- sealing of eaves
- sealing of wall vents
- upgrading window and door seals and appropriately treatment sub-floor ventilation
- fresh air ventilation systems that meeting Building Code of Australia requirements with the windows and doors shut
- sealing of the underfloor below the bearers
- upgrading windows, glazing and providing doors on the exposed façades of substantial structures
- installing courtyard screen walls.

In most instances, the aim of architectural treatments is to provide internal noise levels that are approximately 20 dBA less than the external noise criteria with windows closed. This would provide similar acoustic amenity and internal noise levels to those experienced at a receiver where the external noise criteria have been met.

Section 6.3 of the RNMG states that at-receiver noise mitigation measures such as façade treatments may replace at-road mitigation (low noise pavements, noise mounds or noise barriers) only in the following circumstances:

- a residence is considered an isolated residence or within an isolated group of closely spaced residences
- where the affected community expresses a preference for at-property treatments and the cost of treatments is less than a combination of barrier and at-property treatments
- where the noise barriers cannot achieve the level of insertion loss required
- where the only applicable noise criteria are internal (e.g. for non-residential receivers including places of worships, medical facilities, educational institutes and child care facilities)
- where other noise mitigation measures have been shown not to be feasible or reasonable.

4. Existing environment

4.1 Noise sensitive receivers

Noise sensitive land uses are defined based on the type of occupancy and the activities performed in the land use.

For the purposes of this assessment, receivers sensitive to noise and vibration have been categorised as:

- residential
- non-residential (including commercial, industrial, recreation and places of worship).

Noise sensitive receivers considered in this assessment are based off building footprints provided by Geoscape and a review of recent aerial imagery. Receiver types for each sensitive receiver have been defined based on ICNG. Properties and buildings that would be acquired as part of the proposal have been excluded from this assessment.

Future residential receivers within the approved DAs for Stage 1 Wilton Greens development have been included. These buildings have been assumed to be two storeys high and the building footprints are based on the proposed lot layout of the development. The buildings within this development have not currently been constructed; however, would likely be constructed by the time construction of the proposal commences. Other developments within the Wilton Growth Area have not been approved (refer to section 3.1.3) and therefore have not been included in this assessment.

The nearest sensitive receivers to the proposal within each noise catchment area is described in Table 4.1. Descriptions of each noise catchment area are provided in section 3.1.1. An overview of the modelled noise sensitive receivers is provided in Table 4.2 and shown in Figure 4.1. The non-residential receivers that have been considered are listed in Table 4.3.

Table 4.1 Distance to nearest sensitive receiver

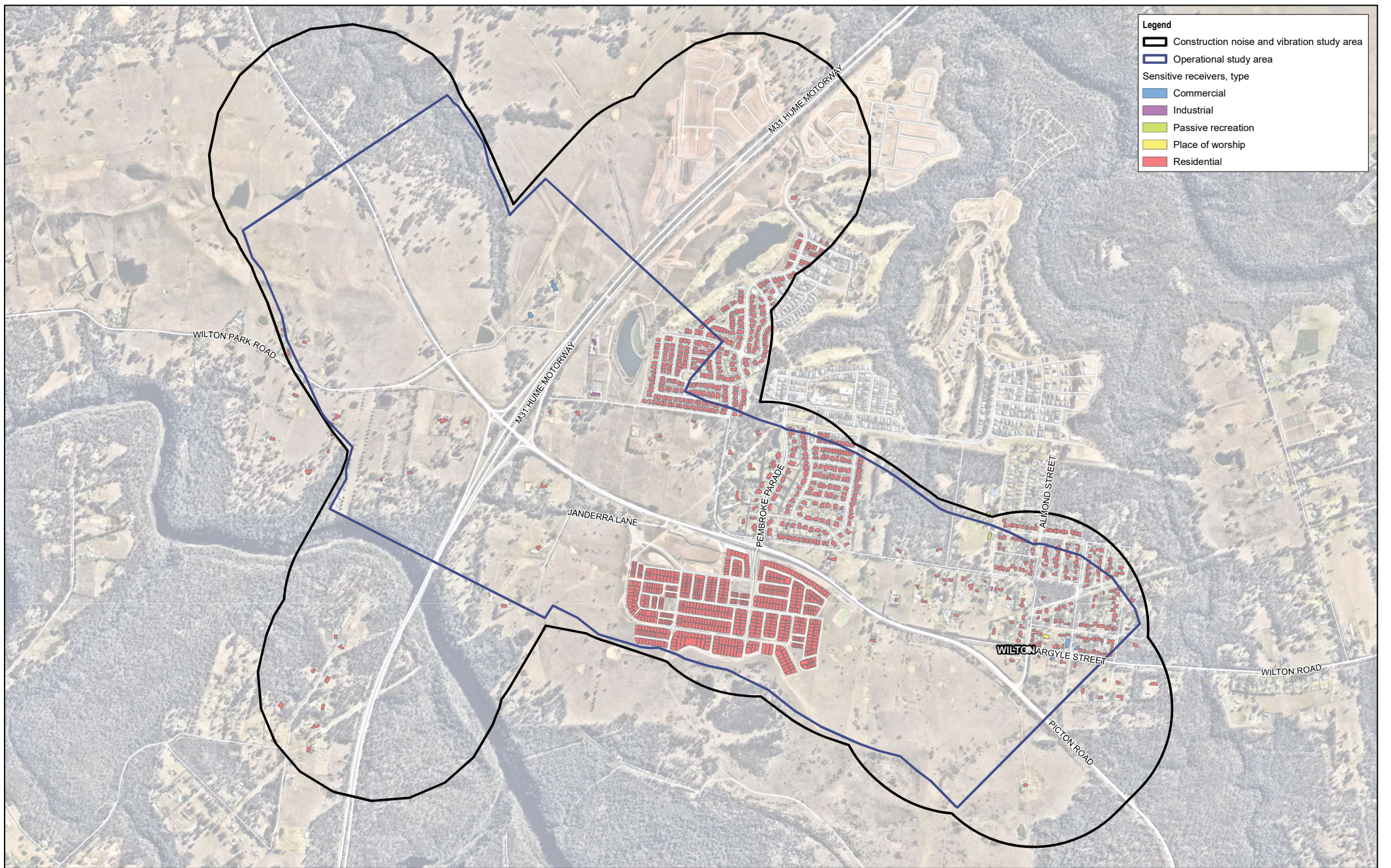
NCA	Nearest sensitive receiver		Approximate distance to proposal (metres)
	Receiver ID	Location (Lot /DP)	
NCA01	R0007	2/556124	571
NCA02	R0028	211/735556	41
NCA03	R0328	24/280010	71
NCA04	R0316	21/280010	198
NCA05	R0555	16/207392	206
NCA06	F0486	1408/1232553	35
NCA07	F0510	1122/1232553	170

Table 4.2 Number of modelled noise sensitive receivers

Receiver type	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	Total
Residential	12	239	33	221	206	135	573	1419
Commercial	0	2	0	0	3	0	0	5
Industrial	0	4	0	0	0	0	0	4
Passive recreation	0	1	0	0	2	0	0	3
Place of worship	0	0	0	0	2	0	0	2
Total	12	246	33	221	213	135	573	1433

Table 4.3 *Non-residential sensitive receivers*

Receiver ID	Premises	Location (Lot/DP)	NCA	Receiver type
R0027	Wilton Airport / Sydney Skydivers	13/702024	NCA02	Commercial
R0031		13/702024	NCA02	Commercial
R0033	Wilton Recycled Water Treatment Plant	102/1108927	NCA02	Industrial
R0034		302/1184442	NCA02	Industrial
R0035		302/1184442	NCA02	Industrial
R0036		302/1184442	NCA02	Industrial
R0213	Golf Park	1/280055	NCA02	Passive recreation
R0528	Wilton Community Centre	7004/92818	NCA05	Passive recreation
R0529		118/751297	NCA05	Passive recreation
R0594	Wilton Anglican Church	1/1236516	NCA05	Place of worship
R0597		1/1236516	NCA05	Place of worship
R0604	n/a	1/112522	NCA05	Commercial
R0632	Miscellaneous shops	/SP71333	NCA05	Commercial
R0648	Shell Wilton	1/866793	NCA05	Commercial



Legend

- Construction noise and vibration study area
- Operational study area

Sensitive receivers, type

- Commercial
- Industrial
- Passive recreation
- Place of worship
- Residential

Paper Size ISO A3
 0 260 520
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Modelled noise sensitive receivers

Figure 4.1

4.2 Methodology for noise monitoring

Noise monitoring was undertaken to determine existing background and road traffic noise levels throughout the study area. The noise monitoring locations were selected based on their exposure to road traffic noise from Picton Road and the M31 Hume Motorway as these roads are the primary contributors to the ambient noise environment.

The methodology for the noise monitoring involved:





- Noise monitoring was undertaken using Svantek environmental noise loggers, which were programmed to accumulate the L_{A90} , L_{A10} and L_{Aeq} noise descriptors continuously over the entire monitoring period.
- Meteorological data was sourced from the Bureau of Meteorology's Campbelltown (Mount Annan) Automatic Weather Station, station number 68257, located about 21 kilometres north of the proposal site.
- A calibration check was performed on the noise monitoring equipment using a sound level calibrator with a sound pressure level of 94 dBA at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The noise loggers were found to be within the acceptable tolerance of ± 0.5 dBA.
- The data collected by the loggers was downloaded and analysed. Data was excluded during periods where average wind speeds were greater than 5 m/s or when rainfall occurred in accordance with the *Noise Policy for Industry* (EPA, 2017) (NPfI).




4.3 Unattended noise monitoring

4.3.1 Noise monitoring locations

Noise monitoring was undertaken over a period of 14 days between 12 October 2022 and 26 October 2022 at the seven free-field locations shown in Figure 3.4. Noise monitoring locations and equipment details are provided in Table 4.4.

Table 4.4 Noise monitoring location and equipment details

Detail	NM01	NM02	NM03	NM04
Location (Lot / DP)	4 / 2539224 / 253922	10 / 702024	25 / 280010	152 / 280010
Easting / Northing (m)	284557 / 6210779	285877 / 6210457	286592 / 6209347	286790 / 6209595
Measurement start	12 October 2022	12 October 2022	12 October 2022	12 October 2022
Measurement end	26 October 2022	26 October 2022	26 October 2022	26 October 2022
Equipment details	Svantek 977 / 45744	Svantek 977 / 36871	Svantek 977 / 36872	Svantek 977 / 45743
Equipment settings	A weighted, Fast time response 15 minute intervals	A weighted, Fast time response 15 minute intervals	A weighted, Fast time response 15 minute intervals	A weighted, Fast time response 15 minute intervals
Calibration drift, dBA	- 0.2	+ 0.1	+ 0.6	+ 0.2
Distance to road, m	Picton Road: 10 M31 Hume Motorway: 1,020	Picton Road: 830 M31 Hume Motorway: 230	Picton Road: 60	Picton Road: 360
Site photo				

Detail	NM05	NM06	NM07
Location (Lot / DP)	21 / 253157	Inside road corridor - Corner of Almond St and Picton Road	2 / 517863
Easting / Northing (m)	287130 / 6208956	287832 / 6208590	288043 / 6208950
Measurement start	12 October 2022	12 October 2022	12 October 2022
Measurement end	26 October 2022	26 October 2022	26 October 2022
Equipment details	Svantek 977 / 45733	Svantek 977 / 36873	Svantek 977 / 97592
Equipment settings	A weighted, Fast time response 15 minute intervals	A weighted, Fast time response 15 minute intervals	A weighted, Fast time response 15 minute intervals
Calibration drift, dBA	- 0.1	+ 0.3	+ 0.4
Distance to road, m	Picton Road: 15	Picton Road: 30	Picton Road: 430
Site photo			

4.3.2 Noise monitoring results

Rating background levels and ambient noise levels recorded at each monitoring location are summarised in Table 4.5. These levels were processed in accordance with the methodology described in the NPfl.

Daily noise monitoring charts for the entire monitoring period at each location are presented in Appendix A.

Table 4.5 Measured background and ambient noise levels, dBA

Location	Rating background levels (RBL), dBA			Ambient noise levels, dBA		
	Day	Evening	Night	Day	Evening	Night
NM01	45	43	37	64	60	60
NM02	43	42	42	52	53	49
NM03	48	41	34	56	52	52
NM04	33	32	28	54	45	41
NM05	52	42	34	65	61	61
NM06	51	51	44	65	63	63
NM07	37	32	30	53	54	48

Note: Day, evening and night-time periods are defined in the NPfl.

Road traffic noise levels during the day and night-time periods were calculated from the measured noise levels in accordance with the RNP. The measured weekday road traffic noise levels are summarised in Table 4.6.

Table 4.6 Measured road traffic noise levels, dBA

Location	Road traffic noise levels (free field), dBA		Road traffic noise levels (façade corrected), dBA	
	Day $L_{Aeq}(15 \text{ hour})$	Night $L_{Aeq}(9 \text{ hour})$	Day $L_{Aeq}(15 \text{ hour})$	Night $L_{Aeq}(9 \text{ hour})$
NM01	64	61	67	63
NM02	53	50	56	52
NM03	56	52	58	54
NM04	53	40	56	43
NM05	65	62	68	64
NM06	65	63	68	66
NM07	53	49	56	51

Note: Periods for road traffic noise levels are based on the RNP. Day: 7 am to 10 pm. Night: 10 pm to 7 am

5. Construction impact assessment

5.1 Construction assessment criteria

5.1.1 Key descriptions

The metrics used to describe noise and vibration levels for the construction noise and vibration assessment are defined in section 12 of the CNVG and are outlined in Table 5.1.

Table 5.1 Key construction noise and vibration metrics

Metric	Description
Noise	
L _{Aeq(15 min)}	The energy average noise Level during construction activities, evaluated over a measurement period of 15 minutes. This is the main parameter used to assess the construction noise impacts.
L _{AFmax}	The maximum noise level for an event used in the assessment of potential sleep disturbance during night-time periods. The subscript 'A' indicates that the noise levels are filtered to match normal human hearing characteristics (i.e., A-weighted). 'Fast' time constant is used for this measurement.
Background Noise Level (L _{A90})	The background noise level in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. The L _{Aeq(15 minute)} construction noise objectives are based on an allowance margin above the L _{A90} background noise levels.
NML	The noise level where there may be a community reaction to construction noise. Where the predicted or measured construction noise level is above the NML at a sensitive receiver, the proponent should apply all feasible and reasonable work practices to minimise noise.
Vibration	
Peak Particle Velocity (PPV)	The peak vector vibration velocity used to assess the risk of damage to structures from ground-borne vibration. This is generally evaluated at the building footings.
VDV	When assessing intermittent vibration, such as construction activities, the cumulative measurement of the vibration level received a location over the relevant assessment period (day or night) is a Vibration Dose Value (VDV).

5.1.2 Construction noise management levels

Construction noise management levels for residential premises and other sensitive land uses are provided in the CNVG and are based on the ICNG. Extracts from the ICNG which detail the approach to determining residential and non-residential NMLs are provided in Appendix B.

The residential NMLs adopted for each NCA are provided in Table 5.2 for the hours outlined in Table 3.4. Works undertaken outside the ICNG standard construction hours would require additional justification. These may include the delivery of oversized plant or structures, emergency work, maintenance and repair of public infrastructure, public infrastructure works and works where the proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Table 5.2 Residential noise management levels, dBA

NCA	Background monitoring location	Noise management level, $L_{Aeq}(15 \text{ min})$					
		ICNG recommended standard hours		OOHW			
		Noise affected (RBL + 10 dB)	Highly noise affected ($\geq 75 \text{ dB}$)	Day (RBL + 5 dB)	Evening (RBL + 5 dB)	Night (RBL + 5 dB)	Sleep disturbance L_{Amax}
NCA01	NM01	55	75	50	48	42	65
NCA02	NM02	53	75	48	47	47	65
NCA03	NM03	58	75	53	46	39	65
NCA04	NM04	45	75	40	37	35	65
NCA05	NM07	47	75	42	37	35	65
NCA06	NM05	62	75	57	47	39	65
NCA07	NM04	45	75	40	37	35	65

NMLs for non-residential land uses, which only apply when the premises are occupied and in use, are provided in Table 5.3 .

Table 5.3 Non-residential noise management levels, dBA

Type of occupancy / activity	Management level, L_{Aeq} dBA (applies when land use is being utilised)	
	Internal	External
Commercial	-	70
Industrial	-	75
Places of worship	45	55
Passive recreation	-	60

Note 1: External noise levels have been determined by assuming a 10 dBA reduction with windows open.

5.1.3 Construction vibration management levels

5.1.3.1 Human comfort vibration objectives

Humans are capable of detecting vibration at levels which are well below those causing risk of damage to a building. Acceptable vibration levels for human comfort are assessed in NSW with consideration to *Assessing vibration: A technical guideline* (DEC, 2006).

Typically, construction activities generate ground vibration of an intermittent/continuous nature. Acceptable values for exposure to continuous vibrations are presented in Table 5.4.

Table 5.4 Human comfort continuous vibration limits

Receiver type	Period	Root mean square (RMS) velocity (mm/s)		Peak velocity (mm/s)	
		Preferred value	Maximum value	Preferred value	Maximum value
Continuous vibration					
Residential	Day (7 am to 10 pm)	0.20	0.40	0.28	0.56
	Night (10 pm to 7 am)	0.14	0.28	0.20	0.40
Offices	When in use	0.40	0.80	0.56	1.1
Intermittent vibration					
Residential	Day (7 am to 10 pm)	6.0	12.0	8.6	17.0
	Night (10 pm to 7 am)	2.0	4.0	2.8	5.6
Offices	When in use	13.0	26.0	18.0	36.0

5.1.3.2 Cosmetic damage

Standard structures

The effects of transient vibration on structures are considered in *BS 7385 Part 2 – 1993 Evaluation and measurement for vibration in buildings*. The criteria provided in BS 7385 are presented in Table 5.5. The guide values in BS7385 for transient vibration assumes there are no resonant responses in structures and low-rise buildings. Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at lower frequencies, then the guide values are reduced by up to 50 per cent.

Table 5.5 Vibration guide values – minimal risk of cosmetic damage

Line	Type of structure	Peak component particle velocity in frequency range of predominant pulse – transient vibration		Peak component particle velocity in frequency range of predominant pulse – continuous vibration ¹	
		4 Hz to 15 Hz	15 Hz and above	4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above		25 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above	7.5 mm/s at 4 Hz increasing to 10 mm/s at 15 Hz	10 mm/s at 15 Hz increasing to 25 mm/s at 40 Hz and above

Note: 1. These values are based on section 7.4.3 *Guide values for continuous vibration relating to cosmetic damage* from BS 7385-2

The predominant vibration for most construction activities involving intermittent vibration sources such as rock breakers, piling rigs, vibratory rollers and excavators occurs at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range). However, a conservative vibration damage screening level per receiver type is:

- reinforced or framed structures: 25 mm/s
- unreinforced or light framed structures: 7.5 mm/s.

Heritage structures

Heritage buildings and structures are assessed as per the screening vibration levels for reinforced and unreinforced buildings (see Table 5.5) as heritage items should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound.

Subsequent to an inspection of the building, if a heritage building or structure is found to be structurally unsound, a conservative cosmetic damage objective of 3 mm/s peak particle velocity level would be considered (based on *DIN 4150-3:2016 Vibration in Buildings – Part 3: Effects on structures* (German Standards, 2016) (DIN 4150-3).

Table 5.6 Guideline values for short-term vibration effects on structures

Line	Type of structure	Guideline values for velocity, mm/s		
		1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz ¹
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (for example listed buildings under preservation order)	3	3 to 8	8 to 10

Upper Canal (Pheasants Nest Weir to Prospect Reservoir)

The Upper Canal pipeline is located below the proposal site (about 90 metres below ground level). Guidance on potential vibration impacts has been taken from *Guideline for Development Adjacent to the Upper Canal and Warragamba Pipelines* (WaterNSW, 2021) which states that, ‘*The Upper Canal is particularly susceptible to vibration and settlement due to its age*’ and ‘*At present, no Australian Standards exist for the assessment of damage caused by vibration. WaterNSW accepts Line 3 of Table 1 from the current German Standard DIN 4150 – Part 3 - Structural Vibration Part 3: Effects of vibration in structures as the maximum allowable limit of vibration acceptable at water supply infrastructure*’.

DIN 4150-3 values for short-term vibration on buried pipework are reproduced in Table 5.6. As per *Guideline for Development Adjacent to the Upper Canal and Warragamba Pipelines*, the appropriate maximum allowable limit of vibration for the Upper Canal is a peak particle velocity (PPV) of 3 mm/s.

For reference, the guideline vibration values for buried pipework as stated in Table 2 of DIN 4150-3 are presented in Table 5.7. These are substantially higher (less stringent) than the WaterNSW criteria for the Upper Canal pipeline.

Table 5.7 DIN 4150-3 values for short-term vibration on buried pipework

Line	Pipe material	Guideline values for velocity measured on pipes in mm/s, PPV
1	Steel	80
2	Concrete and stone	60
3	Masonry	40

5.1.4 Construction road traffic noise criteria

The RNP provides road traffic noise criteria for residential land uses affected by construction traffic on the public road network.

The RNP application notes state that any increase in the total noise level at existing residences and other sensitive land uses affected by traffic generation on existing roads should be limited to 2 dBA above current levels. This limit only applies when the noise level without the development (No Build scenario) is within 2 dBA or exceeds the road traffic noise criterion provided in the RNP.

This has been used to identify potential impacts as a result of noise produced by construction traffic. If road traffic noise increases as a result of construction works are within 2 dBA of current levels, then the objectives of the RNP are considered to be met and no specific mitigation measures would be required.

Where construction traffic increases the existing road traffic noise levels by more than 2 dBA then further assessment against the road traffic noise criteria in Table 5.8 is required.

Table 5.8 Road traffic noise criteria, dBA

Type of development	Day 7 am to 10 pm	Night 10 pm to 7 am
Existing residence affected by additional traffic on freeway/arterial/sub-arterial roads	L _{Aeq} (15 hour) 60	L _{Aeq} (9 hour) 55
Existing residence affected by additional traffic on local roads	L _{Aeq} (1 hour) 55	L _{Aeq} (1 hour) 50

5.1.5 Construction blasting criteria

Airblast overpressure and vibration for blasting are assessed against the limits provided in the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990). The recommended maximum and maximum levels are provided in Table 5.9.

The recommended maximum levels may be exceeded on up to five per cent of the total number of blasts over a period of 12 months. The maximum criteria are not to be exceeded at any time.

Table 5.9 ANZECC limits for blasting

Item	Recommended maximum level	Maximum level
Airblast overpressure	115 dB	120 dB
Ground vibration	5 mm/s	10 mm/s

5.2 Construction noise assessment

5.2.1 Overview of the assessment

Construction noise levels have been predicted based on the methodology outlined in section 3.2 and are based on the proposal site as of March, 2023. The proposal site was refined after the modelling for this assessment had been completed. However, the changes to the proposal site are not considered to impact the noise assessment outcomes for sensitive receivers and the boundary has moved away from most sensitive receivers. The worst-case noise level for each sensitive receiver has been used to assess potential construction noise impacts. The impacts have been assessed for residential and non-residential sensitive receivers by considering the following:

- construction noise level ranges for each construction scenario and activity group
- the number of exceedances for each construction scenario and activity group.

Predicted construction noise levels are provided in Appendix B-2 and construction noise contours for each scenario are provided in Appendix B-4.

5.2.2 Residential construction noise impacts

5.2.2.1 Predicted residential construction noise levels

The predicted noise level ranges for residential receivers are shown in Figure 5.1 to Figure 5.6 for each construction activity. The predicted noise levels show that the highest levels of construction noise would generally be due to the following construction activities for each activity group:

- **Activity group 1 (AG1):** Property adjustments and demolition works (CS03)
- **Activity group 2 (AG2):** Utility relocation and traffic control system installations (CS05)
- **Activity group 3 (AG3):** Bridge works involving drainage and structure construction (CS07)
- **Activity group 4 (AG4):** Pavement works (CS11)
- **Activity group 5 (AG5):** Road furniture installations (CS13)
- **Construction compounds (CC):** Operation of compound 2 (CS16).

The highest predicted construction noise levels would be experienced at residential receivers located in NCA02, NCA03, NCA05 and NCA06. Residential receivers located in these catchment areas are also predicted to experience noise levels above the highly noise affected level (75 dBA) during some construction activities, as shown in Figure 5.1 to Figure 5.6.

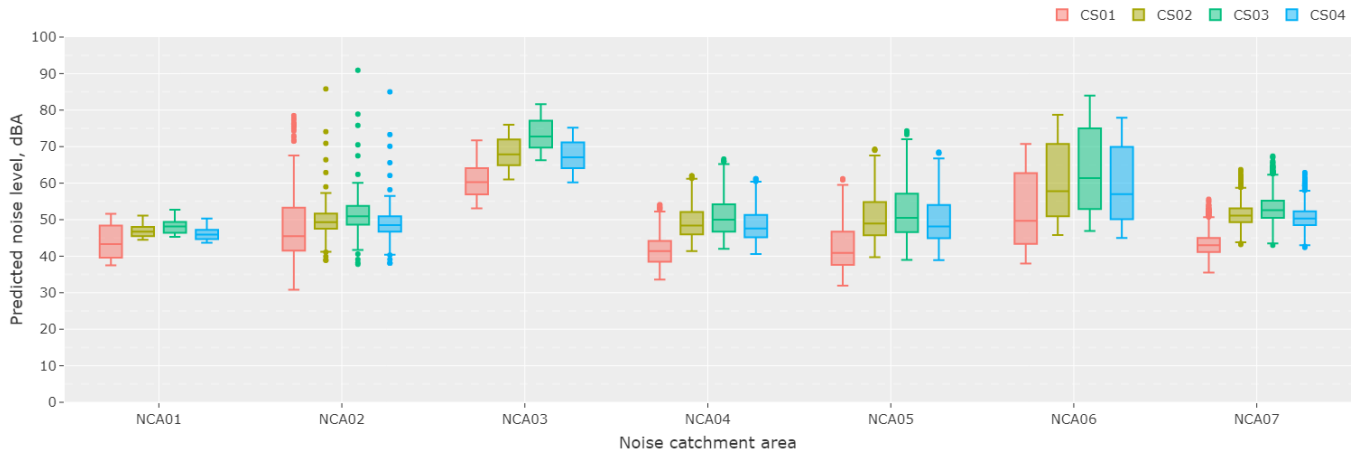


Figure 5.1 Predicted residential construction noise level range – Property adjustments/demolition (AG1)

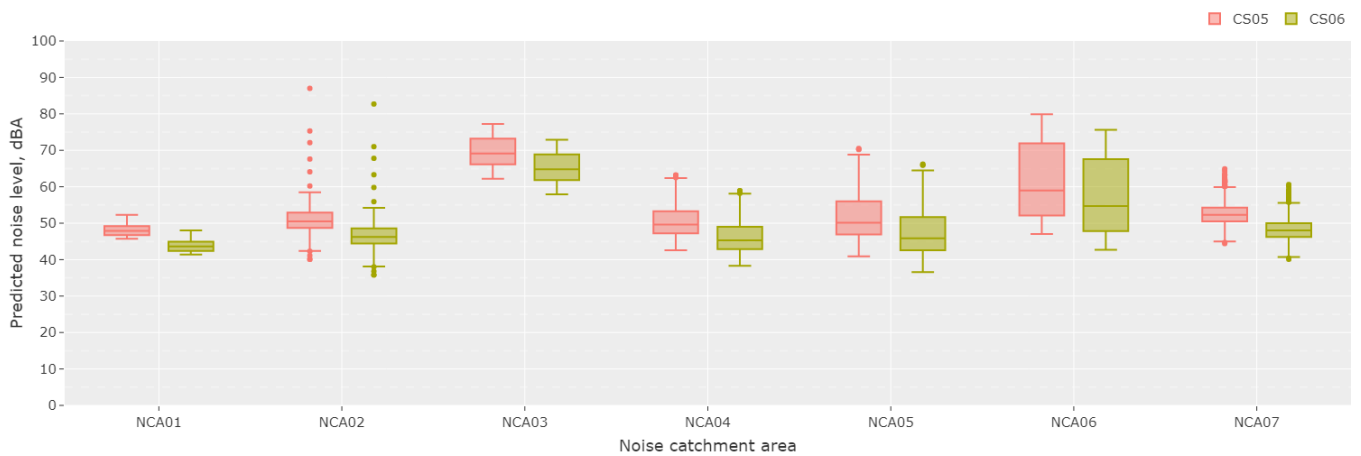


Figure 5.2 Predicted residential construction noise level range – Utility relocation/traffic control installations (AG2)

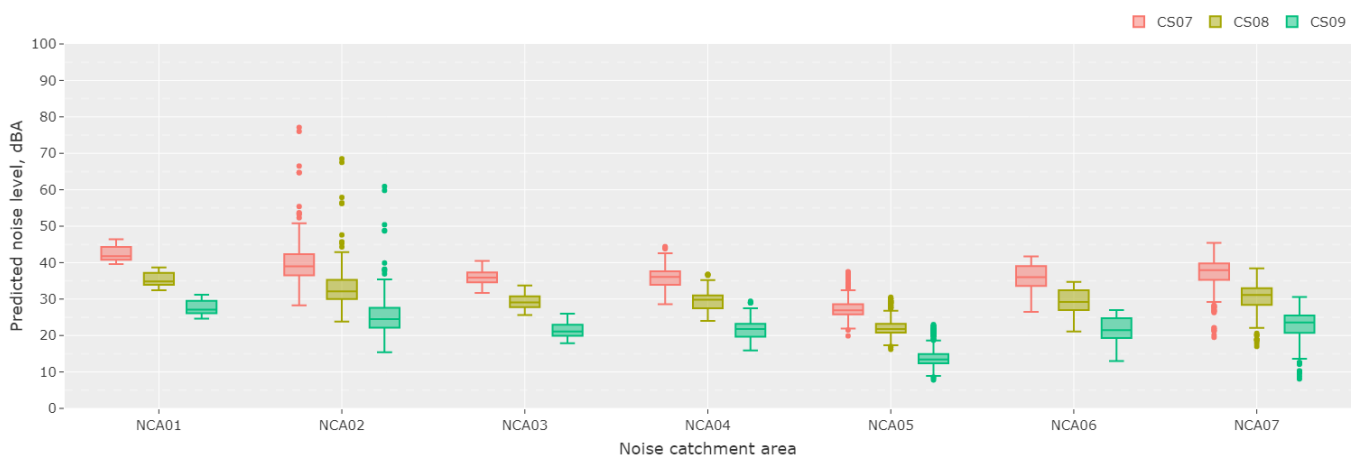


Figure 5.3 Predicted residential construction noise level range – Bridge works (AG3)

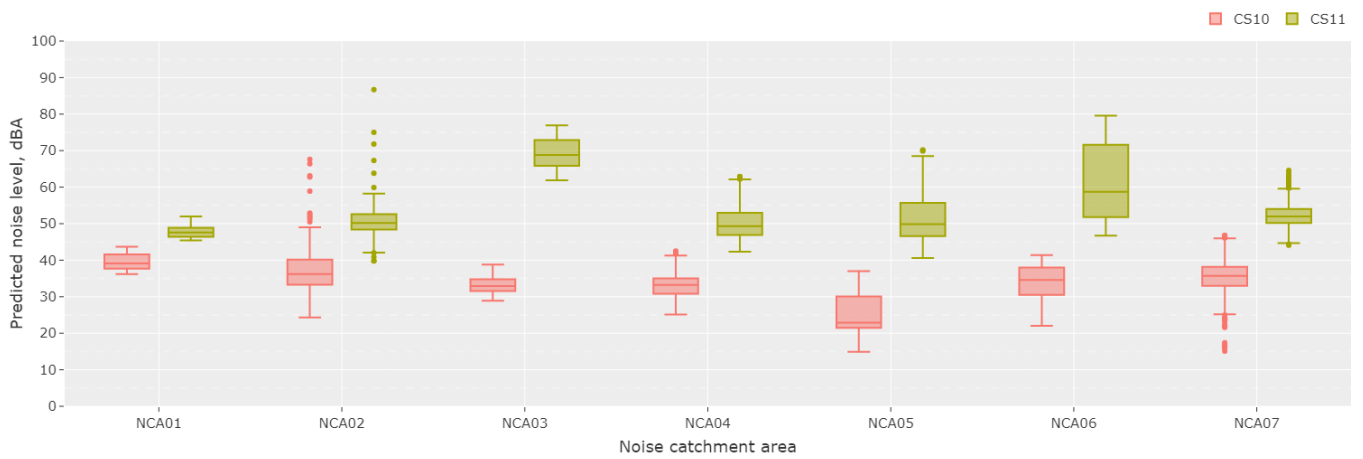


Figure 5.4 Predicted residential construction noise level range – Pavement works (AG4)

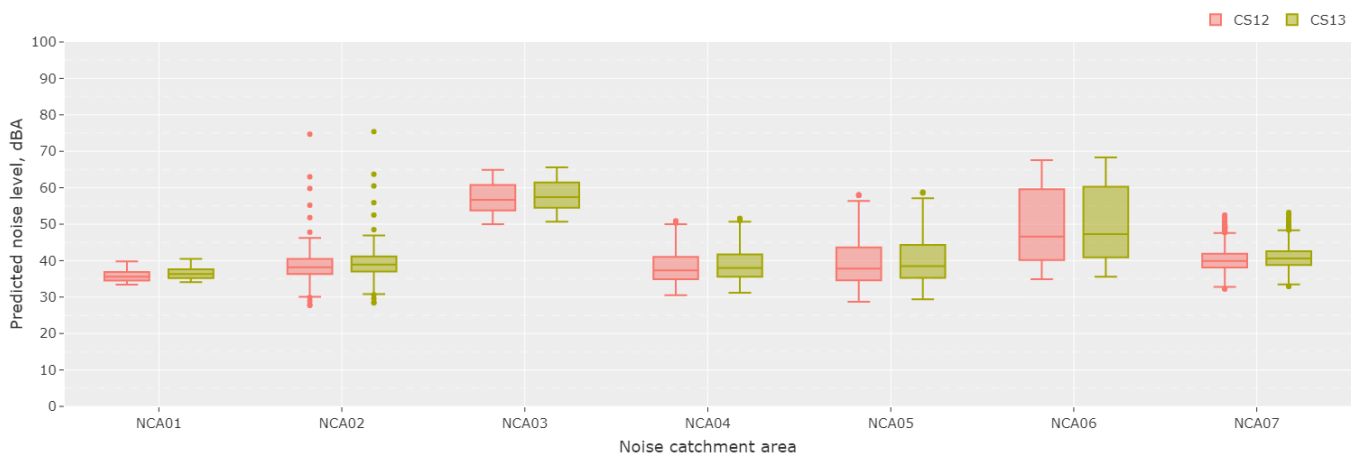


Figure 5.5 Predicted residential construction noise level range – Road furniture installations (AG5)

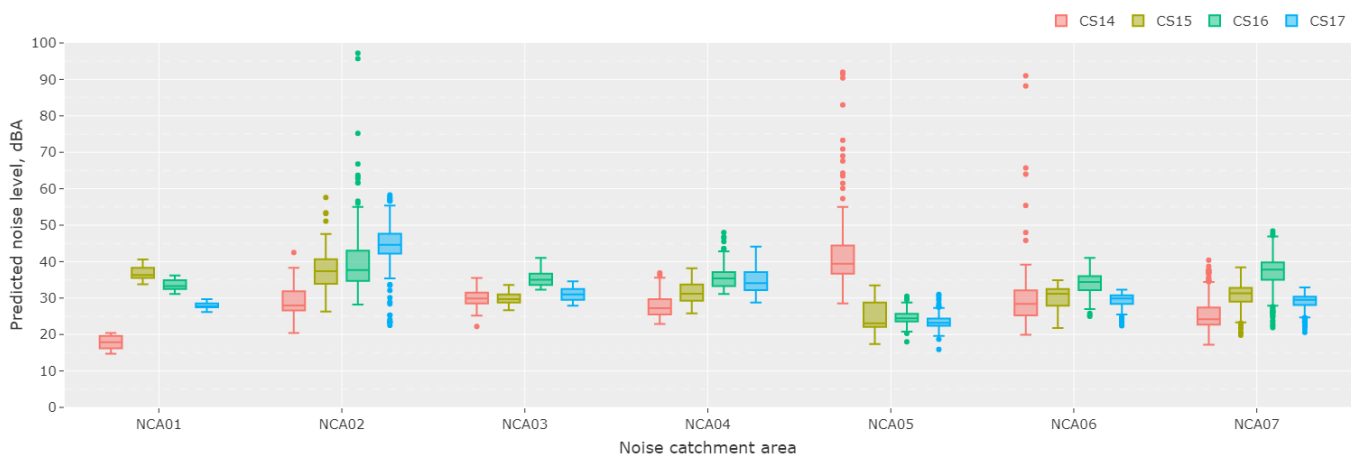


Figure 5.6 Predicted residential construction noise level range – Construction compounds (CC)

5.2.2.2 Residential construction noise level exceedances

The perception categories outlined in the CNVG have been used to identify the number of residential exceedances for each construction activity group. The CNVG perception categories and the exceedance range above the RBL and NMLs are provided in Table 5.10. Highly noise affected receivers are based on the level of exceedance above a fixed noise level (75 dBA).

The number of residential structures within each perception category has been presented for the following time periods:

- **Standard hours:** where the noise impacts would be the lowest due to higher background noise levels.
- **OOHW (Night):** where the noise impacts would be the highest due to lower background noise levels.

Other time periods (OOHW Day and OOHW Evening) are provided in Appendix B-3 for reference.

Each exceedance is representative of a single building. A building may have multiple exceedances (i.e. floors and façades) however these have not been considered. Note that all residential structures have been included, therefore an address or lot may have multiple exceedances if the property contains multiple residential structures.

Table 5.10 CNVG perception categories

Perception category	Abbreviation	dBA above RBL	dBA above NML	
			Standard hours	Outside standard hours
Noticeable	N	5 to 10	n/a	1 to 5
Clearly audible	CA	11 to 20	1 to 10	6 to 15
Moderately intrusive	MI	21 to 30	11 to 20	16 to 25
Highly intrusive	HI	> 30	> 20	> 25
Highly noise affected (≥ 75 dBA)	HNA	n/a	n/a	n/a

Exceedances during standard hours

The number of residential structures within each perception category are shown in Figure 5.7 to Figure 5.12 for each construction activity during standard construction hours.

In general, residents in all NCAs (except NCA01) are predicted to experience noise levels that exceed the residential NMLs during construction. Table 5.11 provides a summary of the following impacts for each construction activity group:

- the construction scenario with the largest number of exceedances of the NML
- the NCA and scenario with the largest number of highly noise affected (HNA) receivers
- the NCA with the most exceedances for existing and Wilton Greens residential premises along with the most common perception category range.

Table 5.11 Summary of perception category exceedances during standard hours

Activity group	Construction scenario with the most exceedances	Largest number of HNA receivers	NCA with the most exceedances	
			Existing residences	Wilton Greens
AG1	CS03	NCA06, CS03	NCA04, CA	NCA07, CA
AG2	CS05	NCA06, CS05	NCA04, CA	NCA07, CA
AG3	CS07	NCA02, CS07	NCA02, N	NCA07, N
AG4	CS11	NCA06, CS11	NCA04, CA	NCA07, CA
AG5	CS13	NCA02, CS12/CS13	NCA04, N	NCA07, N
CC	CS14	NCA05, CS14	NCA02, N	NCA07, N

'Highly intrusive' noise levels (exceedances of more than 20 dB above the NML) are predicted for a small number of receivers during all construction activities and during compound operations.

In general, noise impacts would be either 'noticeable' or 'clearly audible' as the majority of residential structures within each NCA would be shielded by other residential structures. The highest impacts would be located at the residential structures in the first rows of houses fronting the construction footprint, this is shown on noise contour plots provided in Appendix B-4.

Construction noise impacts would be managed in accordance with the construction noise management measures detailed in section 7.1.

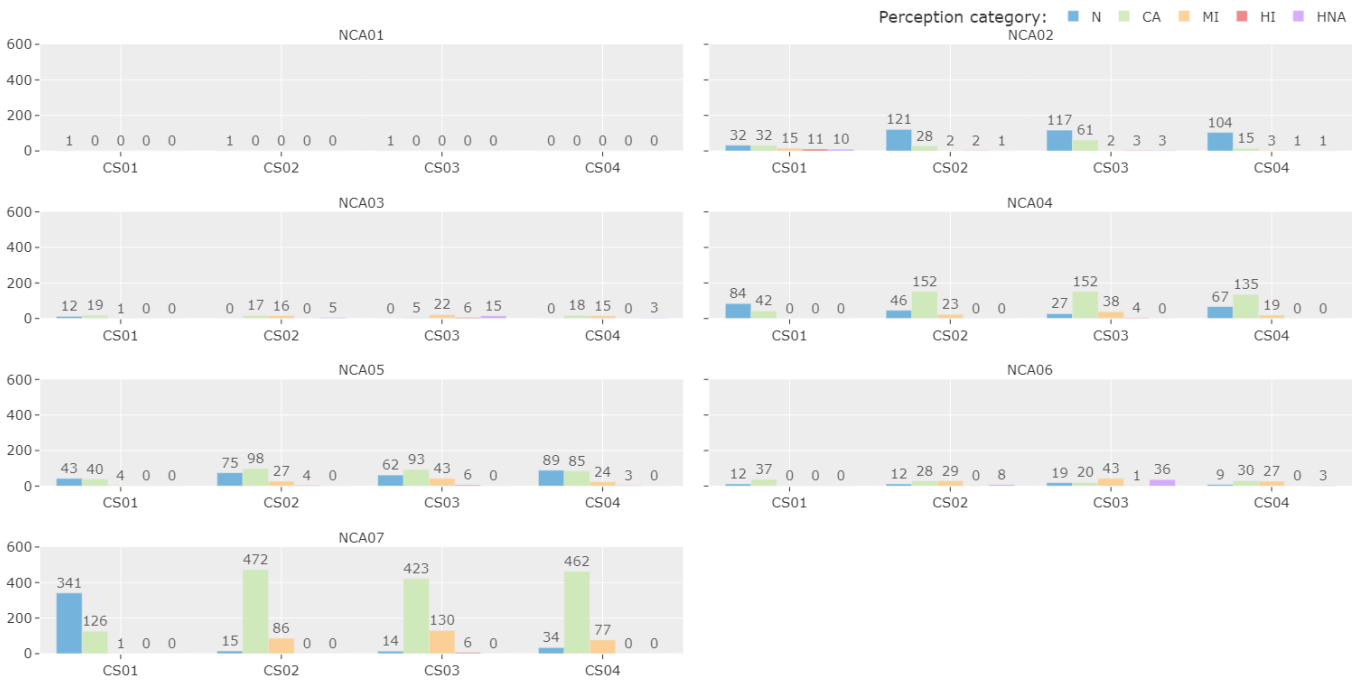


Figure 5.7 Number of residential exceedances during standard hours – Property adjustments/demolition (AG1)

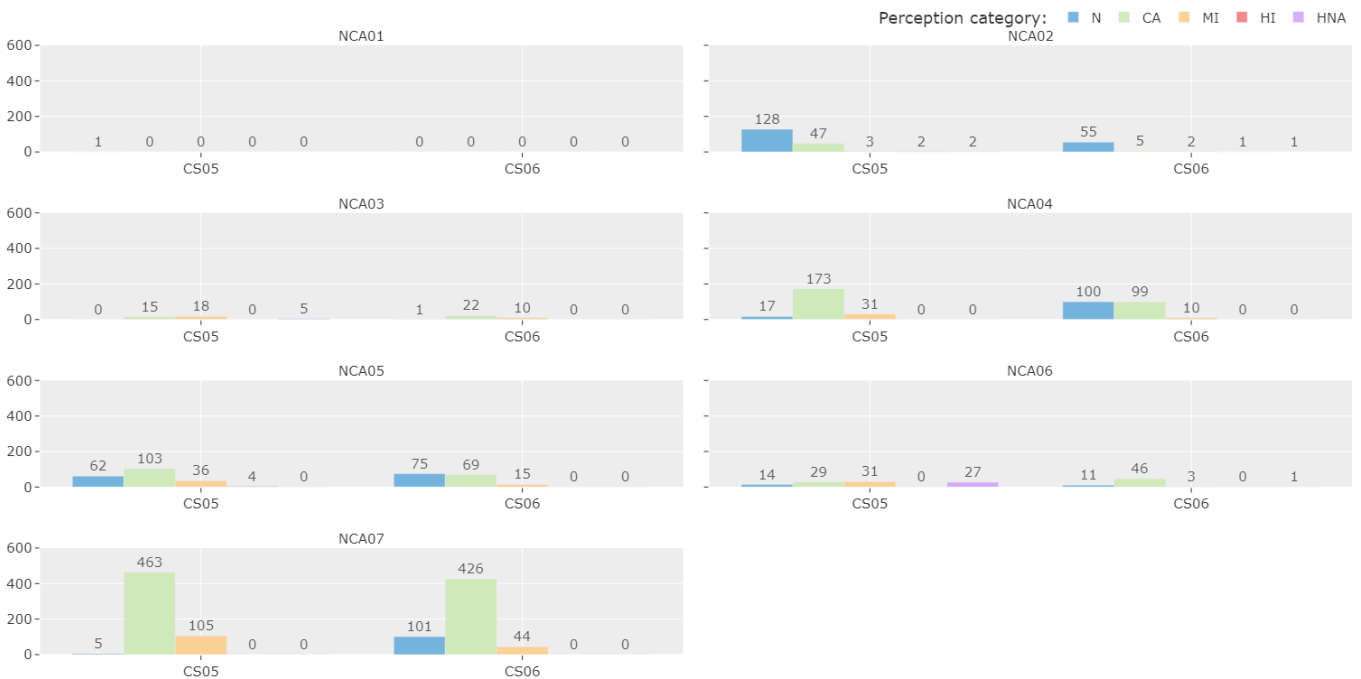


Figure 5.8 Number of residential exceedances during standard hours – Utility relocation/traffic control installations (AG2)

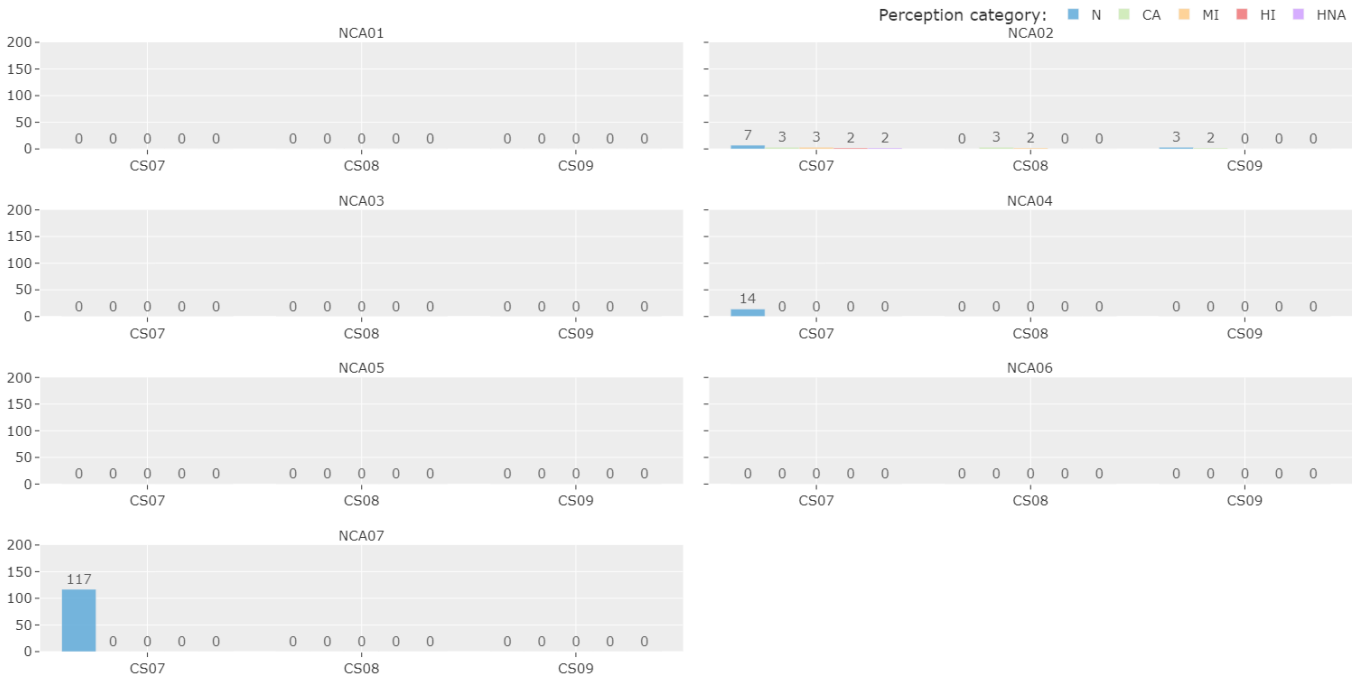


Figure 5.9 Number of residential exceedances during standard hours – Bridge works (AG3)

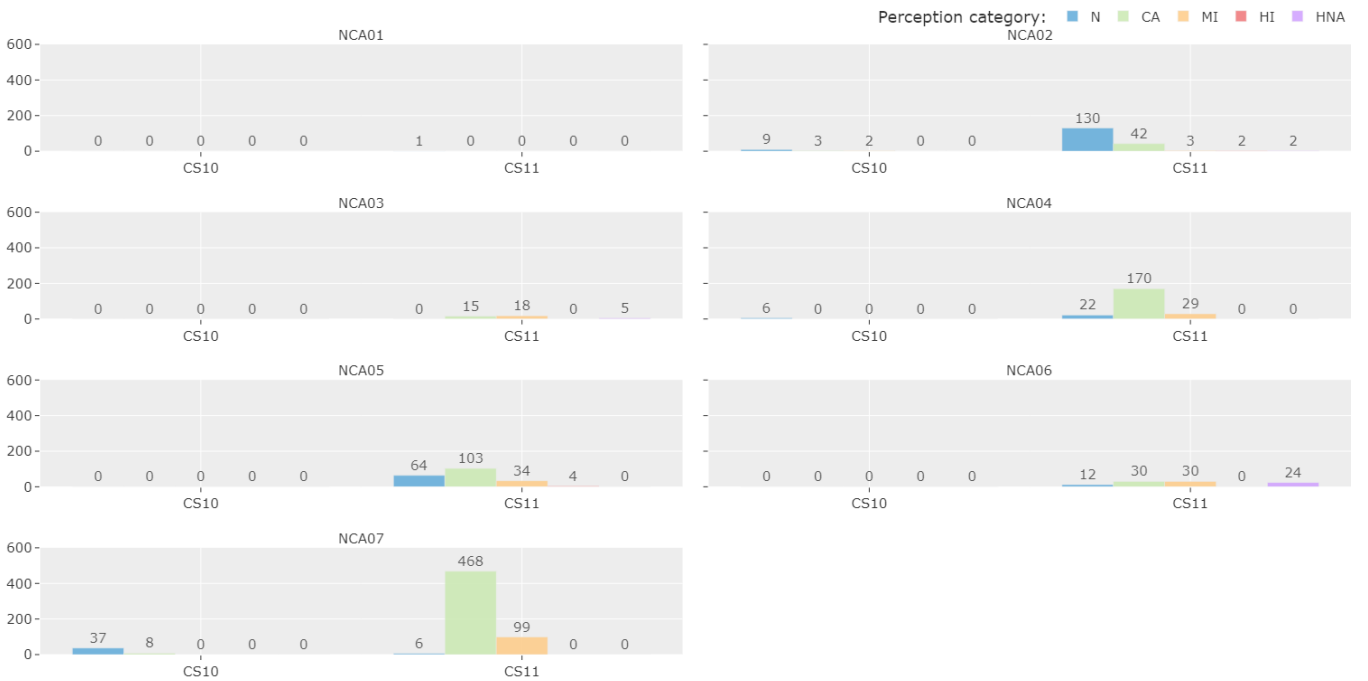


Figure 5.10 Number of residential exceedances during standard hours – Pavement works (AG4)

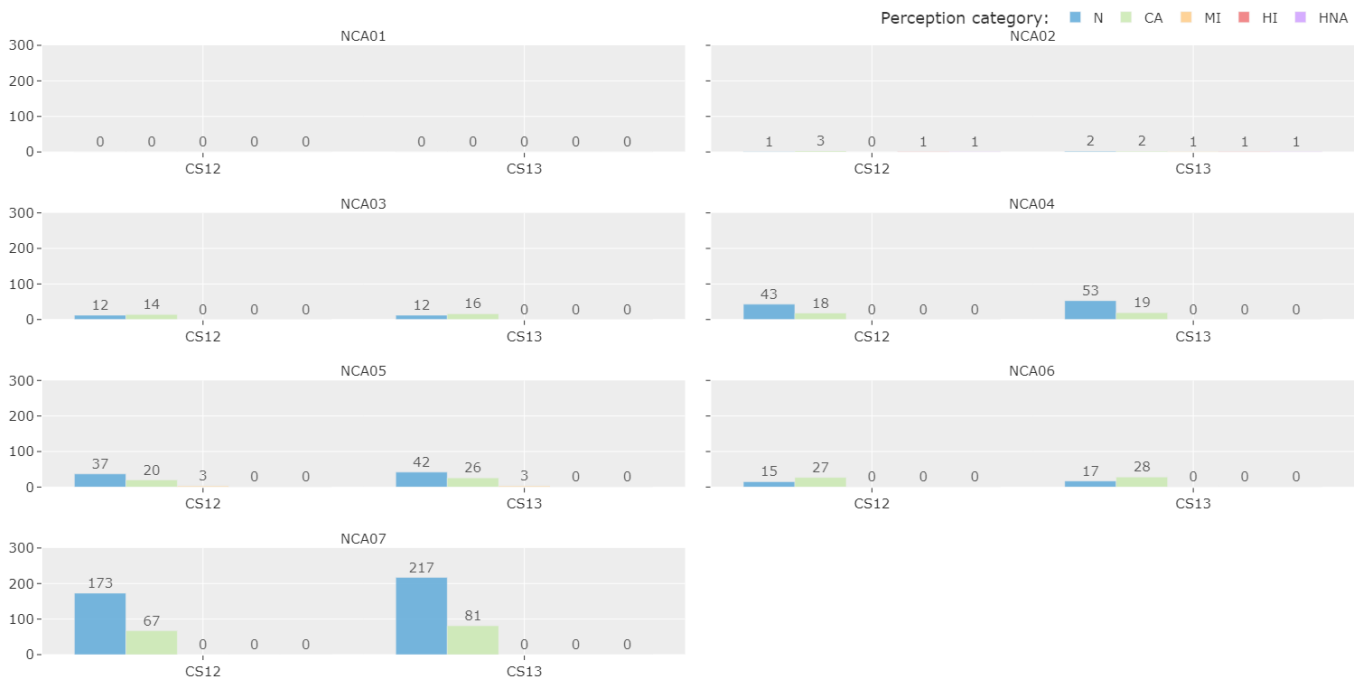


Figure 5.11 Number of residential exceedances during standard hours – Road furniture installations (AG5)

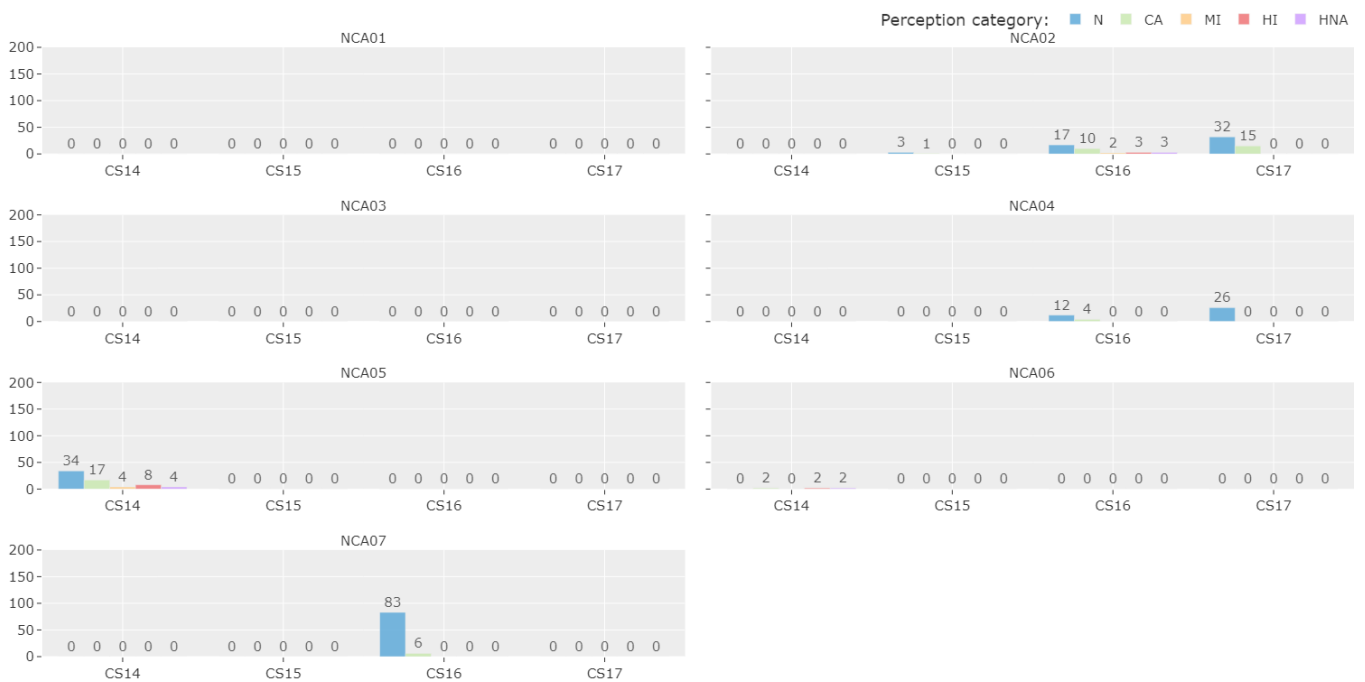


Figure 5.12 Number of residential exceedances during standard hours – Construction compounds (CC)

Exceedances during OOHW (Night)

The number of residential structures within each perception category are shown in Figure 5.13 to Figure 5.18 for each construction activity during OOHW (night).

In general, all NCAs are predicted to exceed the residential NMLs during construction. A summary of the impacts for each activity group is provided in Table 5.12 which includes:

- the construction scenario with the largest number of exceedances of the NML
- the NCA and scenario with the largest number of highly intrusive (HI) receivers during the night period
- the NCA with the most exceedances for existing and Wilton Greens residential premises along with the most common perception category range.

Table 5.12 Summary of perception category exceedances during OOHW (night)

Activity group	Construction scenario with the highest impacts	Largest number of HI receivers	NCA with the most exceedances	
			Existing residences	Future residences
AG1	CS03	NCA06, CS03	NCA04, CA	NCA07, MI
AG2	CS05	NCA06, CS05	NCA04, CA	NCA07, MI
AG3	CS07	NCA02, CS07	NCA04, N	NCA07, N
AG4	CS11	NCA06, CS11	NCA04, CA	NCA07, MI
AG5	CS13	NCA06, CS13	NCA04, N	NCA07, CA
CC	CS16	NCA05, CS14	NCA04, N	NCA07, N

In general, noise impacts would be either ‘noticeable’ or ‘clearly audible’ as the majority of residential structures within each NCA would be shielded by other residential structures. The highest impacts would be located at the residential structures in the first rows of houses fronting the construction footprint, this is shown on noise contour plots provided in Appendix B-4.

Future residential premises located within the Stage 1 Wilton Greens development would generally experience a higher level of impact with the majority of exceedances located in the ‘moderately intrusive’ perception category. These receivers are located closer to the construction work area when compared to existing residences to the north of Picton Road.

Construction noise impacts would be managed in accordance with the construction noise management measures detailed in section 7.1.

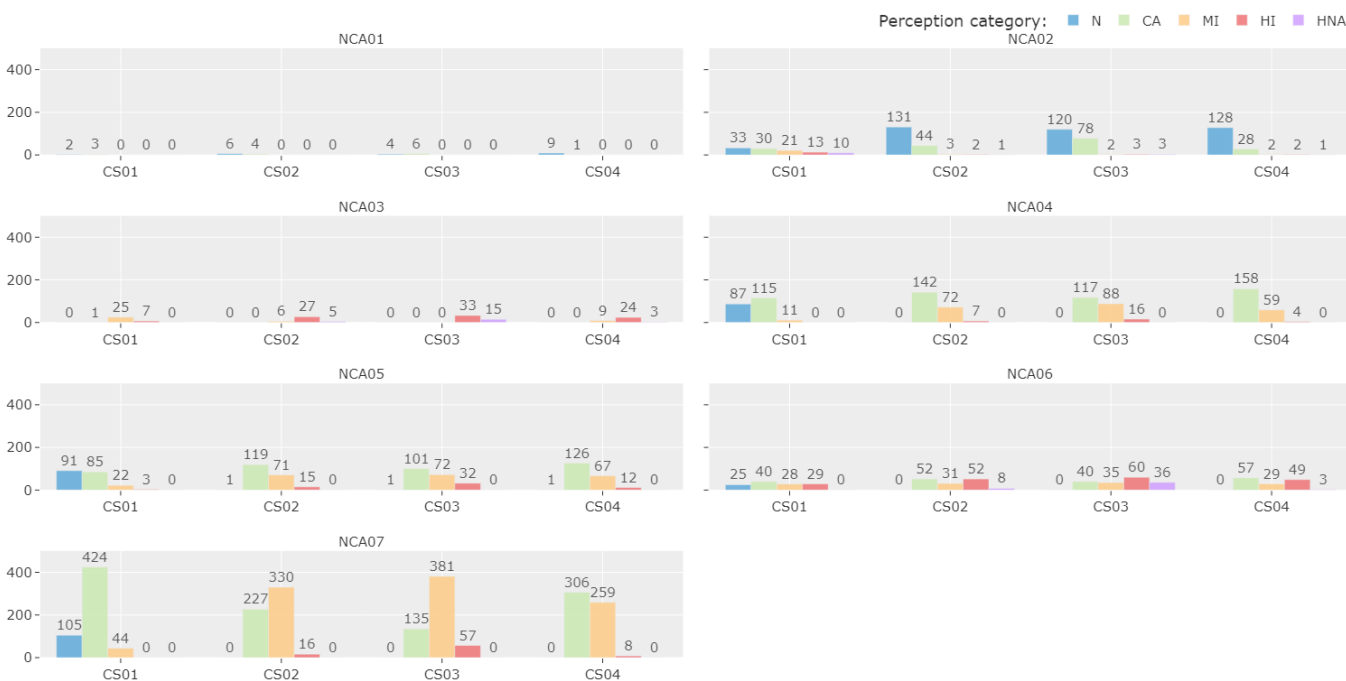


Figure 5.13 Number of residential exceedances during OOHW (night) – Property adjustments/demolition (AG1)

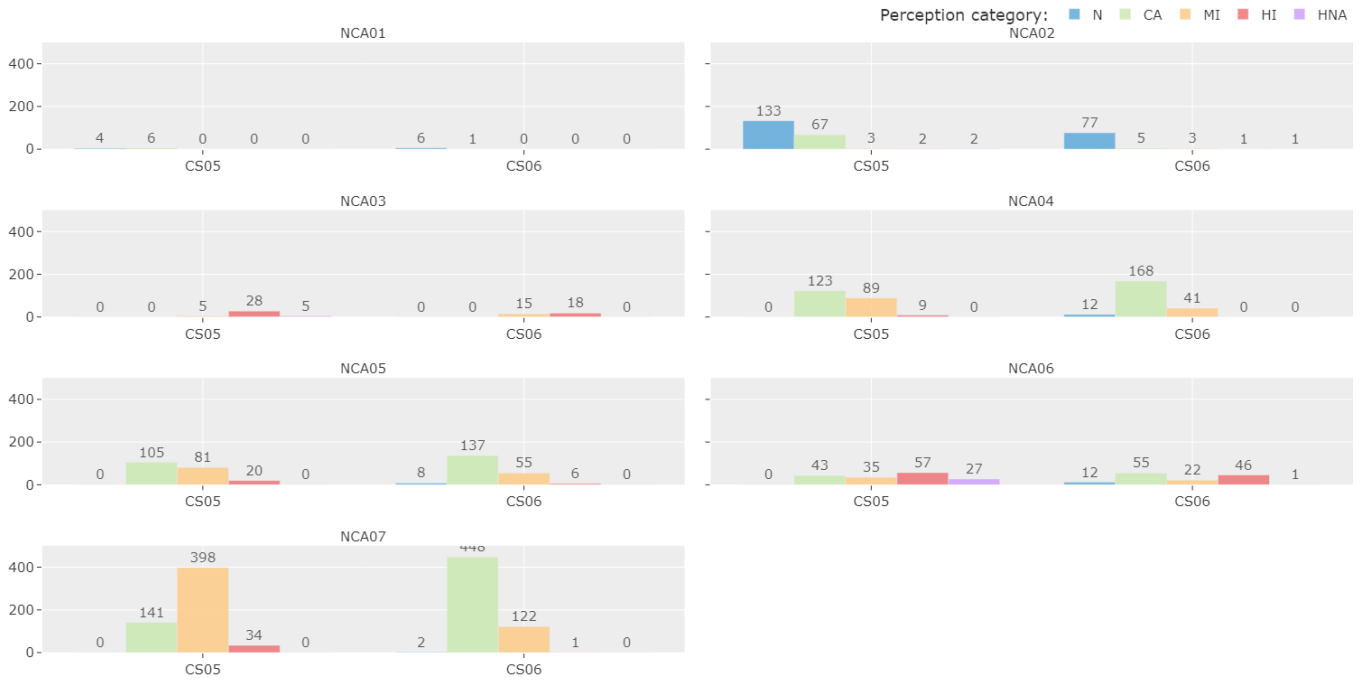


Figure 5.14 Number of residential exceedances during OOHW (night) – Utility relocation/traffic control installations (AG2)

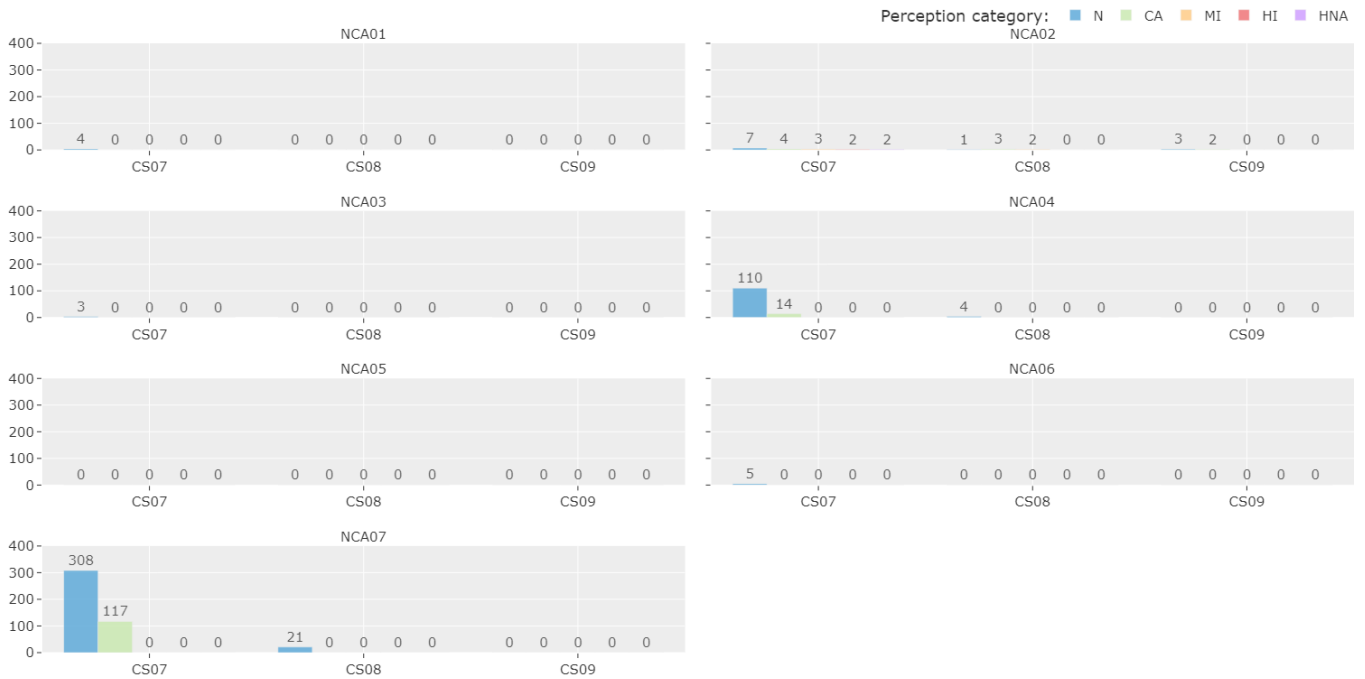


Figure 5.15 Number of residential exceedances during OOHW (night) – Bridge works (AG3)

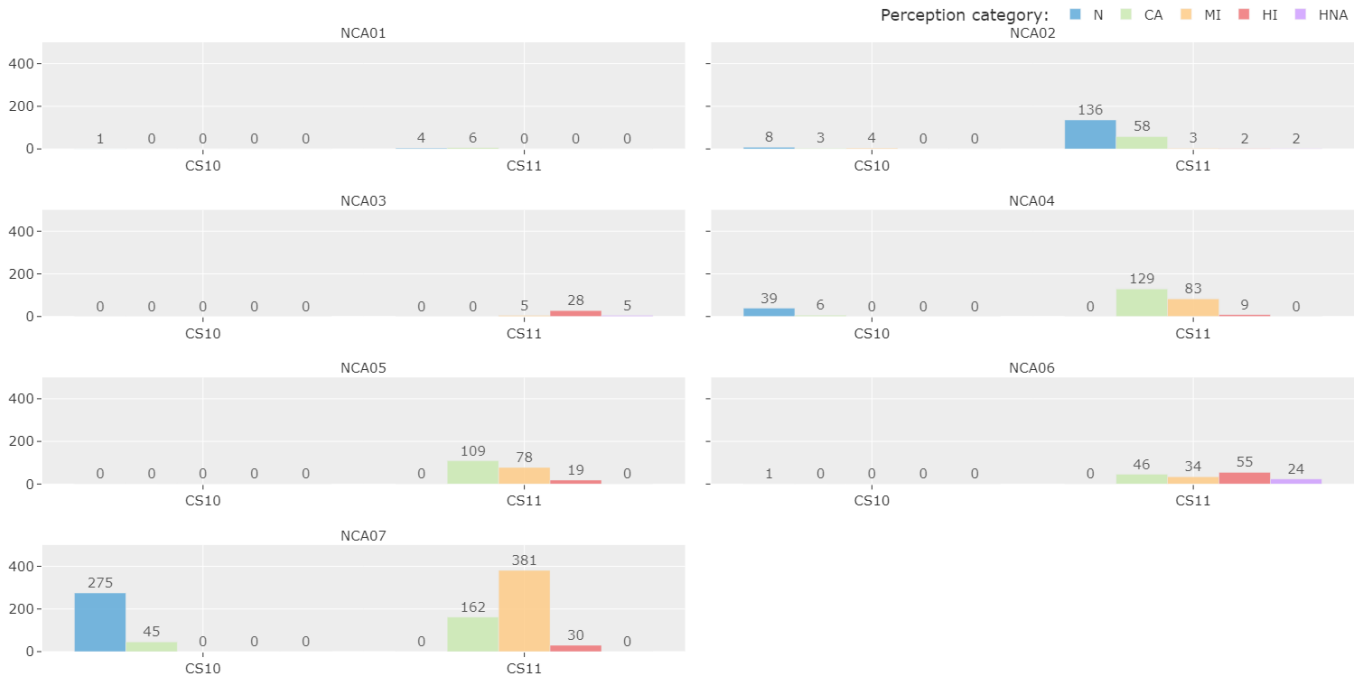


Figure 5.16 Number of residential exceedances during OOHW (night) – Pavement works (AG4)

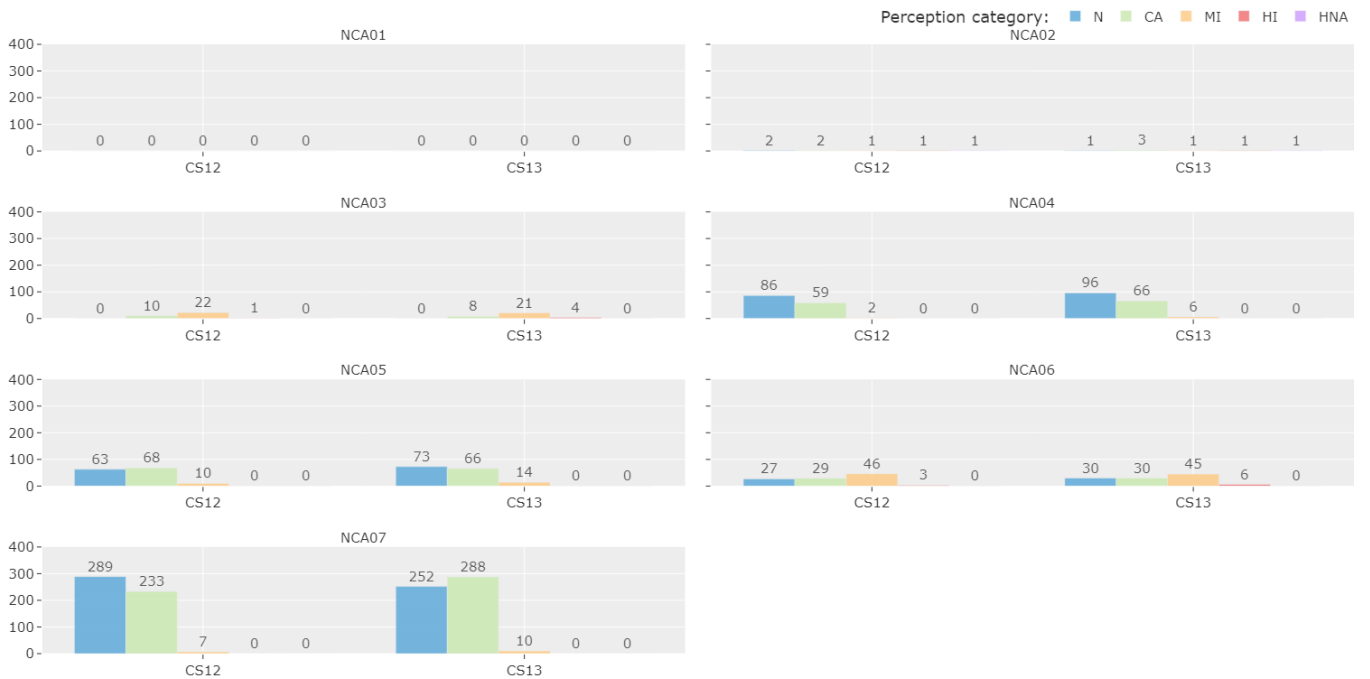


Figure 5.17 Number of residential exceedances during OOHW (night) – Road furniture installations (AG5)

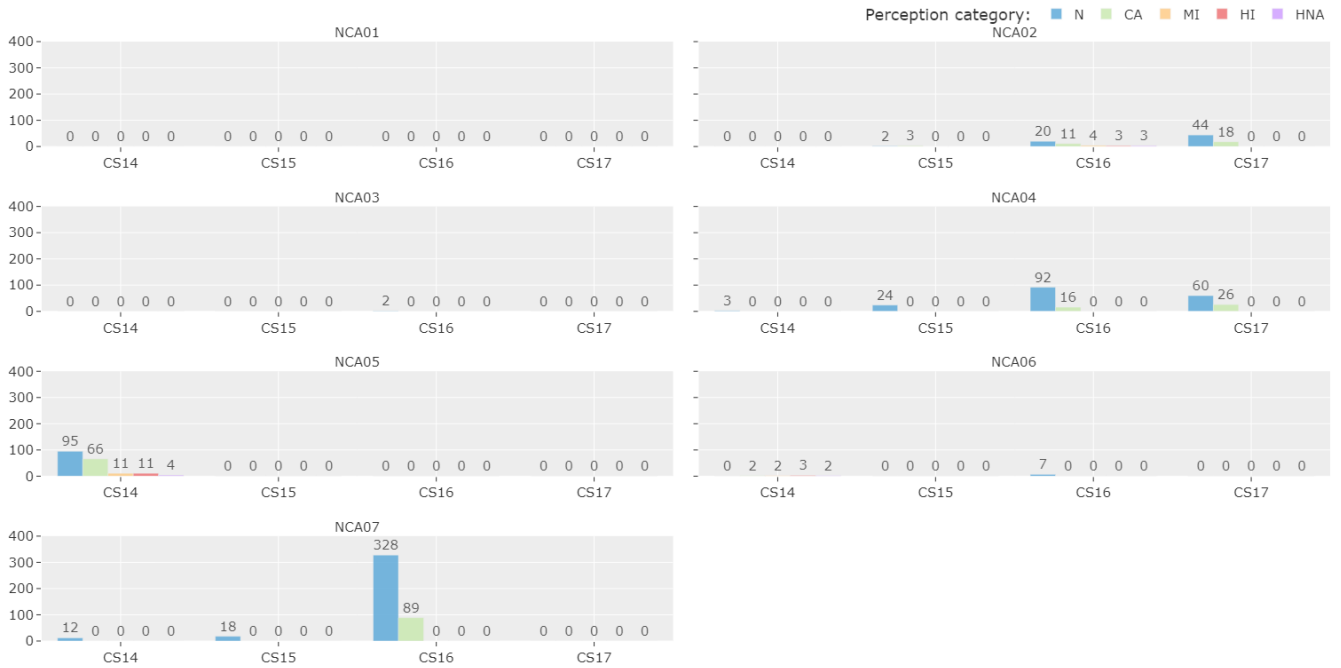


Figure 5.18 Number of residential exceedances during OOHW (night) – Construction compounds (CC)

5.2.2.3 Sleep disturbance impacts

Construction activities that could require OOHW are indicated in Table 3.5. The number of residential receivers that are predicted to exceed the sleep disturbance screening criteria are provided in Table 5.13. No exceedances have been identified in NCA01.

Drainage works (CS06) has the potential to cause the highest impacts with up to 193 residential receivers exceeding the screening criteria. The majority of these receivers are located in NCA06 and NCA07 which comprise of residences located within the Stage 1 Wilton Greens development currently being constructed to the south of Picton Road near Pembroke Parade.

Sleep disturbance impacts would be managed in accordance with the construction noise management measures detailed in section 7.1.

Table 5.13 Number of sleep disturbance impacted receivers

Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	Total
CS01	0	39	13	0	0	37	0	89
CS02	0	11	33	9	23	63	31	170
CS03	0	12	33	13	34	67	44	203
CS04	0	11	33	9	25	63	34	175
CS05	0	11	33	9	25	63	34	175
CS06	0	12	33	10	29	65	44	193
CS07	0	2	0	0	0	0	0	2
CS08	0	2	0	0	0	0	0	2
CS09	0	0	0	0	0	0	0	0
CS10	0	4	0	0	0	0	0	4
CS11	0	7	23	0	6	49	0	85
CS12	0	6	19	0	5	47	0	77
CS13	0	3	5	0	0	23	0	31

Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	Total
CS14	0	0	0	0	15	4	0	19
CS15	0	1	0	0	0	0	0	1
CS16	0	8	0	0	0	0	0	8
CS17	0	0	0	0	0	0	0	0
CS01	0	39	13	0	0	37	0	89

5.2.2.4 Discussion on the predicted noise levels

The magnitude of construction noise levels depends on the:

- intensity and location of construction activities
- type of equipment used
- existing background noise levels
- intervening terrain and structures
- weather conditions during construction works.

The predicted construction noise levels during standard hours and OOHW (night) are discussed in the following section. Noise levels have been assessed during each assessment time period by considering the 'typical' and 'worst-case' noise perception categories during each construction activity group. These have been identified based on the following:

- **Typical perception:** the perception category (refer to Table 5.10) in which the greatest number of exceedances fall.
- **Highest perception:** the perception category in which the highest level of exceedance falls.

The predicted noise levels are considered conservative as they assume worst-case operations relative to each receiver. Construction would not be occurring along the entire length of the corridor simultaneously and would instead be concentrated in areas for short periods before moving along the alignment. This means that the number of exceedances provided for each construction scenario is greater than what would occur during any one time.

Construction noise and vibration management measures are discussed in section 7.1.

Potential impacts during standard hours

The predicted typical and highest perception levels during standard construction hours are summarised in Table 5.14 and Table 5.15 for each construction scenario and NCA. The number of residential receivers for the typical and highest categories are presented in the table where the shade of the coloured cell indicates the level of impact based on the CNVG perception categories defined in Table 5.10.

A summary of the predicted noise impacts for each construction activity during standard hours is as follows:

- **Property adjustments and demolitions works (AG1):** noise levels are typically 'noticeable' or 'clearly audible' which indicates construction noise levels would generally exceed the NML by 10 dB or less. 'Highly intrusive' noise levels are predicted during all construction scenarios modelled within this construction activity. Highest impacts are predicted to occur during property adjustments and demolition works (CS03) which requires operation of a concrete saw.
- **Utility relocation and traffic control system installations (AG2):** noise levels are typically 'noticeable' or 'clearly audible' which indicates construction noise levels would generally exceed the NML by 10 dB or less. 'Highly intrusive' noise levels are predicted during both construction scenarios modelled within this construction activity. Highest noise levels are predicted to occur during utilities relocation and traffic control system installation works (CS05) which requires operation of a jackhammer, excavator and vacuum truck.
- **Bridge works (AG3):** noise levels are typically 'noticeable' which indicates construction noise levels would be below the NML. 'Highly intrusive' noise levels are predicted during one construction scenario modelled within this construction activity. Highest noise levels are predicted to occur during bridge drainage and structure construction works (CS07) which requires operation of a jackhammer and concrete truck.

- **Pavement works (AG4):** noise levels are typically ‘noticeable’ or ‘clearly audible’ which indicates construction noise levels would generally exceed the NML by 10 dB or less. ‘Highly intrusive’ noise levels are predicted during one construction scenario modelled within this construction activity. Highest noise levels are predicted to occur during pavement works (CS11) due to operation of a pavement laying machine and vibratory roller.
- **Road furniture installations (AG5):** noise levels are typically ‘noticeable’ or ‘clearly audible’ which indicates construction noise levels would generally exceed the NML by 10 dB or less. ‘Highly intrusive’ noise levels are predicted during both construction scenarios modelled within this construction activity. Highest noise levels are predicted to occur during road furniture installation works (CS13) due to operation of welding equipment.
- **Construction compounds (CC):** In general, noise levels are typically ‘noticeable’ which indicates construction noise levels would be below the NML. The highest noise levels would be considered ‘highly intrusive’ and would only occur at residences located near the proposed compound or turning bay areas.

Table 5.14 Typical construction noise impact during standard hours – number of impacted residential receivers

Activity group	Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07
AG1	CS01	1	32	19	84	43	37	341
	CS02	1	121	17	152	98	29	472
	CS03	1	117	22	152	93	43	423
	CS04	0	104	18	135	89	30	462
AG2	CS05	1	128	18	173	103	31	463
	CS06	0	55	22	100	75	46	426
AG3	CS07	0	7	0	14	0	0	117
	CS08	0	3	0	0	0	0	0
	CS09	0	3	0	0	0	0	0
AG4	CS10	0	9	0	6	0	0	37
	CS11	1	130	18	170	103	30	468
AG5	CS12	0	3	14	43	37	27	173
	CS13	0	2	16	53	42	28	217
CC	CS14	0	0	0	0	34	2	0
	CS15	0	3	0	0	0	0	0
	CS16	0	17	0	12	0	0	83
	CS17	0	32	0	26	0	0	0

Table 5.15 Maximum construction noise impact during standard hours – number of impacted residential receivers

Activity group	Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07
AG1	CS01	1	11	1	42	4	37	1
	CS02	1	2	16	23	4	29	86
	CS03	1	3	6	4	6	1	6
	CS04	0	1	15	19	3	27	77
AG2	CS05	1	2	18	31	4	31	105
	CS06	0	1	10	10	15	3	44
AG3	CS07	0	2	0	14	0	0	117
	CS08	0	2	0	0	0	0	0
	CS09	0	2	0	0	0	0	0

Activity group	Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07
AG4	CS10	0	2	0	6	0	0	8
	CS11	1	2	18	29	4	30	99
AG5	CS12	0	1	14	18	3	27	67
	CS13	0	1	16	19	3	28	81
CC	CS14	0	0	0	0	8	2	0
	CS15	0	1	0	0	0	0	0
	CS16	0	3	0	4	0	0	6
	CS17	0	15	0	26	0	0	0

Impacts during OOHW (night)

The predicted typical and highest perception levels during OOHW (night) are summarised in Table 5.16 and Table 5.17 for each construction scenario and NCA. The number of residential receivers for the typical and highest categories are presented in the table while the shade of the coloured cell indicates the level of impact based on the CNVG perception categories defined in Table 5.10.

A summary of the noise levels for each stage during OOHW (night) is as follows:

- **Property adjustments and demolitions works (AG1):** noise levels typically range between ‘noticeable’ to ‘highly intrusive’ and is dependent on the location of works and existing background noise levels. The highest noise levels are predicted in NCA03 and NCA06 where the typical noise level is considered ‘highly intrusive’. This indicates construction noise levels would generally exceed the NML by more than 25 dB. ‘Highly intrusive’ noise levels are predicted during all construction scenarios modelled within this construction stage. Highest noise levels are predicted to occur during property adjustments and demolition works (CS03) which requires operation of a concrete saw.
- **Utility relocation and traffic control system installations (AG2):** noise levels typically range between ‘clearly audible’ to ‘highly intrusive’. The highest noise levels are predicted in NCA03 and NCA06 where the typical noise level is considered ‘highly intrusive’. This indicates construction noise levels would generally exceed the NML by more than 25 dB. ‘Highly intrusive’ noise levels are predicted during both construction scenarios modelled within this construction stage. Highest noise levels are predicted to occur during utilities relocation and traffic control system installation works (CS05) which requires operation of a jackhammer, excavator and vacuum truck.
- **Bridge works (AG3):** noise levels are typically ‘noticeable’ which indicates construction noise levels would generally exceed the NML by 5 dB or less. ‘Highly intrusive’ noise levels are predicted during one construction scenario modelled within this construction stage. Highest noise levels are predicted to occur during bridge drainage and structure construction works (CS07) which requires operation of a jackhammer and concrete truck.
- **Pavement works (AG4):** noise levels are typically ‘noticeable’ or ‘clearly audible’ which indicates construction noise levels would generally exceed the NML by 15 dB or less. ‘Highly intrusive’ noise levels are predicted during one construction scenario modelled within this construction stage. Highest noise levels are predicted to occur during pavement works (CS11) due to operation of a pavement laying machine and vibratory roller.
- **Road furniture installations (AG5):** noise levels are typically ‘noticeable’ or ‘clearly audible’ which indicates construction noise levels would generally exceed the NML by 15 dB or less. ‘Highly intrusive’ noise levels are predicted during both construction scenarios modelled within this construction stage. Highest noise levels are predicted to occur during road furniture installation works (CS13) due to operation of welding equipment.
- **Construction compounds (CC):** In general, noise levels are typically ‘noticeable’ which indicates construction noise levels would exceed the NML by 5 dB or less. The highest noise levels would be considered ‘highly intrusive’ and would only occur at residences located near the proposed compound or turning bay areas.

Table 5.16 Typical construction noise impact during OOHW (night) – number of impacted residential receivers

Activity group	Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07
AG1	CS01	3	33	25	115	91	40	424
	CS02	6	131	27	142	119	52	330
	CS03	6	120	33	117	101	60	381
	CS04	9	128	24	158	126	57	306
AG2	CS05	6	133	28	123	105	57	398
	CS06	6	77	18	168	137	55	448
AG3	CS07	4	7	3	110	0	5	308
	CS08	0	3	0	4	0	0	21
	CS09	0	3	0	0	0	0	0
AG4	CS10	1	8	0	39	0	1	275
	CS11	6	136	28	129	109	55	381
AG5	CS12	0	2	22	86	68	46	289
	CS13	0	3	21	96	73	45	288
CC	CS14	0	0	0	3	95	3	12
	CS15	0	3	0	24	0	0	18
	CS16	0	20	2	92	0	7	328
	CS17	0	44	0	60	0	0	0

Table 5.17 Worst-case construction noise impacts during OOHW (night) – number of impacted residential receivers

Activity group	Construction scenario	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07
AG1	CS01	3	13	7	11	3	29	44
	CS02	4	2	27	7	15	52	16
	CS03	6	3	33	16	32	60	57
	CS04	1	2	24	4	12	49	8
AG2	CS05	6	2	28	9	20	57	34
	CS06	1	1	18	41	6	46	1
AG3	CS07	4	2	3	14	0	5	117
	CS08	0	2	0	4	0	0	21
	CS09	0	2	0	0	0	0	0
AG4	CS10	1	4	0	6	0	1	45
	CS11	6	2	28	9	19	55	30
AG5	CS12	0	1	1	2	10	3	7
	CS13	0	1	4	6	14	6	10
CC	CS14	0	0	0	3	11	3	12
	CS15	0	3	0	24	0	0	18
	CS16	0	3	2	16	0	7	89
	CS17	0	18	0	26	0	0	0

5.2.3 Non-residential construction noise impacts

5.2.3.1 Predicted non-residential construction noise levels

The predicted noise level ranges for residential receivers are shown in Figure 5.19 to Figure 5.24 for each construction activity.

The predicted noise levels show that the highest levels of construction noise would generally be due to the following construction activities for each activity group:

- **Activity group 1 (AG1):** Property adjustments and demolition works (CS03)
- **Activity group 2 (AG2):** Utility relocation and traffic control system installations (CS05)
- **Activity group 3 (AG3):** Bridge works involving drainage and structure construction (CS07)
- **Activity group 4 (AG4):** Pavement works (CS11)
- **Activity group 5 (AG5):** Road furniture installations (CS13)
- **Construction compounds (CC):** Operation of compound 2 (CS16).

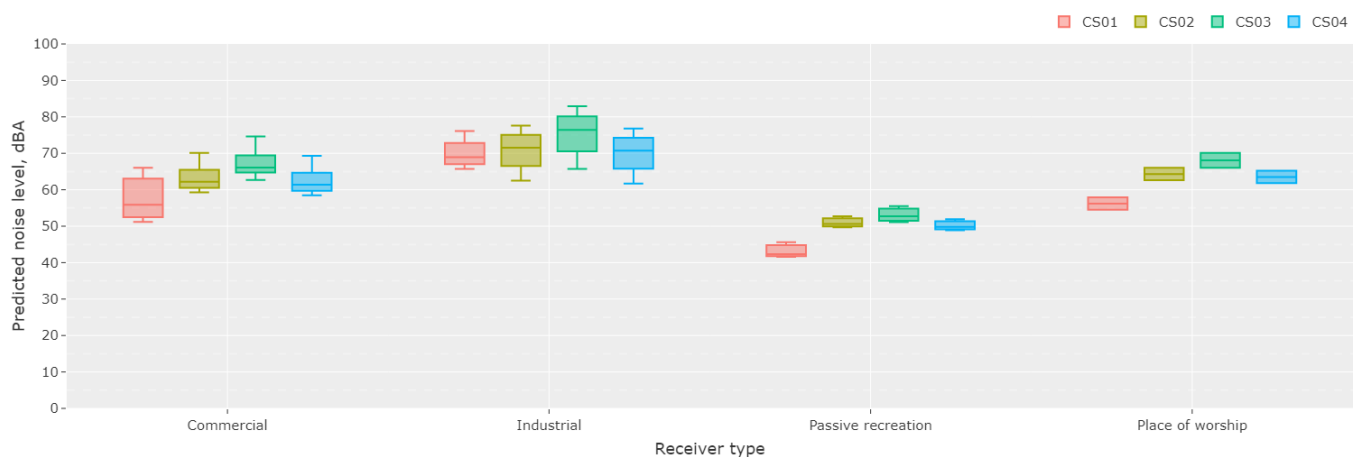


Figure 5.19 Predicted non-residential construction noise level range – Property adjustments and demolition (AG1)

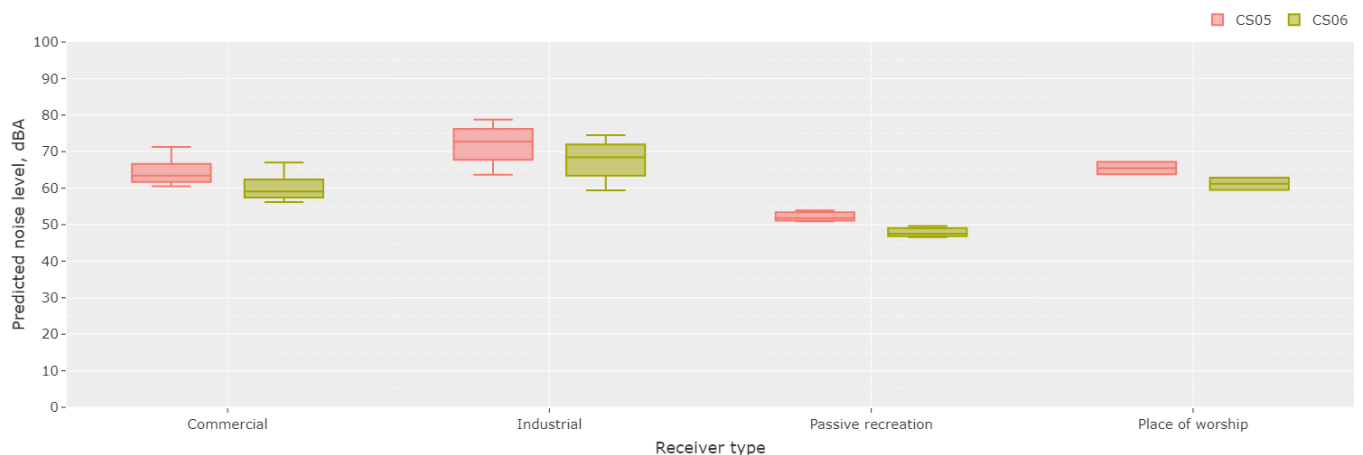


Figure 5.20 Predicted non-residential construction noise level range – Utility relocation and traffic control systems (AG2)



Figure 5.21 Predicted non-residential construction noise level range – Bridge works (AG3)

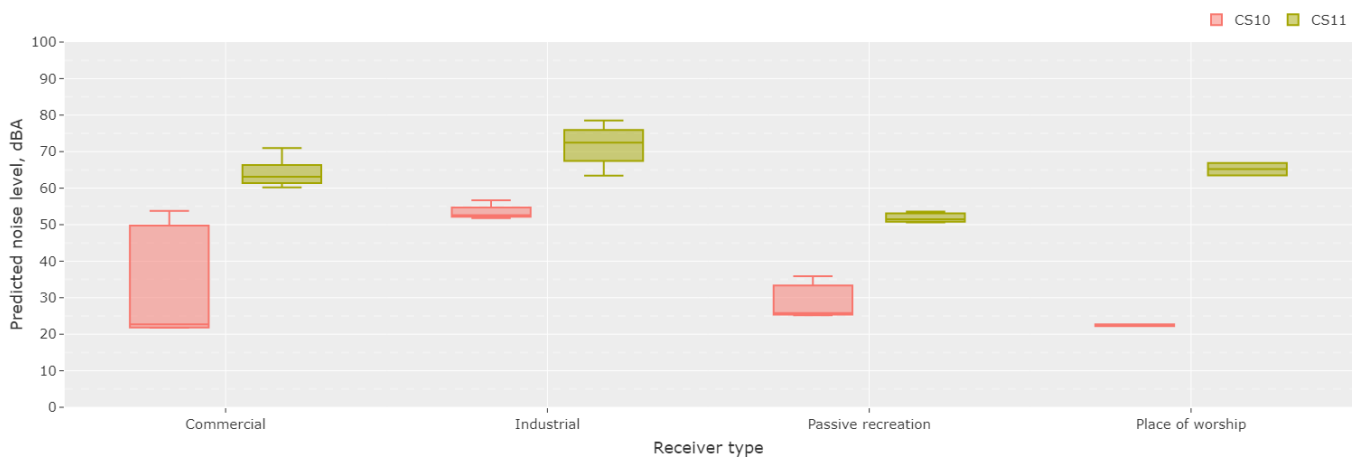


Figure 5.22 Predicted non-residential construction noise level range – Pavement works (AG4)

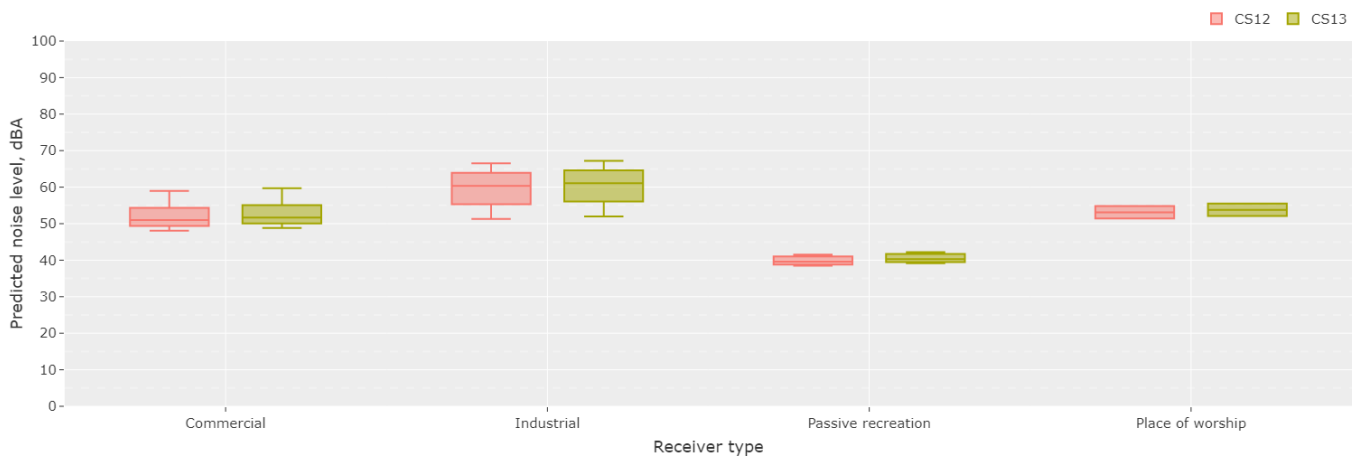


Figure 5.23 Predicted non-residential construction noise level range – Road furniture installations (AG5)

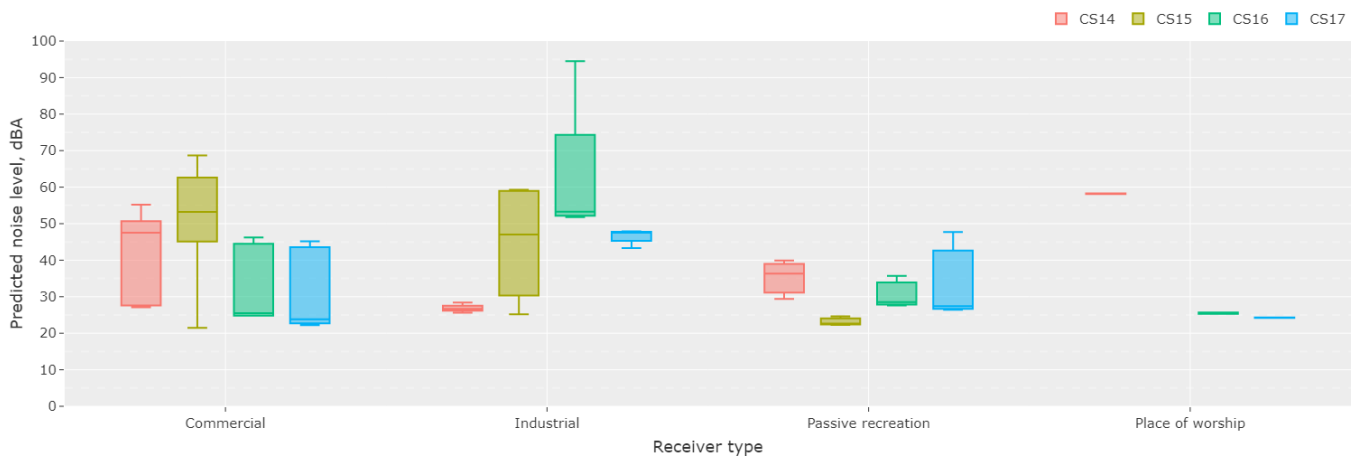


Figure 5.24 Predicted non-residential construction noise level range – Construction compounds (CC)

5.2.3.2 Non-residential construction noise level exceedances

The predicted exceedances of the non-residential NMLs have been grouped into the following six categories: '1-5 dB', '6-10 dB', '11-15 dB', '16-20 dB', '21-25 dB' and '>25 dB'. These categories represent the level of construction noise impact that a non-residential receiver would likely experience during construction and apply to the period when the premises are occupied and in use.

The number of non-residential structures within each exceedance category are shown in Figure 5.25 to Figure 5.30 above the respective bar for each construction activity.

Exceedances of the non-residential NMLs are predicted during site establishment and earthworks (AG1), utilities and drainage works (AG2), bridge demolition and pavement works (AG4), finishing works (AG5) and compound operations (CC). The level of exceedance is dependent on the location of the construction works relative to each non-residential receiver. The highest noise impacts are predicted during property adjustments and demolition works (CS03).

No exceedances of the non-residential NMLs are predicted during bridge works (AG3) due to the distances from the modelled non-residential receivers.

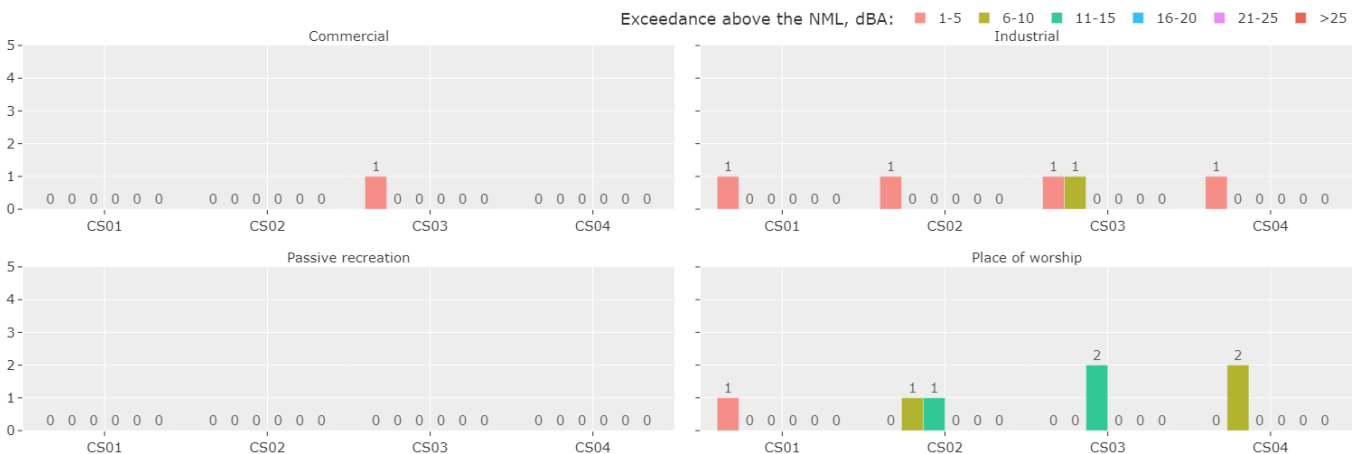


Figure 5.25 Number of non-residential exceedances during standard hours – Property adjustments and demolition (AG1)

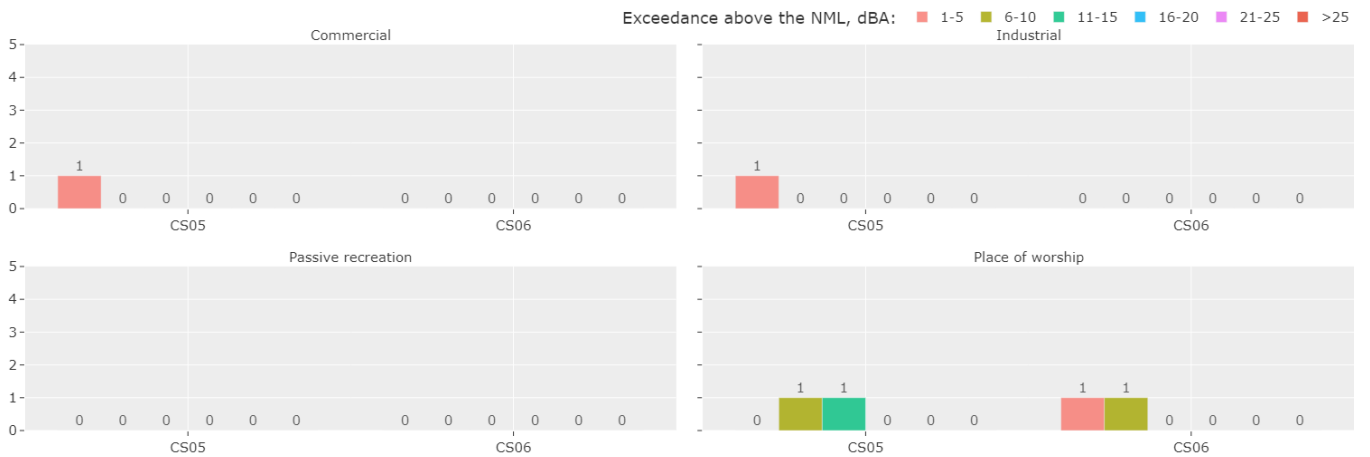


Figure 5.26 Number of non-residential exceedances during standard hours – Utility relocation and traffic control systems (AG2)

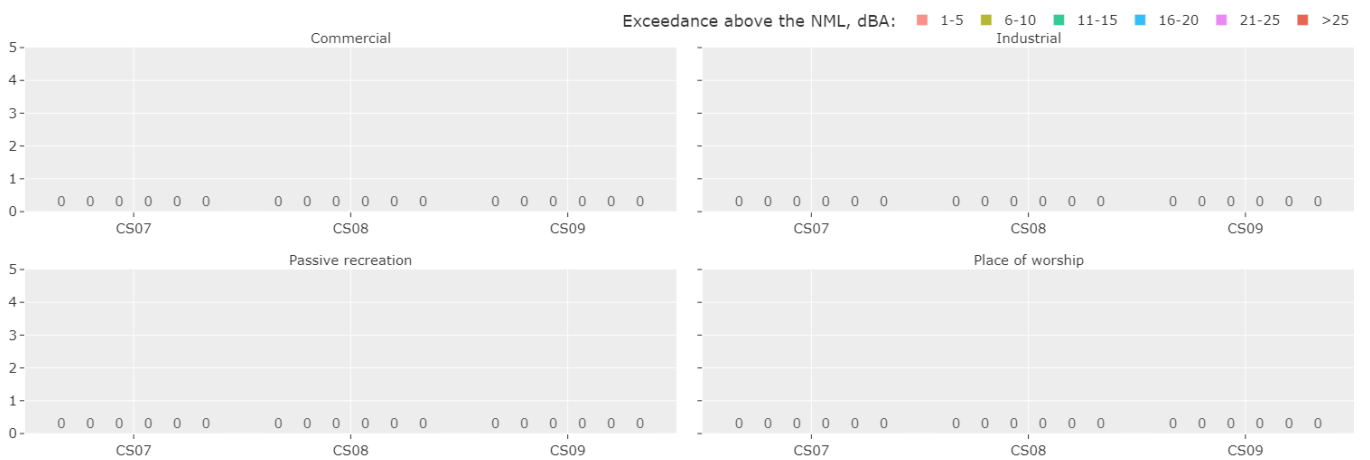


Figure 5.27 Number of non-residential exceedances during standard hours – Bridge works (AG3)

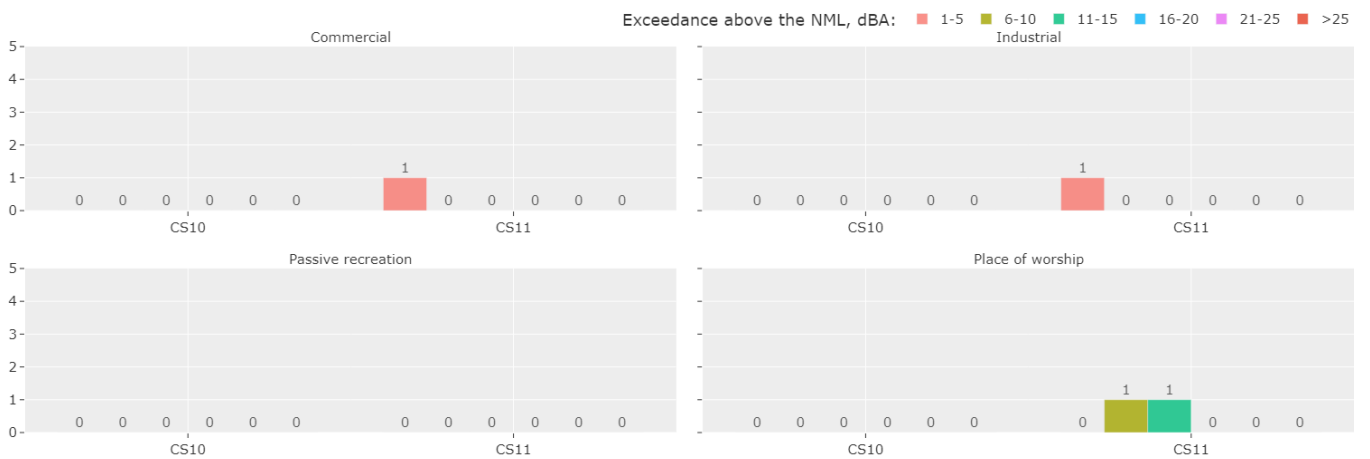


Figure 5.28 Number of non-residential exceedances during standard hours – Pavement works (AG4)

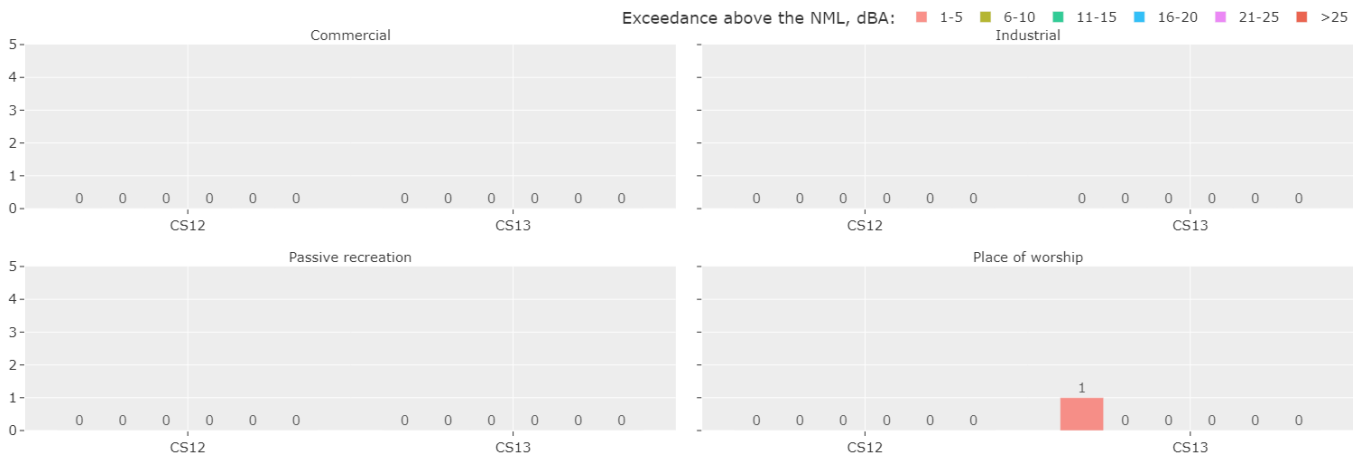


Figure 5.29 Number of non-residential exceedances during standard hours – Road furniture installations (AG5)

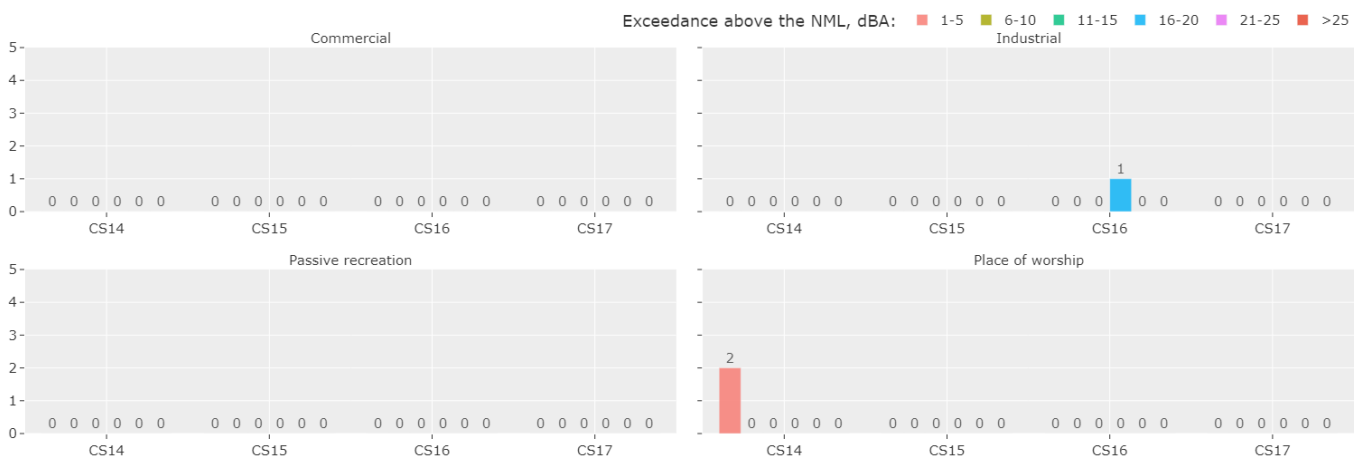


Figure 5.30 Number of non-residential exceedances during standard hours – Construction compounds (CC)

5.2.3.3 Discussion on the predicted noise levels for non-residential receivers

The results indicate that the modelled commercial, industrial and place of worship sensitive receivers would have the potential to experience noise in excess of the NMLs during construction.

One commercial receiver (R0604) located on 1100 Argyle Street Wilton is predicted to exceed the construction NMLs. Worst-case exceedances would be during property adjustments and demolition works (CS03) where exceedances up to 5 dBA are predicted. Based on a review of street map imagery, this receiver is currently in a highly dilapidated condition and is not currently in operation or inhabited and is not expected to be operating during construction.

Two industrial receivers (R0034 and R0036), both located within the Wilton Recycled Water Treatment Plant, are predicted to exceed the construction NMLs. Construction noise levels up to 83 dBA are predicted during property adjustments and demolition works (CS03), which would exceed the NML by 8 dBA.

Two structures located within the Wilton Anglican Church on 1095 Argyle Street (R0594 and R0597) are predicted to exceed the construction NMLs. Construction noise levels up to 70 dBA are predicted during property adjustments and demolition works (CS03) which would exceed the NML by 15 dBA.

The measures listed in section 7 would be implemented to manage the potential impacts identified.

No exceedances of the NMLs are predicted at the modelled passive recreation receivers.

5.3 Construction vibration assessment

The construction vibration assessment has been undertaken based on the methodology described in section 3.2.5. Potential cosmetic damage impacts on structures and human comfort impacts are assessed in the following sections.

5.3.1 Potential for cosmetic damage impacts

5.3.1.1 Standard structures

The CNVG specifies a minimum working distance of 25 metres for standard structures (see Table 3.9). This distance is based on the use of a vibratory roller greater than 18 tonnes.

Up to 39 structures have been identified within the minimum working distances for standard structures. These include 30 future residential structures located within the development being constructed as part of the Stage 1 of Wilton Greens, with the closest lot within three metres of the construction footprint for the proposal.

Nine existing residential structures have been identified within the minimum working distances for standard structures as listed in Table 5.18.

The standard structures located within the minimum working distances are shown in Figure 5.31. Potential construction vibration impacts would be managed in accordance with the recommendations provided in section 7.

Table 5.18 Existing standard structures located within the minimum working distances for vibration

Receiver ID	Location (Lot/Lot / DP)	NCA	Distance to construction footprint (metres)
R0023	16/251051	NCA02	Within construction footprint
R0027	20/251051	NCA02	5
R0028	211/735556	NCA02	Within construction footprint
R0030	210/735556	NCA02	Within construction footprint
R0035	173/280029	NCA02	21
R0285	183/280010	NCA03	23
R0552	1/1044944	NCA06	5
R0569	13/846009	NCA05	6
R0578	102/838769	NCA05	11

5.3.1.2 Heritage or other sensitive structures

The CNVG specifies a minimum working distance of 68 metres for heritage listed or other sensitive structures (see Table 3.9). Heritage listed structures that are located within this distance are listed in Table 5.19 for further assessment. Further information about these items is provided in section 6.4 of the REF.

Table 5.19 Heritage listed structures within the minimum working distances for vibration

Heritage name	Listing number	Lot / DP	Distance to construction footprint
Cottage	I275	32 / 813280	25 m
St Luke's Anglican Church	I276	1 / 1236516	63 m
Upper Nepean Scheme – Upper Canal	I16, 01373	1 / 1018965 1 / DP1288665	Main canal: Located 90 metres below ground level within the construction footprint. Airshaft #9: Located 80 metres from the construction footprint at ground level

The potential impacts on the heritage listed structures are provided in Table 5.20 for each vibration plant item. The items have the potential to experience cosmetic damage impacts if the following equipment is used:

- **Cottage:** roller greater than 4 tonnes, large hydraulic hammer mounted to an excavator greater than 18 tonnes, vibratory pile driver.
- **St Luke’s Anglican Church:** roller greater than 18 tonnes.
- **Upper Canal:** impacts are not anticipated as the distance to the asset (90 metres vertically) exceeds the minimum working distances for vibration. Additional analysis has been undertaken for the Upper Canal (see section 5.3.1.4).

The heritage listed structures that were assessed for the potential to experience cosmetic damage impacts during construction are shown in Figure 5.32. Potential construction vibration impacts would be managed in accordance with the recommendations provided in section 7.1.

Table 5.20 Potential vibration impacts for heritage listed structures

Plant	Approximate size	Minimum working distance Cosmetic damage (DIN4150)	Predicted vibration impact		
			Cottage (I275)	St Luke’s Anglican Church (I276)	Upper Canal (I16)
Vibratory roller	1-2 tonnes	14 m	No	No	No
	2-4 tonnes	16 m	No	No	No
	4-6 tonnes	33 m	Yes	No	No
	7-13 tonnes	41 m	Yes	No	No
	13-18 tonnes	54 m	Yes	No	No
	> 18 tonnes	68 m	Yes	Yes	No
Small hydraulic hammer	300 kg – 5 to 12 tonne excavator	5 m	No	No	No
Medium hydraulic hammer	900 kg – 12 to 18 tonne excavator	19 m	No	No	No
Large hydraulic hammer	1600 kg – 18 to 34 tonne excavator	60 m	Yes	No	No
Vibratory pile driver	Sheet piles	50 m	Yes	No	No
Piling rig – bored	≤ 800 mm	5 m	No	No	No
Jackhammer	Handheld	2 m	No	No	No

5.3.1.3 Heritage listed trees

The use of construction equipment close to trees has the potential to result in root damage, soil compaction (making it difficult for roots to absorb water and nutrients), bark and limb damage, and other secondary effects that can result in stress on the tree.

However, there are no vibration limits available to quantitatively assess potential construction vibration impacts on trees with heritage significance. There is also limited research available that would provide a clear understanding of the distance at which there could be indirect vibration impacts (i.e. no contact between the plant and tree) associated with the use of construction equipment close to trees.

Two culturally-modified trees have been identified within the proposal site and have the potential to be impacted by nearby construction activities:

- **AHIMS 52-5-4079/WJ-ST-04:** located north of Picton Road and the M31 Hume Motorway interchange. This tree is an approximately 25-metre-tall Blue-leaved Stringybark (*Eucalyptus agglomerate Maiden*). The tree trunk is approximately 1.3 metres in diameter at 1.4 metres from the ground and has five wounds of varying sizes. The tree protection zone (TPZ) has been determined to be 15.6 metres.

- **AHIMS 52-2-3590/Wilton 01:** located south of Picton Road and east of Janderra Lane. The tree is a 30-metre-tall Forest Red Gum (*Eucalyptus tereticornis Sm.*). The tree is approximately 1.3 metres in diameter above the root buttress. The scar is located on the southern side of the tree and measures 1.41 metres by 0.145 metres. The TPZ has been determined to be 15 metres.

In view of the above, advice should be sought from a qualified arborist to determine an appropriate safe working distance to minimise potential impacts on the two culturally-modified trees as recommended in section 7.1.

5.3.1.4 Cosmetic impacts on the Upper Canal

Further analysis was undertaken on potential vibration impacts on the Upper Canal. Potential vibration impacts on the Upper Canal have been assessed using:

- vibratory compactor/roller detailed in Table 5.21
- equations to predict the peak part particle velocities in Table 5.22, with descriptions of the parameters provided in Table 5.23.

Other vibration generating plant are anticipated to be used; however, would produce lower vibration emissions than the vibratory compactor used to assess potential impacts.

Table 5.21 Vibration intensive equipment

Item	Equipment model	Data	Source
Vibratory soil compactor	CAT CS79B	Amplitude: 2.1 mm Drum width: 2,134 mm Operating frequency: 28 Hz Weight: 20,220 kg	Equipment datasheet

Table 5.22 Construction vibration propagation equations

Operation	Equation	Scaling factor
Vibratory compaction (BS5228-2, Table E.1)	$v_{res} \leq k_s \sqrt{n_d} \left[\frac{A}{x + L_d} \right]^{1.5}$	$k_p = 75$ (50% chance of exceedance) $k_p = 143$ (33% chance of exceedance) $k_p = 276$ (5% chance of exceedance) (k_p refers to the scaling factor applied that reflects the probability of the predicted value being exceeded)

Table 5.23 Parameter description

Parameter	Description	Units
v_{res}	Resultant PPV	mm/s
k_s	Scaling factor	-
n_d	Number of vibrating drums	-
A	Maximum amplitude of drum vibration	mm
x	Distance	m
L_d	Vibrating roller drum width	m

Construction vibration levels were predicted using the vibration source levels provided in Table 5.21. The predicted PPV vibration levels are provided in Table 5.24 and represent indicative vibration levels from a vibratory compactor. Cells shaded in grey represent the distance at which the 3 mm/s PPV criteria would be exceeded.

It should be noted that vibration due to body waves that are also known as primary waves (such as those that have the potential to impact the Upper Canal pipeline) have lower velocities and amplitudes than vibration due to surface waves (also known as Rayleigh waves that is vibration experienced at ground level). Given this, vibration levels at 90 metres below ground level would be lower than those predicted in Table 5.24.

Ground vibration predictions have a significant amount of variability depending on the varying properties of the ground and the power/energy produced by the vibrating equipment, therefore results as a function of chance of exceedance have been provided.

The results of the modelling indicate that vibration levels at both 90 metres below the ground (main canal) and 80 metres along the surface (Airshaft #9) would likely be below 1.1 mm/s PPV and would be well below the WaterNSW criteria of 3 mm/s PPV. Nevertheless, it is recommended that WaterNSW be consulted prior to construction works to confirm the applicable vibration criteria for the pipeline, confirm the as-built depth of the pipeline beneath the construction work area, and confirm the requirement for any further assessment.

Potential construction vibration impacts would be managed in accordance with the recommendations provided in section 7.

Table 5.24 Predicted peak particle velocity vibration levels

Distance	50% chance of exceedance	33% chance of exceedance	5% chance of exceedance
5 m	12.0	22.8	44.1
10 m	5.4	10.3	19.9
15 m	3.2	6.1	11.8
20 m	2.2	4.2	8.1
25 m	1.6	3.1	5.9
30 m	1.3	2.4	4.6
35 m	1.0	1.9	3.7
40 m	0.8	1.6	3.1
45 m	0.7	1.3	2.6
50 m	0.6	1.2	2.2
55 m	0.5	1.0	1.9
60 m	0.5	0.9	1.7
65 m	0.4	0.8	1.5
70 m	0.4	0.7	1.4
75 m	0.3	0.6	1.2
80 m	0.3	0.6	1.1
85 m	0.3	0.5	1.0
90 m	0.3	0.5	0.9
95 m	0.2	0.5	0.9
100 m	0.2	0.4	0.8

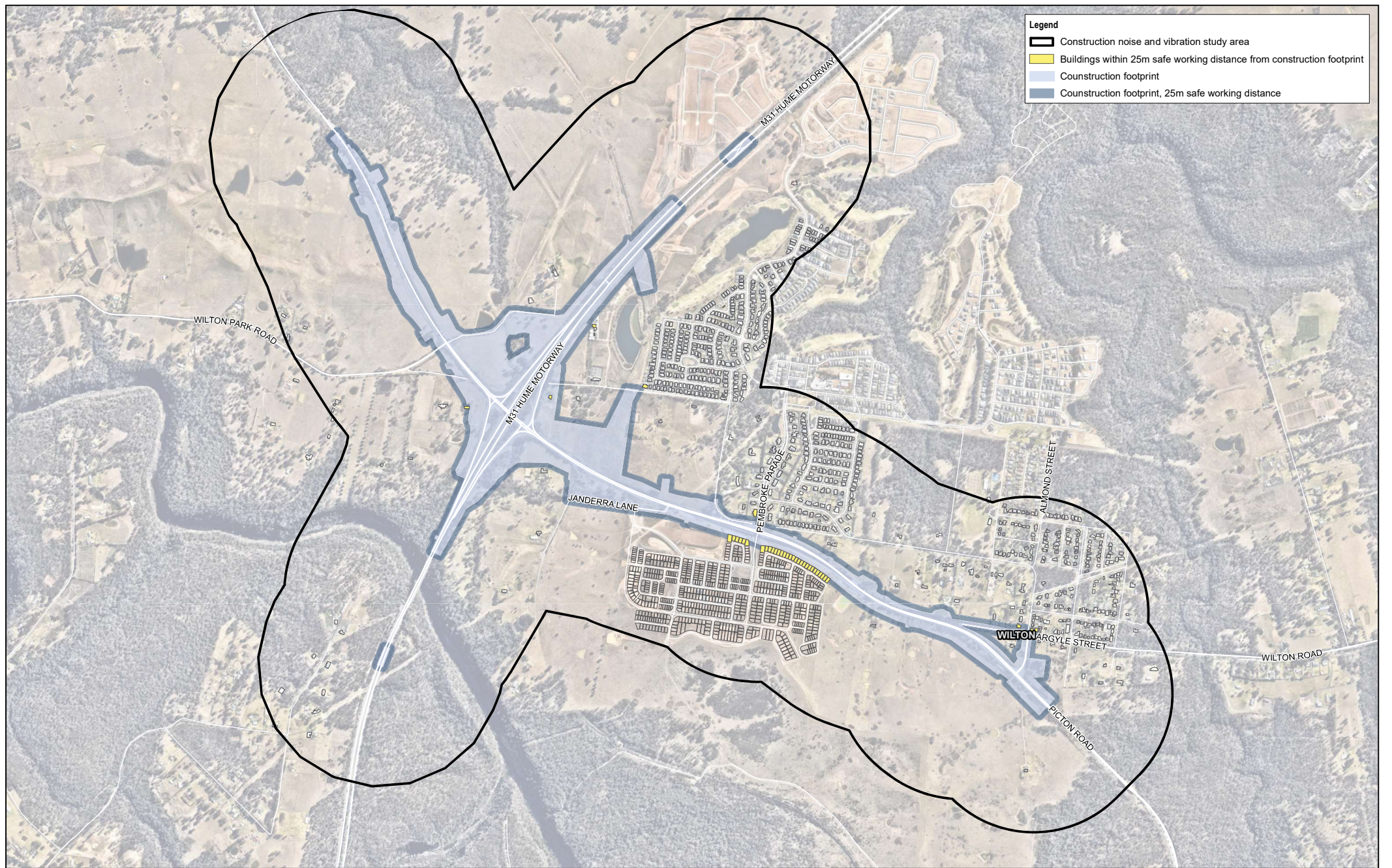
5.3.2 Potential for human comfort impacts

Up to 147 residential premises (50 existing and 97 future) are located within 100 metres of the construction footprint and have the potential to experience human comfort vibration impacts during compaction works, assuming use of a vibratory roller (see Table 3.9). These residences are generally located in the following areas:

- future residential structures located within the development being constructed in the South East Wilton Precinct
- along Hornby Street West
- along Balmoral Rise
- along Pembroke Parade
- on the intersection of Argyle Street and Almond Street.

The structures located within the minimum working distances for human comfort are shown in Figure 5.33.

Potential construction vibration impacts would be managed in accordance with the recommendations provided in section 7.



Legend

- Construction noise and vibration study area
- Buildings within 25m safe working distance from construction footprint
- Construction footprint
- Construction footprint, 25m safe working distance



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

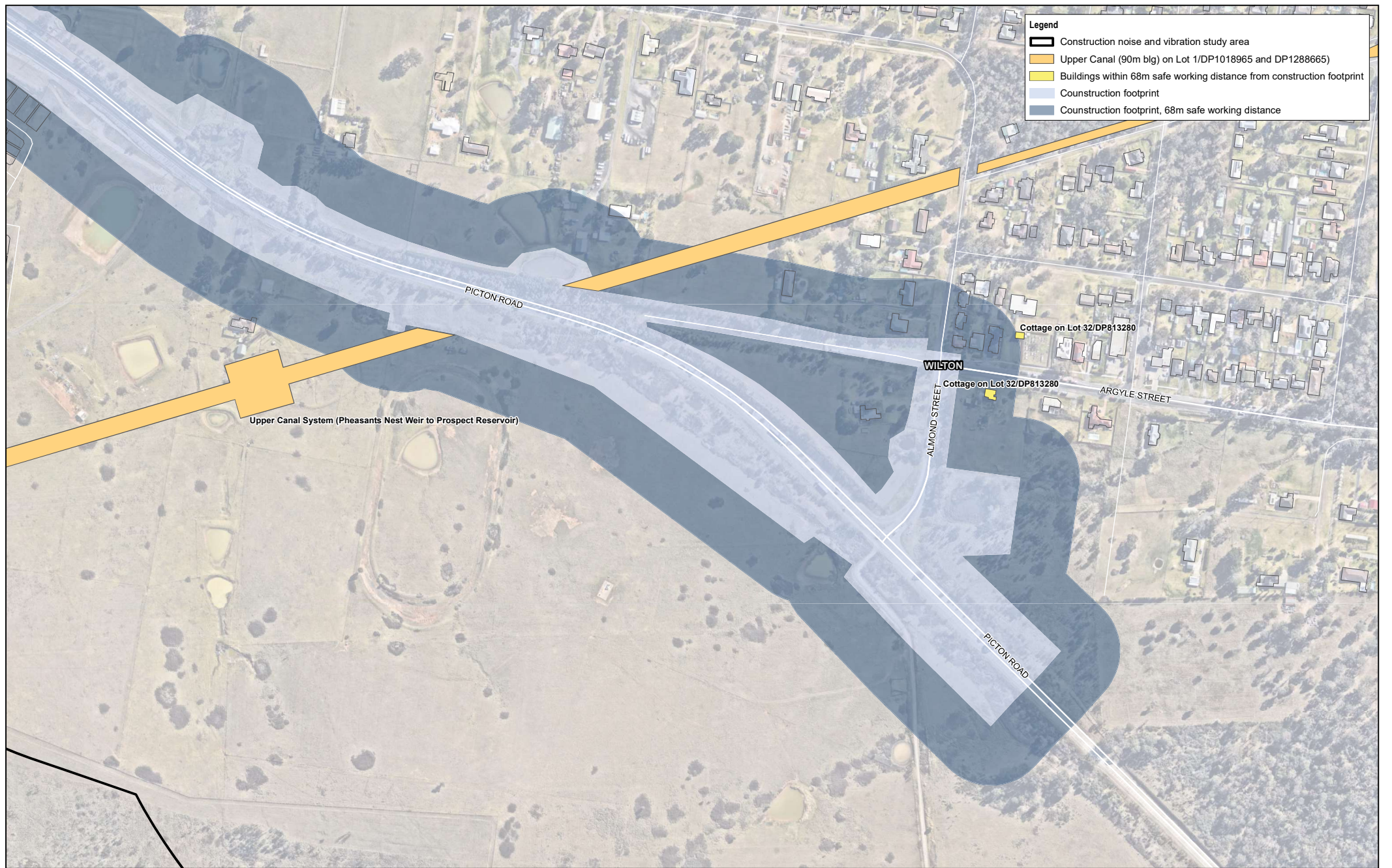


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**Cosmetic damage working distance
for standard structures**

Figure 5.31



Paper Size ISO A3
 0 50 100
 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

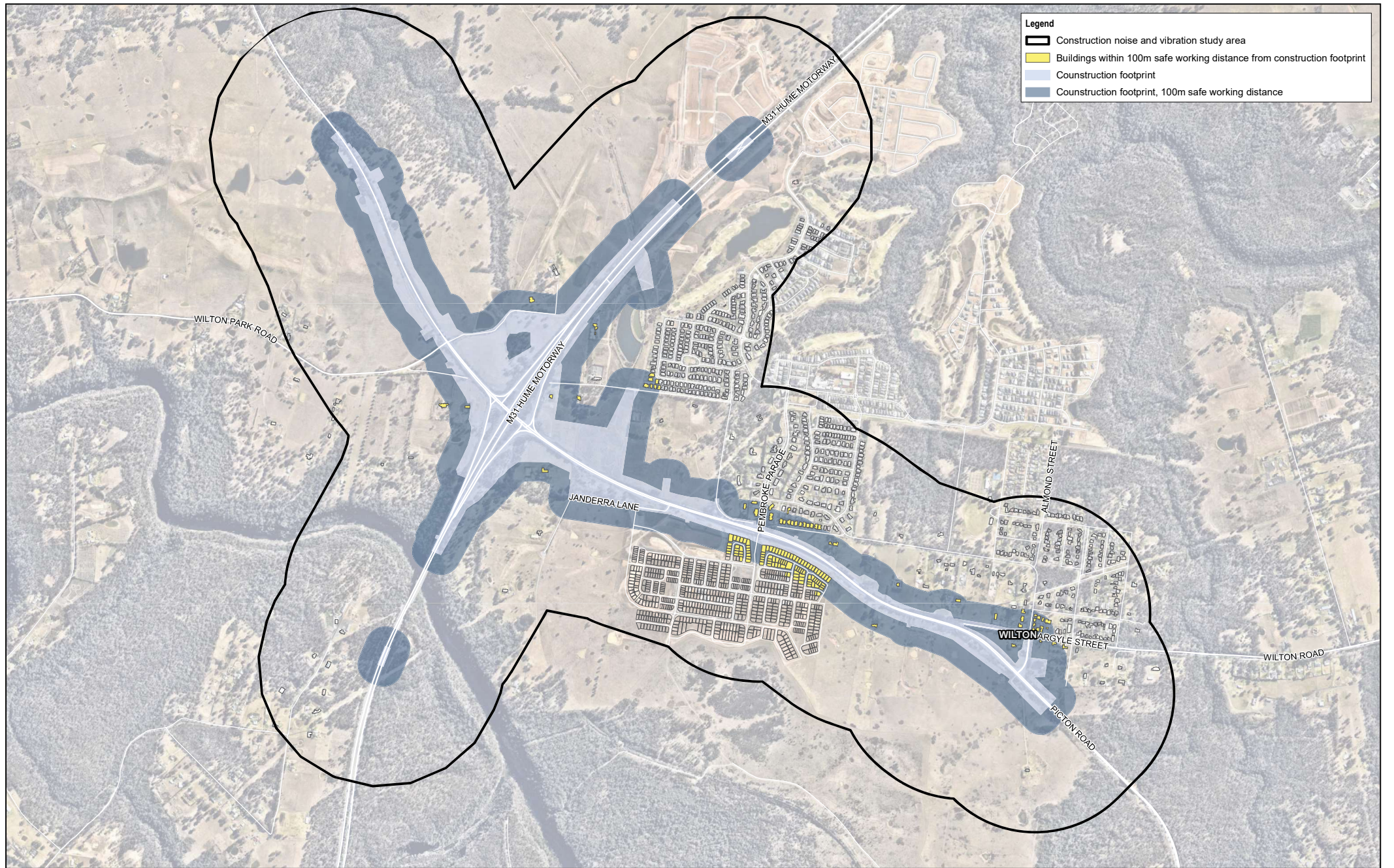


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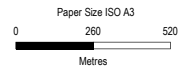
Cosmetic damage working distance
 for heritage structures

Figure 5.32



Legend

- Construction noise and vibration study area
- Buildings within 100m safe working distance from construction footprint
- Construction footprint
- Construction footprint, 100m safe working distance



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

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Human comfort working distance

Figure 5.33

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Print date: 26 Oct 2023 13:37

Data source: Neimap WMS Server. Created by: spmlr

5.4 Construction blasting assessment

The construction blasting assessment has been undertaken based on the methodology described in section 3.2.6. Ground vibration and airblast overpressure levels at various distances from the potential blasting sites have been calculated and are shown in Figure 5.34 and Figure 5.35 for various charge masses (expressed as variable 'Q' in the figures). The relevant noise and vibration criteria have also been plotted on the graphs. These figures indicate that potential impacts from blasting would be governed by the airblast overpressure rather than the ground vibration levels. Potential impacts from blasting (if required) have been assessed based on the distances to the nearest sensitive receivers to each potential blast site:

- near Almond Street: 70 metres
- near Wilton Park Road: 450 metres.

Table 5.25 shows the distances that are required to meet the ANZECC recommended maximum and absolute maximum airblast overpressure and ground vibration criteria as presented in Table 5.9. It is noted that the recommended maximum criteria of 115 dB(Lin)_{peak} may be exceeded on up to five per cent of the total number of blasts over a period of 12 months up to a maximum level of 120 dB(Lin)_{peak}. The following potential impacts are predicted based on the predicted blasting levels in Figure 5.34 and Figure 5.35:

- Near Almond Street: the airblast overpressure limit (absolute maximum) would be exceeded for all blast charge masses. The ground vibration limit would be exceeded if a charge mass greater than five kilograms is used.
- Near Wilton Park Road: the airblast overpressure limit (absolute maximum) would be exceeded if a charge mass greater than five kilograms is used. Ground vibration impacts are not anticipated to generate adverse impacts due to the distance between the blast site and the nearest sensitive receiver.

It is noted that the blast design (if required) would be determined by the blasting contractor during construction and that indicative site constants have been used for assessment purposes only in the absence of site-specific information regarding the blasting works. In accordance with mitigation measures provided in Table 7.3, once the exact location and details of blasting is known, the distance to the receiver would be used to estimate the allowable charge mass. Blast monitoring would then be carried out to assess compliance, determine the site-specific constants, define the blast design parameters and confirm the predictions.

Table 5.25 Distance to comply with ANZEC airblast overpressure criteria, metres

Charge mass, kg	Airblast overpressure	
	Distance to achieve recommended maximum airblast overpressure criteria, m	Distance to achieve absolute maximum airblast overpressure criteria, m
1	328	220
2	413	278
3	473	318
4	521	350
5	561	377
10	707	475
15	809	544
20	890	599
25	959	645
30	1019	685
40	1122	754
50	1208	812
80	1413	950
100	1522	1023

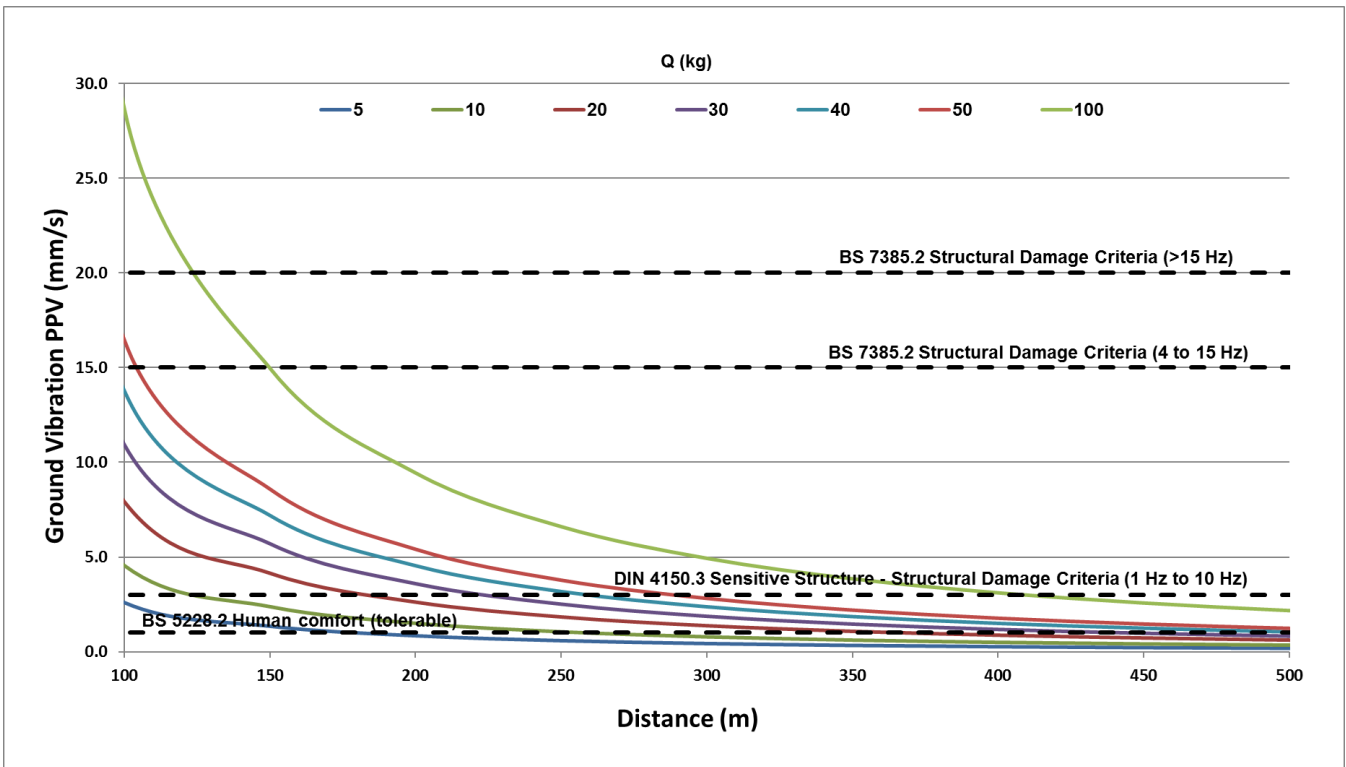


Figure 5.34 Ground vibration overpressure levels for various charge masses

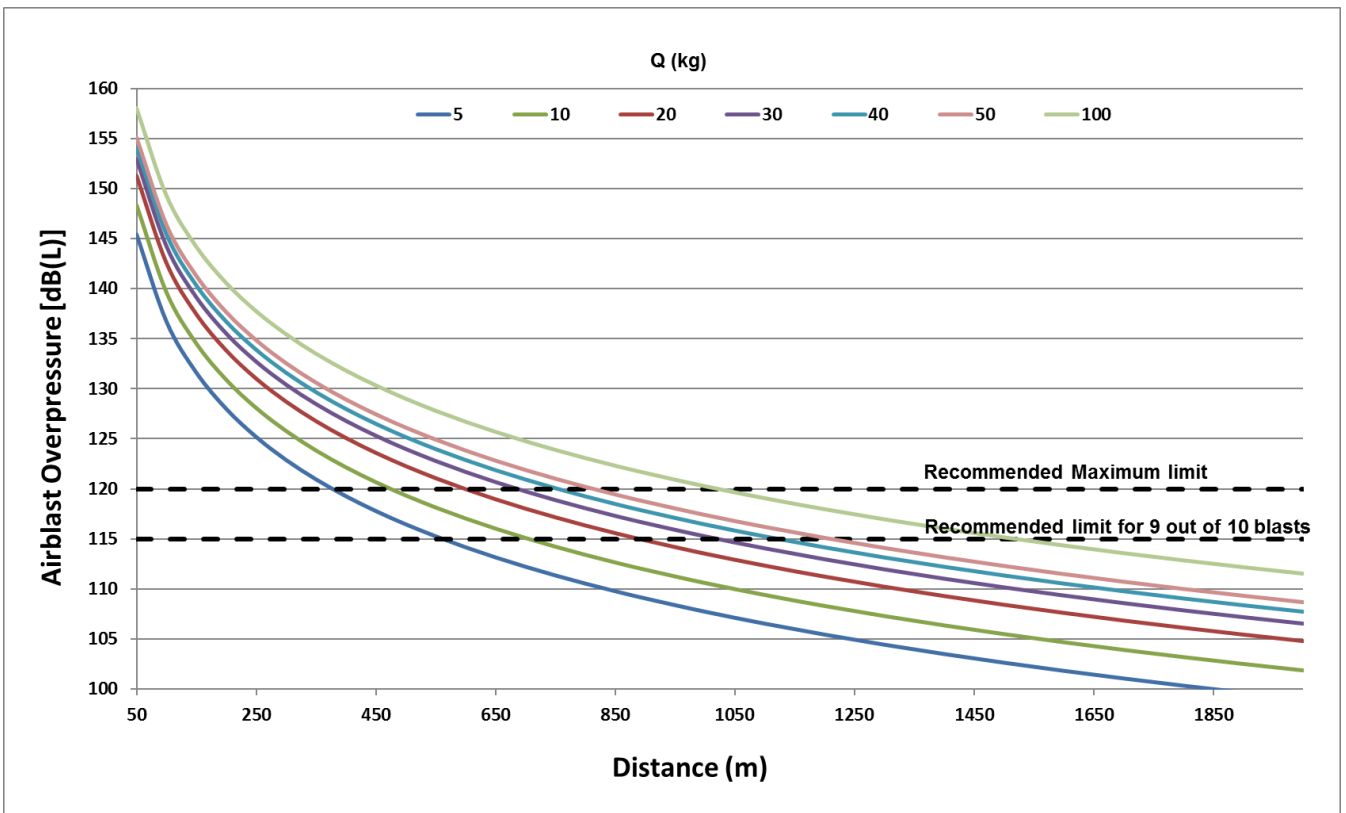


Figure 5.35 Airblast overpressure levels for various charge masses

5.5 Construction traffic noise assessment

The RNP recommends that ‘any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding ‘without construction’ [no build] scenario’. Construction would generate heavy vehicle movements associated with the transportation of construction machinery, equipment, and materials to the site. Light vehicle movements would be associated with employees and smaller deliveries.

5.5.1 Existing traffic movements

Existing traffic volumes along Picton Road and the M31 Hume Motorway were measured as part of the noise model validation process using automatic traffic counters (ATC) at the eight locations listed in Table 3.19.

Measured existing traffic volumes are provided in Appendix C-2-1 and summarised in Table 5.26. Picton Road traffic volumes are based on the measured traffic volumes between Pembroke Parade and Almond Street. This section of Picton Road is located closest to existing residential receivers where potential construction noise impacts are considered most likely. The M31 Hume Motorway traffic volumes are based on the measured volumes to the north of Picton Road.

Table 5.26 Existing total traffic movements

Road	Day (7 am to 10 pm)		Night (10 pm to 7 am)	
	Light vehicle	Heavy vehicle	Light vehicle	Heavy vehicle
Picton Road (Pembroke Parade to Almond Street)	8,901	2,999	1,967	835
Picton Road (West of the M31 Hume Motorway)	8,292	2,924	1,650	713
M31 Hume Motorway	26,183	7,153	4,426	2,356

5.5.2 Construction traffic movements

The estimated construction vehicle movements for heavy and light vehicles are shown in Table 5.27. These volumes are based on the Traffic and Transport Impact Assessment prepared to support the REF.

As light vehicles associated with workforce may arrive before 7am, a worst-case assumption that all daily movements could occur during either the day or night period has been made. It has also been assumed no heavy vehicle movements would occur during the night period (10pm to 7am).

The maximum traffic generation has been used to assess potential construction traffic noise impacts.

Table 5.27 Estimated construction vehicle movements

Traffic generation	Day (7 am to 10 pm)		Night (10 pm to 7 am)	
	Light vehicle	Heavy vehicle	Light vehicle	Heavy vehicle
Average	120	45	120	0
Maximum	200	208	200	0

5.5.3 Construction traffic impacts

Potential construction traffic impacts have been assessed by considering the increase in noise levels as a result of increased traffic along each construction access route. The increase in noise levels due to the estimated construction traffic movements are summarised in Table 5.28. The predicted increase is less than 2 dB on all construction traffic access routes therefore construction traffic noise impacts are not anticipated.

Table 5.28 Predicted increase in traffic noise levels

Road	Road section	Increase in noise level, dB	
		Day	Night
Picton Road	Pembroke Parade to Almond Street	0.3	0.1
Picton Road	West of the M31 Hume Motorway	0.3	0.1
M31 Hume Motorway	Douglas Park to Pheasants Nest	0.1	0.0

5.6 Construction impact assessment results summary

Potential construction noise and vibration impacts have been assessed for works that are proposed during and outside the ICNG recommended standard hours. Potential impacts have been assessed based on the proposed construction activities and the equipment likely to be used for each construction scenario.

The construction noise assessment identified that impacts are predicted to occur during all construction activities. The most-affected sensitive receivers are predicted to experience highly intrusive noise levels at some stage during construction. The predicted impacts are considered conservative as they assume worst-case operations relative to each receiver. In practice, construction would progress along the proposed road alignment and worst-case impacts would be limited to the periods where construction works are located adjacent to sensitive receivers.

Construction vibration impacts were assessed based on the operation of a vibratory roller greater than 18 tonnes. This plant item would cause the highest levels of vibration and has been adopted to provide a conservative worst-case assessment. Potential vibration impacts are summarised as follows:

- **Standard structures:** up to 39 structures are located within the 25 metre minimum working distances for cosmetic damage. The majority of these structures are future residential structures located in the Stage 1 Wilton Greens development. Residents located within 100 metres of the construction work area have the potential to experience human comfort impacts due to construction vibration.
- **Heritage or other sensitive structures:** two non-Aboriginal heritage items and two Aboriginal heritage items have been identified within or adjacent the construction work area and have been assessed for the potential to be impacted by vibration. The Upper Canal has additionally been assessed for potential vibration impacts and found to be unlikely to be affected by vibration during construction.

Additional noise and vibration management measures have been recommended to minimise the potential impacts associated with construction noise and vibration (see section 7). These measures include community notifications, property condition surveys and noise and vibration monitoring throughout construction.

6. Operational impact assessment

6.1 Operational assessment criteria

6.1.1 Key descriptions

The metrics used to describe noise and vibration levels for the operational noise and vibration assessment are defined in Table 6.1.

Table 6.1 Key operational noise and vibration metrics

Metric	Description
Noise	
L _{Aeq(15 hour)}	The A-weighted equivalent continuous (energy average) sound pressure level during the day-time assessment period between 7 am to 10 pm.
L _{Aeq(9 hour)}	The A-weighted equivalent continuous (energy average) sound pressure level during the night-time assessment period between 10 pm to 7 am.
L _{Aeq(1 hour)}	The highest hourly A-weighted equivalent continuous (energy average) sound pressure level during the day and night periods.
L _{AFmax}	The A-weighted maximum noise level from road traffic noise, measured using the fast time weighting on a sound level meter.

6.1.2 Assessment criteria for residential land uses

Noise criteria are assigned to sensitive receivers using the RNCG.

The following factors contribute to the road traffic noise assessment criteria that is assigned to a residential land use:

- type of development (new road or redeveloped road) - a description of the development types is provided in the glossary
- functional class / road category of the road.

Following consideration of these factors, the assessment criteria can be adjusted depending on whether the residence is located within a transition zone or located in an area where the relative increase criteria apply.

Road traffic noise assessment criteria for residential land uses are provided in Table 6.2.

Table 6.2 Residential road traffic noise assessment criteria

Road category	Existing residences affected by	Assessment criteria, dBA	
		Day 7 am to 10 pm	Night 10 pm to 7 am
Freeway / arterial / sub-arterial roads	New freeway/arterial/sub-arterial road corridors	L _{Aeq(15 hour)} 55 (external)	L _{Aeq(9 hour)} 50 (external)
	Redevelopment of existing freeway/arterial/sub-arterial roads	L _{Aeq(15 hour)} 60 (external)	L _{Aeq(9 hour)} 55 (external)
	New roads and redevelopment of existing freeway/arterial/sub-arterial roads in a Transition Zone	Between L _{Aeq(15 hour)} 55-60 (external)	Between L _{Aeq(9 hour)} 50-55 (external)
	Increases in traffic noise of 12 dBA or more from new freeway/arterial/sub-arterial roads	Between L _{Aeq(15 hour)} 42-55 (external)	Between L _{Aeq(9 hour)} 42-50 (external)
	Increases in traffic noise of 12 dBA or more from existing freeway/arterial/sub-arterial roads	Between L _{Aeq(15 hour)} 42-60 (external)	Between L _{Aeq(9 hour)} 42-55 (external)

6.1.3 Assessment criteria for non-residential land uses

Road traffic noise assessment criteria for non-residential land uses are provided in Table 6.3.

Table 6.3 *Non-residential road traffic noise assessment criteria*

Existing sensitive land use	Assessment criteria, dBA	
	Day (7 am to 10 pm)	Night (7 am to 10 pm)
Places of worship	L _{Aeq} (1 hour) 40 (internal) L _{Aeq} (1 hour) 50 (external) ¹	L _{Aeq} (1 hour) 40 (internal) L _{Aeq} (1 hour) 50 (external) ¹
Open space (passive use)	L _{Aeq} (15 hour) 55 (external)	-

Note 1: The external noise criteria has been determined based on a 10 dBA addition to the internal noise criteria. This is based on a typical reduction of 10 dBA with windows open.

6.1.4 Maximum noise levels

A review of research into the impacts of sleep disturbance is provided in section 5.4 of the RNP. The RNP states that current literature concerning sleep disturbance due to noise indicates that the main noise characteristics that influence sleep disturbance are the number of noisy events heard distinctly above the background level, the emergence of these events and the highest noise level.

The RNP notes that the triggers for and effects of sleep disturbance have not yet been conclusively determined however provides the following conclusions based on current research:

- Maximum internal noise levels below 50-55 dBA are unlikely to awaken people.
- One or two noise events per night, with maximum internal noise levels of 65-70 dB, are not likely to affect health and wellbeing significantly.

A maximum external noise level of 65 dBA has been adopted based on a 10 dBA addition to an internal noise level of 55 dBA. This is based on a typical reduction of 10 dBA with windows open.

6.2 Noise model validation

6.2.1 Overview

Noise model validation is undertaken for road traffic projects to demonstrate that the noise model produced for the existing situation is an accurate representation of the real world within the limitations of the algorithm.

The noise model validation process determines the variation between the predicted road traffic noise levels (using measured traffic volumes) with the measured traffic noise levels at each noise monitoring location.

Details of the measured traffic counts are provided in Appendix C-2-1.

6.2.2 Noise model validation

A comparison of the measured and modelled road traffic noise levels during the day-time and night-time periods is provided in Table 6.4.

Table 6.4 Noise model validation summary

Location	L _{Aeq} (15 hour) Day (7 am to 10 pm)			L _{Aeq} (9 hour) Night (10 pm to 7 am)		
	Measured	Modelled	Difference	Measured	Modelled	Difference
NM01	64.0	68.3	4.3 ¹	60.7	64.6	3.9 ¹
NM02	53.3	53.4	0.1	49.8	50.5	0.7
NM03	55.8	56.9	1.1	51.8	53.8	2
NM05	65.0	65.7	0.7	61.7	63	1.3
NM06	65.3	65.9	0.6	63.2	62.8	-0.4
Median			0.7			1.0
Standard deviation			0.4			1.0

Note 1: Measurement at NM01 has been excluded from the calculate of the median difference and standard deviation due road shielding effects

6.2.3 Noise model validation outcomes

The median difference between the measured and modelled noise levels is within ± 2.0 dBA. The difference between the measured and modelled noise levels is greater than 2.0 dBA at NM01.

The noise logger at NM01 was located adjacent Picton Road and was located around one to two metres below the road surface. The modelling algorithm used does not account for shielding from the road surface which results in an over-prediction adjacent the road. This noise monitor was located in an undeveloped area that has been rezoned for low density residential uses as part of the Wilton Town Centre Precinct. Calibration factors for this location have not been applied as the predicted noise levels at this location are for strategic purposes only and not to determine the mitigation packages required.

No calibration factors have been applied to the no-build and build noise levels.

6.3 Operational noise assessment

6.3.1 Road traffic noise

6.3.1.1 Predicted no-mitigation noise levels

Overall predicted noise levels for the proposal are provided in Appendix C-5 for all façades and buildings. The predicted noise levels have been assessed against the RNCG noise criteria and receivers which qualify for consideration of additional noise mitigation have been identified in accordance with the RNMG.

6.3.1.2 No-mitigation exceedance summary

Noise levels were processed to identify the number of exceedances on each floor for all modelled buildings. This assessment identifies a single exceedance per floor even in cases where multiple façades exceed the operational noise criteria. The number of exceedances is based on all modelled floors and façades and not the most affected façade as the most affected façade does not always present exceedances. The most affected façade has been defined as the one which receives the highest noise contribution from the project roads.

Predicted noise levels at each façade were assessed against each RNMG trigger to determine whether it qualifies for consideration of additional mitigation. Exceedances of the 'change in noise level' trigger have only been calculated for receivers that exceed the RNCG noise criteria. The number of buildings that exceed each RNMG trigger for the no-mitigation case are provided in Table 6.5.

To qualify for additional mitigation consideration under the RNMG, one of the following triggers would need to be applicable:

1. The total noise level for the build year has increased by more than 2.0 dBA relative to the no-build year; or
2. The total noise level is at or above the cumulative limit; or
3. The contribution from the road project is at or above the acute level.

It is noted that receivers that qualify for consideration of additional mitigation may exceed multiple RNMG triggers. In addition, each building may qualify for consideration of additional mitigation multiple times as each façade and floor are assessed separately.

A summary of the total number of floors and buildings that would qualify for consideration of additional noise mitigation is provided in Table 6.6.

Table 6.5 Number of buildings exceeding each RNMG trigger

Receiver type	Trigger 1: Increase in noise level (2041)		Trigger 2: Cumulative limit		Trigger 3: Acute criteria		Qualify for consideration of additional noise mitigation
	Day	Day	Day	Night	Day	Night	
Residential	0	0	5	26	2	18	26
Non-residential	0	0	2	1	0	0	2

Table 6.6 Number of receivers considered for noise mitigation

NCA	Residential		Non-residential	
	Floors	Buildings	Floors	Buildings
NCA01	0	0	0	0
NCA02	4	3	0	0
NCA03	3	2	0	0
NCA04	0	0	0	0
NCA05	0	0	4	2
NCA06	21	21	0	0
NCA07	0	0	0	0
Total	28	26	4	2

6.3.1.3 Assessment of impacts in the no-mitigation case

Trigger 1 – Increase by more than 2.0 dBA

Noise levels are not predicted to be above the RNMG noise criteria and increase by more than 2 dBA at any residential building located within the operational study area.

Trigger 2 – Cumulative limit

The primary noise mitigation trigger is due to exceedance of the cumulative limit with five residential buildings (one existing and four planned/future) during the day and 26 residential buildings (eight existing and 18 planned/future) during the night predicted to exceed this limit. The cumulative limit is exceeded as the majority of noise generated is due to the project road (i.e. Picton Road).

Two non-residential buildings (four non-residential floors) qualify for consideration of additional noise mitigation. Both non-residential buildings that qualify are part of Wilton Anglican Church located on 1095 Argyle Street, Wilton.

Trigger 3 – Acute limit

The project road contribution is predicted to be acute at two residential buildings (one existing and one planned/future) during the day (levels 65 dBA and above) and 18 residential buildings (three existing and 16 planned/future) during the night (levels 60 dBA and above).

6.3.1.4 Sensitivity analysis

A change to the predicted noise levels would change the number of buildings that would qualify for consideration of additional noise mitigation. A sensitivity analysis was undertaken to identify these changes using the following methodology:

- Apply a correction factor from -5 to 5 dBA in 1 dBA increments to the 2041 No-Build and Build predicted noise levels. A correction factor of zero represents the 'no-mitigation case' used to assess potential impacts.
- Determine the number of buildings that would qualify for consideration of additional noise mitigation with the corrected noise levels.
- Potential changes are discussed using a change in noise level of 3 dBA. This would correspond to a change in road traffic volumes by a factor of two.

The change in number of buildings that would qualify for consideration of additional noise mitigation is shown in Figure 6.1 for the night-time period. The sensitivity analysis shows that 43 additional buildings would qualify for consideration if the predicted noise levels were to increase by at least 3 dBA. Conversely, 26 fewer buildings would qualify if the predicted noise levels were to decrease by at least 3 dBA.

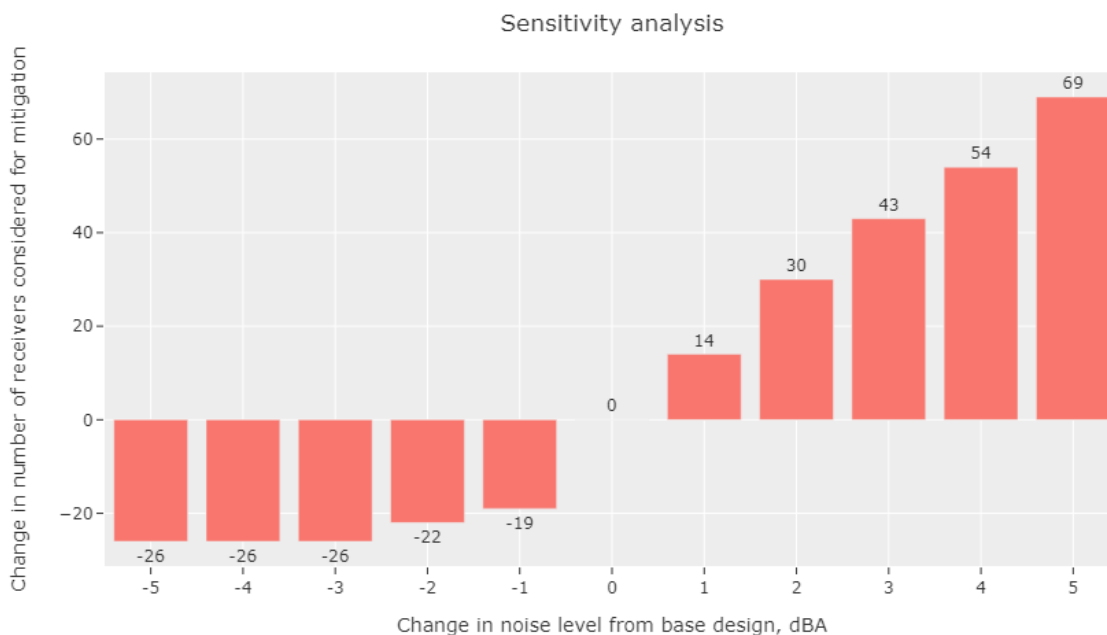


Figure 6.1 Road traffic noise sensitivity analysis

6.3.2 Maximum noise level assessment

6.3.2.1 Maximum noise levels

Potential maximum noise level events would occur during heavy vehicle pass-bys and compression braking. The locations where these events would occur would be on sections of the road where there are high road gradients such as interchange ramps and at signalised intersections. Away from these sections, the frequency of maximum noise level events would be lower as heavy vehicles would generally be travelling at constant speeds and potential events would be due to heavy vehicle pass-bys.

The number of receivers where maximum noise levels are predicted to exceed 65 dBA are presented in Table 6.7. The modelled maximum noise level increase for receivers that are predicted to experience potential maximum noise level impacts as a result of the future road alignment is provided for reference.

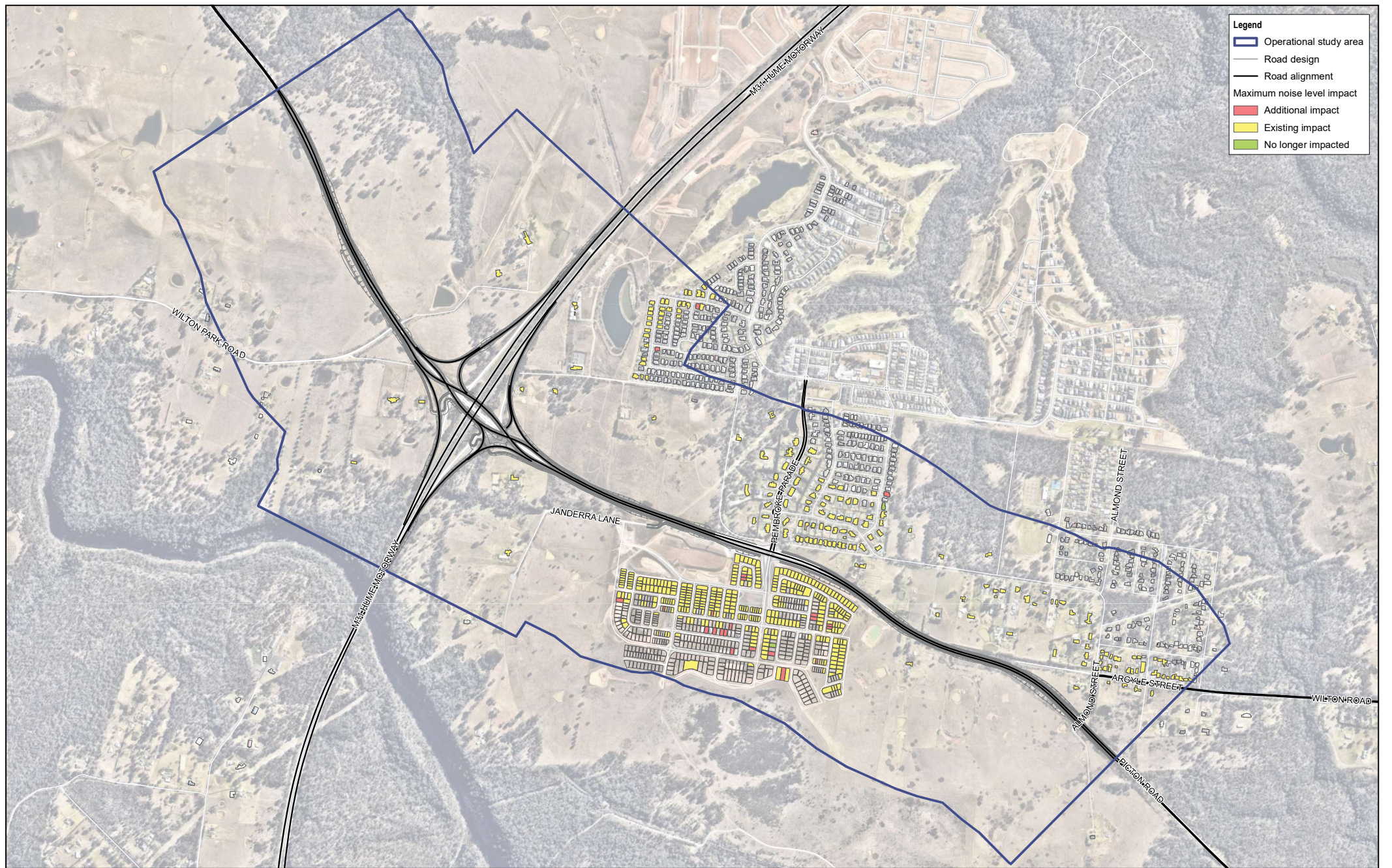
Table 6.7 Maximum noise level assessment summary

Package	Number of receivers where maximum noise levels exceed 65 dBA			Range of maximum noise level change
	Existing	Future	Change	
Compression braking	524	544	+20	-2.1 dB to 7.8 dB
Heavy vehicle pass-by	20	30	+10	-0.7 dB to 7.8 dB

Up to 20 additional (three existing) receivers are predicted to experience potential maximum noise level impacts. The locations where additional maximum noise impacts are anticipated are shown in Figure 6.2 and are based on the predicted impacts during compression braking.

The range of maximum noise level increase is based on the existing and future predicted noise levels. Locations near the future road alignment with low existing maximum noise levels, such as areas away from existing roads, would experience a higher change in maximum noise levels.

Maximum noise level impacts would be expected at the majority of sensitive receivers located along the study area. The main potential impacts would be located in Wilton near the signalised intersection at Picton Road and Pembroke Parade intersection where heavy vehicle braking has the potential to occur. In general, the maximum noise levels are expected to decrease at residences to the north of Picton Road and increase at residences to the south of Picton Road. The additional impacts are generally located beyond the first three rows of residential structures as the residences closer to Picton Road are predicted to experience existing maximum noise level impacts.

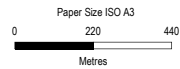


Legend

- Operational study area
- Road design
- Road alignment

Maximum noise level impact

- Additional impact
- Existing impact
- No longer impacted



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



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Maximum noise level impact

Figure 6.2

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6.3.2.2 Frequency of maximum noise level events

6.3.2.3 Existing maximum noise levels

Existing maximum noise level events along Picton Road have been identified in accordance with Appendix A of the RNCG. A maximum noise level event is defined in the RNCG as a traffic pass-by where the maximum noise level (L_{max}) exceeds the $L_{eq(1\text{ hour})}$ by at least 15 dBA.

The number and distribution of maximum noise level events and events where the maximum noise level is greater than 65 dBA is provided in the following figures:

- Figure 6.3: monitoring location NM01
- Figure 6.5: monitoring location NM03
- Figure 6.6: monitoring location NM05
- Figure 6.7: monitoring location NM06.

The following noise monitoring locations have been excluded from the maximum noise level assessment where maximum noise level events are not anticipated to change:

- Noise levels at NM02 are due to the M31 Hume Motorway, which is not a project road.
- Noise levels at NM04 and NM07 were used to determine existing background noise levels and not to determine the road noise level contributions from Picton Road.

At all monitoring locations, it can be observed that the number of maximum noise level events is greater during weekdays. This can be attributed to a higher degree of traffic movements that would occur during the weekday period. Maximum noise level events are due to traffic movements along Picton Road.

For the noise monitoring locations with direct line of sight to the road (NM01, NM05 and NM06), the number of maximum noise level events is greatest during the 12 am to 3 am period. The higher frequency during this time period can be attributed to lower traffic volumes which results in a lower road traffic noise level ($L_{eq(1\text{ hour})}$) during this time period. The frequency of maximum noise level events gradually decreases after 4 am which is due to traffic build-up leading into the peak hour where a higher road traffic noise level ($L_{eq(1\text{ hour})}$) would be observed.

Noise monitoring location NM03 is located behind the existing noise wall to the north of Picton Road. There is no clear distribution of maximum noise level events at this location as maximum noise level events at this location would depend on the location of the heavy vehicle when a maximum noise level event occurs. At all other locations with direct line of sight to the road, this location would generally be fixed at the closest distance between the monitoring location and the road.

The frequency of events greater than 65 dBA is dependent on the distance to Picton Road and the overall number of potential maximum noise level events.

6.3.2.4 Future maximum noise levels

The number and frequency of maximum noise level events at receivers that are impacted along existing roads is expected to increase due to the increase in traffic volumes associated with the 'build' scenario.

As the proposal involves a lane duplication and the existing traffic lanes would still be used, the absolute noise level of maximum noise events could change at the most-affected residences. For receivers where maximum noise levels could exceed 65 dBA, the change in noise levels can be categorised as:

- an **increase** in maximum noise levels at 316 residences (average change in noise level = +0.5 dB)
- **no change** in maximum noise levels at 88 residences
- a **decrease** in maximum noise levels at 140 residences (average change in noise level = -0.3 dB).

The change in traffic speeds from 60 km/h to 80 km/h on Picton Road between Pembroke Parade and Almond Street may result in an increase in maximum noise level events resulting from heavy vehicle acceleration. These acceleration events would not occur for the existing scenario as Picton Road has a sign-posted speed of 80 km/h throughout the operational study area.

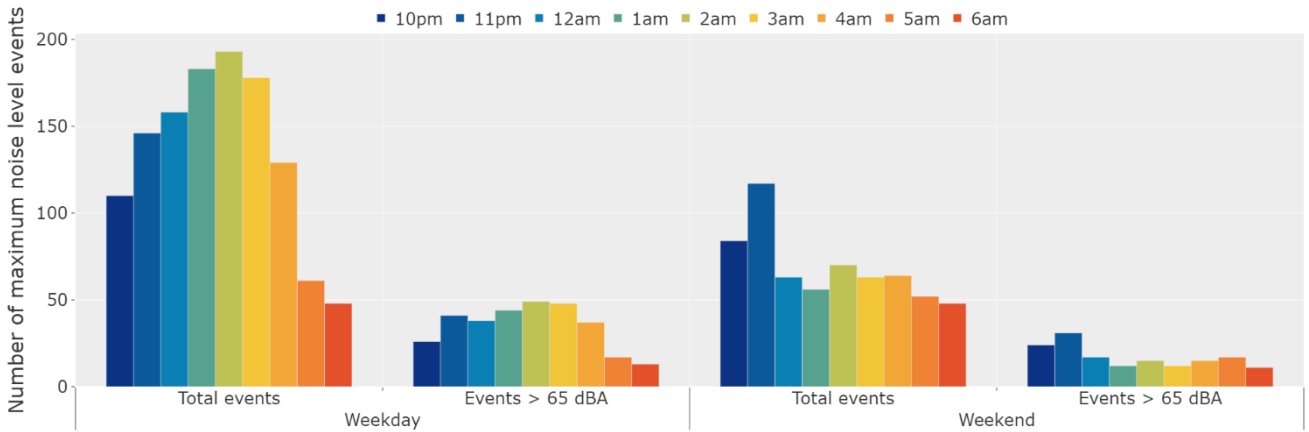


Figure 6.3 Monitoring location NM01 maximum noise level events

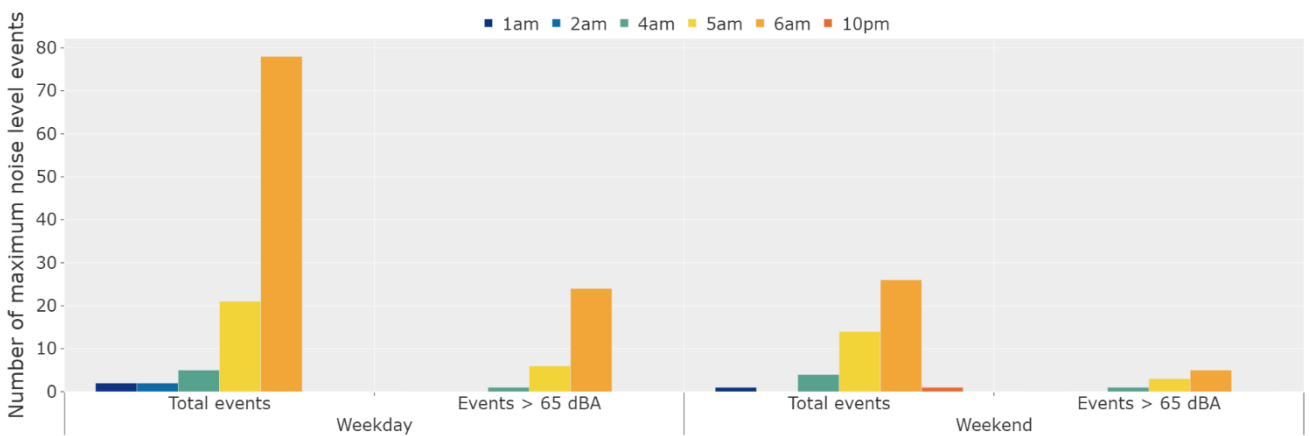


Figure 6.4 Monitoring location NM02 maximum noise level events

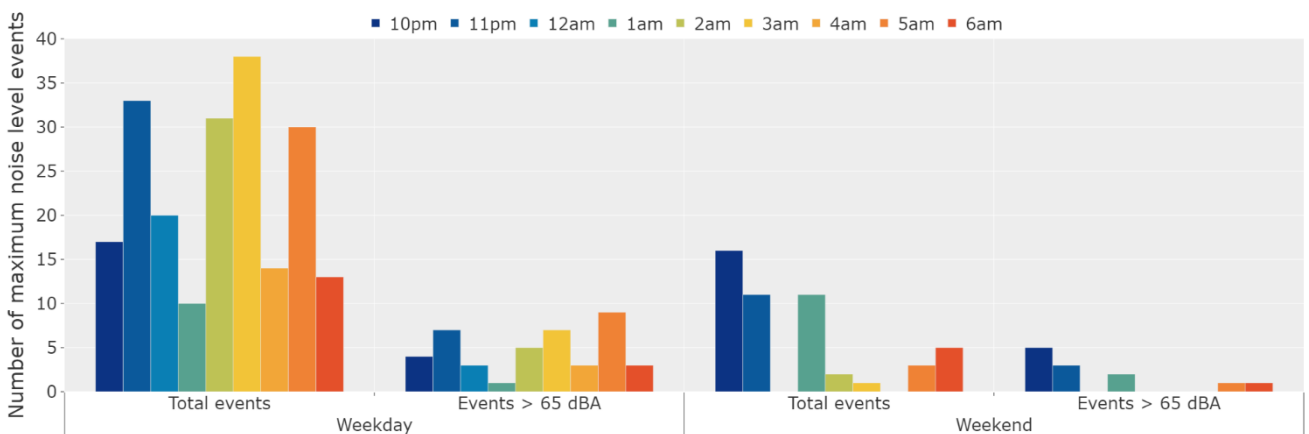


Figure 6.5 Monitoring location NM03 maximum noise level events

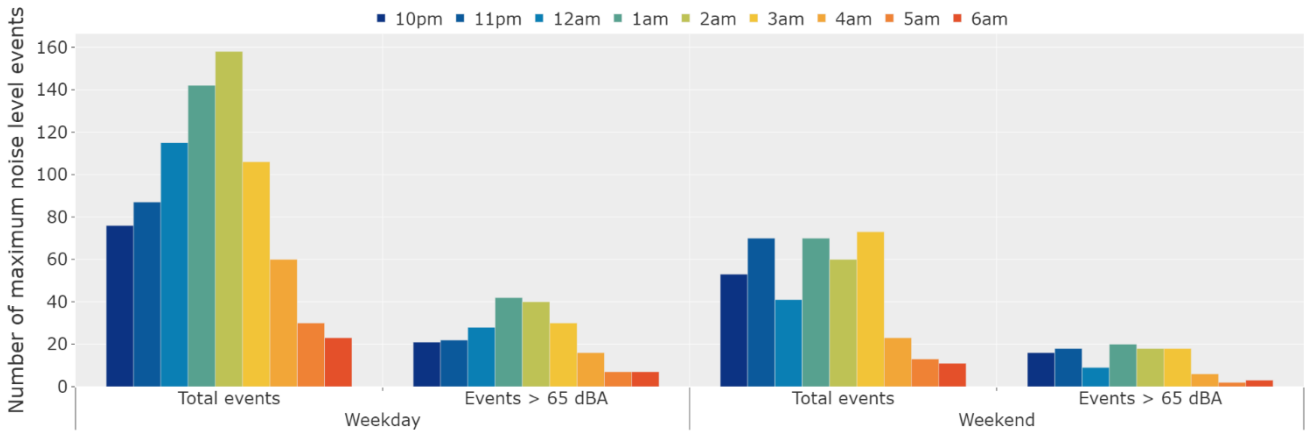


Figure 6.6 Monitoring location NM05 maximum noise level events

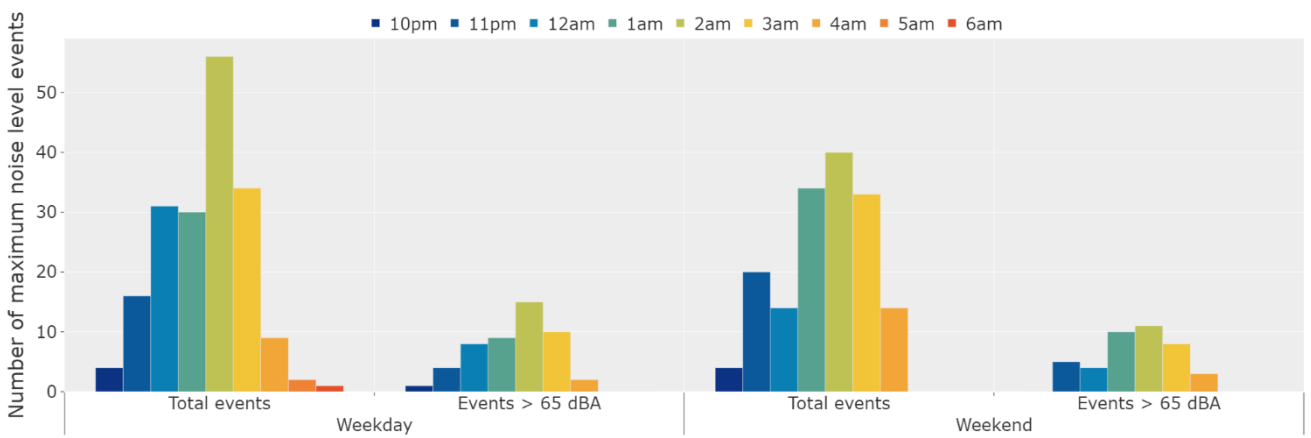


Figure 6.7 Monitoring location NM06 maximum noise level events

6.4 Operational vibration assessment

Operational vibration impacts can occur as a result of ground-borne vibration or airborne noise resulting in vibration of lightweight elements. Ground-borne vibration is typically generated from road projects by heavy vehicles travelling at high speeds over an uneven surface, such as a degrading road surface or over bridge expansion joints.

Distances where there is the potential for operational vibration impacts are based on the following guidelines:

- The RNP states that vehicles operating on a roadway are unlikely to cause a perceptible level of vibration if the receiver is more than 20 metres from the roadway.
- The *Transit Noise and Vibration Impact Assessment Manual* (FTA, 2018) states that ground-borne vibration can be perceptible at distances up to 23 metres from irregular road surfaces.

The FTA recommended distance of 23 metres from the roadway has been adopted for a conservative assessment. The nearest structures located to the road are provided in Table 6.8. Exceedances of the human comfort criteria are not anticipated as all structures are located over 23 metres from the road.

Table 6.8 Distance to nearest sensitive receiver

NCA	Nearest sensitive receiver		Approximate distance to road centreline (metres)
	Receiver ID	Location (Lot/DP)	
NCA01	R0007	2/556124	571
NCA02	R0028	211/735556	41
NCA03	R0328	24/280010	71
NCA04	R0316	21/280010	198
NCA05	R0555	16/207392	206
NCA06	F0486	1408/1232553	35
NCA07	F0510	1122/1232553	170

Low frequency noise emissions from heavy vehicle pass-bys have the potential to cause windows and lightweight structures to rattle which may be perceptible to building occupants. Low frequency noise emissions would typically be generated during heavy vehicle acceleration or braking and would generally be considered negligible when travelling at constant speeds. Light vehicle pass-bys would not typically generate low frequency noise emissions which would cause lightweight structure elements to vibrate.

Operational vibration impacts are not expected as a result of the proposal as the nearest sensitive receivers are over 23 metres from the road and no further assessment would be required.

6.5 Review of the subdivision DA noise mitigation measures

The subdivision development application (DA DD010.2018.00000339.001) for Stage 1 Wilton Greens development, currently under construction, was approved based on inclusion of two 3.6 metre high noise mound and noise walls between Picton Road and the proposed lots and dwellings (see section 3.1.5). The DA acoustic report (Atkins Acoustics, 2018) provides the traffic noise reduction categories that have been applied to building lots that exceed the external road traffic noise target design levels. The purpose of these categories is to reduce road traffic noise levels such that the internal road traffic noise target design levels are achieved. It is noted that the recommendations in the Atkins acoustic report are based on the assumptions used in their modelling. The key differences in noise modelling assumptions between this assessment and the Atkins acoustic report are detailed in Table 6.9.

Table 6.9 Differences in noise modelling assumptions for build case

Modelling assumption	Atkins acoustic report, 2018	This report
Traffic forecasts	<ul style="list-style-type: none"> – 2036 Bi-directional averages: <ul style="list-style-type: none"> • Daily volume of 23800 • 25% heavy vehicles 	<ul style="list-style-type: none"> – 2031 Bi-directional averages: <ul style="list-style-type: none"> • Daily volume of 26461 • 22% heavy vehicles – 2041 Bi-directional averages: <ul style="list-style-type: none"> • Daily volume of 29849 • 20% heavy vehicles
Picton Road alignment	Based on existing Picton Road alignment	Based on the proposal design
Prediction method	<ul style="list-style-type: none"> – CoRTN using RTA Computer Model – Three-source height method – One-category heavy vehicle method 	<ul style="list-style-type: none"> – CoRTN using SoundPLAN Version 8.2 software – Four-source height method – Six-category heavy vehicle method

The traffic noise reduction categories adopted in the DA and a description of the typical installations are provided in Table 6.10. Standard construction materials are defined in the subdivision DA as follows:

- standard brick veneer structure with internal plasterboard linings or double brick
- concrete/terracotta tiles or metal deck roof with bulk insulation
- plasterboard ceiling
- external solid core doors fitted with acoustic rated seals
- mechanical ventilation / air conditioning.

Table 6.10 Traffic noise reduction categories

Description	Traffic noise reduction, dBA	Construction overview
Category 1	< 10	Standard construction, openings, including open windows/doors (up to 10% of exposed façade).
Category 2	10-20	Standard wall and roof constructions, except light weight elements such as fibrous cement or metal cladding or all glass façades. Windows/doors selected with and installed with Q-Lon or equivalent acoustic rated seals. Windows/doors and other openings closed. Mechanical ventilation.
Category 3	20-25	Upgraded wall and roof constructions. Windows/doors selected with and installed with Q-Lon or equivalent acoustic rated seals. Windows/doors and other openings closed. Mechanical ventilation.

Description	Traffic noise reduction, dBA	Construction overview
Category 4	25-30	Upgraded wall and roof constructions. Windows/doors selected with and installed with Q-Lon or equivalent acoustic rated seals. Windows/doors and other openings closed. Mechanical ventilation.
Category 5	>30	Special acoustic design advice required with mechanical ventilation.

With the inclusion of the 3.6 metre high noise walls/mounds described in section 3.1.5, residual noise impacts are predicted at the buildings fronting Picton Road. The Atkins acoustic report recommends that buildings fronting onto Picton Road would require Category 3 or Category 4 building treatments. Note that these buildings would require approval by Council prior to construction. The approval conditions would reference the noise mitigation measures recommended within the subdivision DA to ensure the acoustic requirements of the T&ISEPP are achieved. These treatments would be the responsibility of the individual building DA applicant and Council would require certification during the DA, construction certificate and occupation certificate stages to confirm these treatments have been implemented.

It is anticipated that the at-receiver treatment packages that could be offered by Transport to qualifying residences within Stage 1 of Wilton Greens development would be consistent with the architectural treatments that would be required by Council (as part of individual lot approvals) and implemented by future residential owners to meet the internal noise levels prescribed in the T&ISEPP.

Nevertheless, the adequacy of the existing controls has been tested to confirm whether additional mitigation measures would be required (as a result of the proposal) in the following sections:

- **Section 6.6.3:** Confirm whether greater building treatments (i.e. DA Category 5) would be required for the lots/dwellings fronting Picton Road.
- **Table 6.13:** Confirm whether a noise wall greater than 3.6 metres (the approved height) is considered to be a reasonable and feasible mitigation measure.

6.6 Operational noise mitigation

6.6.1 Closely spaced receivers

Closely spaced receivers have been identified in accordance with the definitions provided in the RNMG to determine locations where pavement treatments or noise barriers be considered.

The area of residential receivers located within the Stage 1 Wilton Greens development to the south-east of the Pembroke Parade and Picton Road intersection contain closely spaced receivers which would qualify for consideration of additional noise mitigation.

Receivers located outside the area described above are not considered closely spaced. At-property treatments have been investigated for these receivers as outlined in Section 6.6.5.

6.6.2 Pavement treatments

Low noise pavement treatments are not considered appropriate as the proposed traffic speed is 60 km/h in the area where closely spaced receivers have been identified. Low noise pavement would have a negligible effect on the road traffic noise levels as traffic noise at these speeds would be dominated by engine noise and not tyre noise.

6.6.3 Noise barrier analysis (NW.01)

The noise barrier optimisation process described in section 3.3.7.3 has been used to determine the optimal heights of the noise barrier along the westbound Picton Road alignment to the east of the Pembroke Parade and Picton Road intersection (NW.01 as shown in Figure 6.8).

A summary of the noise barrier analysis is provided in Table 6.11 and the number of benefiting receivers (receivers that receive an insertion loss greater than 2 dBA) is provided in Table 6.12. Barrier analysis charts are provided in Appendix C-7.

Table 6.11 Noise wall results summary

Noise wall	Optimised height	Is there a 5 dBA or 10 dBA benefit at the optimised barrier height?	Do we get a 5 dBA benefit at 5.0 m height if the optimised height is above 5.0 m?	Design height subject to a feasible and reasonable assessment
NW.01	5.0 m	Yes	Yes	5.0 m – Undertake a feasible and reasonable assessment

Table 6.12 Number of benefiting receivers

Noise wall	At-property treatments			Number of receivers with an insertion loss greater than 2 dBA		
	No barrier	Optimised height	Design height	No barrier	Optimised height	Design height
NW.01	18	3	3	0	16	16

Based on the outputs of the noise barrier analysis, NW.01 may be considered reasonable from a noise perspective as it would provide the required insertion loss and/or reduce the number of at-property treatments by at least two-thirds. A feasible and reasonable assessment would be required in order to determine whether the barrier is considered a reasonable mitigation option.

A preliminary feasible and reasonable assessment for the noise barrier is provided in Table 6.13. As part of the feasible and reasonable assessment, the following have been considered:

- the number of receivers that require at-property treatment if no barrier is constructed
- the number of receivers that require at-property treatments at the optimised design height
- determine whether a lower barrier height would provide a similar degree of noise benefits
- review the benefitting receivers and identify whether at-property treatments would be considered in lieu of at-road treatments (section 7.3 of the RNMG).

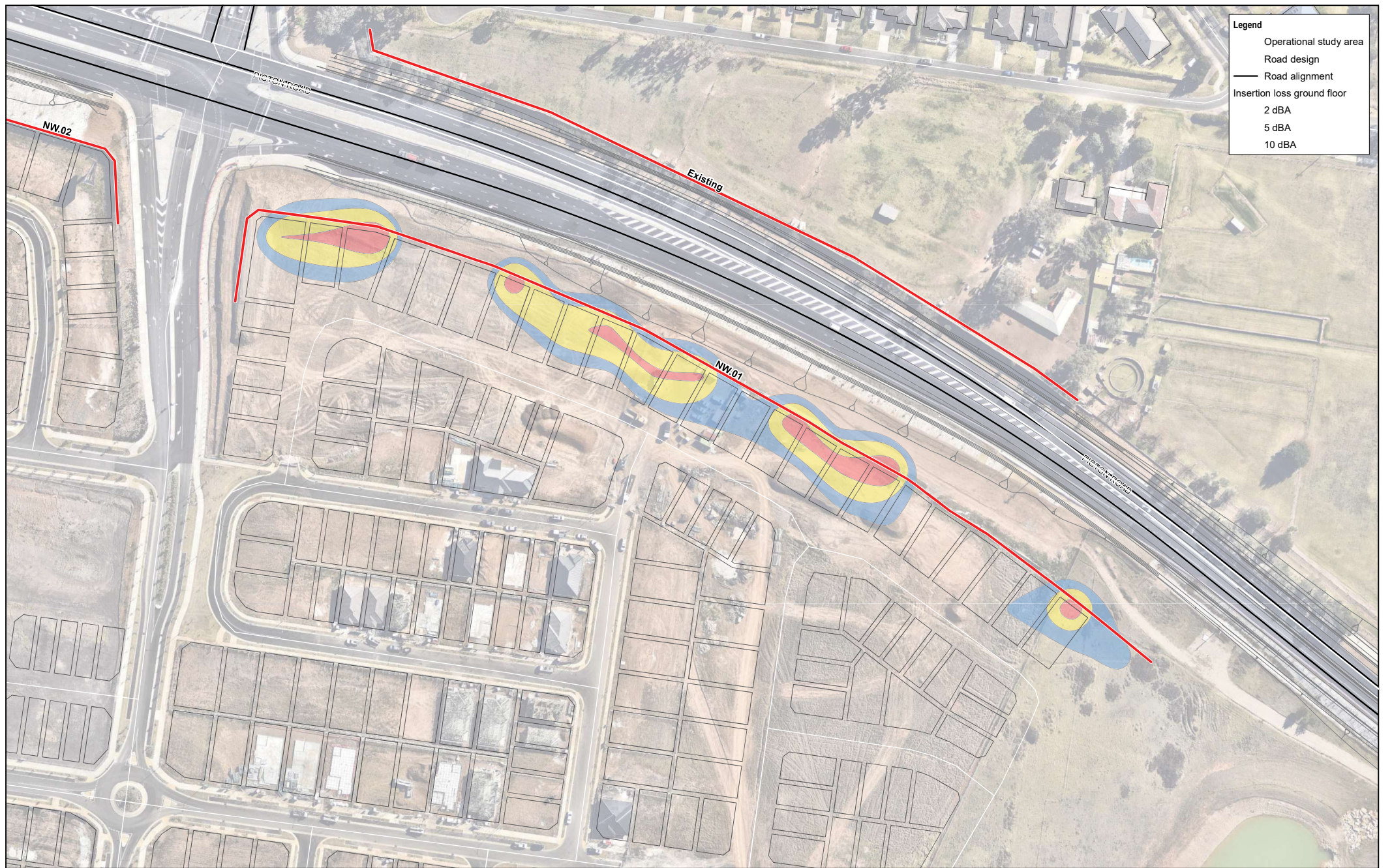
Cost considerations, which would include an assessment of the treatment packages required with and without mitigation, have not been taken into account in this assessment.

The insertion loss provided by the optimised barrier height of 5.0 metres is provided in Figure 6.8 for ground floor receivers and Figure 6.9 for first floor receivers.

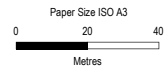
The at-property treatments required are summarised in section 6.6.4.

Table 6.13 Noise barrier analysis – Feasible and reasonable assessment

Noise wall	Length	Design height from barrier analysis	Details	Outcome of the feasible and reasonable assessment
NW.01	479 m	5.0 m	<p>21 receivers would require at-property treatments without a noise wall.</p> <p>With a design barrier height of 5.0 m:</p> <ul style="list-style-type: none"> – 3 receivers would still require at-property treatments – 16 receivers would receive an insertion loss of at least 2 dBA – 15 receivers would receive an insertion loss of at least 5 dBA – 14 receivers would receive an insertion loss of at least 10 dBA – the maximum insertion loss is 12.7 dBA. 	<p>Not reasonable</p> <ul style="list-style-type: none"> – This barrier is not considered a reasonable mitigation option although it meets the reasonable criteria from a noise perspective (reduces the number of at-property treatments by at least two-thirds or provides an insertion loss of at least 5 dB). – The barrier is not considered reasonable as: <ul style="list-style-type: none"> • A 3.6 metre mound/barrier is a condition requirement of the Stage 1 Wilton Greens DA. It would also be required for residential development within 100 metres of Picton Road to submit a DA to Council to ensure the acoustic requirements of the T&I SEPP can be achieved through appropriate architectural treatments (to address potential residual noise impacts). • The at-property treatments recommended in the subdivision DA do not change as a result of the proposal (i.e. impacts are unchanged when compared to the subdivision DA). • A 5.0 metre noise wall has the potential to cause overshadowing and visual impact issues.



Legend	
	Operational study area
	Road design
	Road alignment
	Insertion loss ground floor
	2 dBA
	5 dBA
	10 dBA



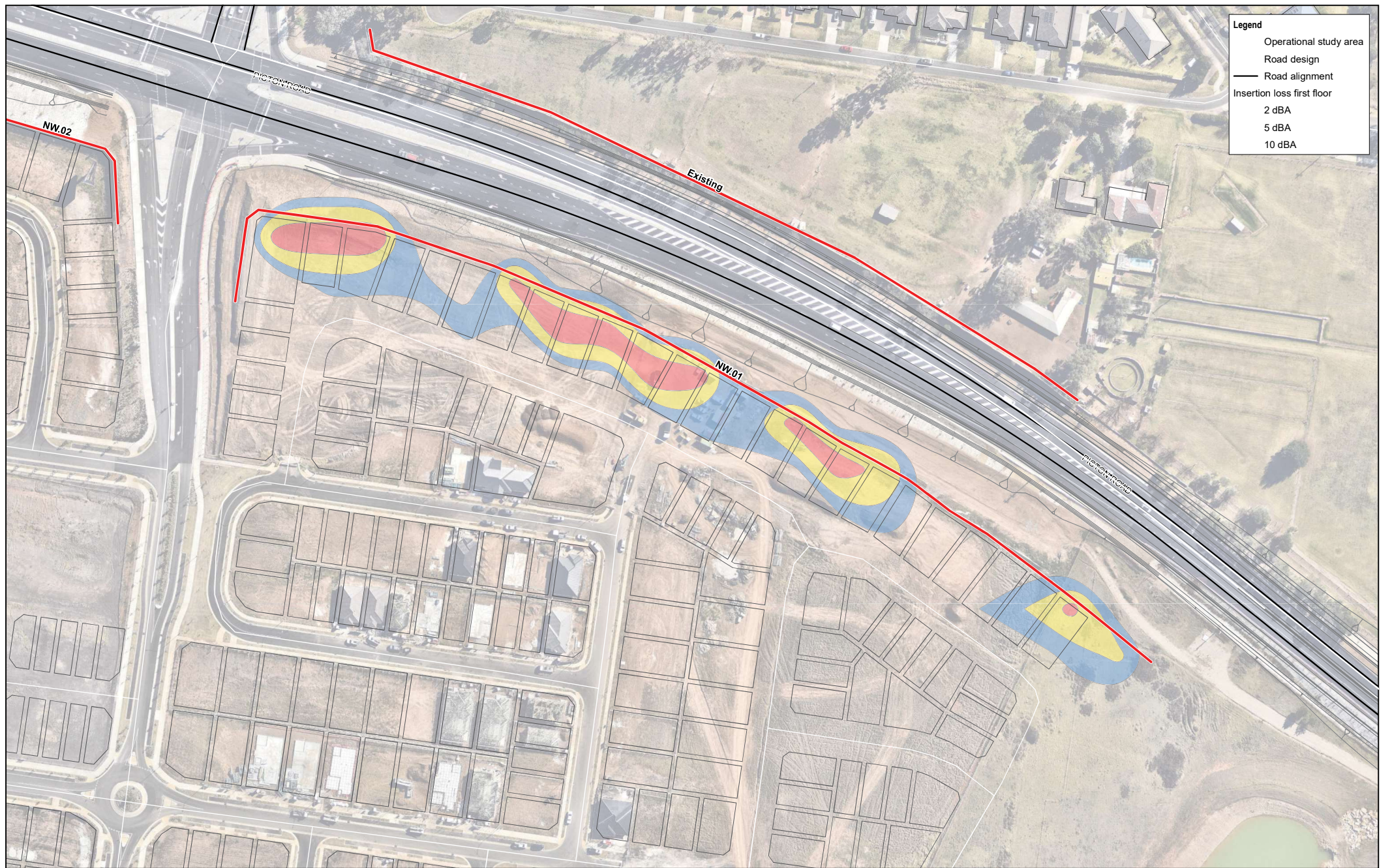
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Grid: GDA2020 MGA Zone 56

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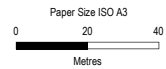
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Noise barrier insertion loss
(ground floor receivers)

Figure 6.8



Legend	
	Operational study area
	Road design
	Road alignment
	Insertion loss first floor
	2 dBA
	5 dBA
	10 dBA



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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Noise barrier insertion loss
 (first floor receivers)

Figure 6.9

6.6.4 Noise barrier analysis (existing)

The existing 3.6 metre noise barrier located east of Pembroke Parade (north of Picton Road) may need to be relocated in part or as a whole. For this assessment, it has been assumed that the wall would be relocated along its length to approximately two metres directly north of its existing location (immediately after its removal) to allow sufficient space for the proposal. The exact arrangement for the noise barrier relocation would be determined in detailed design.

Noise modelling has been undertaken to determine the effects of relocating the noise barrier on the noise levels for residences east of Pembroke Parade and north of Picton Road (NCA03 and NCA04). A comparison between night period noise levels for the existing and relocated noise barrier positions is presented in Table 6.14 for the controlling assessment period, being the $L_{Aeq(9hour)}$ noise level.

Table 6.14 Difference in overall noise levels, 2041 Build $L_{Aeq(9hour)}$, dBA (night)

Change in noise level, dBA	Residential buildings
0 (No change)	126
+0.1	54
+0.2	7
Total residential buildings within NCA03 and NCA04	187

The results of the noise modelling indicate that the noise levels could increase by up to +0.2 dBA as a result of relocating the 3.6 metre barrier approximately two metres to the north.

A sensitivity analysis has been undertaken to determine whether the outcomes of the noise modelling change as a result of the barrier relocation. A +0.2 dBA correction has been applied to the 2041 Build $L_{Aeq(9hour)}$ noise levels to check whether there are any changes to the receivers identified as qualifying for mitigation consideration. The sensitivity analysis indicates that:

- **Trigger 1 – Change in noise levels:** Noise levels are not predicted to increase by more than 2.0 dBA at any residential receivers (no change – no receivers qualify).
- **Trigger 2 – Cumulative limit:** No additional receivers are predicted to qualify for mitigation due to the cumulative limit (no change - R0285 and R0315 qualify).
- **Trigger 3 – Acute limit:** No additional receivers are predicted to qualify for mitigation consideration due to the acute limit (no change - receivers R0285 and R0315 qualify).

If four or more closely spaced residences qualify for mitigation consideration, a detailed noise barrier analysis should be undertaken assuming that the existing barrier does not exist. Given only two receivers would qualify for mitigation consideration, an assessment of the barrier design height (as per Section 7 of the Noise Mitigation Guideline) is not required at this stage as four or more closely spaced receivers do not qualify for mitigation consideration.

A detailed noise barrier analysis would be undertaken during detailed design as part of the ONVR (see section 7) once the exact location of the noise barrier has been determined.

6.6.5 At-property treatments

The at-property treatment package types and the number of residential buildings in each category are provided in Table 6.15 and are based on the no-mitigation scenario, which includes a 3.6 metre high noise barriers and noise mounds included as part of the Stage 1 Wilton Greens. The majority of the receivers are predicted to exceed the RNCG criteria by up to 5 dBA. The mitigation treatment package that would be considered at these receivers would be treatment package type 1. The proposed treatment packages would be confirmed during detailed design.

The locations of these receivers are shown in Figure 6.10 and listed in Table 6.16 for confirmed existing residential dwellings. As the timing of individual development applications would influence whether receivers within the Stage 1 Wilton Greens development would be eligible for at-property treatments, the potential treatment packages for these receivers have been discussed separately in section 6.6.6.

Two places of worship (R0592, R0595) located on 1095 Argyle Street would qualify for consideration of additional mitigation. It is recommended that acoustic performance of the existing façade is determined to identify the potential level of mitigation required in order to achieve the internal noise level targets as outlined in the RNP.

Recommendations for operational noise mitigation measures are described in section 7.2.

Table 6.15 Buildings identified for at-property treatments

Treatment package type	Exceedance of NCG criteria, dBA	Number of treatments		
		Residential buildings (built)	Stage 1 Wilton Greens residences (pending DA approval)	Places of worship buildings
1	1-5	4	14	1
2	6-8	4	3	1
3	9-11	0	1	0
4	12-14	0	0	0
5	>14	0	0	0
Total		8	18	2

Table 6.16 Treatment packages for identified receivers (existing buildings)

Receiver ID	Lot/Lot/DP	NCA	Receiver type	Floor	Treatment package
R0023	16/ 251051	NCA02	Residential	F.0	Type 2
R0027	20/ 251051	NCA02	Residential	F.0	Type 1
R0028	211/ 735556	NCA02	Residential	F.0	Type 2
R0028	211/ 735556	NCA02	Residential	F.1	Type 1
R0285	183/280010	NCA03	Residential	F.0	Type 1
R0315	184/280010	NCA03	Residential	F.0	Type 2
R0315	184/280010	NCA03	Residential	F.1	Type 2
R0510	103/1232553	NCA06	Residential	F.0	Type 1
R0512	21/253157	NCA06	Residential	F.1	Type 2
R0545	1/1018965	NCA06	Residential	F.0	Type 1
R0592	1/1236516	NCA05	Place of worship	F.0	Type 1
R0592	1/1236516	NCA05	Place of worship	F.1	Type 2
R0595	1/1236516	NCA05	Place of worship	F.0	Type 2
R0595	1/1236516	NCA05	Place of worship	F.1	Type 3

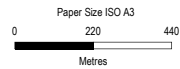


Legend

- Operational study area
- Road design
- Road alignment

Treatment package

- Type 1
- Type 2
- Type 3



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



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At-property treatments

Figure 6.10

6.6.6 At-property treatments at Stage 1 of Wilton Greens

Acoustic treatments would be required as part of the consent conditions for both the subdivision DA (3.6 metre noise mound/wall) and individual lots within Stage 1 of Wilton Greens (buildings designed to achieve the acoustic requirements of the T&I SEPP and in accordance with the recommendations of the Atkins 2018 acoustic report). As there are differences in the modelling assumptions between the Atkins acoustic report and this assessment, modelling was undertaken to determine whether additional at-property treatments would be required due to the proposal.

As discussed in section 3.1.5, DAs for individual lots within the Stage 1 Wilton Greens development that are approved by Council prior to the approval of the proposal could be eligible for at-property treatments. Residential development approved after approval of the proposal would be required to consider noise from Picton Road to achieve the internal noise requirements of the T&I SEPP and Section 3.12 of the Wilton Growth Area Development Control Plan (DCP) (DPIE, 2021).

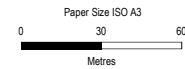
Receivers that could be eligible for mitigation consideration are presented in Table 6.17 and Figure 6.11. These receivers are all located within the first row of houses fronting Picton Road. Buildings at this location would be required to be designed to achieve the internal noise levels of the T&I SEPP and the Wilton Growth Area DCP. The architectural treatments required for each residential building would need to consider the treatment packages recommended in the Stage 1 Wilton Greens subdivision acoustic report (Atkins, 2018). The building and architectural design would then require a development approval, and issue of the construction and occupation certificates. The results of the noise modelling in this assessment indicate that the recommendations in the Atkins acoustic report would be adequate and no additional at-property treatments would be required (see Table 6.17).

Table 6.17 Review of treatment packages for identified receivers within Stage 1 Wilton Greens (GHD / Atkins acoustic report)

Receiver ID	Lot / DP number	NCA	Receiver type	Floor	Treatment package	
					Atkins	GHD
F0416	912/1232553	NCA06	Residential	F.1	Type 3+	Type 2
F0460	1406/1232553	NCA06	Residential	F.1	Type 3+	Type 3
F0486	1408/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0511	1410/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0520	1411/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0537	1412/1232553	NCA06	Residential	F.1	Type 3+	Type 2
F0553	1413/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0570	1414/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0576	1415/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0584	1416/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0640	1421/1232553	NCA06	Residential	F.1	Type 3+	Type 2
F0652	1422/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0659	1423/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0694	1426/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0696	1454/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0697	1427/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0698	1428/1232553	NCA06	Residential	F.1	Type 3+	Type 1
F0699	1455/1232553	NCA06	Residential	F.1	Type 3+	Type 1

The at-property treatment packages that would be applicable for eligible receivers within the Stage 1 Wilton Greens are consistent with the subdivision DA recommendations discussed in section 6.5. Given the front row of houses facing Picton Road would require a minimum Type 3 treatment package (as per the subdivision DA), recommending architectural treatments for these properties is not considered reasonable as consistent noise-mitigation would already be incorporated into the architectural design as part of their individual lot DA requirements.

Nevertheless, during detailed design, an ONVR would be undertaken, and noise mitigation requirements would be reviewed and confirmed. The ONVR process is described in section 7.2.1.



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment
Potential architectural treatment packages for Stage 1 Wilton Greens residences

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure 6.11

6.7 Operational impact assessment results summary

Road traffic noise levels were assessed for the opening year (2031) and design year (2041). Calibration factors were not required as the noise model validation process indicated that the modelled noise levels were an accurate representation of the measured noise levels.

The number of sensitive receivers that qualify for consideration of additional noise mitigation are based on the predicted noise levels in the design year. A summary of the no-mitigation results follows:

- **Built residential dwellings:** Up to eight residential dwellings would qualify for mitigation consideration. The trigger for mitigation is generally due to an exceedance of the cumulative limit.
- **Place of worship buildings:** Both buildings at 1095 Argyle Street, Wilton would qualify for mitigation consideration (One heritage building and one modern building).
- **Stage 1 Wilton Greens development:** Up to 18 future residential dwellings could qualify for mitigation consideration (depending on the timing of the DA approval for the individual lot).

The residential receivers located within the Stage 1 Wilton Greens development were identified as an area where additional noise mitigation (e.g. pavement treatments or noise barriers) would be considered. However, pavement treatments are not considered appropriate due to the 60 km/h speed limit proposed along Picton Road in this area.

The noise barrier analysis found that a 5.0 metre high noise barrier that extends for 479 metres is not considered reasonable as the proposal does not increase the road traffic noise impacts from those considered within the Stage 1 Wilton Greens subdivision DA.

No additional mitigation (i.e. at-property treatments) has been recommended for residential dwellings within the Stage 1 Wilton Greens development at this stage as it is anticipated that the following measures that would be implemented as part of the respective DA consent conditions would be adequate:

- Subdivision DA: Construction of a 3.6 metre noise mounds/walls along the northern boundary of the development; and
- Individual lot DAs: Architectural treatments required to achieve the internal noise levels of the T&I SEPP.

At-property treatments are recommended for all other residential receivers that qualify for consideration of additional mitigation. Indicative treatment packages have been identified in accordance with the ARNTG.

Additional monitoring (facade acoustic testing) is recommended at Wilton Anglican Church. The purpose of this monitoring is to identify the performance of the existing façades to determine the level of mitigation required to achieve the internal noise level targets.

Noise mitigation measures would be reviewed and confirmed as part of an ONVR. The ONVR would include an updated land use survey, a review of the road design and modelling assumptions and a review/survey of the architectural design of residential dwellings identified for at-property treatments (should they qualify for mitigation consideration).

7. Recommended safeguards and management measures

7.1 Construction management measures

7.1.1 Construction noise and vibration management measures

7.1.1.1 Standard noise and vibration management measures

Noise mitigation can be categorised into source control, transmission path control or receiver control. Noise control measures at the receiver are not suitable for construction noise as construction noise is temporary in nature. Where possible, source controls would be given priority over transmission path controls as they reduce the noise levels for all receivers in the surrounding environment. A list of typical source and transmission path control measures are provided in Table 7.1.

Table 7.1 Noise control measures

Control measure	Type of control	Typical reduction, dBA	Maximum reduction, dBA	Source
Silencers / mufflers / diffusers	Source	7 – 10	15	AS2436
Acoustic enclosures	Source	15 – 30	50	AS2436
Equipment substitution	Source	5-10	10	AS2436
Shielding (barriers/mounds)	Transmission path	7 – 10	15	AS2436

The reasonable and feasible construction noise and vibration mitigation measures in Table 7.2 have been sourced from the CNVG and are to be implemented by the construction contractor on all Transport road construction projects.

Table 7.2 Standard construction noise management measures

Action required	Applies to	Details
Management measures		
Implementation of any proposal specific mitigation measures required.	Airborne noise	Implementation of any proposal specific mitigation measures required.
Implement community consultation or notification measures	Airborne noise	Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of seven calendar days prior to the start of works and may include the following notification strategies: <ul style="list-style-type: none"> – website (if required) – contact telephone number for community – email distribution list (if required) – community drop-in session (if required by approval conditions).

Action required	Applies to	Details
Site inductions	Airborne noise Ground-borne noise and vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: <ul style="list-style-type: none"> – all proposal specific and relevant standard noise and vibration mitigation measures – relevant licence and approval conditions – permissible hours of work – any limitations on high noise generating activities – location of nearest sensitive receivers – construction employee parking areas – designated loading/unloading areas and procedures – site opening/closing times (including deliveries) – environmental incident procedures.
Behavioural practices	Airborne noise	<ul style="list-style-type: none"> – No swearing or unnecessary shouting or loud stereos/radios on site. – No dropping of materials from height, throwing of metal items and slamming of doors. – No excessive revving of plant and vehicle engines. – Controlled release of compressed air.
Verification	Airborne noise	A noise verification program is to be carried out for the duration of the works in accordance with the CNVMP and any approval and licence conditions.
Attended vibration measurements	Ground-borne vibration	Where required attended vibration measurements should be undertaken at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Building condition surveys	Vibration	<ul style="list-style-type: none"> – Undertake building dilapidation surveys on all buildings located within the buffer zone (see Table 3.9) prior to the commencement of activities with the potential to cause property damage. – A list of structures is provided in Table 5.18 for standard structures and Table 5.19 for heritage listed structures.
Update Construction Environmental Management Plans	Airborne noise	The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
Source controls		
Construction hours and scheduling	Airborne noise Ground-borne noise and vibration	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating noise with special audible characteristics and/or vibration levels would be scheduled during less sensitive time periods.
Construction respite period	Airborne noise	Refer to section 7.1.1.2 of this report or Appendix C of the CNVG for more details on the following respite measures: <ul style="list-style-type: none"> – Respite Offers (RO) – Respite Period 1 (R1) – Respite Period 2 (R2) – Duration Respite (DR).
Equipment selection	Airborne noise Ground-borne noise and vibration	<ul style="list-style-type: none"> – Use quieter and less vibration emitting construction methods where feasible and reasonable. – For example, where piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. – Ensure plant including the silencer is well maintained.
Plant noise levels	Airborne noise	<ul style="list-style-type: none"> – The noise levels of plant and equipment must have operating sound power levels compliant with the equipment listed in Table 3.6 of this report or Appendix H of the CNVG. – Implement a noise monitoring audit program to ensure the equipment remains within the more stringent of the manufacturer's specifications or the equipment listed in Table 3.6 of this report or Appendix H of the CNVG.

Action required	Applies to	Details
Rental plant and equipment	Airborne noise	<ul style="list-style-type: none"> The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the equipment noise levels specified in Table 3.6 of this report or Appendix F of the CNVG.
Use and siting of plant	Airborne noise	<ul style="list-style-type: none"> The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site.
Plan worksites and activities to minimise noise	Airborne noise	<ul style="list-style-type: none"> Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noisy activities would be scheduled for normal working hours. If the work cannot be undertaken during the day, it would be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters. If programmed night work is postponed the work would be reprogrammed and the approaches in this guideline apply again.
Reduced equipment power	Airborne noise	<ul style="list-style-type: none"> Use only the necessary size and power.
Non-tonal reversing alarms	Airborne noise	<ul style="list-style-type: none"> Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out-of-hours work.
Minimise disturbance arising from delivery of goods to construction sites	Airborne noise	<ul style="list-style-type: none"> Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles would be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out-of-hours movements where possible.
Blasting regime	Airborne noise Ground-borne vibration	<p>The noise and vibration impacts of blasting operations can be minimised by:</p> <ul style="list-style-type: none"> Choosing the appropriate blast charge configurations Ensuring appropriate blast-hole preparation Optimising blast design, location, orientation and spacing Selecting appropriate blast times Utilising knowledge of prevailing meteorological conditions Australian Standard AS 2187.2-2006 Explosives - Storage and use, Part 2: Use of Explosives provides more detailed advice on ground vibration and air blast overpressure impact minimisation options.
Structural surveys and vibration monitoring	Ground-borne vibration	<ul style="list-style-type: none"> Pre-construction surveys of the structural integrity of vibration sensitive structures may be warranted. At locations where there are high-risk receptors, vibration monitoring would be conducted during the activities causing vibration.

Action required	Applies to	Details
Path controls		
Shield stationary noise sources such as pumps, compressors, generators, fans etc.	Airborne noise	– Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix F of AS 2436:2010 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities	Airborne noise	– Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant.

7.1.1.2 Proposal-specific construction noise and vibration management measures

Recommended proposal-specific management measures, developed based on the predicted impacts in section 5, are outlined in Table 7.3.

Table 7.3 Proposal-specific construction safeguards and management measures

Management measure	Details of the management measure
Confirmation of activity sound power levels	Any changes to plant and equipment assessed in this NVIA will be reassessed using the Transport for NSW Construction Noise Estimator spreadsheet to determine if noise levels are consistent with those assessed in this NVIA. If noise levels from alternative plant and equipment are equal to or less than those identified in this NVIA, no further assessment is required.
Design of blast parameters	In the event that blasting is required, the blast parameters will be designed, and allowable charge mass confirmed, to achieve the airblast overpressure and ground vibration requirements of the <i>Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration</i> (ANZECC, 1990). This will include trial blasting and airblast/vibration monitoring to confirm site-specific constants and to refine the safe blasting distances.
Managing construction noise and vibration	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared and implemented as part of the CEMP. The CNVMP will generally follow the approach in ICNG and the CNVG and identify: <ul style="list-style-type: none"> – all sensitive receivers within 600 metres of the proposal site following a land use review to capture new developments that have not been identified in the REF – all potential high noise and vibration generating activities associated with the construction of the proposal – standard and additional mitigation measures from the CNVG – a monitoring program to assess performance against relevant noise and vibration criteria – arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures – contingency measures to be implemented in the event of non-compliance with noise and vibration criteria – outline requirements for the development and implementation of an out-of-hours work protocol
Construction Noise and Vibration Impact Statements (CNVIS)	Location and activity specific construction noise and vibration impact assessments will be undertaken: <ul style="list-style-type: none"> – prior to works with the potential to generate noise levels above 75 dBA at residences – prior to works that need to occur outside standard construction hours and are likely to result in noise levels greater than the relevant NMLs – prior to works with the potential to exceed relevant performance criteria for vibration – prior to works where an alternative construction methodology is proposed that would result in: <ul style="list-style-type: none"> • activity sound power levels higher than those assumed in the REF assessment; or • vibration intensive equipment (e.g. impact piling) not assessed in the REF assessment. <p>The assessments will confirm predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures in accordance with the CNVG. The measures will be detailed in the CNVMP and implemented for the duration of the activity.</p>

Management measure	Details of the management measure
Building condition surveys	<p>Building condition inspections will be undertaken prior to and after construction works where vibration intensive works would be required within the minimum working distances listed in Table 2 of the CNVG.</p> <p>Where required, the vibration management level will be refined based on the type and condition of the structure. The survey will consider the heritage value of the structure in consultation with a structural engineer and heritage specialist for the following listed heritage items:</p> <ul style="list-style-type: none"> – Cottage (I275) – St Luke’s Anglican Church (I276) – WaterNSW airshaft #9 associated with the Upper Canal (SHR 01373).
Cumulative impacts during construction	The potential for cumulative construction noise impacts will be reviewed during construction planning in consultation with the proponents of other projects. Where the potential for cumulative impacts is identified, feasible and reasonable management measures will be developed and included in the CNVMP.
Replacement of existing noise barrier east of Pembroke Parade (north of Picton Road)	Additional noise modelling will be carried out during detailed design to determine whether additional noise mitigation measures are required during the relocation of the existing noise wall. Required mitigation measures will be included in the CNVMP.
Pre-construction dilapidation surveys	<p>Where structures are predicted to exceed the screening criteria for structural damage to buildings or structures, a dilapidation survey will be undertaken prior to any construction works, where appropriate. Where required, the vibration management level for the building will be refined based on the type and condition the of building or structure.</p> <p>For heritage buildings and structures, the surveys will consider the heritage value of the structure in consultation with a structural engineer.</p>
Early implementation of operational treatments	At-property treatments required to mitigate operational noise will be implemented prior to construction noise impacts, where reasonable and feasible.

7.1.2 Additional noise and vibration management measures

Additional noise mitigation measures may be implemented based on the level of exceedance above the background noise level or NML. A summary of the additional noise management measures is provided in Table 7.4. Descriptions of the additional management measures are provided in Appendix B-1-4.

The recommended additional noise management measures based on worst-case operations for each receiver are provided in Appendix B-2 and shown in Appendix B-5. Additional mitigation measures are based off the predicted impacts during OOHW Period 2 as impacts during the night-time period would be the highest.

Additional vibration management measures are recommended for the structures located within the safe working buffer distances. The CNVG additional vibration management measures are provided in in Table 7.5. Descriptions of the additional management measures are provided in Appendix B-1-4.

Table 7.4 Additional construction noise management measures

Construction hours	Receiver perception	dBA above RBL	dBA above NML	Additional management measures
Standard hours Monday – Friday (7 am – 6 pm) Saturday (8 am – 1 pm)	Noticeable	5 to 10	0	-
	Clearly audible	> 10 to 20	< 10	-
	Moderately intrusive	> 20 to 30	> 10 to 20	PN, V
	Highly intrusive	> 30	> 30	PN, V
	75 dBA or greater	N/A	N/A	PN, V, SN
OOHW Period 1 Monday – Friday (6 pm – 10 pm)	Noticeable	0 to 10	< 5	-
	Clearly audible	> 10 to 20	5 to 15	PN

Construction hours	Receiver perception	dBA above RBL	dBA above NML	Additional management measures
Saturday (7 am – 8 am, 1 pm – 10 pm) Sunday/PH (8 am – 6 pm)	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RO
	Highly intrusive	> 30	> 25	PN, V, SN, RO, RP, DR, RP#, DR#
OOHW Period 2 Monday – Saturday (12 am – 7 am, 10 pm – 12 am) Sunday/PH (12 am – 8 am, 6 pm – 12 am)	Noticeable	0 to 10	< 5	PN
	Clearly audible	> 10 to 20	5 to 15	PN, V
	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RP, DR
	Highly intrusive	> 30	> 25	PN, V, SN, AA, RP, DR
Notes:	PN = Project notification V = Verification monitoring RP = Respite period AA = Alternative accommodation	SN = Specific notification, individual briefings, or phone call DR = Duration reduction RO = Project specific respite offer	# Respite periods and duration respites are not applicable when works are carried out during OOHW Period 1 (Day) only	

Table 7.5 Additional construction vibration management measures

Construction hours	Receiver perception	Additional management measures	Application
Standard hours	Cosmetic damage	V, N, RO	Structures identified in section 5.3.
OOHW Period 1	Cosmetic damage	V, IB, N, RO, PC, R1, SN	
OOHW Period 2	Cosmetic damage	AA, V, IB, N, PC, R2, SN	

7.2 Operational management measures

7.2.1 Confirming operational noise management measures during detailed design

Operational noise mitigation measures have been assessed in section 6.6 of this NVIA in accordance with the RNP and the RNCG.

An ONVR would be undertaken as part of the detailed design to review the potential for operational impacts and confirm feasible and reasonable mitigation measures to be incorporated in the design. Feasible and reasonable operational noise management would be developed based on the outcomes of this assessment. The identification and implementation of operational noise management would be undertaken in accordance with the ARNTG.

It is recommended that the ONVR process include:

- Consultation with the private developer for Stage 1 Wilton Greensand other relevant property holders/developers to ensure roles and responsibilities in regard to noise management are clearly understood, including:
 - confirmation of the 3.6 metre noise walls to be built by the private developer and the timing its construction
 - the responsibilities of future residential developers within the subdivision to incorporate architectural noise treatments as recommended in the subdivision acoustic report (Atkins, 2018).
- A land use survey of existing and approved developments that need to be considered in the noise modelling and assessment to capture any receivers not identified/included in the REF assessment. This would include consultation with Council to have a clear understanding of the properties within the Stage 1 Wilton Greens development that have been approved at the time of approval of the proposal. For these developments, the following documentation would be requested from Council:
 - the development application consent conditions for the approved lot.

- if the approved lots are within 100 metres of Picton Road, the accompanying acoustic report/s detailing the architectural treatments implemented to achieve the requirements of the T&I SEPP would be requested. The architectural drawings showing the building footprint and building height would also be required. Consideration would be given to the lots identified in this NVIA (lot numbers 912, 1406, 1408, 1410, 1411 to 1416, 1421, 1422, 1423, 1426, 1454, 1427, 1428 and 1455 on the first row of houses fronting Picton Road).
- A review of any design changes or modelling/assessment assumptions that need to be reflected in the noise model, with special consideration given to the status of the two 3.6 metres noise walls fronting Picton Road within the Stage 1 Wilton Greens development and the 3.6 metre noise wall to be removed and replaced east of Pembroke Parade (north of Picton Road).
- An updated detailed design noise model to reflect any changes to the design and/or modelling assumptions.
- Facade acoustic testing of the following buildings at 1095 Argyle Street, Wilton. The results of the testing would be used to assess the internal road noise level within each building to confirm whether the building would be eligible for at-property treatments:
 - Heritage building (1276 St Luke’s Anglican Church) (Receiver ID: R0595 in this NVIA)
 - Wilton Anglican Church (modern building) (Receiver ID: R0592 in this NVIA).
- Confirm the at-property treatment recommendations for the eight built residential dwellings qualifying for mitigation consideration:
 - 16/251051 (R0023)
 - 2020/ 251051 (R0027)
 - 211211/ 735556 (R0028)
 - 183183/280010 (R0285)
 - 184184/280010 (R0315)
 - 2121/253157 (R0512)
 - 103/1232553 (R0510)
 - 11/1018965 (R0545).

7.2.2 Post construction operational compliance

Post-construction operational compliance checks using measurements and a validated post-construction operational noise model is recommended following road opening. The post-construction operational compliance assessment would be undertaken in accordance with the RNMGV. This would include:

- selection of noise monitoring locations - where possible, these locations would be completed in the same locations as those described in section 4.3
- simultaneous hourly classified traffic (light and heavy vehicle volumes and speeds) would be completed alongside the noise monitoring
- a comparison between the measured traffic volumes and predicted traffic volumes would be undertaken to determine whether the traffic mix and/or speeds are significantly different.

Mitigation would be re-evaluated where the validated noise model predicts a noise level at a receiver that is more than 2 dBA higher than the detail design predicted noise level.

7.2.3 Operational noise and vibration safeguards

Recommended operational safeguards are listed in Table 7.6.

Table 7.6 *Operational mitigation and management measures*

Measure	Details of the measure
Operational noise and vibration review	<p>An operational noise and vibration review (ONVR) will be undertaken as part of the detailed design to review the potential for operational noise impacts based on the most current information and confirm feasible and reasonable mitigation measures to be incorporated into the design.</p> <p>The identification and implementation of noise mitigation measures will be undertaken in accordance with the RNMG and the ARNTG.</p>
Post-construction operational compliance	<p>Post-construction operational compliance noise monitoring using a validated post-construction operational noise model will be undertaken following road opening. This program will be undertaken within 12 months of opening of the proposal and will be completed once traffic flows have stabilised.</p> <p>Noise mitigation measures will be revised at the completion of the monitoring period in accordance with RNMG and the ARNTG.</p>

8. Conclusion

8.1 Existing environment

The proposal is located in an area consisting of suburban and rural residential areas. The existing noise environment is dominated by road traffic noise from vehicles travelling along Picton Road and the M31 Hume Motorway. Noise from local roads and natural sounds such as wind, birds and insects also contribute to the existing noise environment. The construction and operational study area was adopted in accordance with relevant Transport noise assessment guidelines.

Sensitive receivers within the study area were identified, and mainly consist of rural residential and suburban residences (734 existing residences, future residential dwellings within Stage 1 of the Wilton Greens development and 14 non-residential receivers). Noise monitoring was undertaken at seven locations in October 2022 to quantify the existing background, ambient and road traffic noise environment of the study area.

8.2 Construction noise and vibration

Construction noise and vibration impacts have been assessed for works that are proposed during and outside standard construction hours. Impacts have been assessed based on the proposed construction activities and the equipment that are likely to be used for each construction scenario.

The construction noise assessment finds that impacts are likely to occur during all construction activities. The most-affected sensitive receivers are likely to experience highly intrusive noise levels at some stage during construction. The predicted impacts are considered conservative as they assume worst-case operations relative to each receiver. In practice, construction would progress along the proposed road alignment and maximum impacts would be limited to the periods where construction works are located adjacent to the impacted sensitive receivers.

Construction vibration impacts were assessed based on the operation of a vibratory roller greater than 18 tonnes. This plant item would cause the highest levels of vibration and has been adopted for a conservative assessment. Vibration impacts are summarised as follows:

- **Standard structures:** up to 39 structures are located within the 25 metre minimum working distances for cosmetic damage. The majority of these structures are future residential structures located in the South East Wilton Precinct. Residents located within 100 metres of the construction work area have the potential to experience human comfort impacts due to construction vibration.
- **Heritage or other sensitive structures:** two heritage items have been identified adjacent the construction work area and have the potential to be impacted by vibration.

No vibration impacts are anticipated for the Upper Canal pipe as the distance to the asset (90 metres vertically) exceeds the minimum working distances for vibration. Nevertheless, the need for further assessment would be confirmed with WaterNSW as part of the CNVMP.

Additional noise and vibration management measures have been recommended in order to minimise the potential impacts associated with construction noise and vibration. These measures include recommendations of community notifications, property condition surveys and verification noise and vibration monitoring throughout construction.

8.3 Operational noise and vibration

Road traffic noise levels were assessed for the opening year (2031) and design year (2041). Calibration factors were not required as the noise model validation process indicated that the modelled noise levels were an accurate representation of the measured noise levels.

The number of sensitive receivers that qualify for consideration of additional noise mitigation are based on the predicted noise levels in the design year. A summary of the no-mitigation results follows:

- **Built residential dwellings:** Up to eight residential dwellings would qualify for mitigation consideration. The trigger for mitigation is generally due to an exceedance of the cumulative limit.

- **Place of worship buildings:** Both buildings at 1095 Argyle Street, Wilton would qualify for mitigation consideration (One heritage building and one modern building).
- **Stage 1 Wilton Greens development:** Up to 18 future residential dwellings could qualify for mitigation consideration (depending on the timing of the DA approval for the individual lot). The future residential receivers located within the residential development to the south-east of the Pembroke Parade and Picton Road intersection were identified as an area where additional noise mitigation (e.g. pavement treatments or noise barriers) would be considered.

The outcomes of the assessment indicate the following mitigation measures were not considered reasonable and feasible:

- Low-noise pavement treatments: not considered appropriate due to the 60 km/h speed limit proposed along Picton Road in this area.
- Noise walls taller than the 3.6 metre wall to be built by the Stage 1 Wilton Greens developer (Walker Corporation Pty Ltd) as residual noise levels would be managed with façade design measures to achieve the required internal noise levels in the T&I SEPP. This is the responsibility of future residential owners or developers where Council would be the regulatory authority of the individual lot's DA.
- A noise wall taller than 3.6 metres east of Pembroke Parade (north of Picton Road) that would be removed and replaced during the early stages of the construction phase of the proposal.

Operational mitigation measures would be confirmed as part of the ONVR, which are recommended to include:

- Consultation with Stage 1 Wilton Greens developers and Council.
- A land use survey of existing and approved developments that need to be considered in the noise modelling and assessment to capture any receivers not identified/included in this assessment.
- A review of any design changes or modelling/assessment assumptions that need to be reflected in the detailed design noise model.
- Facade acoustic testing to confirm (future/predicted) internal road traffic noise levels at the heritage-listed St Luke's Anglican Church (receiver ID: R0595 in this NVIA) and Wilton Anglican Church (Receiver ID: R0592 in this NVIA).
- Confirming the at-property treatment recommendations for the eight built residential dwellings qualifying for mitigation consideration.

Post-construction operational compliance checks using measurements and a validated post-construction operational noise model is recommended following road opening. This program would be undertaken within 12 months of opening of the entire proposal (Picton Road upgrade between Nepean River and Almond Street, Wilton) and would be completed once traffic flows have stabilised.

Operational vibration impacts are not expected as a result of the proposal, as the nearest sensitive receivers are outside the distances adopted to assess potential vibration impacts from traffic movements.

9. References

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10. Glossary of terms and abbreviations

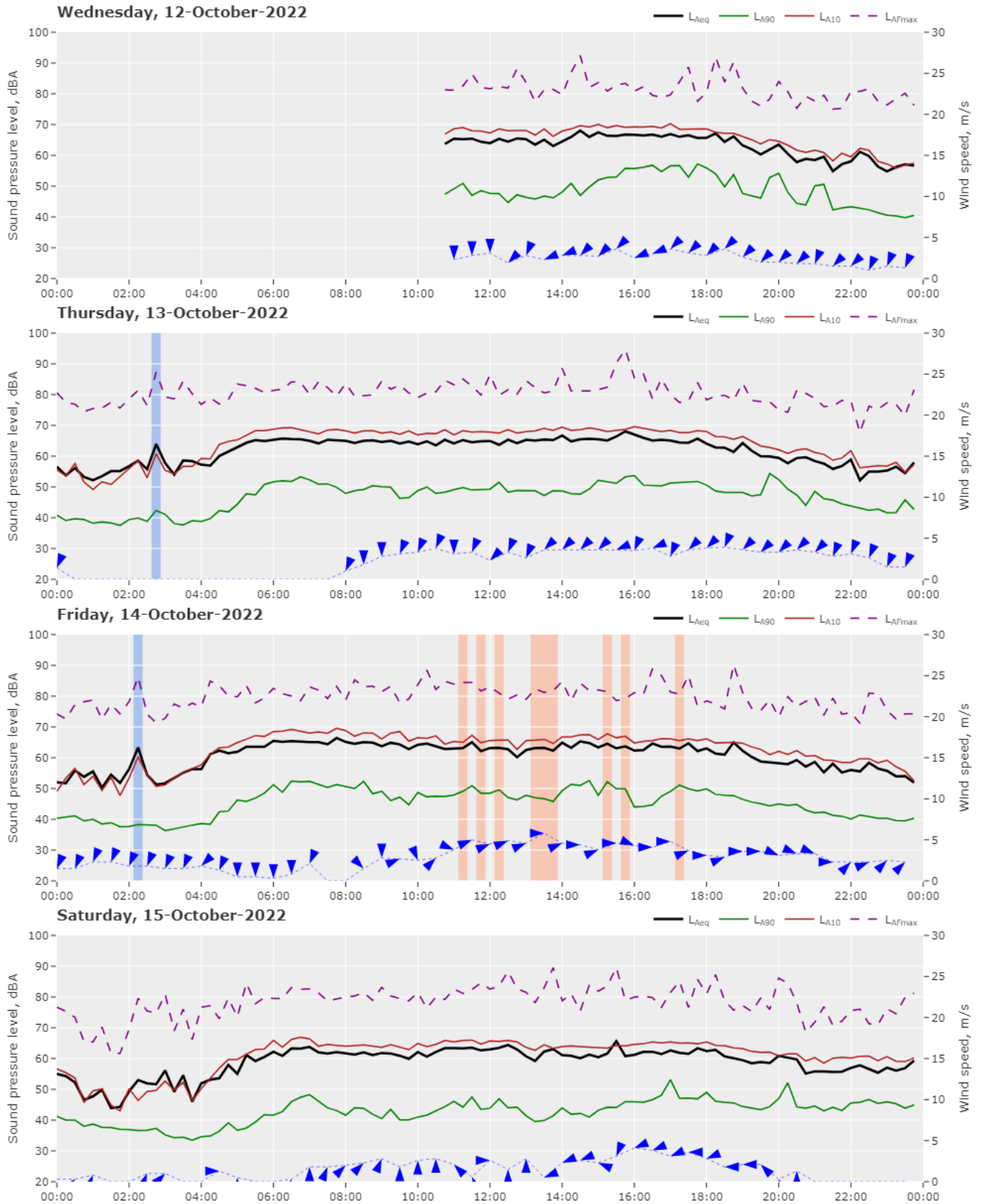
Term	Definition
Acute noise level	A level of road traffic noise of: <ul style="list-style-type: none"> – 65 dBA or more for the day period between 7 am to 10 pm, or – 60 dBA or more for the night period between 10 pm to 7 am. The level is measured as an equivalent continuous noise level (L_{Aeq}) 1 metre from the building façade.
ARNTG	<i>At-Receiver Road Noise Treatment Guideline</i> (Transport for NSW, March 2022)
ATC	Automatic traffic counters
Closely spaced group of residences	Residences are generally considered closely spaced where the façades are separated by less than 20 metres.
Controlling criterion	Whichever of the day or night-time L_{Aeq} criteria (<i>Road Noise Criteria Guideline</i>) is exceeded by the greatest amount.
CoRTN	<i>Calculation of Road Traffic Noise</i> (UK Department of Transport, 1988)
Cumulative limit	A total noise level that is 5 dBA above the <i>Road Noise Criteria Guideline</i> criteria in the build year.
CNVMP	Construction noise and vibration management plan
CNVG	<i>Construction Noise and Vibration Guideline (for road and maritime works)</i> (Transport for NSW, June 2022)
CS	Construction scenario
dB	Decibel is the logarithmic unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics.
dBA	Frequency weighting filter used to measure ‘A-weighted’ sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
DGA	Dense graded asphalt
Frequency content	The overall sound energy split across the frequency (n-octave) bands. For construction noise assessments, typically the sound energy is split across one-third octave frequency bands.
HV	Heavy vehicle
ICNG	<i>Interim Construction Noise Guideline</i> (DECC, 2009)
Isolated single residences and isolated groups of closely spaced receivers	Single residences of closely spaced groups of residences in numbers of three or less are considered isolated where they are separated from other residences by more than 100 metres. Where residences are between 20 metres and 100 metres, they may be considered isolated but this depends on examining surrounding development more broadly.
kHz	Kilohertz
$L_{Aeq(period)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{Aeq(15\text{ hour})}$	The L_{Aeq} noise level for the period 7 am to 10 pm.
$L_{Aeq(9\text{ hour})}$	The L_{Aeq} noise level for the period 10 pm to 7 am.
$L_{Aeq(1\text{ hour})}$	The highest hourly L_{Aeq} noise level during the day and night periods.
LGA	Local government area
Low noise pavement	Low noise pavement is pavement that has an emission 2 dBA lower or more than dense graded asphalt.
LV	Light vehicle
NCA	Noise catchment area

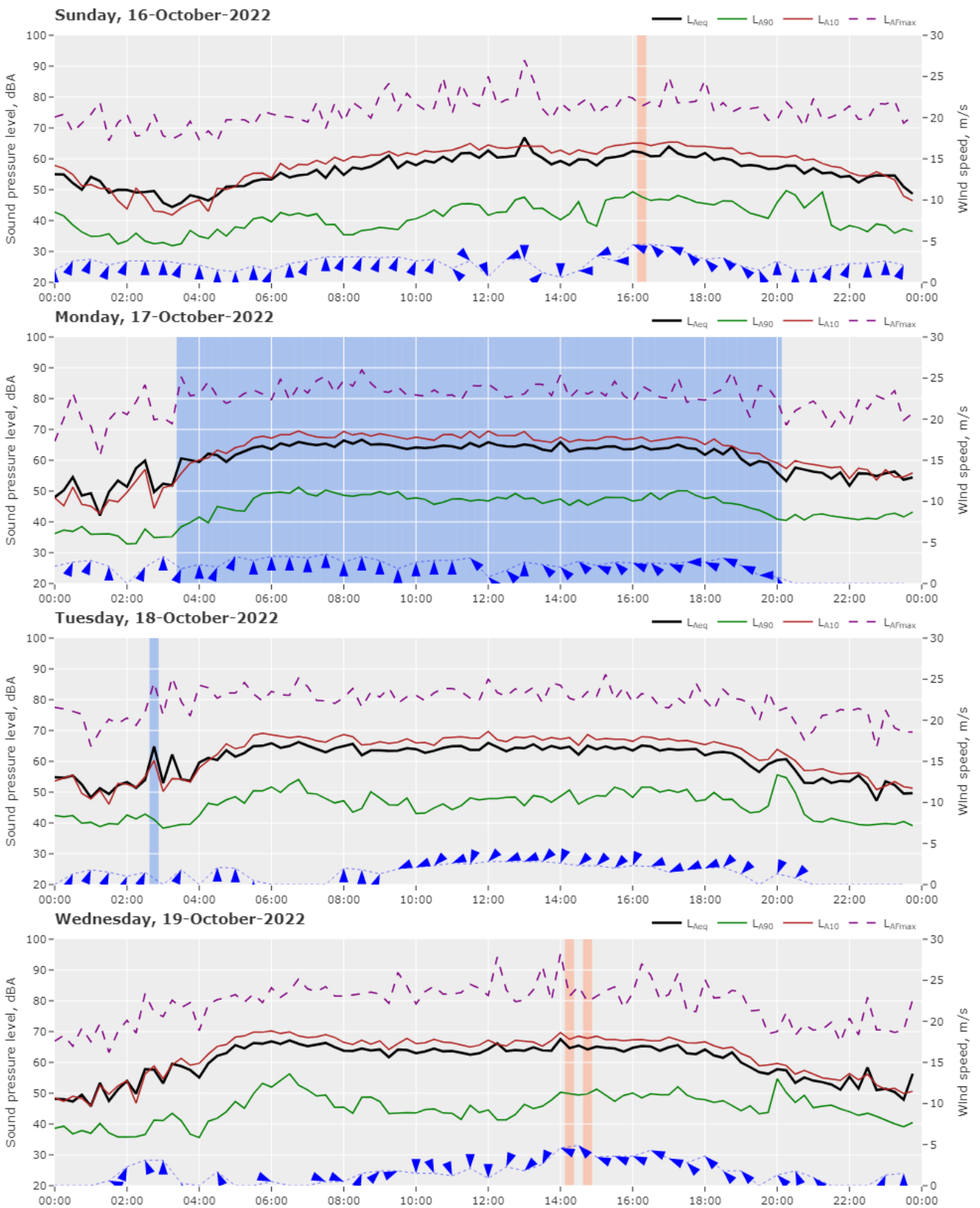
Term	Definition
New road	A road is new for any of the following cases: <ul style="list-style-type: none"> – a project proposes road construction in an undeveloped corridor – a road project changes the functional class of the road – a widening, curve straightening or adjustment of the corridor where the upgrade road pavement has been substantially realigned – a duplication where the new lanes have been substantially realigned from the existing corridor in which case the existing lanes are also assessed as a new road development type – a bypass where the upgraded road extends beyond the existing road corridor.
NPfI	<i>Noise Policy for Industry</i> (EPA, 2017)
OGA	Open Graded Asphalt
ONVR	Operational noise and vibration review
OOHW	Out-of-hours works
RBL	Rating background level
REF	Review of Environmental Factors
RNCG	<i>Road Noise Criteria Guideline</i> (Transport for NSW, April 2022)
RNMG	<i>Road Noise Mitigation Guideline</i> (Transport for NSW, March 2022)
RNMVG	<i>Road Noise Model Validation Guideline</i> (Transport for NSW, August 2022)
Receiver	A noise sensitive receiver includes the following: residences, schools, child care centres, places of worship, health care institutions.
Redeveloped road	A road is redeveloped if the purpose or outcome of the upgrade will result in one or more of the following: <ul style="list-style-type: none"> – increase in the traffic-carrying capacity – increases in the number of heavy vehicles by 50 per cent or more on the road where the physical works are located. – for the road to be considered redeveloped rather than new, the pavement should not be substantially realigned.
RNP	<i>NSW Road Noise Policy</i> (DECCW, 2011)
Substantially realigned	A road will be substantially realigned when the new carriageway in the road project is more than approximately six times the total existing lane width from the edge of the existing road corridor.
SWL	Sound power level
Transition zone	The 'transition zone' is the area either side of the physical transition point between road function classes (e.g. arterial vs local) or road development types (e.g. new vs redeveloped).
WHO	World Health Organisation
Worst-case scenario	The configuration of construction noise generating sources for a given construction activity resulting in the highest expected noise level at the receiver. For example, the worst-case scenario would be the loudest construction equipment likely to be operating simultaneously at any given time at the closest point between the construction work area and any given sensitive receiver.

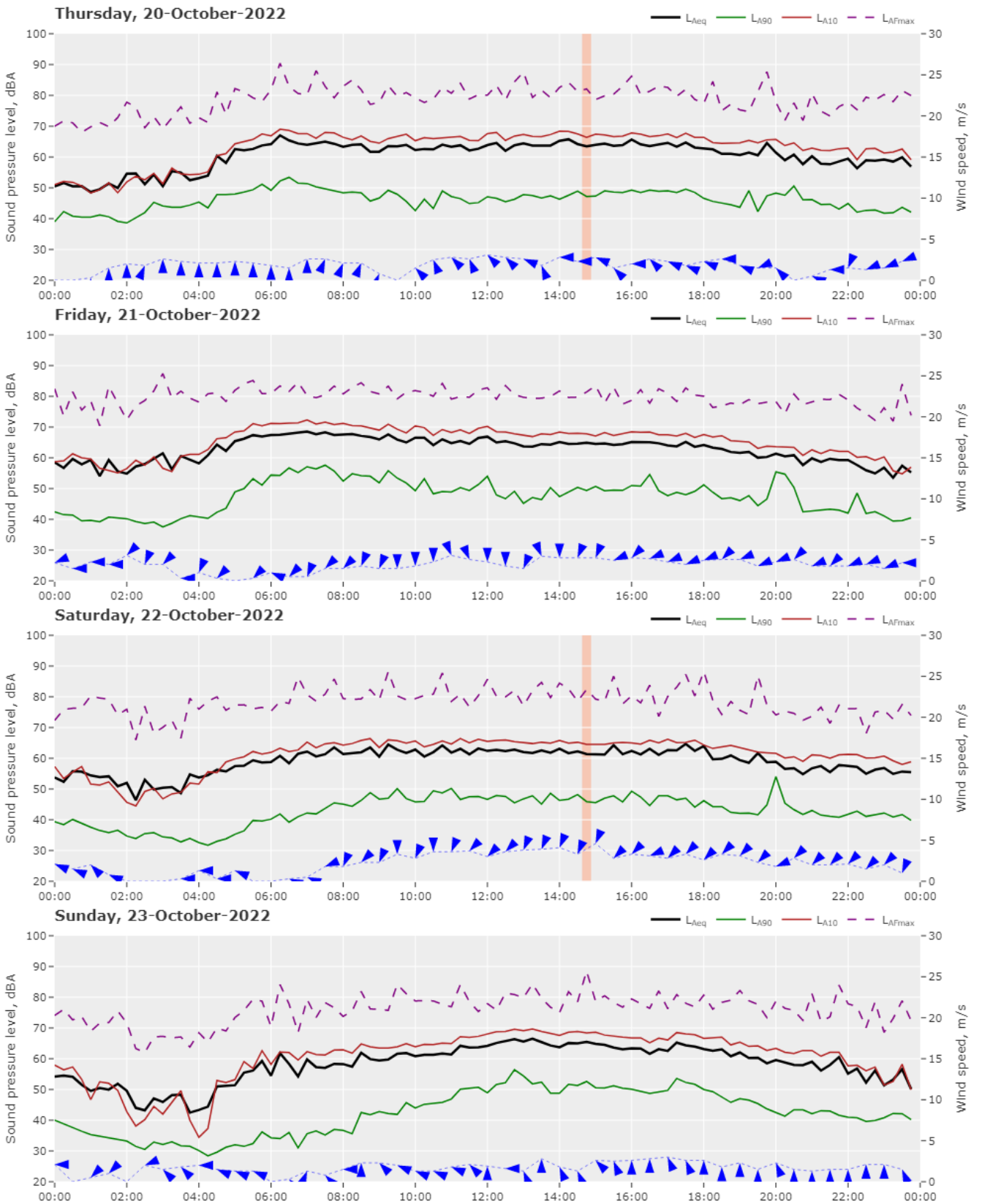
Appendix A

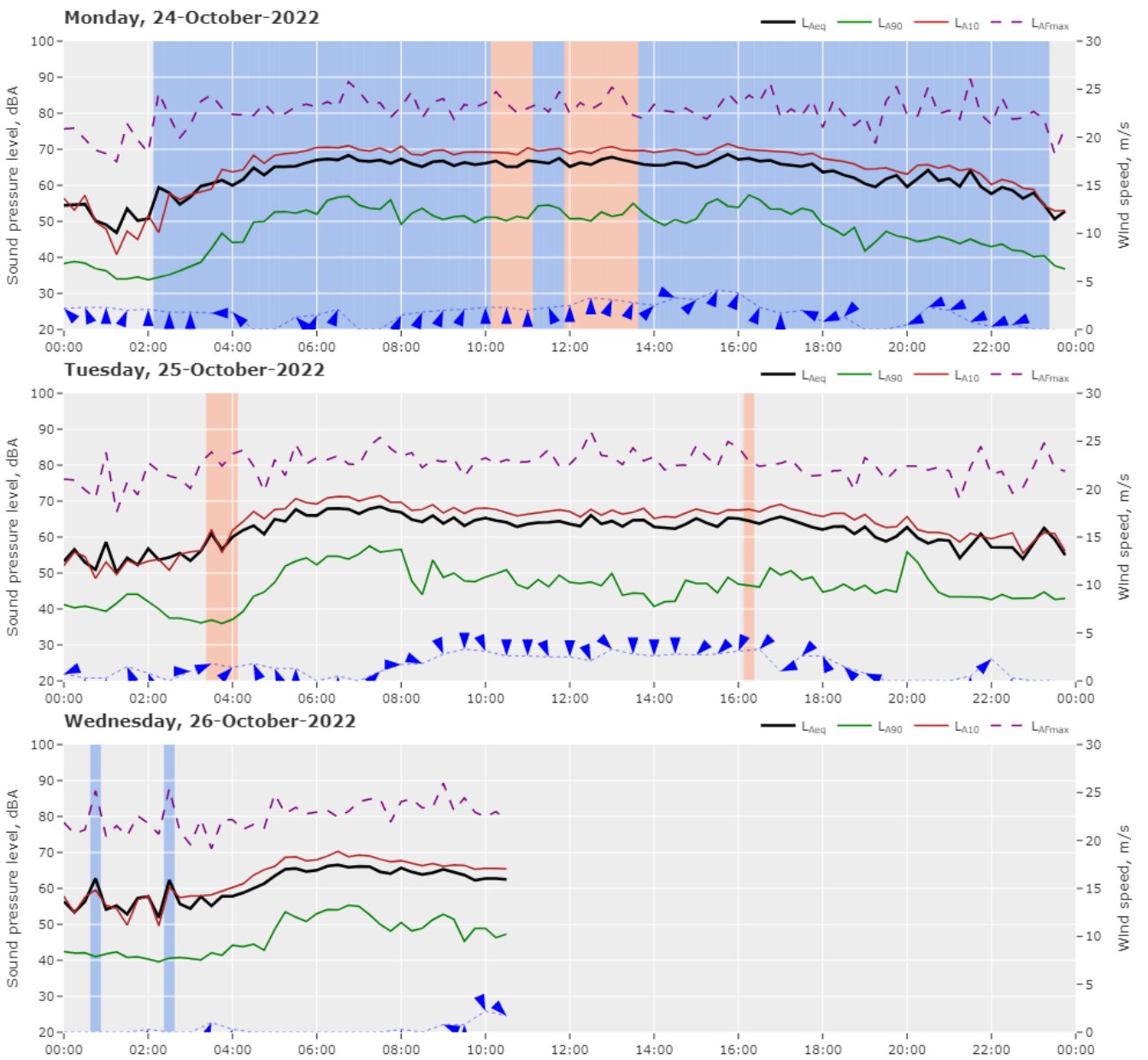
Measured noise levels

NM01 – Picton Road (West of the M31 Hume Motorway)

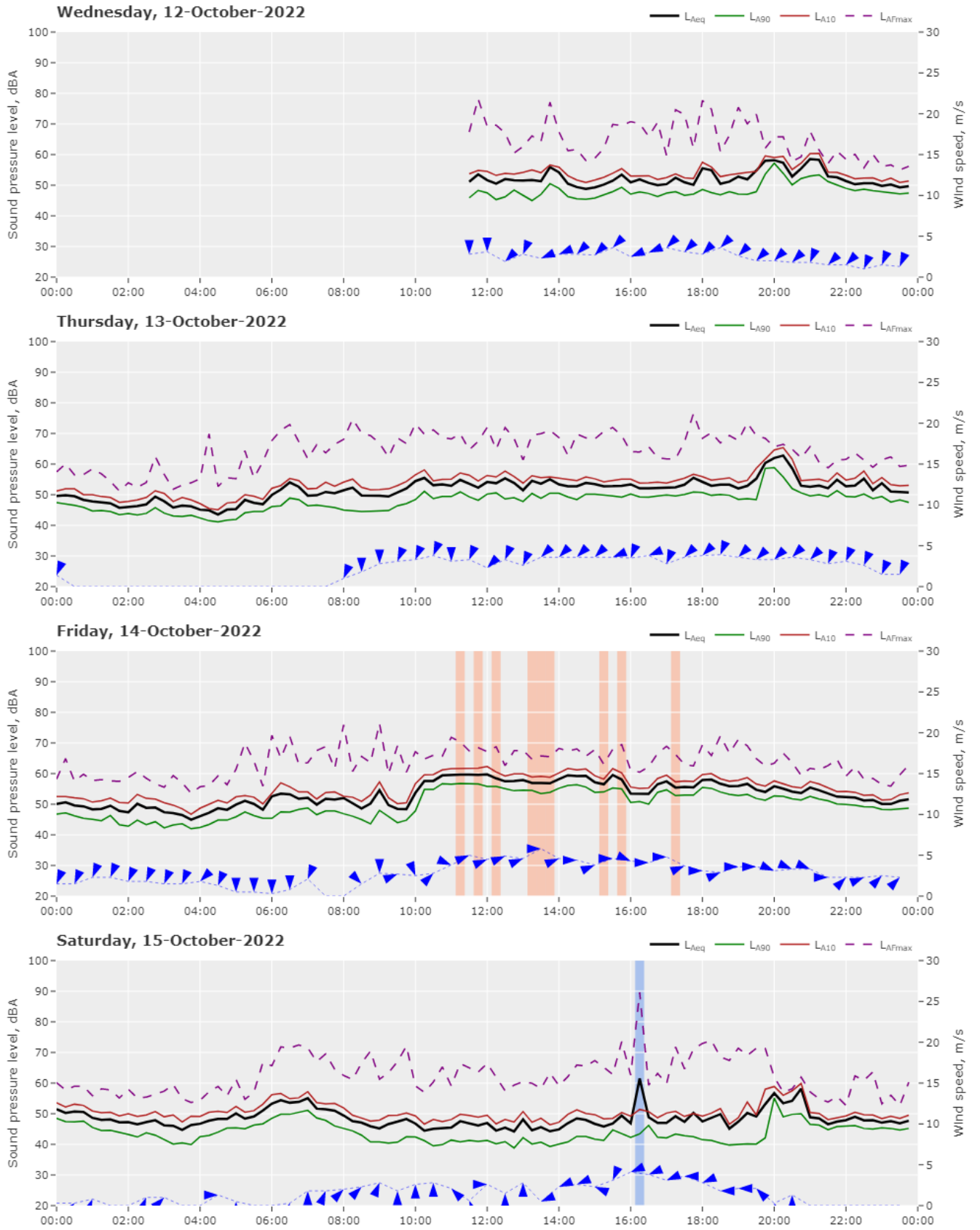


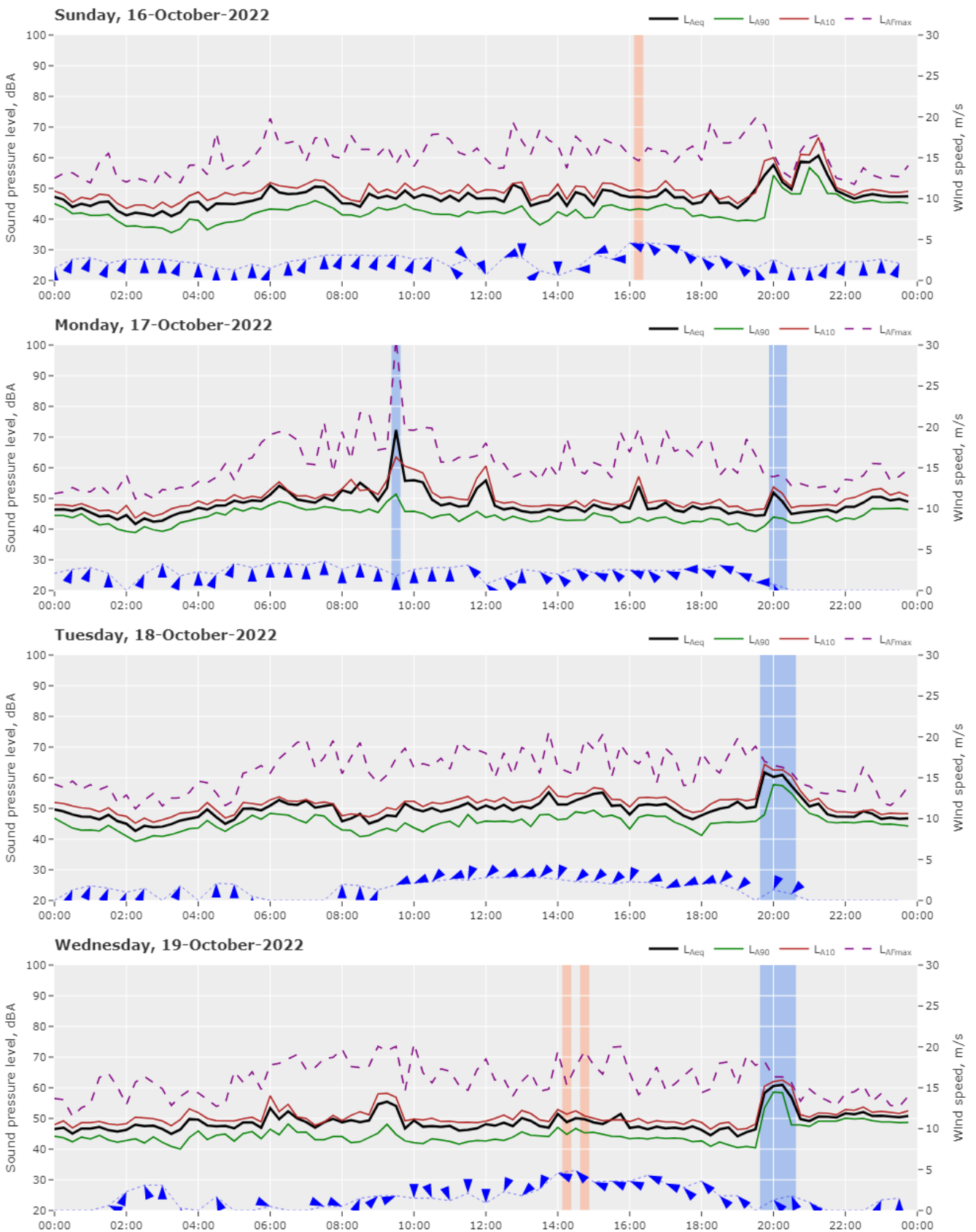


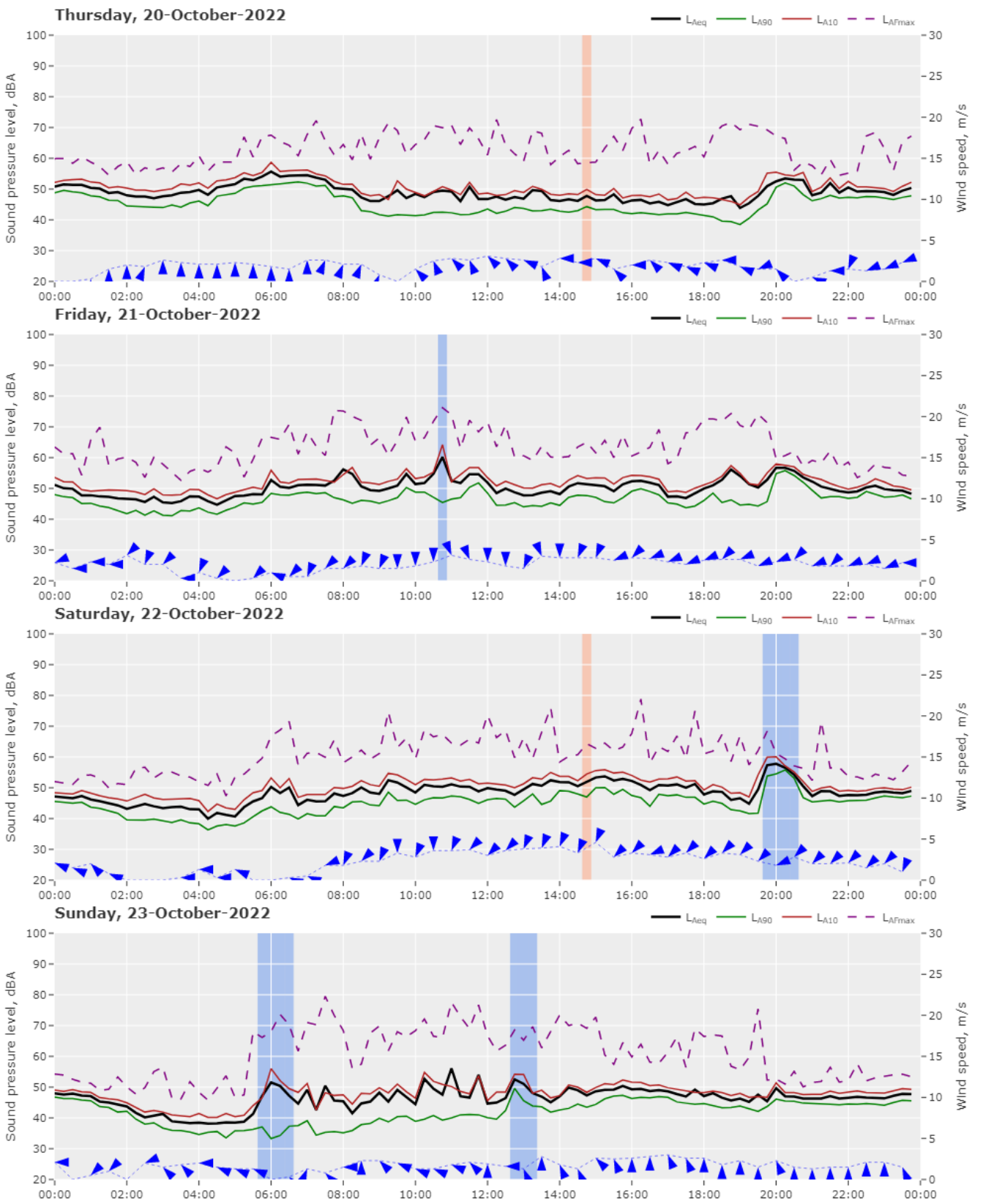


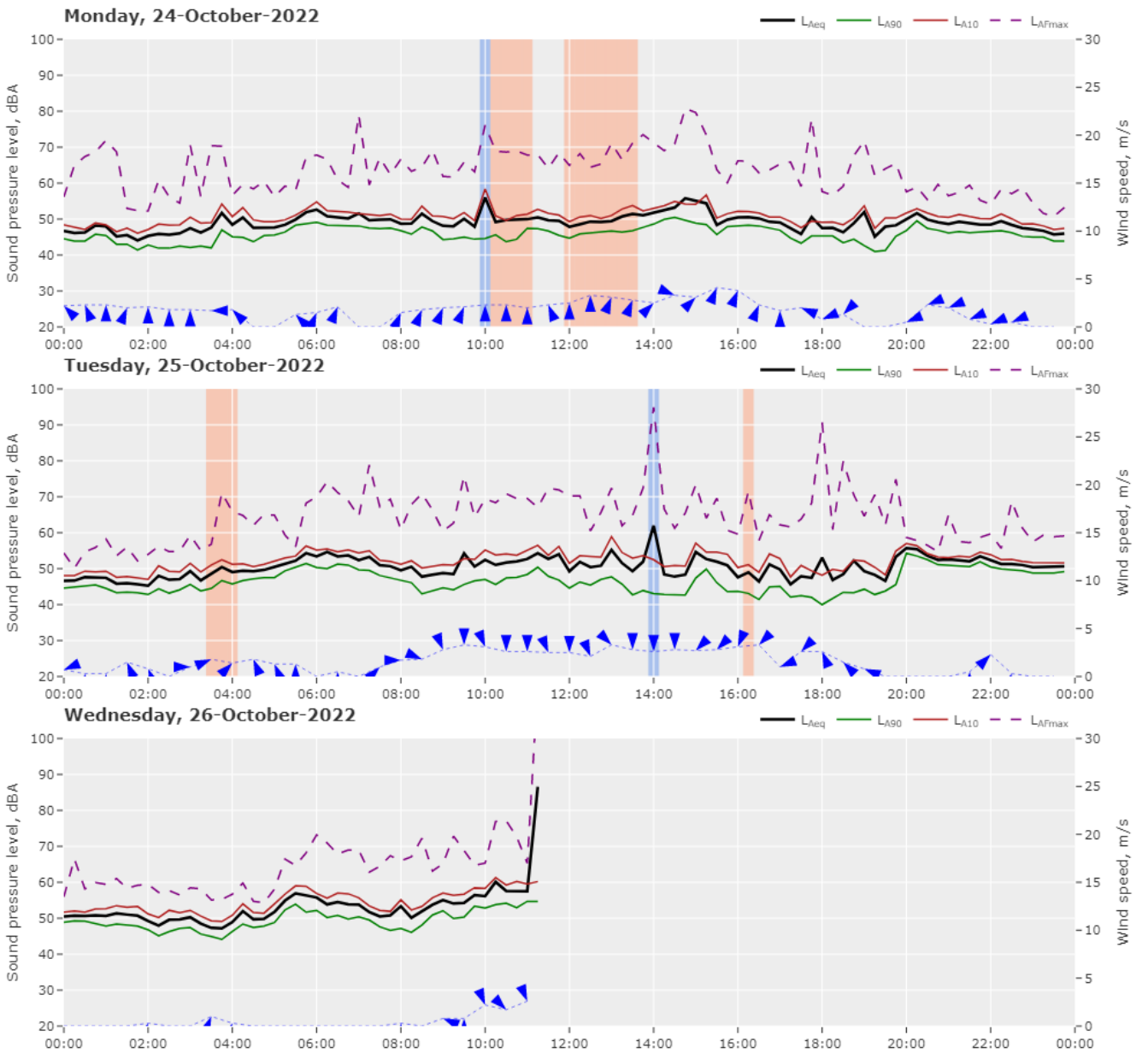


NM02 – Balmoral Rise / Stirling Drive

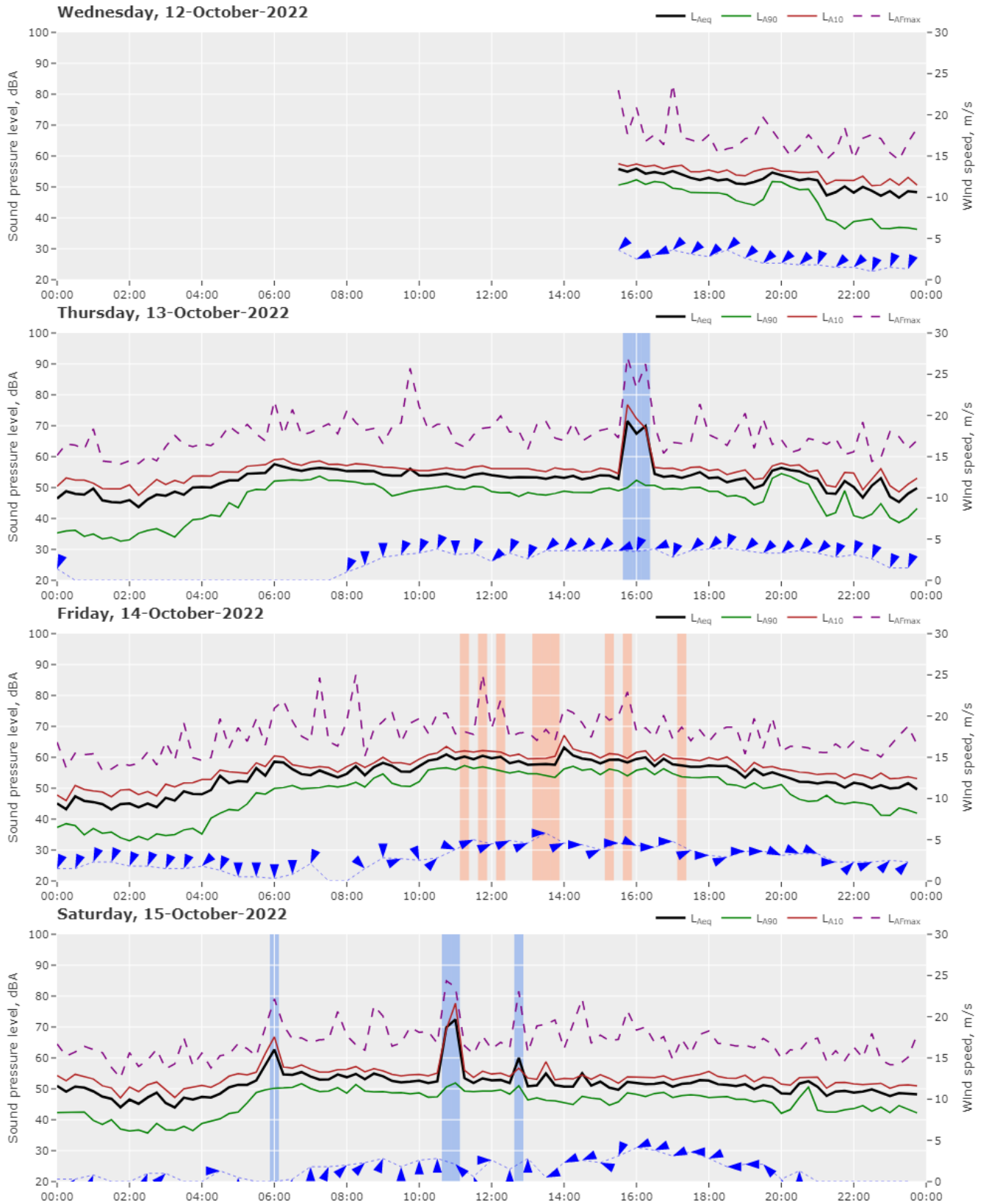


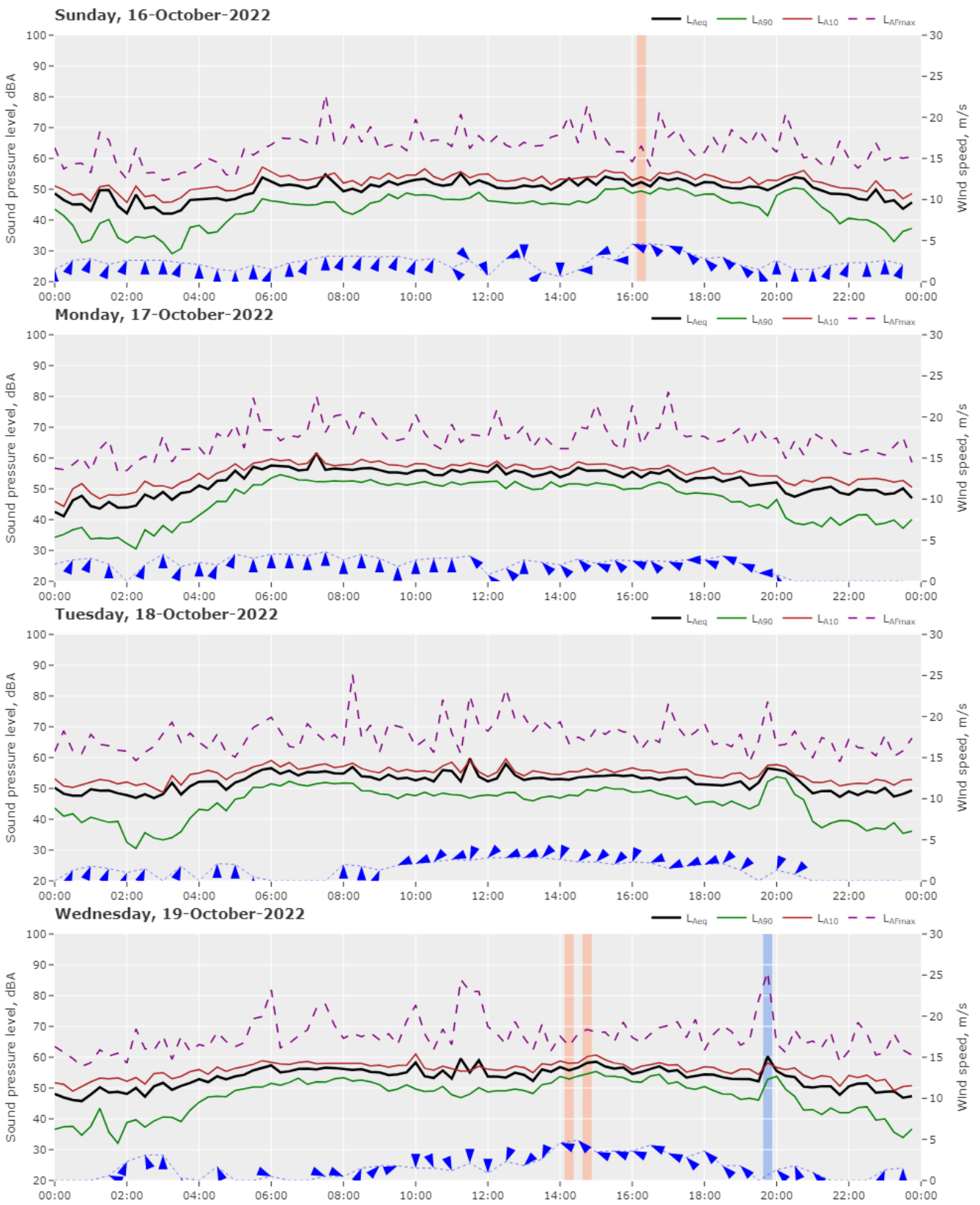


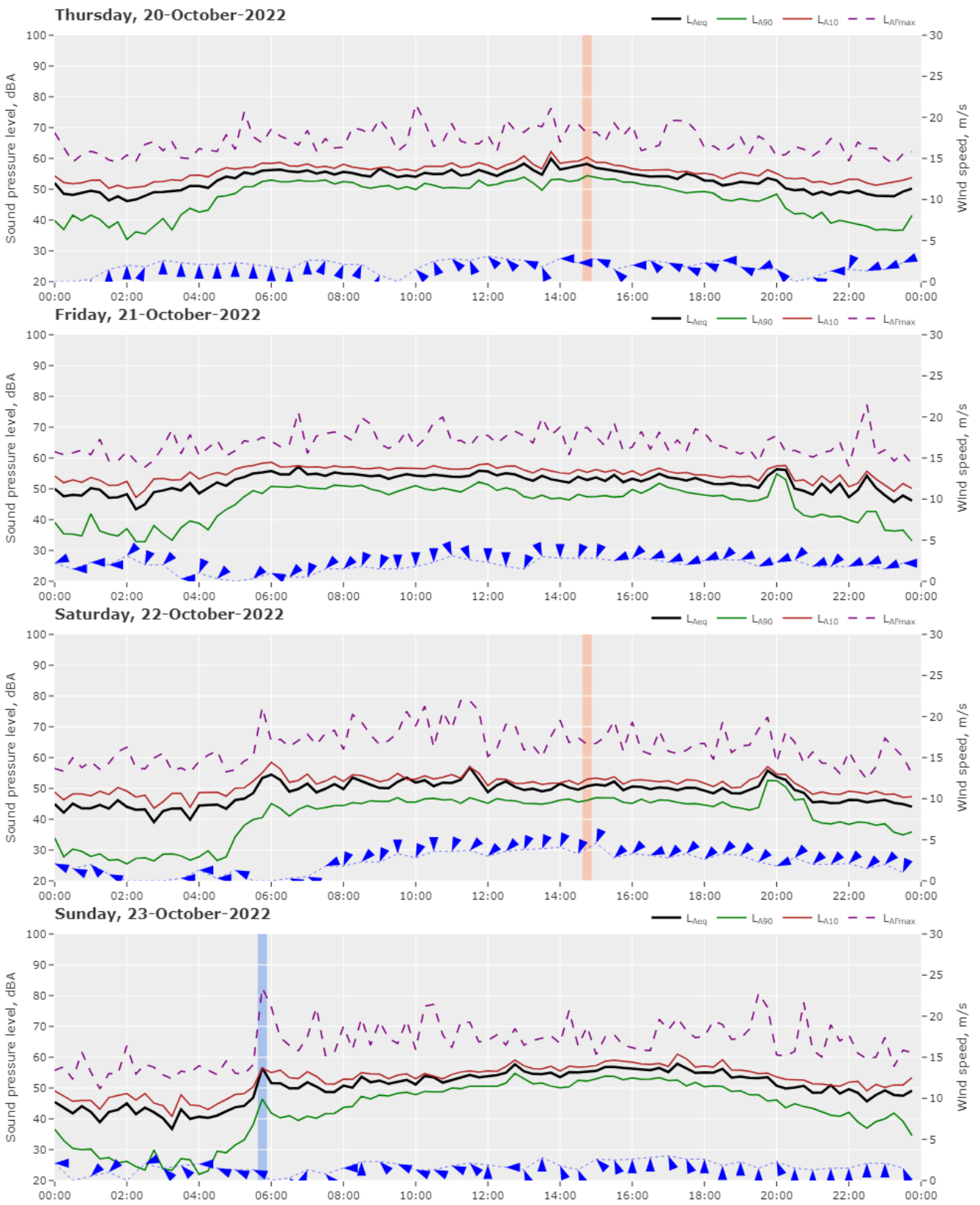


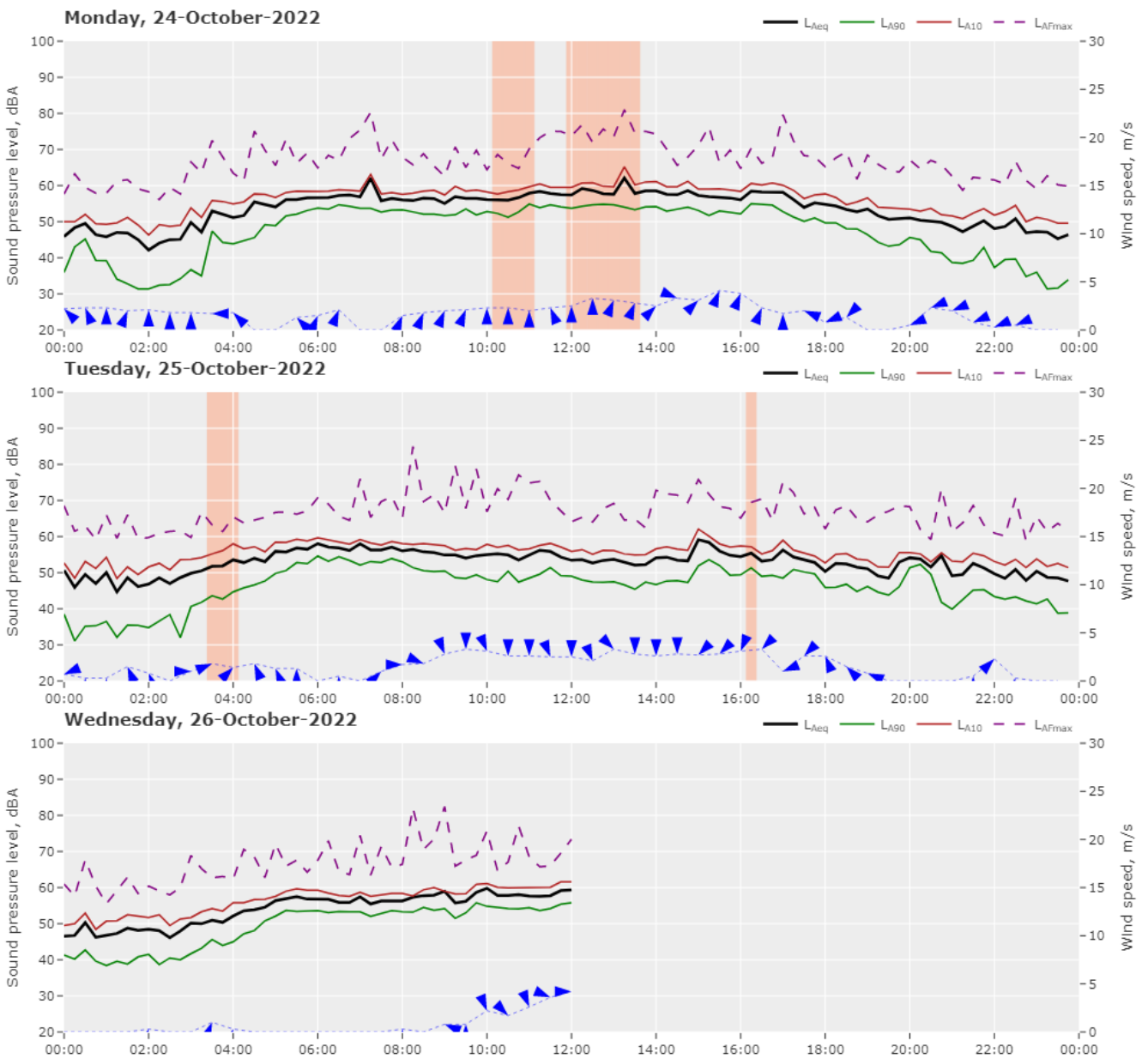


NM03 – 7 Hornby Street West, Wilton

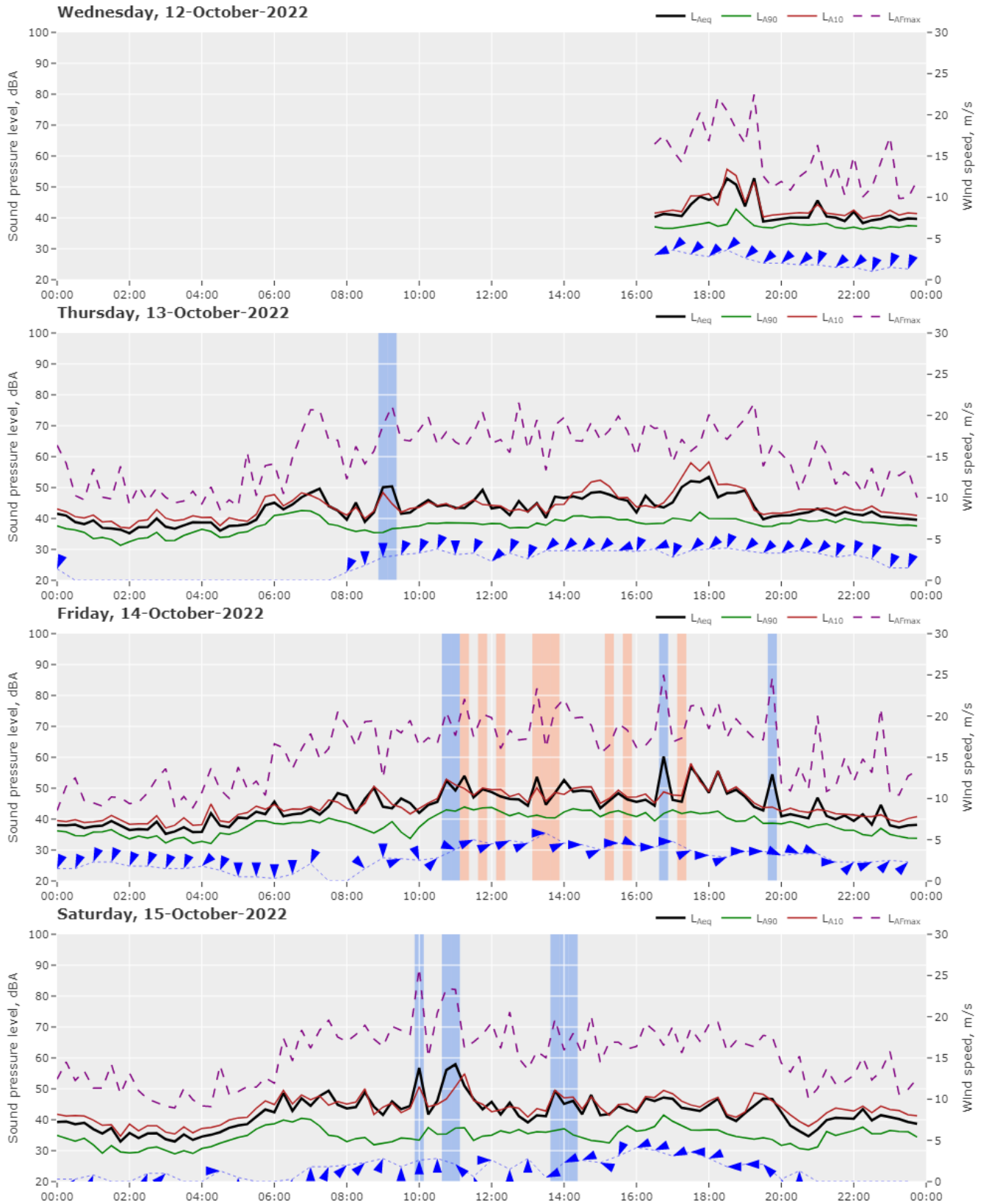


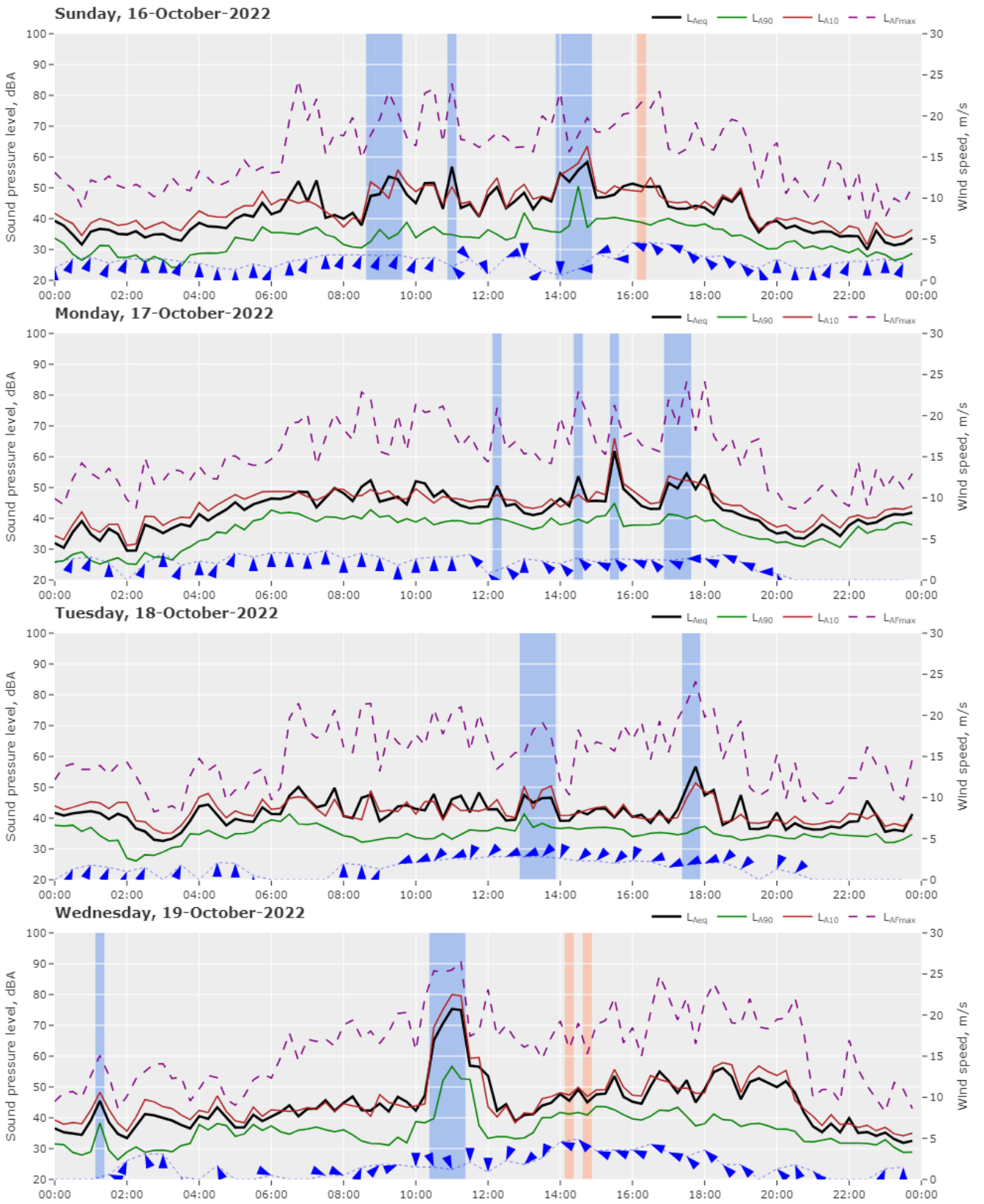


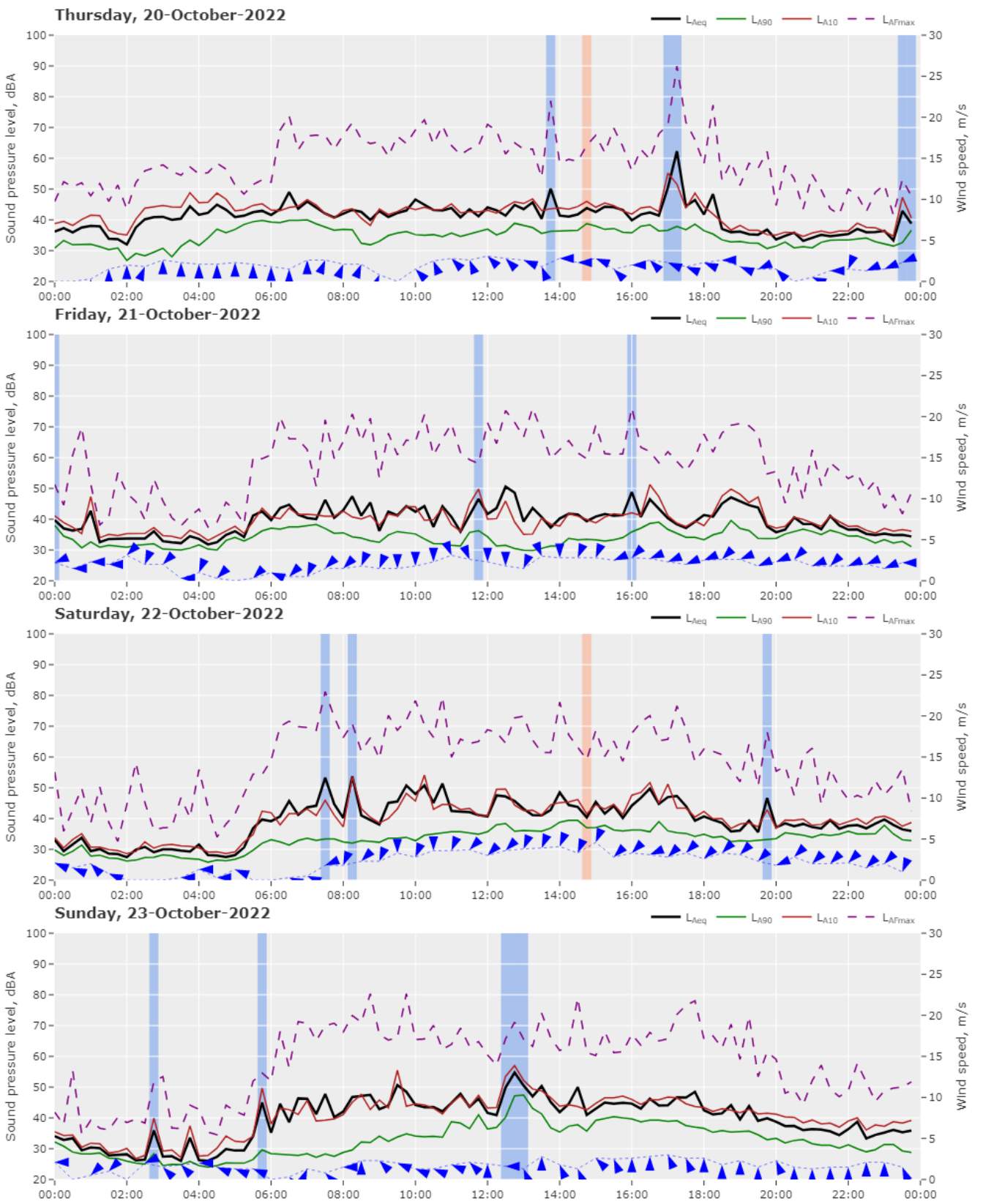


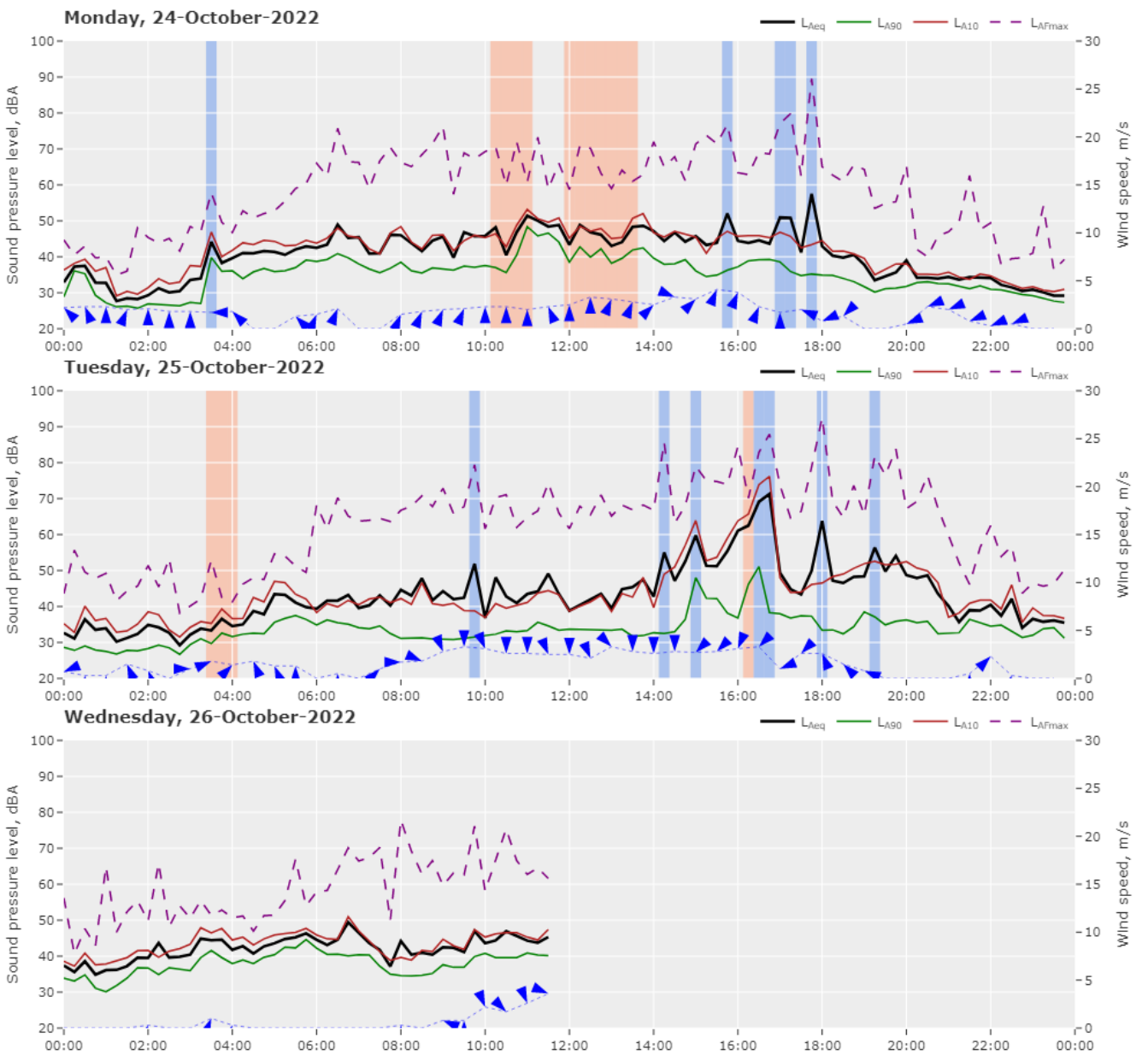


NM04 – 5 Goodwin Street, Wilton

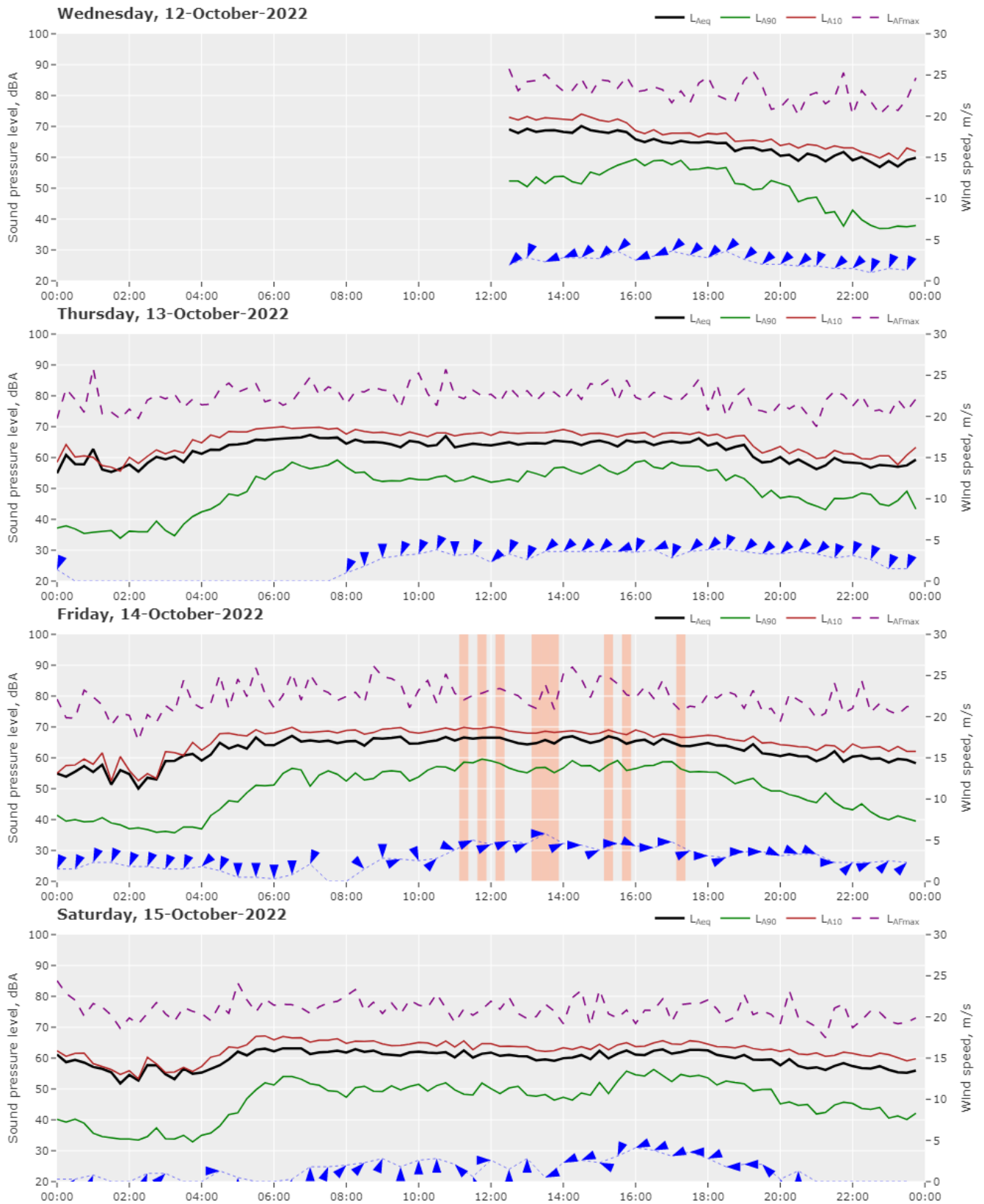


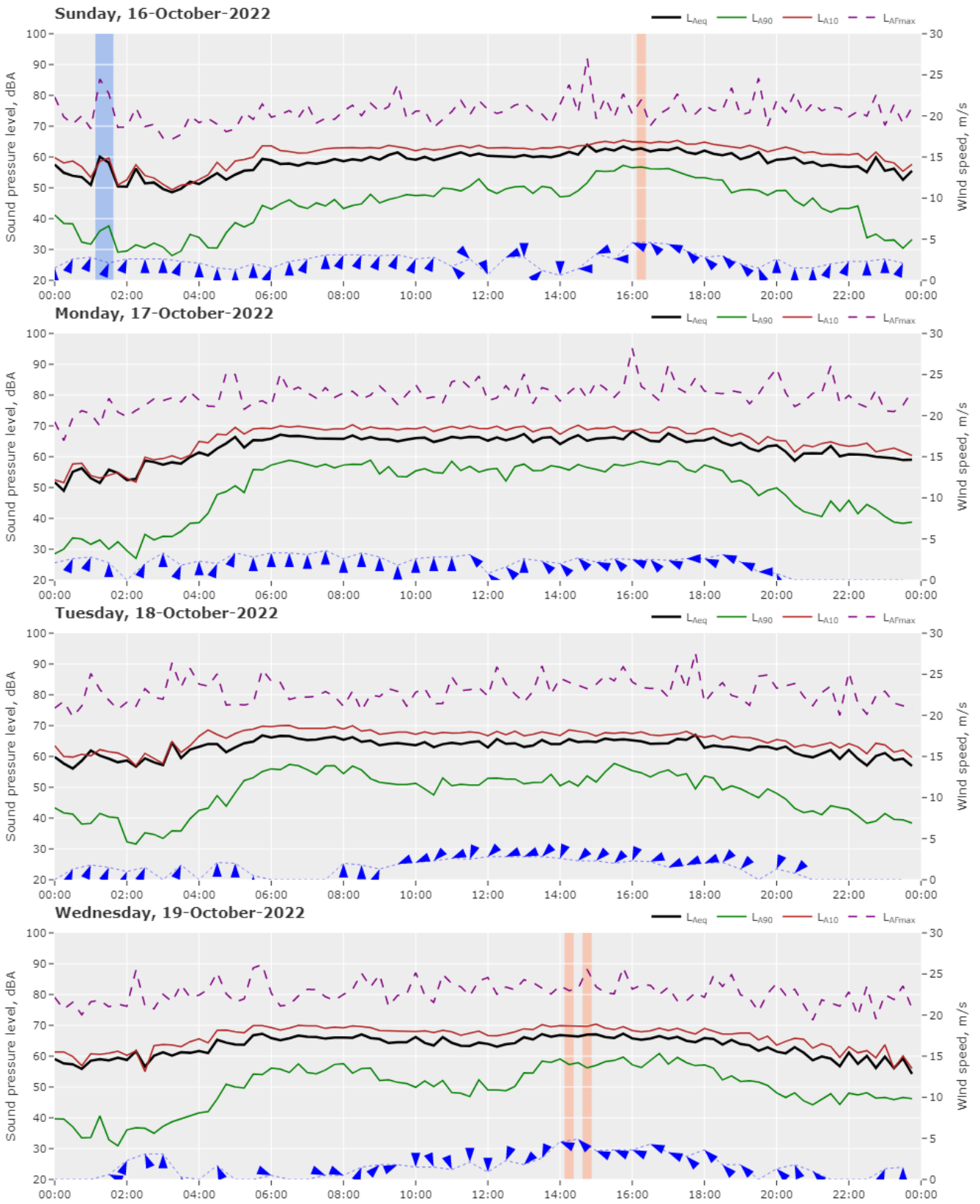


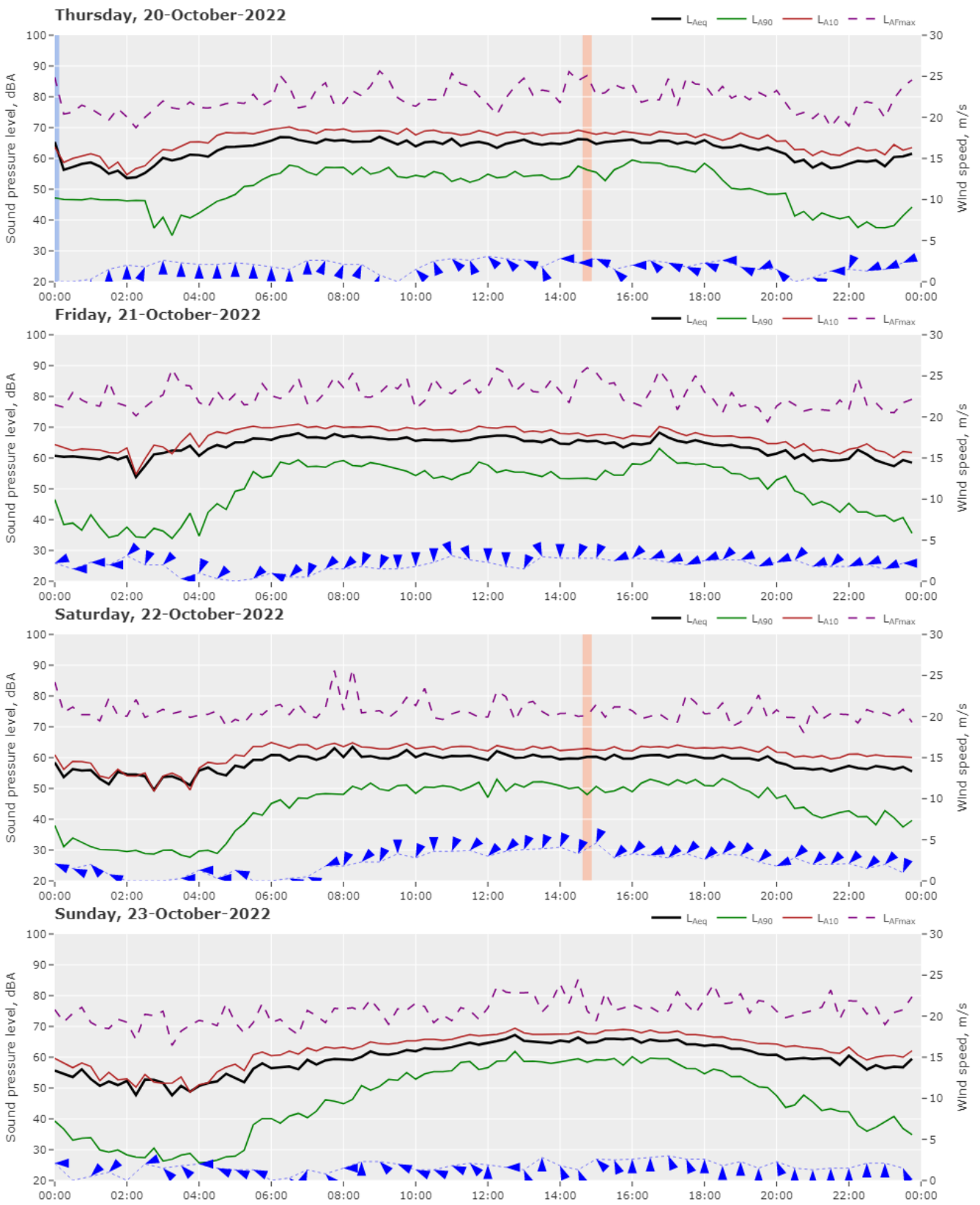


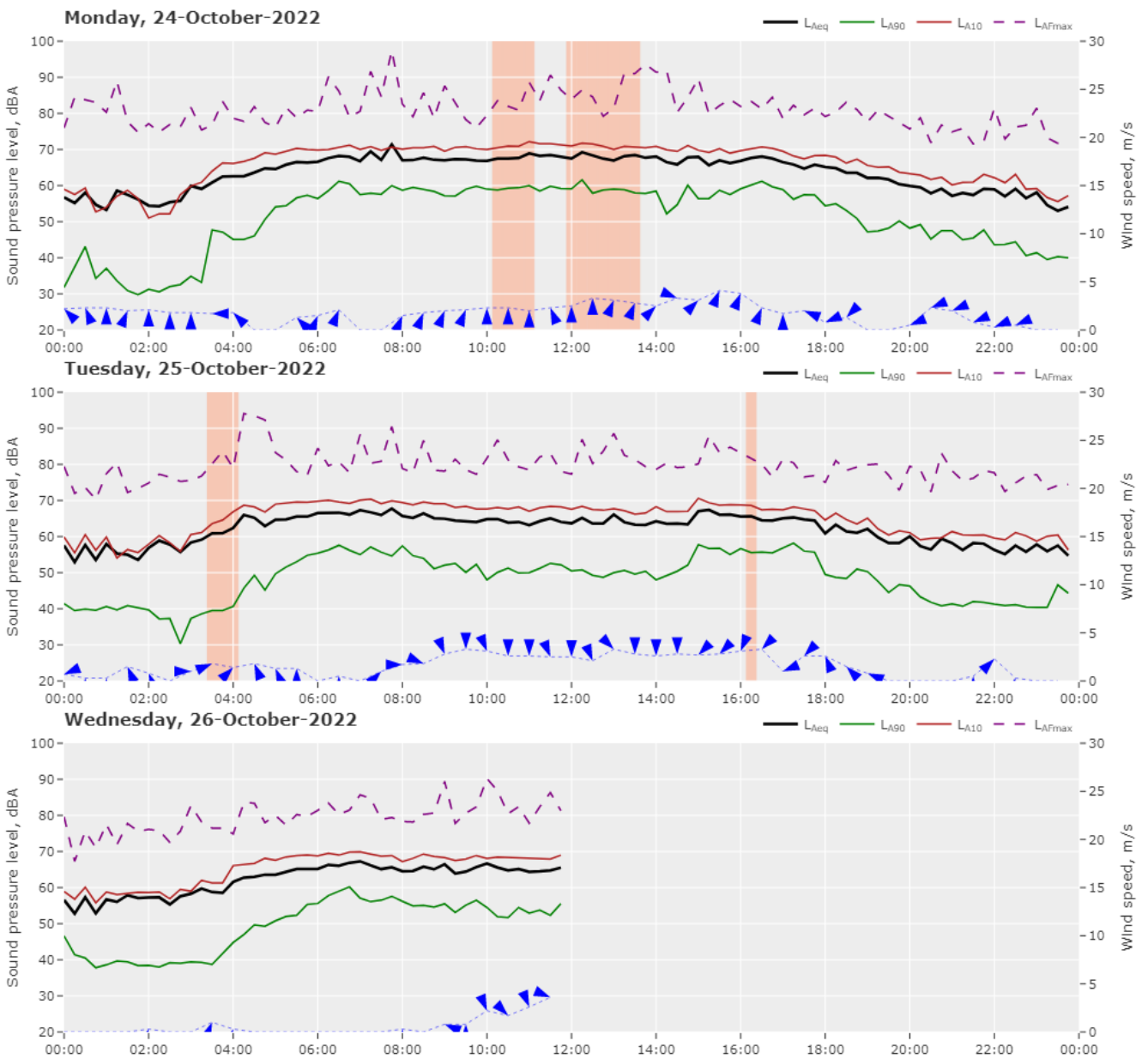


NM05 – 70 Hornby Street, Wilton

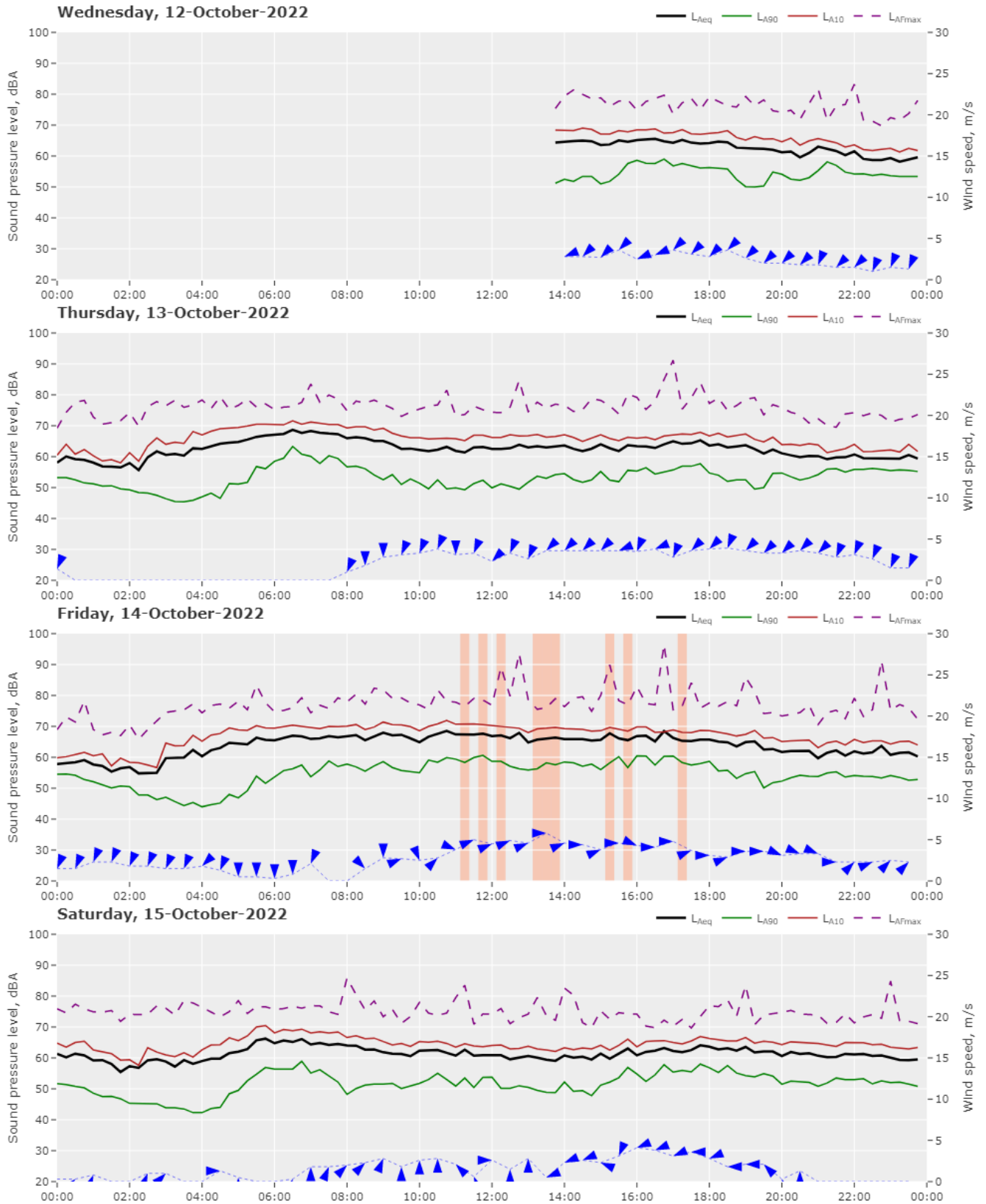


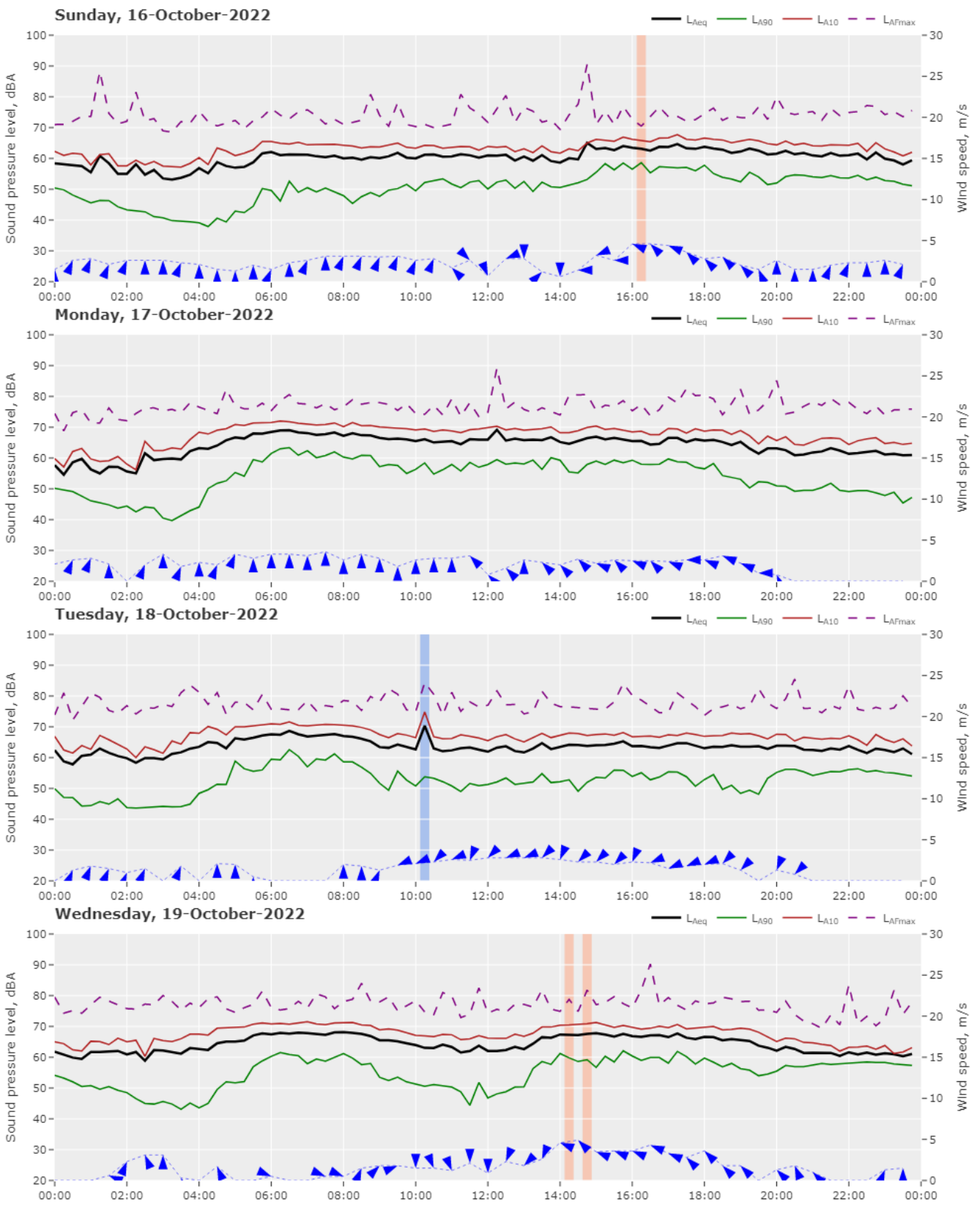


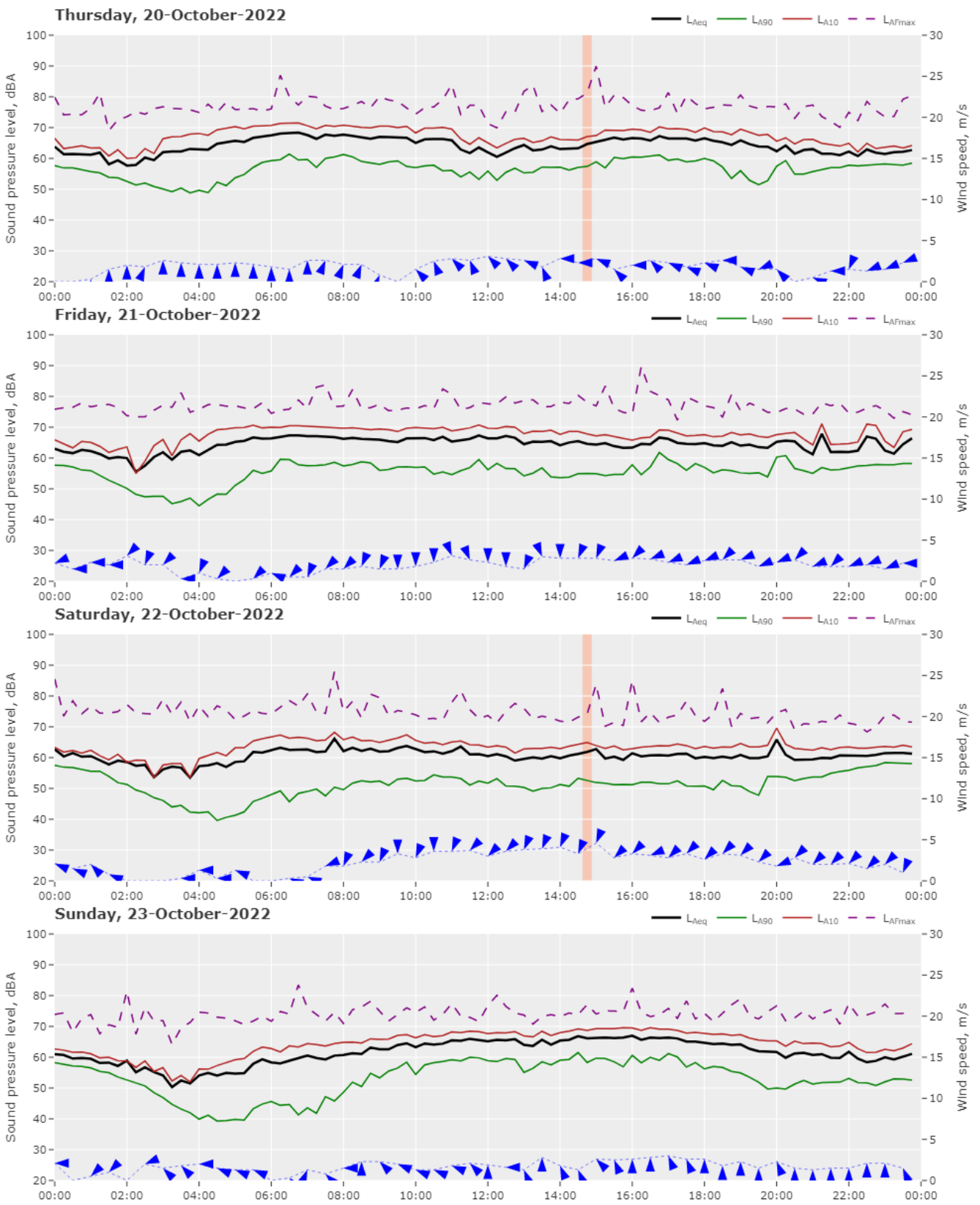


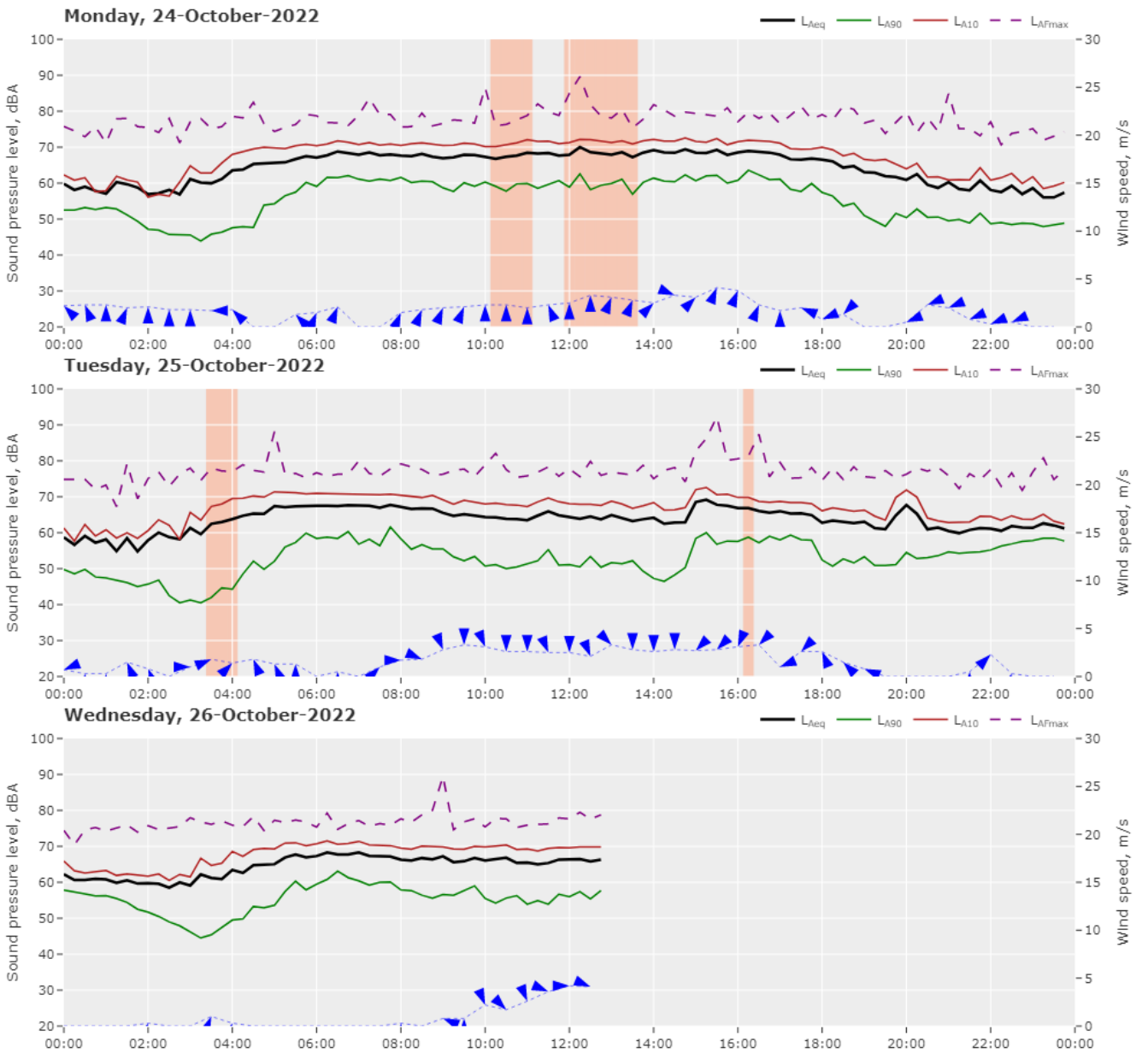


NM06 – Corner of Almond Street and Picton Road

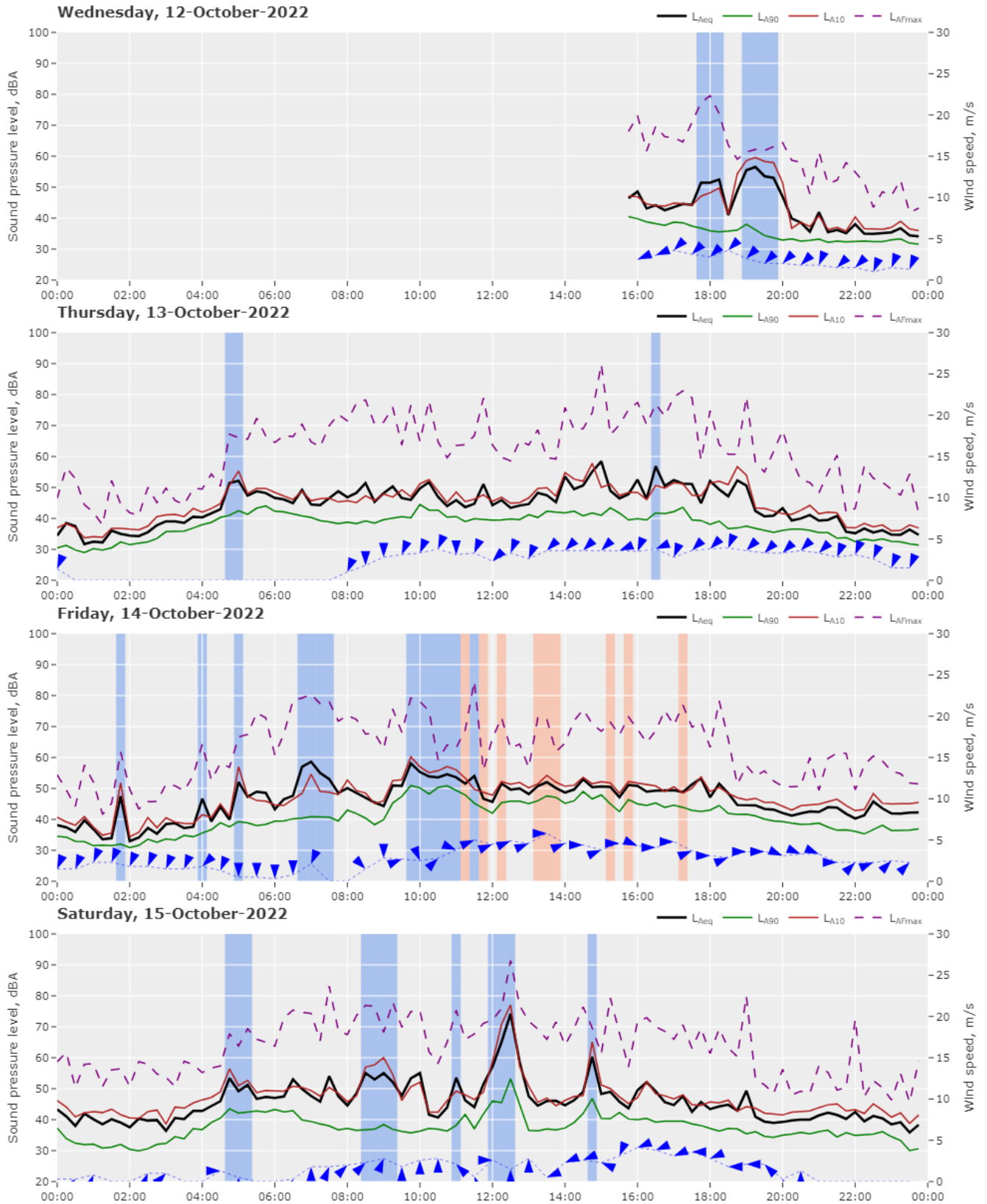


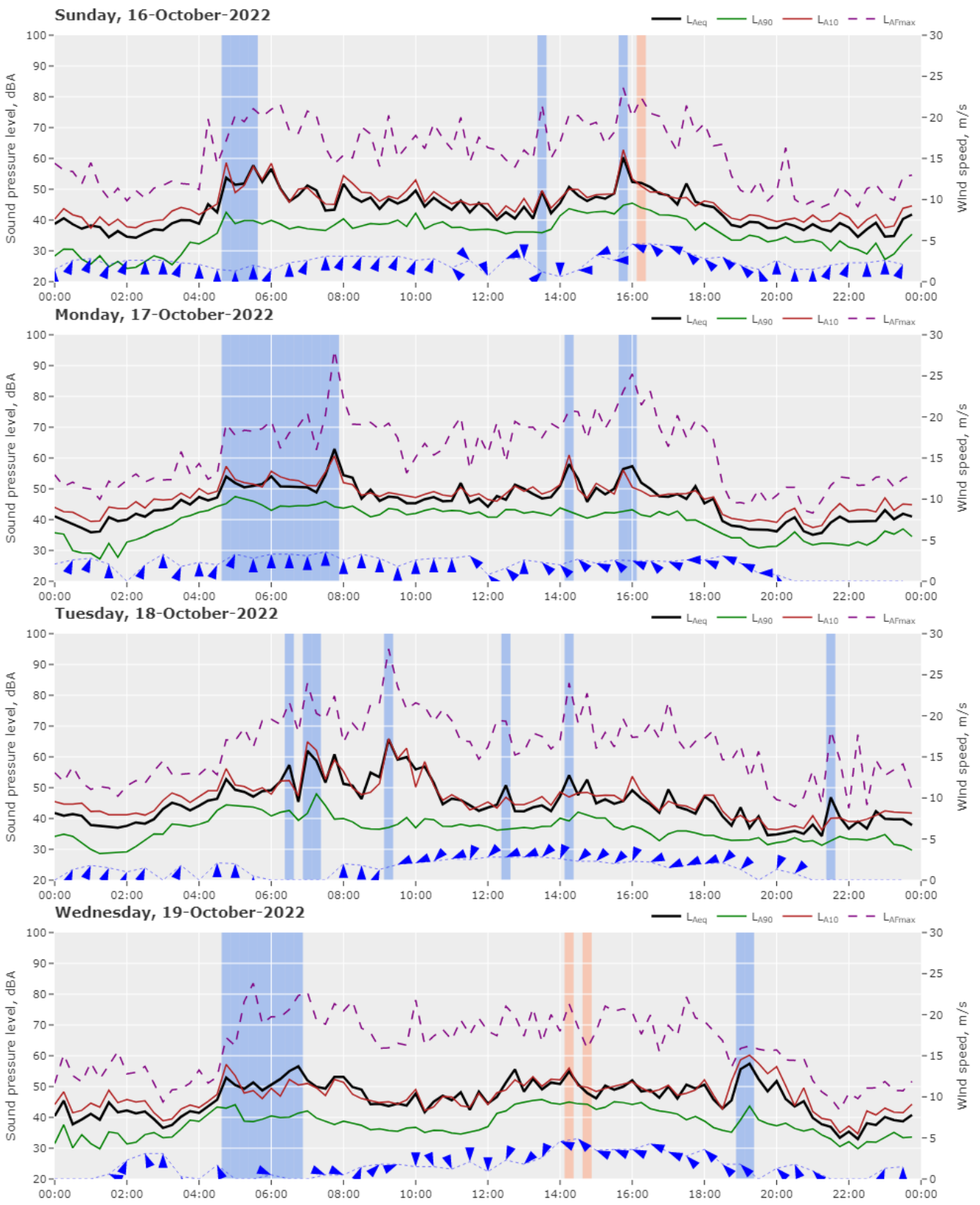


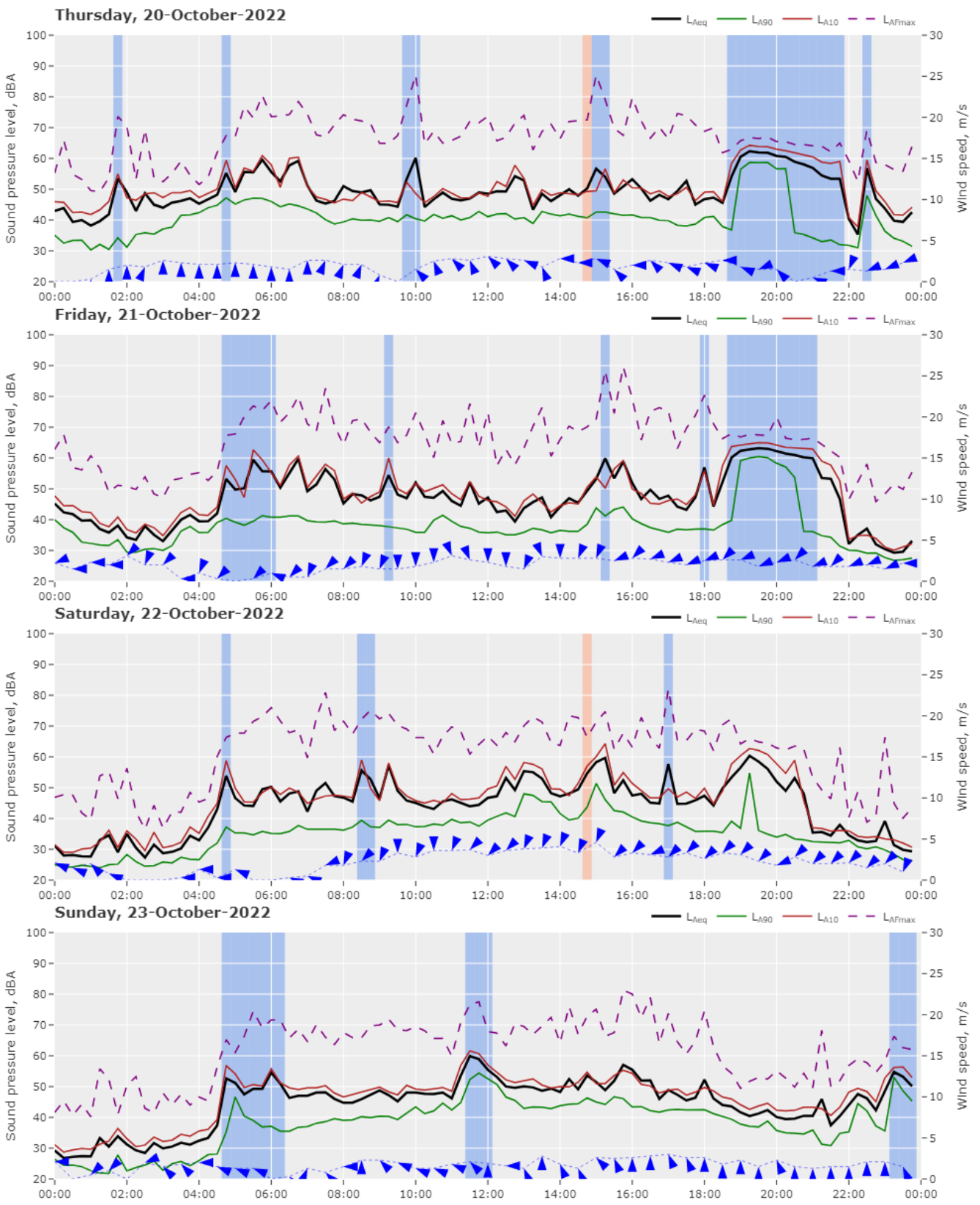


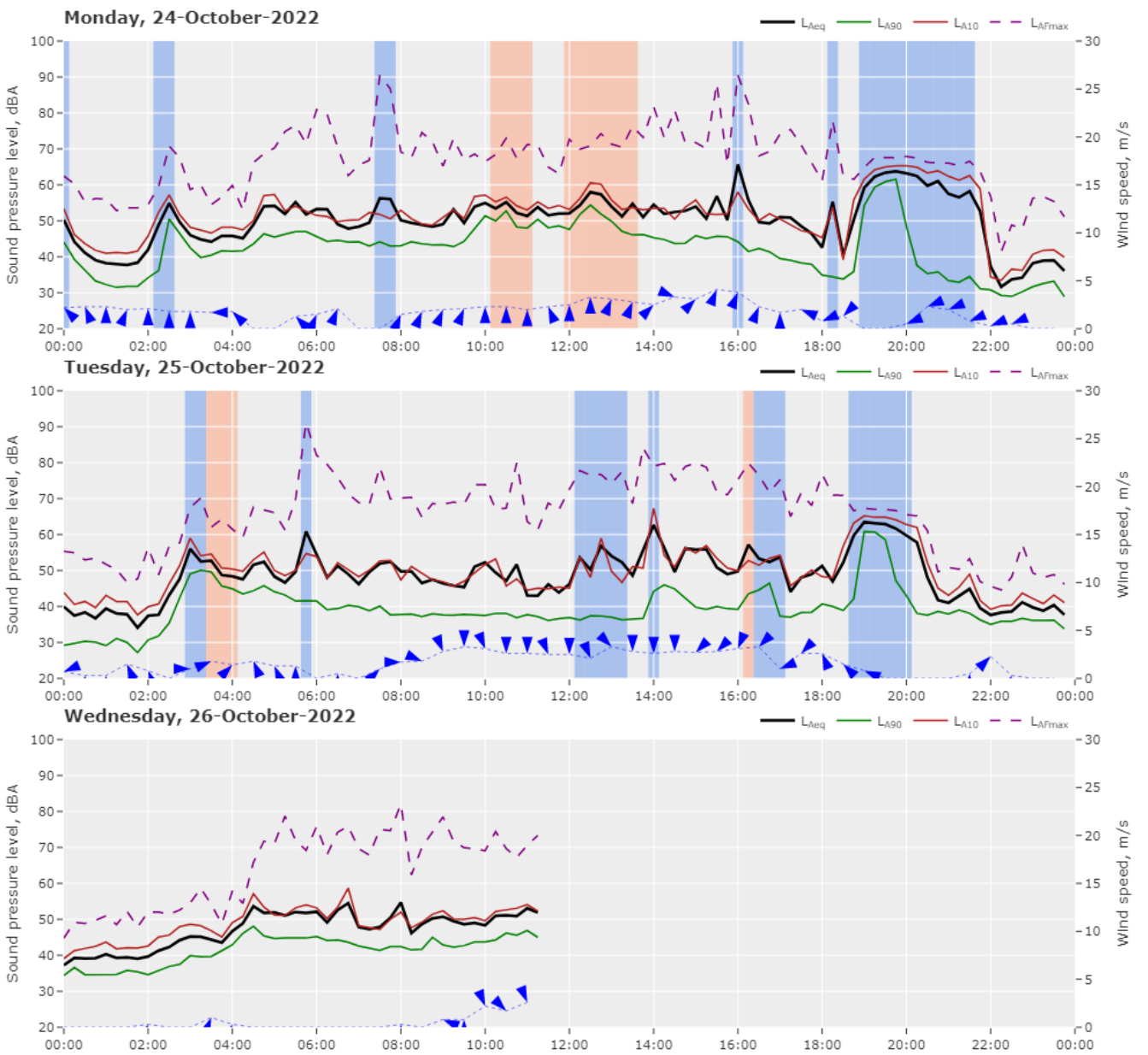


NM07 – 23 Fitzroy Street, Wilton









Appendix B

Construction impact assessment

B-1 Construction noise criteria

B-1-1 Residential noise management levels

The residential noise criteria for general construction activities are provided in the table below.

Time of day	Noise Management Level L _{Aeq} (15 minute)	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured L _{Aeq} (15 minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents and stakeholders of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise levels of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours:	Noise affected	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and the noise is more than 5 dBA above the noise affected level, the proponent should consult with the community.

B-1-2 Non-residential noise management levels

Internal noise criteria are provided for non-residential sensitive receivers in the table below. These criteria apply when the land is in use. External noise levels have been determined by assuming a 10 dBA reduction with windows open.

Type of occupancy / activity	Management level, L _{Aeq} dBA (applies when land use is being utilised)	
	Internal	External
Classrooms at schools and other educational institutions	45	55
Places of worship	45	55
Active recreation (characterised by sporting activities and activities which generate their own noise or focus of participants, making them less sensitive to external noise intrusion)	-	65
Offices, retail outlets	-	70

B-1-3 Sleep disturbance

The ICNG states that sleep disturbance caused by construction noise should be undertaken if works are planned to extend over more than two consecutive nights. The ICNG refers to NSW road noise policies for guidance to identify potential sleep disturbance impacts.

The *NSW Road Noise Policy* (DECCW, 2011) provides the following guidance on sleep disturbance:

- Maximum internal noise levels below 50-55 dBA are unlikely to awaken people from sleep.
- One or two noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly.

Sleep disturbance has been assessed based on a maximum internal noise level of 55 dBA outlined in the *NSW Road Noise Policy*. A 10 dBA addition to the internal noise level has been applied to determine the external noise level screening criteria of 65 dBA for sleep disturbance.

B-1-4 Additional mitigation measures description

After standard noise mitigation measures have been applied noise levels may still exceed noise management levels. Where exceedances remain consider implementing the following approaches in Table 7.4 and Table 7.5 where feasible and reasonable. Note that assistance from Transport Communication and Stakeholder Engagement is available to coordinate and deliver community consultation and notification. The team also has the latest noise fact sheets and letter templates.

The range of additional measures in Table 7.4 and Table 7.5 are described below. Note in instances where there are many receivers above the NML it may not be practical to discuss the proposal with every receiver recommended below. Instead, the community should be proactively engaged so they have an incentive to participate in discussion. Support from the community may be demonstrated from surveys, online feedback, contact phone numbers and community events.

Notification (letterbox drop or equivalent)

Advanced warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of five working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.

Specific notifications (SN)

Specific notifications are letterbox dropped (or equivalent) to identified stakeholders no later than seven calendar days ahead of construction activities that are likely to exceed the noise objectives. The specific notification provides additional information when relevant and informative to more highly-affected receivers than covered in general letterbox drops.

The exact conditions under which specific notifications would proceed are defined in the relevant Additional Mitigation Measures (Table 7.4 and Table 7.5). This form of communication is used to support periodic notifications, or to advertise unscheduled works.

Phone calls (PC)

Phone calls detailing relevant information made to identified/affected stakeholders within seven calendar days of proposed work. Phone calls provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs. Where the resident cannot be telephoned then an alternative form of engagement should be used.

Individual briefings (IB)

Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Proposal representatives would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with opportunity to comment on the proposal. Where the resident cannot be met with individually then an alternative form of engagement should be used.

Respite offers (RO)

Respite offers should be considered where there are high-noise and vibration-generating activities near receivers. As a guide, work should be carried out in continuous blocks that do not exceed three hours each with a minimum respite period of one hour between each block. The actual duration of each block of work and respite should be flexible to accommodate the usage of, and amenity at, nearby receivers.

The purpose of such an offer is to provide residents with respite from an ongoing impact. This measure is evaluated on a project-by-project basis and may not be applicable to all projects.

Respite period 1 (R1)

Out-of-hours construction noise in out-of-hours period 1 shall be limited to no more than three consecutive evenings per week except where there is a Duration Respite. Work during these periods should be separated by not less than one week and no more than six evenings per month.

Respite period 2 (R2)

Night-time construction noise in out-of-hours period 2 shall be limited to two consecutive nights except for where there is a Duration Respite. For night work, these periods of work should be separated by not less than one week and six nights per month. Where possible, high noise-generating works shall be completed before 11pm.

Duration respite (DR)

Respite offers and respite periods 1 and 2 may be counterproductive in reducing the impact on the community for longer-duration projects. In this instance, and where it can be strongly justified, it may be beneficial to increase the work duration, number of evenings or nights worked through duration respite so that the proposal can be completed more quickly.

The proposal team should engage with the community where noise levels are expected to exceed the NML to demonstrate support for duration respite.

Where there are few receivers above the NML, each of these receivers should be visited to discuss the proposal to gain support for Duration Respite.

Alternative accommodation (AA)

Alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly-intrusive noise levels (Table 7.4 and Table 7.5). The specifics of the offer will be identified on a project-by-project basis. Additional aspects for consideration shall include whether the highly intrusive activities occur throughout the night or before midnight.

Verification

Please see CNVG Appendix F for more details about verification of noise and vibration levels as part of routine checks of noise levels or following reasonable complaints. This verification should include measurement of the background noise level and construction noise. Note that this is not required for projects of less than three weeks unless to assist in managing complaints.

B-2 Construction noise levels

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	
Perception category:				Noticeable		Clearly audible		Moderately intrusive		Highly intrusive											
F0001	1505/1232553	Residential	NCA07	44	51	53	50	52	48	43	35	28	43	52	40	41	20	36	43	28	
F0002	1506/1232553	Residential	NCA07	43	51	53	50	52	48	43	35	28	43	52	40	41	20	35	41	29	
F0003	1504/1232553	Residential	NCA07	44	51	54	51	53	48	43	36	29	44	52	40	41	20	36	44	28	
F0004	1503/1232553	Residential	NCA07	44	52	54	51	53	49	44	37	29	44	53	41	41	20	36	44	28	
F0005	1507/1232553	Residential	NCA07	39	48	49	47	49	45	43	36	28	41	49	37	37	19	34	41	26	
F0006	1502/1232553	Residential	NCA07	45	53	55	52	54	50	44	37	29	45	54	42	42	21	36	44	29	
F0007	1501/1232553	Residential	NCA07	45	53	56	52	54	50	44	37	29	45	54	42	43	20	37	44	29	
F0008	1508/1232553	Residential	NCA07	39	46	47	46	48	43	41	34	26	41	47	35	36	19	34	38	26	
F0009	1635/1232553	Residential	NCA07	45	52	55	52	54	49	45	38	30	44	53	41	42	21	37	45	31	
F0010	1608/1232553	Residential	NCA07	48	56	59	55	57	53	45	38	31	46	57	45	46	22	37	45	30	
F0011	1509/1232553	Residential	NCA07	38	44	44	43	45	40	41	34	27	40	44	32	33	19	32	34	25	
F0012	1607/1232553	Residential	NCA07	49	56	60	56	58	53	44	37	29	46	57	45	46	22	37	45	29	
F0013	1606/1232553	Residential	NCA07	49	57	61	57	59	54	44	37	29	46	58	46	47	23	37	46	29	
F0014	1605/1232553	Residential	NCA07	51	59	62	58	60	56	45	38	31	46	60	48	48	23	37	46	29	
F0015	1604/1232553	Residential	NCA07	51	59	63	59	61	56	45	38	31	47	60	48	49	23	37	47	29	
F0016	1603/1232553	Residential	NCA07	52	60	63	59	61	57	45	38	31	47	61	49	49	23	38	47	29	
F0017	1602/1232553	Residential	NCA07	52	60	64	60	62	57	45	38	30	47	61	49	50	23	38	48	30	
F0018	1601/1232553	Residential	NCA07	53	61	64	60	62	58	45	38	31	47	62	50	51	23	38	48	32	
F0019	1511/1232553	Residential	NCA07	47	54	57	53	55	51	37	30	23	37	55	43	44	21	31	37	28	
F0020	1512/1232553	Residential	NCA07	44	52	54	51	53	49	35	28	20	36	53	41	41	20	29	37	27	
F0021	1636/1232553	Residential	NCA07	48	56	59	55	57	53	43	36	29	43	57	45	46	21	34	40	30	
F0022	1514/1232553	Residential	NCA07	44	52	55	52	54	49	41	33	26	41	53	41	42	23	32	38	28	
F0023	1513/1232553	Residential	NCA07	44	52	55	52	54	49	41	33	26	41	53	41	42	23	32	38	28	
F0024	1515/1232553	Residential	NCA07	45	53	55	52	54	50	37	29	22	38	54	42	42	23	28	37	27	
F0025	1510/1232553	Residential	NCA07	46	54	56	53	55	51	38	31	23	36	55	43	43	22	31	40	30	
F0026	1516/1232553	Residential	NCA07	45	53	55	52	54	50	37	29	22	35	54	42	43	23	28	38	29	
F0027	1517/1232553	Residential	NCA07	45	53	56	52	54	50	40	32	25	41	54	42	43	23	32	40	29	
F0028	1545/1232553	Residential	NCA07	38	46	45	45	47	43	38	32	24	35	47	35	36	19	32	37	29	
F0029	1518/1232553	Residential	NCA07	48	56	59	55	57	53	40	32	25	39	57	45	46	21	31	40	32	
F0030	1967/1232553	Residential	NCA07	40	46	46	45	47	43	40	34	26	39	47	35	35	19	34	39	27	
F0031	1637/1232553	Residential	NCA07	48	55	58	54	56	52	41	34	27	41	56	44	44	21	34	41	31	
F0032	1920/1232553	Residential	NCA07	40	46	47	45	47	43	42	35	28	41	47	35	36	21	35	40	29	
F0033	1944/1232553	Residential	NCA07	37	44	44	43	45	41	41	34	27	40	45	33	34	21	33	38	28	
F0034	1609/1232553	Residential	NCA07	50	58	61	57	59	55	41	34	26	41	59	47	47	23	34	40	31	
F0035	1610/1232553	Residential	NCA07	50	58	61	57	59	55	39	32	24	37	59	47	47	22	33	39	30	
F0036	1901/1232553	Residential	NCA07	39	47	48	46	48	44	32	26	18	27	48	36	37	19	27	36	28	
F0037	1943/1232553	Residential	NCA07	38	46	45	45	47	42	32	28	19	28	46	35	35	18	27	34	27	
F0038	1611/1232553	Residential	NCA07	50	58	61	57	59	55	38	31	23	37	59	47	48	22	32	39	30	
F0039	1638/1232553	Residential	NCA07	49	57	60	56	58	54	43	36	28	43	58	46	47	22	35	40	30	
F0040	1612/1232553	Residential	NCA07	51	59	62	58	60	56	35	30	22	30	60	47	48	23	32	40	31	
F0041	1613/1232553	Residential	NCA07	51	59	62	58	60	56	33	29	21	29	60	48	49	23	31	42	30	
F0042	1921/1232553	Residential	NCA07	39	46	46	46	48	43	42	35	28	40	47	35	36	20	34	39	29	
F0043	1614/1232553	Residential	NCA07	51	59	63	59	61	56	33	29	21	29	60	48	49	23	33	45	30	
F0044	1546/1232553	Residential	NCA07	46	53	55	53	55	50	40	33	26	37	54	42	43	19	33	38	30	
F0045	1615/1232553	Residential	NCA07	52	60	64	60	62	57	44	37	29	42	61	49	50	23	35	45	32	
F0046	1945/1232553	Residential	NCA07	36	43	43	42	44	40	41	34	26	40	44	32	33	21	34	38	28	
F0047	1942/1232553	Residential	NCA07	36	44	44	43	45	41	35	29	21	34	45	33	34	18	29	34	28	
F0048	1527/1232553	Residential	NCA07	44	52	54	51	53	49	40	34	26	40	53	41	42	21	33	41	28	
F0049	1526/1232553	Residential	NCA07	47	55	58	55	57	52	44	37	29	44	56	44	45	22	36	43	31	
F0050	1902/1232553	Residential	NCA07	39	47	49	47	49	44	44	37	29	21	37	48	36	37	19	29	35	28
F0051	1922/1232553	Residential	NCA07	39	47	47	46	48	44	41	34	27	40	48	36	36	21	34	39	29	
F0052	1547/1232553	Residential	NCA07	41	48	49	47	49	45	41	34	27	40	49	36	37	21	33	39	29	
F0053	1941/1232553	Residential	NCA07	36	44	44	43	45	41	35	28	21	34	45	33	34	18	28	34	28	
F0054	1946/1232553	Residential	NCA07	38	46	46	45	47	43	41	34	26	39	47	35	35	21	33	38	29	
F0055	1519/1232553	Residential	NCA07	48	55	58	54	56	52	42	35	28	41	56	44	45	23	36	43	29	
F0056	1639/1232553	Residential	NCA07	49	57	59	56	58	53	43	36	29	42	57	45	46	23	36	44	31	
F0057	1528/1232553	Residential	NCA07	43	51	52	50	52	48	39	31	24	38	52	40	40	23	30	35	28	
F0058	1529/1232553	Residential	NCA07	43	51	52	50	52	48	36	28	20	35	52	40	41	23	26	32	28	
F0059	1530/1232553	Residential	NCA07	43	51	52	50	52	47	36	28	21	35	51	40	40	23	30	36	28	
F0060	1903/1232553	Residential	NCA07	39	47	48	46	48	44	36	29	21	35	48	36	37	19	28	35	27	
F0061	1923/1232553	Residential	NCA07	39	47	47	46	48	44	40	33	26	40	48	36	37	21	33	40	29	
F0062	1531/1232553	Residential	NCA07	42	50	51	49	51	47	36	28	21	33	51	39	39	23	27	38	28	
F0063	1940/1232553	Residential	NCA07	37	45	45	44	46	42	35	28	21	34	46	34	35	18	27	34	27	
F0064	1616/1232553	Residential	NCA07	50	58	60	57	59	54	42	35	27	40	58	46	47	22	35	44	30	
F0065	1532/1232553	Residential	NCA07	41	49	50	48	50	46	42	35	27	41	50	38	39	23	35	41	30	
F0066	1617/1232553	Residential	NCA07	49	57	60	56	58	54	41	34	27	36	58	46	46	21	35	42	30	
F0067	1549/1232553	Residential	NCA07	43	51	52	50	52	48	41	34	26	40	52	40	41	21	33	40	30	
F0068	1548/1232553	Residential	NCA07	43	51	52	50	52	48	41	34	26	40	52	40	41	21	33	40	30	
F0069	1618/1232553	Residential	NCA07	49	57	61	57	59	54	41	34	26	37	58	46	47	23	34	44	30	
F0070	1947/1232553	Residential	NCA07	38	45	45	45	47	42	41	34	26	39	46	34	35	21	33	38	29	
F0071	1619/1232553	Residential	NCA07	52	60	63	59	61	57	43	36	28	41	61	49	50	22	34	45	32	
F0072	1520/1232553	Residential	NCA07	44	52	53	51	53	49	38	30	23	37	53	41	41	23	30	37	29	
F0073	1939/1232553	Residential	NCA07	38	46	46	45	47	43	35	28	21	34	47	35	35	18				

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0099	1621/1232553	Residential	NCA07	52	60	63	60	62	57	42	35	28	41	61	49	50	21	34	44	32
F0100	1523/1232553	Residential	NCA07	44	52	54	52	54	49	38	32	24	37	53	41	42	23	32	39	29
F0101	1926/1232553	Residential	NCA07	41	48	50	48	50	45	41	34	26	40	49	37	38	21	33	41	29
F0102	1551/1232553	Residential	NCA07	43	51	54	50	52	48	40	33	25	38	52	40	41	23	32	39	31
F0103	1643/1232553	Residential	NCA07	45	53	53	52	54	49	41	34	27	40	53	41	42	23	33	40	31
F0104	1950/1232553	Residential	NCA07	37	45	45	44	46	42	40	33	26	39	46	34	35	20	33	38	28
F0105	1935/1232553	Residential	NCA07	38	46	47	45	47	43	40	33	26	38	47	35	35	17	33	38	29
F0106	1524/1232553	Residential	NCA07	44	52	55	52	54	49	40	33	26	39	53	41	42	23	33	40	30
F0107	1632/1232553	Residential	NCA07	51	59	62	58	60	56	42	35	27	40	60	48	49	23	34	43	32
F0108	1622/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	28	41	61	49	50	22	34	44	32
F0109	1927/1232553	Residential	NCA07	41	49	50	48	50	46	42	35	27	41	50	38	38	21	33	41	30
F0110	1644/1232553	Residential	NCA07	44	52	55	52	54	49	40	34	26	39	53	41	42	23	33	40	31
F0111	1934/1232553	Residential	NCA07	38	46	47	45	47	42	40	33	26	38	46	35	35	17	33	39	29
F0112	1951/1232553	Residential	NCA07	38	46	47	45	47	43	40	33	25	39	47	35	36	20	33	39	29
F0113	1539/1232553	Residential	NCA07	43	50	52	49	51	47	42	35	27	40	51	39	40	24	34	42	30
F0114	1525/1232553	Residential	NCA07	44	52	54	52	54	49	40	33	25	37	53	41	42	24	33	40	30
F0115	1540/1232553	Residential	NCA07	42	50	51	49	51	47	42	34	27	39	51	39	40	24	34	42	30
F0116	1919/1232553	Residential	NCA07	42	50	51	49	51	47	41	34	26	40	51	39	39	23	34	41	31
F0117	1541/1232553	Residential	NCA07	43	50	52	49	51	47	41	34	27	39	51	39	40	24	34	41	30
F0118	1542/1232553	Residential	NCA07	42	50	52	49	51	47	41	34	27	39	51	39	39	24	34	41	29
F0119	1645/1232553	Residential	NCA07	45	53	55	53	55	50	40	33	26	39	54	42	43	23	33	39	30
F0120	1543/1232553	Residential	NCA07	43	50	52	49	51	47	41	35	27	40	51	39	40	24	35	41	29
F0121	1544/1232553	Residential	NCA07	45	53	55	52	54	50	42	35	28	40	54	42	42	24	36	42	31
F0122	1631/1232553	Residential	NCA07	51	59	62	58	60	56	42	35	27	40	60	48	48	23	34	43	32
F0123	1623/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	28	41	61	49	50	23	34	44	32
F0124	1907/1232553	Residential	NCA07	40	49	49	48	50	46	41	34	26	39	50	38	38	22	34	40	29
F0125	1928/1232553	Residential	NCA07	41	49	51	48	50	46	42	34	27	40	50	38	39	21	34	40	30
F0126	1933/1232553	Residential	NCA07	38	46	47	45	47	43	40	33	25	38	47	35	35	18	33	39	28
F0127	1918/1232553	Residential	NCA07	39	47	47	46	48	44	41	34	26	39	48	36	37	23	33	40	29
F0128	1952/1232553	Residential	NCA07	39	46	46	45	47	43	39	32	25	37	47	35	36	18	32	39	28
F0129	1908/1232553	Residential	NCA07	42	50	51	49	51	47	39	33	25	38	51	39	39	22	32	39	30
F0130	1917/1232553	Residential	NCA07	40	48	49	47	49	45	41	34	26	39	49	37	37	23	33	39	29
F0131	1624/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	27	40	61	49	50	23	34	43	32
F0132	1932/1232553	Residential	NCA07	38	46	47	45	47	43	38	32	24	36	47	35	36	18	32	38	28
F0133	1929/1232553	Residential	NCA07	40	48	49	48	50	45	41	34	26	39	49	37	38	22	33	40	30
F0134	1630/1232553	Residential	NCA07	50	58	61	57	59	55	42	35	27	40	59	47	47	23	33	43	32
F0135	1909/1232553	Residential	NCA07	43	51	52	50	52	48	39	33	25	38	52	40	40	22	32	40	31
F0136	1953/1232553	Residential	NCA07	40	47	48	46	48	43	40	33	25	38	47	35	36	19	32	39	29
F0137	1916/1232553	Residential	NCA07	40	48	49	47	49	45	40	34	26	39	49	37	37	22	34	39	30
F0138	1931/1232553	Residential	NCA07	38	46	46	45	47	43	38	32	24	37	47	35	35	22	31	37	29
F0139	1652/1232553	Residential	NCA07	45	53	55	52	54	50	42	35	27	41	54	42	43	24	34	41	31
F0140	1625/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	27	40	61	49	50	23	34	43	32
F0141	1910/1232553	Residential	NCA07	43	51	53	50	52	48	40	33	25	38	52	40	41	22	32	40	31
F0142	1646/1232553	Residential	NCA07	45	53	53	52	54	50	40	33	26	39	54	41	42	24	34	39	31
F0143	1930/1232553	Residential	NCA07	41	49	50	48	50	46	40	33	26	39	50	38	38	24	32	39	30
F0144	1915/1232553	Residential	NCA07	40	48	48	47	49	44	40	33	26	39	48	37	37	21	33	40	30
F0145	1629/1232553	Residential	NCA07	47	55	58	55	57	52	41	34	27	40	56	44	45	23	33	43	31
F0146	1911/1232553	Residential	NCA07	43	51	53	50	52	48	40	33	26	39	52	40	40	22	32	40	31
F0147	1653/1232553	Residential	NCA07	42	50	51	50	52	47	40	33	25	39	51	39	40	24	33	40	30
F0148	1647/1232553	Residential	NCA07	44	52	53	51	53	49	39	33	25	38	53	41	41	24	33	40	30
F0149	1626/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	27	40	61	49	50	24	34	43	32
F0150	1914/1232553	Residential	NCA07	40	48	48	47	49	45	39	33	25	39	49	37	37	21	32	39	29
F0151	1912/1232553	Residential	NCA07	43	51	55	50	52	48	40	33	26	39	52	40	41	22	33	40	31
F0152	1654/1232553	Residential	NCA07	42	50	50	49	51	47	39	33	25	38	51	39	39	24	33	39	30
F0153	1648/1232553	Residential	NCA07	44	52	54	52	54	49	40	33	25	38	53	41	42	24	33	39	30
F0154	1913/1232553	Residential	NCA07	39	47	49	47	49	44	41	34	26	39	48	36	37	23	33	39	29
F0155	1954/1232553	Residential	NCA07	39	47	48	46	48	44	40	33	25	37	48	36	37	21	33	38	29
F0156	1628/1232553	Residential	NCA07	46	54	57	54	56	51	41	34	27	39	55	43	44	23	33	42	31
F0157	1955/1232553	Residential	NCA07	39	48	50	47	49	44	41	34	26	37	48	36	37	17	31	38	29
F0158	1655/1232553	Residential	NCA07	43	52	52	51	53	48	39	33	25	37	52	40	41	24	32	39	31
F0159	1627/1232553	Residential	NCA07	52	60	63	59	61	57	42	35	27	40	61	49	50	24	33	43	32
F0160	1965/1232553	Residential	NCA07	43	52	54	51	53	49	41	34	26	39	53	41	41	24	33	40	31
F0161	1956/1232553	Residential	NCA07	40	48	51	48	50	45	41	34	26	36	49	37	38	18	32	38	29
F0162	1649/1232553	Residential	NCA07	44	52	54	52	54	49	39	32	24	38	53	41	42	24	32	40	30
F0163	1957/1232553	Residential	NCA07	42	50	51	49	51	46	41	34	26	38	50	38	39	22	33	39	30
F0164	1656/1232553	Residential	NCA07	42	50	50	49	51	47	40	33	25	38	51	39	39	23	33	39	30
F0165	1055/1232553	Residential	NCA07	43	51	52	50	52	48	41	34	26	39	52	40	41	23	34	40	30
F0166	1650/1232553	Residential	NCA07	44	52	53	51	53	49	39	33	25	38	53	41	41	24	33	41	31
F0167	1204/1232553	Residential	NCA07	47	53	56	52	54	50	36	28	21	36	54	41	42	25	29	37	26
F0168	1203/1232553	Residential	NCA07	46	54	57	53	55	51	36	28	21	34	55	43	44	23	28	37	23
F0169	1202/1232553	Residential	NCA07	45	53	56	52	54	50	37	29	21	35	54	42	42	24	28	37	24
F0170	1657/1232553	Residential	NCA07	43	51	52	50	52	47	40	33	26	40	51	39	40	24	33	40	29
F0171	1201/1232553	Residential	NCA07	52	60	63	59	61	56	41	34	27	40	60	48	49	23	33	43	32
F0172	1651/1232553	Residential	NCA07	44	5															

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0198	1001/1232553	Residential	NCA07	44	52	55	52	54	49	42	35	27	40	53	41	42	23	34	42	32
F0199	1262/1232553	Residential	NCA07	43	51	52	50	52	48	41	34	27	40	52	40	40	23	33	41	30
F0200	1224/1232553	Residential	NCA07	43	51	52	50	52	47	37	31	23	34	51	39	40	26	29	37	28
F0201	1040/1232553	Residential	NCA07	42	50	52	50	52	47	40	33	26	38	51	39	40	23	32	39	30
F0202	1961/1232553	Residential	NCA07	43	51	52	50	52	48	41	33	26	41	52	40	40	25	35	40	30
F0203	1962/1232553	Residential	NCA07	43	51	52	50	52	48	41	33	26	41	52	40	40	25	35	40	30
F0204	1960/1232553	Residential	NCA07	43	51	52	50	52	48	41	33	26	41	52	40	40	25	35	40	30
F0205	1052/1232553	Residential	NCA07	41	49	50	48	50	46	40	33	26	38	50	37	38	24	33	40	30
F0206	1033/1232553	Residential	NCA07	43	51	52	50	52	48	41	34	26	40	52	39	40	23	33	40	31
F0207	1222/1232553	Residential	NCA07	43	51	52	50	52	48	36	28	20	34	52	40	40	24	28	36	29
F0208	1221/1232553	Residential	NCA07	43	51	52	50	52	48	35	27	20	34	52	40	40	24	28	36	29
F0209	1220/1232553	Residential	NCA07	43	51	52	50	52	48	36	28	21	34	52	39	40	25	29	36	28
F0210	1002/1232553	Residential	NCA07	43	52	53	51	53	48	42	34	27	39	52	40	41	23	33	41	32
F0211	1219/1232553	Residential	NCA07	43	51	57	50	52	48	36	28	21	34	52	40	40	24	29	37	29
F0212	1218/1232553	Residential	NCA07	44	52	55	51	53	49	36	28	21	34	53	40	41	24	29	36	29
F0213	1223/1232553	Residential	NCA07	42	50	52	50	52	47	39	31	24	38	51	39	40	26	31	39	27
F0214	1217/1232553	Residential	NCA07	45	53	56	52	54	50	36	28	21	34	54	42	42	24	28	36	27
F0215	1261/1232553	Residential	NCA07	44	52	53	51	53	49	42	34	27	39	53	41	41	23	33	41	30
F0216	1216/1232553	Residential	NCA07	45	53	56	52	54	50	37	29	22	35	54	42	43	23	29	37	26
F0217	1215/1232553	Residential	NCA07	50	58	62	58	60	55	40	34	26	39	59	47	48	23	33	42	32
F0218	1032/1232553	Residential	NCA07	42	50	52	50	52	47	40	33	26	38	51	39	40	23	33	40	31
F0219	1051/1232553	Residential	NCA07	40	48	50	47	49	45	40	33	25	38	49	37	38	24	33	40	30
F0220	1041/1232553	Residential	NCA07	42	51	53	50	52	47	39	32	24	38	51	39	40	23	31	38	30
F0221	1003/1232553	Residential	NCA07	43	51	52	50	52	48	39	33	25	38	52	40	40	23	32	40	32
F0222	1260/1232553	Residential	NCA07	44	52	53	51	53	49	40	34	26	39	53	41	42	23	33	41	31
F0223	1031/1232553	Residential	NCA07	41	49	51	48	50	46	39	32	25	37	50	38	39	23	31	39	31
F0224	1050/1232553	Residential	NCA07	40	48	49	48	50	45	39	33	25	36	49	37	38	24	32	39	30
F0225	1042/1232553	Residential	NCA07	42	50	52	50	52	47	39	33	25	38	51	39	40	23	33	38	30
F0226	1004/1232553	Residential	NCA07	42	50	52	49	51	47	39	32	25	37	51	39	39	23	33	40	31
F0227	1226/1232553	Residential	NCA07	45	53	55	52	54	50	41	34	27	40	54	42	42	24	34	42	32
F0228	1227/1232553	Residential	NCA07	44	52	54	51	53	49	39	33	25	37	53	41	42	25	33	40	31
F0229	1259/1232553	Residential	NCA07	43	50	52	49	51	47	39	33	25	38	51	39	40	24	33	41	31
F0230	1228/1232553	Residential	NCA07	44	52	54	51	53	49	40	33	25	38	53	41	42	24	33	41	31
F0231	1030/1232553	Residential	NCA07	42	50	52	49	51	47	39	32	24	36	51	39	39	23	31	39	31
F0232	1229/1232553	Residential	NCA07	44	52	54	51	53	49	40	33	26	38	53	41	41	24	33	40	31
F0233	1230/1232553	Residential	NCA07	44	52	54	52	54	49	40	33	25	38	53	41	42	23	33	40	31
F0234	1231/1232553	Residential	NCA07	45	53	55	52	54	50	39	33	25	37	54	42	42	23	33	40	31
F0235	1049/1232553	Residential	NCA07	40	48	49	47	49	44	39	32	25	37	48	36	37	24	31	38	30
F0236	1232/1232553	Residential	NCA07	45	53	56	53	55	50	39	32	24	36	54	42	43	23	33	40	31
F0237	1233/1232553	Residential	NCA07	49	57	60	56	58	54	38	32	24	35	58	46	47	24	33	39	31
F0238	1225/1232553	Residential	NCA07	44	52	53	51	53	49	39	32	24	37	53	41	41	23	33	41	29
F0239	1043/1232553	Residential	NCA07	42	50	51	49	51	46	38	32	24	37	50	38	39	23	31	38	30
F0240	1235/1232553	Residential	NCA07	50	58	61	57	59	55	41	34	27	39	59	47	48	24	34	42	32
F0241	1234/1232553	Residential	NCA07	50	58	61	57	59	55	41	34	27	39	59	47	48	24	34	42	32
F0242	1005/1232553	Residential	NCA07	43	51	53	50	52	48	39	32	25	37	52	40	40	23	31	39	31
F0243	1029/1232553	Residential	NCA07	41	49	50	48	50	46	39	32	24	36	50	38	38	23	32	38	30
F0244	1258/1232553	Residential	NCA07	42	50	51	49	51	47	39	32	25	37	51	39	40	23	33	40	30
F0245	1963/1232553	Residential	NCA07	42	51	52	50	52	48	39	32	25	37	52	39	40	25	33	38	30
F0246	1244/1232553	Residential	NCA07	42	50	52	50	52	47	38	31	23	36	51	39	40	24	32	39	29
F0247	1242/1232553	Residential	NCA07	44	52	53	51	53	49	35	28	21	33	53	41	41	24	27	35	25
F0248	1048/1232553	Residential	NCA07	40	48	48	47	49	45	38	31	24	35	49	37	37	25	31	37	29
F0249	1241/1232553	Residential	NCA07	44	52	54	51	53	49	35	28	21	33	53	41	41	24	27	35	25
F0250	1240/1232553	Residential	NCA07	44	52	54	51	53	49	35	28	21	33	53	41	42	23	28	36	25
F0251	1006/1232553	Residential	NCA07	42	50	52	49	51	47	39	32	24	37	51	39	40	24	31	39	31
F0252	1044/1232553	Residential	NCA07	41	50	51	49	51	46	38	32	24	36	50	38	39	23	31	38	30
F0253	1239/1232553	Residential	NCA07	45	53	55	52	54	50	35	28	21	33	54	42	43	23	28	36	26
F0254	1028/1232553	Residential	NCA07	41	49	50	48	50	46	38	32	24	36	50	38	38	23	31	38	30
F0255	1238/1232553	Residential	NCA07	46	55	57	54	56	51	35	28	21	33	55	43	44	23	28	35	25
F0256	1243/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	23	37	53	41	42	25	31	39	29
F0257	1257/1232553	Residential	NCA07	42	50	52	50	52	47	39	32	24	37	51	39	40	24	32	39	30
F0258	1237/1232553	Residential	NCA07	46	54	57	53	55	51	35	28	21	34	55	43	43	23	28	36	25
F0259	1236/1232553	Residential	NCA07	48	56	59	55	57	53	36	28	21	34	57	44	45	23	28	37	23
F0260	1964/1232553	Residential	NCA07	43	51	52	50	52	47	39	32	25	37	51	39	40	28	32	38	30
F0261	1047/1232553	Residential	NCA07	40	48	49	47	49	45	38	31	23	35	49	37	38	25	31	37	29
F0262	1027/1232553	Residential	NCA07	41	49	50	48	50	46	38	32	24	36	50	38	38	23	31	38	30
F0263	1007/1232553	Residential	NCA07	43	52	53	51	53	48	39	32	24	36	52	40	41	23	31	39	30
F0264	1045/1232553	Residential	NCA07	41	49	51	48	50	46	38	32	24	36	50	38	38	24	31	38	30
F0265	1256/1232553	Residential	NCA07	43	51	52	50	52	48	38	32	24	36	52	40	40	24	31	39	30
F0266	1337/1232553	Residential	NCA07	39	47	48	47	49	44	31	25	17	30	48	36	37	26	26	31	25
F0267	1336/1232553	Residential	NCA07	39	47	48	46	48	44	35	29	21	33	48	36	37	26	30	35	27
F0268	1026/1232553	Residential	NCA07	42	50	51	49	51	47	38	32	24	36	51	39	40	24	31	38	30
F0269	1335/1232553	Residential	NCA07	39	47	48	46	48	44	34	29	21	31	48	36	36	27	30	35	27
F0270	1246/1232553	Residential	NCA07	43	51	53	51	53	48	40	33	26	39	52	40	41	24	33	40	31
F0271	1046/1232553	Residential	NCA07	41	4															

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0297	931/1232553	Residential	NCA07	45	53	55	52	54	50	36	28	21	34	54	42	42	22	29	36	25
F0298	1010/1232553	Residential	NCA07	43	52	54	51	53	49	38	31	24	37	53	40	41	25	31	39	30
F0299	930/1232553	Residential	NCA07	45	53	55	52	54	50	35	28	20	34	54	42	43	23	28	36	25
F0300	1338/1232553	Residential	NCA07	36	44	44	44	46	41	33	28	20	27	45	33	34	23	29	34	28
F0301	929/1232553	Residential	NCA07	48	57	59	56	58	54	40	33	26	39	58	45	46	23	33	41	31
F0302	1339/1232553	Residential	NCA07	37	45	45	44	46	42	34	28	20	30	46	34	34	22	29	35	28
F0303	1023/1232553	Residential	NCA07	42	50	52	49	51	47	38	31	24	35	51	39	40	24	31	38	30
F0304	1340/1232553	Residential	NCA07	37	45	45	44	46	42	35	29	21	32	46	34	35	25	29	35	29
F0305	1341/1232553	Residential	NCA07	37	45	45	45	47	42	36	30	22	33	46	34	35	25	30	36	29
F0306	1342/1232553	Residential	NCA07	38	46	46	46	48	43	37	31	23	36	47	35	36	26	31	37	29
F0307	956/1232553	Residential	NCA07	44	52	53	51	53	49	40	33	25	39	53	40	41	24	33	40	30
F0308	1303/1232553	Residential	NCA07	42	50	51	49	51	47	38	31	23	35	51	39	40	24	30	37	30
F0309	1011/1232553	Residential	NCA07	43	51	53	50	52	48	39	32	25	38	52	40	41	25	32	39	30
F0310	1022/1232553	Residential	NCA07	42	50	52	49	51	47	38	31	23	35	51	39	40	24	31	37	30
F0311	957/1232553	Residential	NCA07	42	50	52	49	51	47	40	33	26	39	51	39	39	24	33	40	30
F0312	1304/1232553	Residential	NCA07	42	50	52	49	51	47	37	31	23	35	51	39	39	24	30	37	30
F0313	939/1232553	Residential	NCA07	44	52	54	51	53	49	40	33	25	38	53	41	42	25	32	40	31
F0314	1359/1232553	Residential	NCA07	40	48	49	48	50	45	38	31	24	36	49	37	38	28	32	38	30
F0315	940/1232553	Residential	NCA07	44	52	53	51	53	49	38	31	24	36	53	40	41	25	31	38	31
F0316	1012/1232553	Residential	NCA07	43	51	53	50	52	48	38	31	24	36	52	40	40	24	32	39	31
F0317	941/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	24	35	53	41	41	25	31	38	31
F0318	1021/1232553	Residential	NCA07	41	50	51	49	51	46	37	31	23	35	50	38	39	24	31	37	29
F0319	942/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	24	36	53	41	42	25	32	38	31
F0320	1343/1232553	Residential	NCA07	41	49	50	48	50	46	38	31	24	36	50	38	38	26	31	37	29
F0321	943/1232553	Residential	NCA07	45	53	55	52	54	50	38	31	24	36	54	42	42	25	33	39	31
F0322	958/1232553	Residential	NCA07	42	50	51	49	51	47	40	33	26	39	51	39	39	24	33	40	30
F0323	944/1232553	Residential	NCA07	45	53	55	53	55	50	38	31	24	36	54	42	43	22	32	39	31
F0324	938/1232553	Residential	NCA07	42	50	51	49	51	47	37	31	23	36	51	39	40	25	32	39	30
F0325	945/1232553	Residential	NCA07	50	58	60	57	59	55	41	34	26	40	59	47	47	21	34	41	33
F0326	1305/1232553	Residential	NCA07	42	50	51	49	51	47	37	31	23	35	51	39	39	24	30	37	30
F0327	1013/1232553	Residential	NCA07	42	50	52	50	52	47	38	31	24	36	51	39	40	24	31	38	31
F0328	1020/1232553	Residential	NCA07	42	50	51	49	51	47	38	31	23	35	51	39	39	24	30	37	29
F0329	1358/1232553	Residential	NCA07	42	50	51	49	51	47	38	31	24	35	51	39	39	27	30	37	29
F0330	953/1232553	Residential	NCA07	38	46	47	45	47	43	36	30	22	34	47	35	36	26	29	34	26
F0331	1344/1232553	Residential	NCA07	41	49	50	48	50	46	38	31	24	37	50	38	38	26	31	38	29
F0332	959/1232553	Residential	NCA07	44	52	53	51	53	49	40	33	25	39	53	41	41	24	33	39	29
F0333	951/1232553	Residential	NCA07	44	52	54	51	53	49	38	30	22	34	53	41	42	27	31	37	26
F0334	950/1232553	Residential	NCA07	45	53	56	53	55	50	35	27	20	33	54	42	43	23	28	34	27
F0335	1306/1232553	Residential	NCA07	43	51	52	50	52	48	38	31	24	36	52	40	40	25	31	37	30
F0336	949/1232553	Residential	NCA07	45	53	56	53	55	50	32	27	18	28	54	42	43	26	28	32	27
F0337	901/1232553	Residential	NCA06	51	59	61	58	60	56	41	33	26	40	60	48	48	27	33	41	32
F0338	948/1232553	Residential	NCA07	46	54	56	53	55	51	32	27	18	29	55	43	43	27	28	33	28
F0339	1014/1232553	Residential	NCA07	40	48	49	47	49	45	38	31	24	35	49	37	38	24	32	39	28
F0340	952/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	23	36	53	41	42	27	31	37	27
F0341	902/1232553	Residential	NCA06	53	61	63	60	62	57	40	33	26	39	61	49	50	22	33	41	32
F0342	1019/1232553	Residential	NCA07	42	50	51	49	51	47	39	32	24	36	51	39	39	24	31	37	29
F0343	1357/1232553	Residential	NCA07	42	50	51	49	51	47	38	31	24	36	51	39	39	28	31	37	29
F0344	947/1232553	Residential	NCA07	46	54	55	53	55	51	31	26	18	28	55	43	43	27	28	34	28
F0345	903/1232553	Residential	NCA06	54	62	66	61	63	59	40	33	25	38	63	51	52	23	32	40	32
F0346	946/1232553	Residential	NCA07	46	54	56	53	55	51	40	33	25	38	55	43	44	27	33	40	31
F0347	904/1232553	Residential	NCA06	55	63	67	63	65	60	39	33	25	38	64	52	53	23	32	40	32
F0348	960/1232553	Residential	NCA07	42	50	51	49	51	47	40	33	26	39	51	39	39	24	32	39	31
F0349	905/1232553	Residential	NCA06	57	65	70	64	66	62	39	33	25	38	66	54	55	23	32	40	32
F0350	1345/1232553	Residential	NCA07	42	50	51	49	51	47	38	32	24	36	51	39	39	26	31	37	30
F0351	906/1232553	Residential	NCA06	63	71	75	70	72	68	40	33	25	38	72	60	60	23	34	40	32
F0352	1307/1232553	Residential	NCA07	42	50	51	50	52	47	38	32	24	36	51	39	40	25	31	38	30
F0353	964/1232553	Residential	NCA07	44	52	53	51	53	48	36	29	21	34	52	41	41	26	29	35	27
F0354	907/1232553	Residential	NCA06	60	68	72	67	69	65	40	33	25	38	69	57	58	27	32	40	32
F0355	1018/1232553	Residential	NCA07	43	51	52	50	52	48	39	32	24	37	52	40	40	25	31	38	29
F0356	1356/1232553	Residential	NCA07	40	48	49	48	50	45	37	30	22	34	49	37	38	27	32	36	30
F0357	963/1232553	Residential	NCA07	43	51	53	50	52	48	36	28	21	33	52	40	40	25	29	35	25
F0358	962/1232553	Residential	NCA07	42	49	50	48	50	46	35	28	20	32	50	38	39	25	28	34	25
F0359	961/1232553	Residential	NCA07	41	49	51	49	51	46	40	33	25	38	50	38	39	26	32	39	31
F0360	1346/1232553	Residential	NCA07	41	49	50	48	50	46	38	31	24	36	50	38	39	26	31	37	29
F0361	990/1232553	Residential	NCA07	44	52	54	52	54	49	40	33	26	39	53	41	42	26	33	40	33
F0362	1355/1232553	Residential	NCA07	40	48	49	47	49	45	37	30	22	34	49	37	38	26	30	36	29
F0363	973/1232553	Residential	NCA07	47	56	59	55	57	52	38	32	24	36	56	44	45	27	32	38	31
F0364	908/1232553	Residential	NCA06	61	68	73	68	70	65	36	30	22	35	69	58	58	27	32	38	30
F0365	927/1232553	Residential	NCA06	44	52	53	51	53	49	37	30	22	37	53	40	41	25	32	38	32
F0366	1347/1232553	Residential	NCA07	40	48	49	48	50	45	39	32	24	36	49	37	38	27	31	38	29
F0367	989/1232553	Residential	NCA07	44	52	54	51	53	49	40	33	26	39	53	41	42	26	33	40	32
F0368	926/1232553	Residential	NCA06	42	50	50	49	51	46	36	30	22	34	50	39	39	22	32	36	31
F0369	925/1232553	Residential	NCA06	43	50	52	50	52	47	36	30	22	35	51	40	40	22	33	37	31
F0370	1308/1232553	Residential	NCA07	39	47	48	46	48	44	38	3									

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0396	919/1232553	Residential	NCA06	45	51	51	50	52	48	35	27	20	34	52	40	41	28	29	33	23
F0397	1349/1232553	Residential	NCA07	44	53	55	52	54	50	38	31	23	34	54	42	42	28	31	37	29
F0398	910/1232553	Residential	NCA06	63	70	74	70	72	67	36	29	22	34	71	60	60	23	32	37	30
F0399	968/1232553	Residential	NCA07	43	50	51	49	51	47	38	32	24	37	51	39	40	26	32	38	30
F0400	986/1232553	Residential	NCA07	45	53	55	53	55	50	40	33	25	38	54	42	43	27	33	39	32
F0401	1311/1232553	Residential	NCA07	44	52	54	51	53	49	34	28	20	32	53	41	42	25	30	34	29
F0402	1312/1232553	Residential	NCA07	45	53	55	52	54	49	35	27	20	32	53	41	42	26	30	34	28
F0403	977/1232553	Residential	NCA07	51	59	63	59	61	56	38	32	24	37	60	48	49	26	33	38	31
F0404	1313/1232553	Residential	NCA07	44	53	56	52	54	50	35	27	20	32	54	42	42	24	29	33	28
F0405	1310/1232553	Residential	NCA07	44	52	54	51	53	49	34	27	19	31	53	41	41	24	28	34	26
F0406	1314/1232553	Residential	NCA07	44	53	56	53	55	50	34	27	19	32	54	42	43	25	27	33	27
F0407	1315/1232553	Residential	NCA07	45	54	57	53	55	51	37	29	21	35	55	43	43	26	28	34	26
F0408	985/1232553	Residential	NCA07	45	53	53	52	54	50	39	31	24	37	54	42	43	27	32	38	31
F0409	969/1232553	Residential	NCA07	46	54	54	53	55	50	39	32	24	37	54	42	43	25	31	38	30
F0410	911/1232553	Residential	NCA06	63	71	74	70	72	68	36	29	22	34	72	60	61	23	31	37	30
F0411	978/1232553	Residential	NCA07	53	61	64	60	62	58	38	31	24	37	62	50	50	26	32	38	30
F0412	984/1232553	Residential	NCA07	48	56	59	56	58	53	38	31	23	37	57	45	46	27	32	38	31
F0413	979/1232553	Residential	NCA07	53	61	65	60	62	58	38	31	24	35	62	50	51	26	32	38	30
F0414	918/1232553	Residential	NCA06	58	66	71	66	68	63	36	30	22	36	67	55	56	28	32	36	31
F0415	970/1232553	Residential	NCA07	48	56	58	55	57	53	38	30	23	36	57	45	45	27	30	37	30
F0416	912/1232553	Residential	NCA06	65	73	75	72	74	69	38	31	24	36	73	62	62	26	31	38	32
F0417	917/1232553	Residential	NCA06	60	68	72	67	69	65	36	29	22	34	69	57	57	27	31	36	31
F0418	913/1232553	Residential	NCA06	68	76	81	75	77	73	38	31	24	36	77	65	66	25	33	38	32
F0419	914/1232553	Residential	NCA06	66	74	78	73	75	71	36	30	22	34	75	63	63	26	33	38	32
F0420	983/1232553	Residential	NCA07	48	56	59	56	58	53	38	31	24	37	57	45	46	27	31	38	31
F0421	916/1232553	Residential	NCA06	63	71	75	70	72	68	37	30	22	35	72	60	60	27	32	36	30
F0422	915/1232553	Residential	NCA06	64	72	77	71	73	69	37	30	22	35	73	61	62	27	33	37	31
F0423	1360/1232553	Residential	NCA07	41	50	51	49	51	46	37	31	23	34	50	39	39	24	31	36	29
F0424	980/1232553	Residential	NCA07	53	61	64	60	62	58	38	31	23	35	62	50	50	25	32	38	30
F0425	1361/1232553	Residential	NCA07	42	50	52	49	51	47	38	31	23	35	51	39	40	20	31	37	29
F0426	982/1232553	Residential	NCA07	48	56	60	56	58	53	38	31	24	37	57	45	46	27	31	38	29
F0427	1362/1232553	Residential	NCA07	44	52	55	51	53	49	38	30	23	34	53	41	41	28	31	37	29
F0428	981/1232553	Residential	NCA07	54	62	66	61	63	59	38	31	24	37	63	51	51	27	32	37	30
F0429	1321/1232553	Residential	NCA07	44	52	54	51	53	49	37	31	23	35	53	41	42	23	31	37	30
F0430	1320/1232553	Residential	NCA07	45	52	56	52	54	49	37	30	23	35	53	41	42	22	30	37	31
F0431	1319/1232553	Residential	NCA07	46	53	56	52	54	50	38	31	23	35	54	42	43	23	31	36	30
F0432	1318/1232553	Residential	NCA07	47	55	58	54	56	52	38	31	23	35	56	44	44	23	32	37	30
F0433	1317/1232553	Residential	NCA07	47	55	58	54	56	52	38	31	24	36	56	44	45	24	32	37	30
F0434	1316/1232553	Residential	NCA07	48	56	59	55	57	53	38	31	24	36	57	45	45	25	32	37	30
F0435	1365/1232553	Residential	NCA07	42	50	51	49	51	47	37	31	23	34	51	39	40	23	31	36	30
F0436	971/1232553	Residential	NCA07	49	57	60	56	58	54	40	33	25	39	58	46	47	26	33	38	31
F0437	1363/1232553	Residential	NCA07	39	47	49	47	49	44	36	30	22	34	48	36	37	29	30	36	29
F0438	972/1232553	Residential	NCA07	51	59	62	58	60	56	37	31	23	35	60	47	48	27	31	37	31
F0439	1130/1232553	Residential	NCA07	53	61	65	60	62	58	40	33	25	38	62	50	50	27	33	39	30
F0440	1322/1232553	Residential	NCA07	41	49	50	48	50	46	34	26	19	31	50	38	38	26	28	34	29
F0441	1152/1232553	Residential	NCA07	43	51	51	50	52	48	38	31	24	37	52	39	40	26	32	38	30
F0442	1364/1232553	Residential	NCA07	41	49	50	48	50	46	36	30	22	33	50	37	38	19	29	35	29
F0443	1323/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	23	35	53	41	42	26	31	37	31
F0444	1324/1232553	Residential	NCA07	45	53	54	52	54	50	38	31	24	35	54	42	42	28	32	37	31
F0445	1325/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	24	36	53	41	42	27	33	37	31
F0446	1326/1232553	Residential	NCA07	44	52	54	51	53	49	38	31	24	36	53	41	41	27	31	37	31
F0447	1151/1232553	Residential	NCA07	47	55	56	54	56	52	39	32	24	37	56	44	44	27	32	38	31
F0448	1327/1232553	Residential	NCA07	44	52	54	52	54	49	39	32	24	36	53	41	42	27	32	37	31
F0449	1153/1232553	Residential	NCA07	44	52	53	51	53	49	38	31	24	37	53	41	42	26	31	38	31
F0450	1131/1232553	Residential	NCA07	53	61	65	60	62	58	39	32	24	38	62	49	50	26	33	38	31
F0451	1401/1232553	Residential	NCA06	59	67	71	66	68	64	37	31	23	36	68	56	56	29	31	37	31
F0452	1402/1232553	Residential	NCA06	60	68	73	67	69	65	38	31	23	36	69	57	58	25	31	38	31
F0453	1128/1232553	Residential	NCA07	54	62	66	61	63	59	37	31	23	35	63	51	52	27	31	37	30
F0454	1403/1232553	Residential	NCA06	61	69	74	69	71	66	38	31	23	36	70	58	59	25	31	38	31
F0455	1129/1232553	Residential	NCA07	55	63	67	62	64	60	37	31	23	35	64	52	52	22	30	37	30
F0456	1404/1232553	Residential	NCA06	62	70	75	69	71	67	39	32	24	37	71	59	60	25	31	39	31
F0457	1105/1232553	Residential	NCA06	54	62	66	61	63	59	39	32	24	37	63	51	52	20	32	38	31
F0458	1405/1232553	Residential	NCA06	62	70	74	69	71	67	38	31	23	37	71	58	59	27	31	38	31
F0459	1150/1232553	Residential	NCA07	45	53	55	53	55	50	40	33	25	38	54	42	43	27	33	39	31
F0460	1406/1232553	Residential	NCA06	68	76	78	75	77	73	38	31	24	36	77	65	65	29	31	38	32
F0461	1154/1232553	Residential	NCA07	45	53	54	52	54	50	38	31	24	36	54	42	42	30	32	38	31
F0462	1132/1232553	Residential	NCA07	42	51	52	50	52	48	39	32	25	38	52	39	40	26	33	38	31
F0463	1366/1232553	Residential	NCA07	44	52	54	51	53	49	37	30	23	35	53	41	42	33	31	37	29
F0464	1149/1232553	Residential	NCA07	45	53	55	52	54	50	40	33	25	38	54	42	43	27	33	39	31
F0465	1127/1232553	Residential	NCA07	47	55	56	54	56	52	40	32	25	38	56	44	44	27	34	39	32
F0466	1333/1232553	Residential	NCA07	42	50	51	49	51	47	36	30	22	34	51	39	39	28	30	36	30
F0467	1106/1232553	Residential	NCA06	42	50	50	49	51	47	38	31	23	36	51	39	40	21	32	37	31
F0468	1133/1232553	Residential	NCA07	42	50	52	50	52	47	38	32	24	38	51	39	40	27	32	38	30
F0469	1332/1232553	Residential	NCA07	43	51	52	50	52												

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0495	1135/1232553	Residential	NCA07	40	48	50	47	49	45	38	31	24	37	49	37	38	26	32	37	30
F0496	1704/1232553	Residential	NCA07	38	46	46	46	48	43	32	27	19	29	47	35	36	30	27	33	27
F0497	1109/1232553	Residential	NCA06	39	47	50	46	48	44	37	30	23	34	48	36	37	21	32	36	31
F0498	1703/1232553	Residential	NCA07	39	47	47	46	48	44	33	28	20	31	48	36	36	28	28	32	28
F0499	1433/1232553	Residential	NCA06	46	53	57	52	54	50	37	30	22	33	54	42	43	27	31	36	31
F0500	1702/1232553	Residential	NCA07	39	47	47	46	48	43	34	28	20	31	47	35	36	28	28	32	28
F0501	1409/1232553	Residential	NCA06	66	73	76	73	75	70	36	29	22	33	74	63	63	29	30	36	30
F0502	1701/1232553	Residential	NCA07	43	51	52	51	53	48	38	31	23	35	52	40	41	27	32	37	31
F0503	1123/1232553	Residential	NCA07	42	50	51	49	51	47	38	31	24	37	51	39	39	28	33	38	30
F0504	1157/1232553	Residential	NCA07	41	49	50	49	51	46	37	30	23	35	50	38	39	29	30	36	30
F0505	1146/1232553	Residential	NCA07	43	51	51	50	52	48	39	32	24	36	52	40	41	30	31	38	30
F0506	1110/1232553	Residential	NCA06	39	47	49	46	48	44	36	30	22	34	48	36	37	21	30	36	30
F0507	1136/1232553	Residential	NCA07	40	48	49	47	49	45	37	31	23	36	49	37	37	27	31	37	30
F0508	1102/1232553	Residential	NCA06	41	49	52	48	50	46	34	27	19	31	50	38	38	28	27	31	26
F0509	1434/1232553	Residential	NCA06	46	54	57	53	55	50	36	29	22	34	54	43	43	27	31	36	31
F0510	1122/1232553	Residential	NCA07	41	49	50	49	51	46	38	31	24	36	50	38	39	28	33	38	30
F0511	1410/1232553	Residential	NCA06	66	74	76	73	75	71	37	30	22	33	75	63	64	28	30	36	31
F0512	1158/1232553	Residential	NCA07	41	49	51	49	51	46	37	30	23	35	50	38	39	31	31	36	29
F0513	1111/1232553	Residential	NCA06	39	47	50	46	48	44	36	29	22	34	48	36	37	22	30	36	31
F0514	1145/1232553	Residential	NCA07	43	51	51	50	52	48	37	31	23	34	52	40	41	30	31	37	30
F0515	1762/1232553	Residential	NCA07	43	51	52	50	52	48	33	27	19	28	52	39	40	32	30	34	30
F0516	1761/1232553	Residential	NCA07	40	48	49	48	50	45	35	29	21	32	49	37	38	30	28	34	28
F0517	1137/1232553	Residential	NCA07	38	47	47	46	48	43	37	31	23	34	47	35	36	27	31	36	31
F0518	1103/1232553	Residential	NCA06	41	49	53	48	50	46	33	26	19	30	50	38	39	28	27	30	26
F0519	1121/1232553	Residential	NCA06	40	49	49	48	50	45	37	30	23	35	49	37	38	29	32	37	30
F0520	1411/1232553	Residential	NCA06	66	74	76	73	75	71	36	29	22	32	75	63	64	27	30	36	31
F0521	1112/1232553	Residential	NCA06	38	46	50	46	48	43	36	29	22	33	47	35	36	21	30	35	30
F0522	1435/1232553	Residential	NCA06	45	53	57	52	54	50	35	28	21	34	54	42	43	28	31	35	31
F0523	1712/1232553	Residential	NCA07	40	48	48	47	49	45	35	29	21	32	49	37	37	28	29	35	29
F0524	1763/1232553	Residential	NCA07	42	50	51	49	51	47	34	28	20	31	51	39	40	32	28	33	29
F0525	1711/1232553	Residential	NCA07	40	49	50	48	50	46	35	29	21	32	50	38	38	30	29	34	29
F0526	1144/1232553	Residential	NCA07	43	51	52	50	52	48	37	31	23	35	52	40	40	31	31	37	31
F0527	1120/1232553	Residential	NCA06	39	48	48	47	49	45	37	30	22	34	49	36	37	29	32	36	29
F0528	1710/1232553	Residential	NCA07	42	50	50	49	51	47	35	29	21	33	51	39	40	32	30	34	30
F0529	1104/1232553	Residential	NCA06	42	50	52	49	51	46	33	27	19	30	50	39	40	30	27	30	28
F0530	1436/1232553	Residential	NCA06	46	54	58	53	55	51	35	28	20	31	55	43	44	28	30	35	31
F0531	1709/1232553	Residential	NCA07	41	49	50	48	50	46	35	29	21	33	50	38	39	31	30	34	30
F0532	1764/1232553	Residential	NCA07	42	50	52	49	51	47	34	28	20	31	51	39	39	34	28	33	28
F0533	1113/1232553	Residential	NCA06	39	46	49	45	47	43	36	29	21	34	47	35	36	22	30	35	29
F0534	1138/1232553	Residential	NCA07	39	47	48	46	48	44	36	30	22	34	48	35	36	28	30	36	30
F0535	1708/1232553	Residential	NCA07	41	49	50	48	50	46	35	29	21	32	50	38	39	29	30	35	30
F0536	1760/1232553	Residential	NCA07	41	49	50	49	51	46	34	27	20	30	50	38	39	31	28	33	28
F0537	1412/1232553	Residential	NCA06	67	74	76	73	75	71	35	28	21	31	75	63	64	28	30	35	31
F0538	1707/1232553	Residential	NCA07	40	48	48	47	49	45	36	29	22	33	49	37	38	30	31	35	30
F0539	1159/1232553	Residential	NCA07	40	48	50	47	49	45	37	30	22	35	49	37	38	30	32	36	30
F0540	1119/1232553	Residential	NCA06	39	47	47	46	48	44	36	29	22	34	48	36	36	28	31	35	29
F0541	1765/1232553	Residential	NCA07	43	51	52	50	52	48	34	28	20	31	52	40	40	34	28	33	28
F0542	1143/1232553	Residential	NCA07	40	48	49	47	49	45	34	27	20	33	49	37	38	32	27	32	27
F0543	1114/1232553	Residential	NCA06	39	46	49	46	48	43	36	29	22	34	47	35	36	22	30	35	30
F0544	1437/1232553	Residential	NCA06	46	54	58	53	55	51	35	28	20	31	55	43	44	28	30	35	31
F0545	1142/1232553	Residential	NCA07	41	51	52	50	52	47	31	25	17	30	51	39	40	32	25	31	25
F0546	1759/1232553	Residential	NCA07	41	49	50	48	50	46	29	24	16	26	50	38	38	31	27	31	27
F0547	1141/1232553	Residential	NCA07	41	51	52	50	52	47	35	28	20	33	51	39	40	32	30	35	30
F0548	1766/1232553	Residential	NCA07	43	52	53	51	53	48	34	28	20	31	52	40	41	33	28	33	27
F0549	1140/1232553	Residential	NCA07	39	47	47	46	48	43	32	25	17	29	47	35	36	29	28	31	28
F0550	1713/1232553	Residential	NCA07	42	50	51	49	51	47	33	26	18	31	51	38	39	32	28	32	26
F0551	1139/1232553	Residential	NCA07	43	52	53	51	53	48	37	31	23	34	52	40	41	30	30	36	30
F0552	1118/1232553	Residential	NCA06	38	46	47	45	47	43	35	28	21	33	47	35	36	27	30	34	29
F0553	1413/1232553	Residential	NCA06	66	74	76	73	75	71	35	28	20	31	75	63	64	28	30	35	31
F0554	1438/1232553	Residential	NCA06	46	53	57	53	55	50	35	28	20	31	54	43	43	28	29	34	31
F0555	1115/1232553	Residential	NCA06	39	47	49	46	48	44	36	29	22	33	48	36	37	22	30	35	30
F0556	1160/1232553	Residential	NCA07	41	49	51	48	50	46	35	29	21	33	50	38	38	30	29	35	30
F0557	1758/1232553	Residential	NCA07	41	49	50	48	50	46	27	22	14	25	50	38	39	32	26	31	27
F0558	1767/1232553	Residential	NCA07	42	50	52	50	52	47	34	28	20	31	51	39	40	34	27	33	27
F0559	1714/1232553	Residential	NCA07	41	49	50	49	51	46	29	24	16	27	50	38	39	30	24	28	24
F0560	1439/1232553	Residential	NCA06	49	55	58	54	56	52	34	28	20	33	56	44	45	31	29	34	31
F0561	1440/1232553	Residential	NCA06	49	55	58	54	56	52	34	28	20	33	56	44	45	31	29	34	31
F0562	1715/1232553	Residential	NCA07	40	48	48	47	49	45	32	24	17	29	49	37	37	31	25	30	24
F0563	1716/1232553	Residential	NCA07	40	48	49	47	49	45	32	25	17	29	49	37	38	31	26	31	25
F0564	1768/1232553	Residential	NCA07	41	49	51	49	51	46	31	25	17	29	50	38	39	33	27	33	27
F0565	1117/1232553	Residential	NCA06	38	46	48	45	47	43	33	27	19	32	47	35	36	29	28	32	28
F0566	1717/1232553	Residential	NCA07	40	48	48	47	49	45	32	25	17	29	49	37	37	31	26	30	25
F0567	1757/1232553	Residential	NCA07	42	50	51	50	52	47	31	25	17	25	51	39	40	31	26	31	27
F0568	1826/1232553	Residential	NCA07	38	4															

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0594	1835/1232553	Residential	NCA07	39	47	48	46	48	44	35	29	21	32	48	36	36	32	30	34	30
F0595	1417/1232553	Residential	NCA06	67	74	76	74	76	71	35	28	20	31	75	63	64	29	29	33	30
F0596	1836/1232553	Residential	NCA07	41	49	50	48	50	46	35	29	21	32	50	37	38	31	30	34	30
F0597	1726/1232553	Residential	NCA07	43	51	52	50	52	48	34	28	20	31	52	40	40	31	28	33	28
F0598	1802/1232553	Residential	NCA07	44	52	55	51	53	49	33	27	19	30	53	41	41	33	28	32	27
F0599	1829/1232553	Residential	NCA07	45	53	56	53	55	50	36	29	22	33	54	42	43	32	30	34	30
F0600	1804/1232553	Residential	NCA07	44	52	54	51	53	49	31	25	17	28	53	41	42	32	25	29	24
F0601	1442/1232553	Residential	NCA06	45	54	57	53	55	51	34	28	20	31	55	43	44	29	28	33	29
F0602	1730/1232553	Residential	NCA07	41	49	50	48	50	46	34	27	19	31	50	38	38	30	28	32	27
F0603	1805/1232553	Residential	NCA06	48	57	61	56	58	54	30	25	17	27	58	46	46	34	25	28	24
F0604	1806/1232553	Residential	NCA06	47	55	57	54	56	52	31	25	17	28	56	44	44	36	25	29	25
F0605	1725/1232553	Residential	NCA07	43	51	52	50	52	48	34	28	20	31	52	40	41	31	28	33	28
F0606	1807/1232553	Residential	NCA06	42	50	51	49	51	47	31	25	17	28	51	39	40	31	26	29	24
F0607	1719/1232553	Residential	NCA07	40	48	49	47	49	45	30	24	16	26	49	37	37	31	25	29	24
F0608	1418/1232553	Residential	NCA06	66	74	76	73	75	71	35	28	20	31	75	63	64	29	29	33	30
F0609	1808/1232553	Residential	NCA06	44	52	53	51	53	49	31	25	17	27	53	41	42	30	26	29	26
F0610	1731/1232553	Residential	NCA07	41	49	50	48	50	46	33	27	19	30	50	38	38	30	28	32	27
F0611	1443/1232553	Residential	NCA06	49	57	60	56	58	54	35	28	20	30	58	46	47	29	28	32	29
F0612	1803/1232553	Residential	NCA07	44	52	55	51	53	49	32	27	19	30	53	41	42	34	27	32	27
F0613	1446/1232553	Residential	NCA06	42	50	54	49	51	47	33	27	19	30	51	39	40	30	27	32	25
F0614	1724/1232553	Residential	NCA07	43	51	52	50	52	48	35	28	20	31	52	40	41	31	28	33	28
F0615	1830/1232553	Residential	NCA07	46	54	56	53	55	51	35	28	20	32	55	43	44	33	28	34	28
F0616	1732/1232553	Residential	NCA07	42	50	51	50	52	47	35	28	20	32	51	39	40	31	28	32	27
F0617	1720/1232553	Residential	NCA07	40	48	48	47	49	45	31	25	17	27	49	37	37	30	27	30	26
F0618	1444/1232553	Residential	NCA06	47	54	57	54	56	51	33	27	19	30	55	44	44	30	27	32	29
F0619	1834/1232553	Residential	NCA07	43	51	51	50	52	47	28	23	15	24	51	39	40	32	24	28	23
F0620	1723/1232553	Residential	NCA07	44	51	52	51	53	48	35	28	20	32	52	40	41	31	28	33	28
F0621	1419/1232553	Residential	NCA06	66	74	76	73	75	71	35	28	20	30	75	63	64	30	28	33	30
F0622	1833/1232553	Residential	NCA07	42	50	51	49	51	47	30	24	16	27	51	39	40	32	25	27	23
F0623	1748/1232553	Residential	NCA07	47	55	56	54	56	51	34	28	20	30	55	43	44	34	28	33	28
F0624	1746/1232553	Residential	NCA07	47	55	56	54	56	51	34	28	20	30	55	43	44	34	28	33	28
F0625	1747/1232553	Residential	NCA07	47	55	56	54	56	51	34	28	20	30	55	43	44	34	28	33	28
F0626	1733/1232553	Residential	NCA07	43	51	53	50	52	48	34	27	20	31	52	40	41	32	28	32	27
F0627	1831/1232553	Residential	NCA07	47	55	57	54	56	52	34	28	20	32	56	44	45	34	28	33	28
F0628	1445/1232553	Residential	NCA06	48	56	58	55	57	53	33	27	19	29	57	45	46	32	26	32	28
F0629	1721/1232553	Residential	NCA07	42	50	51	50	52	47	31	25	17	27	51	39	40	32	27	30	26
F0630	1722/1232553	Residential	NCA07	44	53	54	52	54	49	34	27	20	31	53	41	42	33	28	33	28
F0631	1420/1232553	Residential	NCA06	66	74	76	73	75	71	33	27	19	30	75	63	64	29	28	33	29
F0632	1749/1232553	Residential	NCA07	42	50	51	49	51	47	22	19	10	17	51	39	39	32	20	22	23
F0633	1832/1232553	Residential	NCA07	51	59	63	58	60	56	34	28	20	32	60	48	49	35	28	33	28
F0634	1822/1232553	Residential	NCA07	45	53	56	52	54	50	31	26	18	29	54	42	43	34	29	33	30
F0635	1821/1232553	Residential	NCA07	46	54	57	53	55	51	33	27	19	30	55	43	43	33	28	32	29
F0636	1820/1232553	Residential	NCA06	45	53	57	52	54	50	33	26	19	28	54	42	43	33	28	32	29
F0637	1819/1232553	Residential	NCA06	50	58	63	58	60	55	34	28	20	31	59	47	48	32	29	33	29
F0638	1740/1232553	Residential	NCA07	44	52	54	51	53	49	35	29	21	32	53	41	41	34	28	34	28
F0639	1811/1232553	Residential	NCA06	48	56	59	56	58	53	34	28	20	31	57	45	46	35	30	33	29
F0640	1421/1232553	Residential	NCA06	67	75	76	74	76	72	33	27	19	30	76	64	65	33	28	33	29
F0641	1739/1232553	Residential	NCA07	45	54	55	53	55	51	34	28	20	31	55	42	43	33	28	32	28
F0642	1810/1232553	Residential	NCA06	40	48	51	47	49	45	34	28	20	32	49	37	37	29	30	34	30
F0643	1809/1232553	Residential	NCA06	42	50	53	49	51	47	34	28	20	31	51	39	40	30	30	33	30
F0644	1738/1232553	Residential	NCA07	41	49	51	48	50	46	34	28	20	31	50	38	39	32	28	32	28
F0645	1447/1232553	Residential	NCA06	47	54	58	54	56	51	35	29	21	32	55	44	44	30	30	34	30
F0646	1737/1232553	Residential	NCA07	43	51	54	51	53	48	32	26	18	29	52	40	41	32	28	32	28
F0647	1736/1232553	Residential	NCA07	42	49	53	49	51	46	34	28	20	31	50	38	39	31	28	33	28
F0648	1735/1232553	Residential	NCA07	46	54	55	53	55	51	32	27	19	29	55	43	44	34	28	32	28
F0649	1750/1232553	Residential	NCA07	42	50	51	49	51	47	21	18	10	17	51	39	39	33	22	24	21
F0650	1741/1232553	Residential	NCA07	43	51	53	51	53	48	30	22	15	27	52	40	41	34	24	28	23
F0651	1734/1232553	Residential	NCA07	46	52	55	51	53	49	31	26	18	26	53	41	42	33	28	32	28
F0652	1422/1232553	Residential	NCA06	67	75	77	74	76	72	34	28	20	31	76	64	65	31	28	33	29
F0653	1823/1232553	Residential	NCA07	47	55	58	54	56	52	31	25	18	28	56	44	45	35	28	32	28
F0654	1745/1232553	Residential	NCA07	47	55	58	55	57	52	33	27	20	30	56	44	45	32	27	30	26
F0655	1837/1232553	Residential	NCA07	46	54	56	53	55	51	33	27	19	29	55	43	43	32	28	32	28
F0656	1818/1232553	Residential	NCA06	50	58	62	57	59	55	34	28	20	31	59	47	47	34	28	33	28
F0657	1838/1232553	Residential	NCA07	45	53	56	52	54	50	33	27	19	30	54	42	43	34	29	32	28
F0658	1839/1232553	Residential	NCA07	53	61	65	60	62	58	34	28	20	31	62	49	50	34	29	33	29
F0659	1423/1232553	Residential	NCA06	67	75	78	74	76	72	34	27	19	31	76	64	65	31	29	32	29
F0660	1751/1232553	Residential	NCA07	42	50	52	49	51	47	20	17	8	15	51	39	40	33	21	22	22
F0661	1742/1232553	Residential	NCA07	44	52	54	51	53	49	27	20	13	24	53	40	41	34	23	27	22
F0662	1448/1232553	Residential	NCA06	50	57	60	57	59	54	34	28	20	31	58	47	47	33	28	33	30
F0663	1812/1232553	Residential	NCA06	48	56	59	55	57	53	30	24	17	25	57	45	46	35	26	32	28
F0664	1744/1232553	Residential	NCA07	48	56	58	55	57	53	30	25	16	27	57	45	46	33	27	29	27
F0665	1824/1232553	Residential	NCA06	48	56	59	56	58	53	33	27	19	31	57	45	46	36	28	32	28
F0666	1817/1232553	Residential	NCA06	50	59	62	58	60	56	34	28	20	31	60	48	48	35	28	33	28
F0667	1850/1232553	Residential	NCA07	50	58															

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
F0693	1814/1232553	Residential	NCA06	57	65	69	64	66	62	31	24	17	25	66	53	54	37	27	30	26
F0694	1426/1232553	Residential	NCA06	66	74	76	73	75	71	34	27	20	32	75	63	64	33	27	33	29
F0695	1453/1232553	Residential	NCA06	56	64	69	63	65	61	30	24	16	23	65	53	54	37	25	28	23
F0696	1454/1232553	Residential	NCA06	58	66	70	65	67	63	27	22	14	22	67	55	55	37	27	31	28
F0697	1427/1232553	Residential	NCA06	66	74	76	73	75	71	34	27	19	31	75	63	64	33	27	33	29
F0698	1428/1232553	Residential	NCA06	66	74	76	73	75	71	34	27	19	31	75	63	64	34	26	32	28
F0699	1455/1232553	Residential	NCA06	66	74	76	73	75	70	33	27	19	31	74	63	63	36	26	32	29
R0001	85 WILTON PARK ROAD, WILTON	Residential	NCA01	38	45	45	44	46	42	40	33	25	37	46	34	35	16	35	32	26
R0002	545 PHEASANTS NEST ROAD, PHEASANTS NEST	Residential	NCA02	31	39	38	38	40	36	37	30	22	33	40	28	28	26	26	29	24
R0003	35 ESEN WAY, PHEASANTS NEST	Residential	NCA02	32	40	39	39	41	37	37	31	23	32	41	29	30	24	27	29	23
R0004	100A WILTON PARK ROAD, WILTON	Residential	NCA01	38	46	46	45	47	42	40	32	25	36	46	35	35	15	34	31	28
R0005	90 WILTON PARK ROAD, WILTON	Residential	NCA01	40	47	48	46	48	44	41	34	26	38	48	36	36	16	36	33	28
R0006	75 WILTON PARK ROAD, WILTON	Residential	NCA01	42	48	49	47	49	45	42	35	27	38	49	37	38	17	36	33	28
R0007	80 WILTON PARK ROAD, WILTON	Residential	NCA01	44	48	50	47	49	45	42	35	27	39	49	37	38	17	38	33	29
R0008	55 WILTON PARK ROAD, WILTON	Residential	NCA01	42	45	46	44	46	41	42	35	27	39	45	33	34	20	36	34	27
R0009	555 PHEASANTS NEST ROAD, PHEASANTS NEST	Residential	NCA02	31	39	38	38	40	36	33	28	20	31	40	28	29	28	26	29	23
R0010	20 ESEN WAY, PHEASANTS NEST	Residential	NCA02	33	41	41	40	42	38	35	28	21	32	42	30	31	27	28	28	23
R0011	45 ESEN WAY, PHEASANTS NEST	Residential	NCA02	35	43	43	42	44	40	36	30	22	32	44	32	33	24	29	29	23
R0012	30 ESEN WAY, PHEASANTS NEST	Residential	NCA02	33	41	42	40	42	38	35	29	21	31	42	30	31	28	28	30	23
R0013	40 ESEN WAY, PHEASANTS NEST	Residential	NCA02	35	43	43	42	44	40	37	31	23	34	44	32	33	28	28	31	24
R0014	45 WILTON PARK ROAD, WILTON	Residential	NCA01	45	46	47	45	47	43	44	37	29	41	47	35	36	19	37	35	28
R0015	45 WILTON PARK ROAD, WILTON	Residential	NCA01	49	48	49	47	49	45	44	37	30	42	49	37	38	20	39	35	29
R0016	45 WILTON PARK ROAD, WILTON	Residential	NCA01	48	47	49	46	48	44	44	37	30	42	48	36	36	18	38	35	28
R0017	45 WILTON PARK ROAD, WILTON	Residential	NCA01	52	51	53	50	52	48	46	39	31	44	52	40	41	20	41	36	30
R0018	55 ESEN WAY, PHEASANTS NEST	Residential	NCA02	39	47	48	46	48	43	41	34	27	39	47	36	36	27	30	33	25
R0019	60 ESEN WAY, PHEASANTS NEST	Residential	NCA02	40	48	51	48	50	45	42	35	27	39	49	37	38	30	30	33	25
R0020	25 WILTON PARK ROAD, WILTON	Residential	NCA02	45	51	53	50	52	48	51	43	35	49	52	40	41	22	39	39	29
R0021	10 BERWICK PARK ROAD, WILTON	Residential	NCA02	51	59	62	58	60	56	55	48	40	53	60	48	49	22	41	42	30
R0022	20 BERWICK PARK ROAD, WILTON	Residential	NCA02	56	63	68	62	64	60	65	56	49	59	64	52	53	21	51	47	34
R0023	30 BERWICK PARK ROAD, WILTON	Residential	NCA02	66	74	79	73	75	71	76	68	60	63	75	63	64	21	53	47	34
R0024	20 EMMA LANE, WILTON	Residential	NCA02	43	52	54	51	53	49	44	37	30	42	53	40	41	26	34	37	28
R0025	745 PICTON ROAD, WILTON	Commercial	NCA02	66	62	66	61	63	59	57	49	41	54	63	51	52	27	69	46	43
R0026	10 EMMA LANE, WILTON	Residential	NCA02	53	57	60	56	58	54	52	44	37	51	58	46	47	21	39	48	32
R0027	50 JANDERRA LANE, WILTON	Residential	NCA02	64	71	76	70	72	68	67	58	50	66	72	60	61	22	48	56	35
R0028	165 CONDELL PARK ROAD, WILTON	Residential	NCA02	64	86	91	85	87	83	77	69	61	68	87	75	75	24	58	96	39
R0029	745 PICTON ROAD, WILTON	Commercial	NCA02	56	64	68	63	65	61	50	42	35	48	65	53	54	28	53	44	45
R0030	155 CONDELL PARK ROAD, WILTON	Residential	NCA02	76	66	71	66	68	63	65	56	49	63	67	55	56	24	53	97	41
R0031	152 CONDELL PARK ROAD, WILTON	Industrial	NCA02	70	63	66	62	64	59	59	51	44	57	63	51	52	26	53	95	43
R0032	150A CONDELL PARK ROAD, WILTON	Industrial	NCA02	76	78	83	77	79	75	55	46	39	53	79	67	67	28	61	53	48
R0033	150A CONDELL PARK ROAD, WILTON	Industrial	NCA02	66	71	75	70	72	68	53	45	38	52	72	59	60	27	59	54	48
R0034	150A CONDELL PARK ROAD, WILTON	Industrial	NCA02	68	73	77	72	74	69	54	46	38	53	73	61	62	27	59	52	47
R0035	118 CONDELL PARK ROAD, WILTON	Residential	NCA02	79	53	55	52	54	50	54	46	38	53	54	42	42	26	44	75	46
R0036	30 BALMORAL RISE, WILTON	Residential	NCA02	73	51	53	50	52	48	49	41	34	49	52	40	41	23	43	63	46
R0037	28 BALMORAL RISE, WILTON	Residential	NCA02	73	52	54	51	53	49	48	41	33	48	53	41	41	26	43	62	48
R0038	116 CONDELL PARK ROAD, WILTON	Residential	NCA02	68	54	55	53	55	51	54	46	38	52	55	43	43	27	45	67	45
R0039	22 BALMORAL RISE, WILTON	Residential	NCA02	75	51	54	50	52	48	46	39	31	44	52	40	41	26	44	55	49
R0040	26 BALMORAL RISE, WILTON	Residential	NCA02	72	52	54	51	53	49	50	42	35	51	53	40	41	27	44	63	47
R0041	24 BALMORAL RISE, WILTON	Residential	NCA02	72	51	53	50	52	48	46	39	31	45	52	40	41	24	43	57	41
R0042	16 BALMORAL RISE, WILTON	Residential	NCA02	78	54	56	53	55	51	45	38	30	43	55	42	43	28	44	51	52
R0043	18 BALMORAL RISE, WILTON	Residential	NCA02	74	51	52	50	52	48	44	37	30	43	52	40	41	27	43	54	44
R0044	20 BALMORAL RISE, WILTON	Residential	NCA02	72	52	55	51	53	49	44	37	29	43	53	41	42	27	44	49	49
R0045	14 BALMORAL RISE, WILTON	Residential	NCA02	77	53	55	52	54	50	45	38	30	43	54	41	42	27	44	50	52
R0046	114 CONDELL PARK ROAD, WILTON	Residential	NCA02	63	54	55	53	55	51	53	45	38	52	55	43	43	27	43	64	45
R0047	12 BALMORAL RISE, WILTON	Residential	NCA02	76	53	56	52	54	50	45	38	30	43	54	41	42	27	43	49	53
R0048	32 BALMORAL RISE, WILTON	Residential	NCA02	63	49	50	48	50	46	47	40	32	44	50	38	38	26	41	53	45
R0049	10 BALMORAL RISE, WILTON	Residential	NCA02	76	53	56	52	54	50	45	38	30	43	54	42	42	27	43	48	54
R0050	8 BALMORAL RISE, WILTON	Residential	NCA02	76	53	57	52	54	50	45	38	30	42	54	42	42	28	44	47	55
R0051	6 BALMORAL RISE, WILTON	Residential	NCA02	76	54	57	53	55	51	45	38	30	42	55	43	43	28	44	47	57
R0052	112 CONDELL PARK ROAD, WILTON	Residential	NCA02	61	51	53	50	52	48	50	42	35	49	52	39	40	24	43	62	45
R0053	4 BALMORAL RISE, WILTON	Residential	NCA02	75	55	58	54	56	52	46	39	31	43	56	44	45	30	44	48	58
R0054	34 BALMORAL RISE, WILTON	Residential	NCA02	59	50	52	49	51	47	46	39	32	44	51	39	39	27	43	53	47
R0055	115 CONDELL PARK ROAD, WILTON	Residential	NCA02	52	57	60	57	59	54	49	41	34	47	58	46	47	23	41	55	39
R0056	25 BALMORAL RISE, WILTON	Residential	NCA02	63	50	51	49	51	47	47	39	31	45	51	39	39	26	43	51	44
R0057	23 BALMORAL RISE, WILTON	Residential	NCA02	63	49	50	48	50	46	43	36	29	41	50	38	38	25	41	50	45
R0058	110 CONDELL PARK ROAD, WILTON	Residential	NCA02	57	49	50	48	50	45	46	39	31	46	49	38	38	26	41	55	43
R0059	21 BALMORAL RISE, WILTON	Residential	NCA02	63	50	53	49	51	47	43	36	29	42	51	39	39	27	42	48	47
R0060	19 BALMORAL RISE, WILTON	Residential	NCA02	63	52	54	51	53	49	45	38	31	44	53	41	42	28	44	49	50
R0061	17 BALMORAL RISE, WILTON	Residential	NCA02	62	51	54	51	53	48	41	35	27	40	52	40	41	27	42	48	48
R0062	15 BALMORAL RISE, WILTON	Residential	NCA02	64	51	54	51	53	48	41	34	27	37	52	40	41	24	42	43	49
R0063	13 BALMORAL RISE, WILTON	Residential	NCA02	64	52	55	51	53	49	42	35	28	39	53	41	42	26	42	45	48
R0064	36 BALMORAL RISE, WILTON	Residential	NCA02	58	51	52	50	52	48	45	38	30	42	52	40	40	27	42	47	46
R0065	11 BALMORAL RISE, WILTON	Residential	NCA02	65	53	55	52	54	50	43	36	28	40	54	42	42	25	42	43	50
R0066	9 BALMORAL RISE, WILTON	Residential	NCA02	65	52	56	52	54	49	43	36	28	40	53	41	42	27	42	45	49
R0067	108 CONDELL PARK ROAD, WILTON	Residential	NCA02	55	49	51	48													

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0093	28 SUTTON CRESCENT, WILTON	Residential	NCA02	46	48	50	47	49	45	41	34	26	38	49	37	38	20	40	43	46
R0094	26 SUTTON CRESCENT, WILTON	Residential	NCA02	52	49	50	48	50	46	41	34	26	38	50	38	39	22	38	41	47
R0095	102 CONDELL PARK ROAD, WILTON	Residential	NCA02	46	49	51	48	50	46	45	37	30	43	50	38	39	26	40	49	41
R0096	13 BUNDANOON ROAD, WILTON	Residential	NCA02	54	49	51	48	50	46	42	35	27	38	50	38	39	28	41	44	47
R0097	33 BALMORAL RISE, WILTON	Residential	NCA02	52	50	51	49	51	47	44	37	30	42	51	39	40	27	42	45	47
R0098	11 BUNDANOON ROAD, WILTON	Residential	NCA02	55	50	52	49	51	47	42	35	27	39	51	39	39	28	41	43	48
R0099	9 BUNDANOON ROAD, WILTON	Residential	NCA02	48	49	51	48	50	46	41	34	26	38	50	38	39	25	39	43	48
R0100	7 BUNDANOON ROAD, WILTON	Residential	NCA02	54	49	53	50	52	48	41	34	26	38	52	40	41	27	40	42	49
R0101	27 SUTTON CRESCENT, WILTON	Residential	NCA02	49	47	49	46	48	44	39	33	25	37	48	36	37	27	38	41	44
R0102	5 BUNDANOON ROAD, WILTON	Residential	NCA02	49	53	55	52	54	50	42	35	27	39	54	42	43	27	40	41	52
R0103	44 BALMORAL RISE, WILTON	Residential	NCA02	50	46	47	45	47	43	40	33	26	37	47	35	36	25	39	40	40
R0104	100 CONDELL PARK ROAD, WILTON	Residential	NCA02	47	50	53	49	51	47	45	37	29	43	51	39	39	26	36	50	39
R0105	3 BUNDANOON ROAD, WILTON	Residential	NCA02	53	55	57	54	56	51	41	35	27	39	55	43	44	28	40	41	55
R0106	21 STIRLING DRIVE, WILTON	Residential	NCA02	56	54	57	54	56	51	42	35	27	39	55	43	44	30	41	41	55
R0107	35 BALMORAL RISE, WILTON	Residential	NCA02	47	48	49	47	49	45	43	36	28	41	49	37	37	27	41	43	44
R0108	25 SUTTON CRESCENT, WILTON	Residential	NCA02	46	49	50	48	50	46	37	31	23	35	50	37	38	28	38	36	45
R0109	24 SUTTON CRESCENT, WILTON	Residential	NCA02	50	48	48	47	49	44	39	32	25	37	48	36	37	28	38	40	45
R0110	7 PENROSE STREET, WILTON	Residential	NCA02	48	50	51	49	51	47	38	31	24	38	51	39	39	28	38	37	47
R0111	46 BALMORAL RISE, WILTON	Residential	NCA02	47	48	49	47	49	45	37	30	23	35	49	37	38	27	37	37	42
R0112	19 STIRLING DRIVE, WILTON	Residential	NCA02	55	54	57	53	55	51	40	33	25	35	55	43	44	28	37	36	54
R0113	9 PENROSE STREET, WILTON	Residential	NCA02	48	48	50	48	50	45	38	32	24	35	49	37	38	26	38	38	46
R0114	11 PENROSE STREET, WILTON	Residential	NCA02	45	50	52	49	51	47	37	31	23	34	51	39	40	28	37	37	48
R0115	98 CONDELL PARK ROAD, WILTON	Residential	NCA04	45	51	54	50	52	48	44	37	29	43	52	40	41	25	37	48	40
R0116	13 PENROSE STREET, WILTON	Residential	NCA02	48	49	51	48	50	46	37	30	22	34	50	38	39	29	39	37	45
R0117	15 PENROSE STREET, WILTON	Residential	NCA02	47	50	53	49	51	47	37	32	24	35	51	39	40	27	39	38	49
R0118	28 STIRLING DRIVE, WILTON	Residential	NCA02	54	55	57	54	56	52	42	35	27	40	56	44	44	31	41	43	55
R0119	48 BALMORAL RISE, WILTON	Residential	NCA04	46	46	47	46	48	43	35	29	21	31	47	35	36	25	37	37	42
R0120	2 PENROSE STREET, WILTON	Residential	NCA02	51	50	51	50	52	47	44	37	30	43	51	39	40	27	41	45	46
R0121	96 CONDELL PARK ROAD, WILTON	Residential	NCA04	45	53	55	52	54	50	44	37	29	42	54	42	43	27	38	47	42
R0122	17 STIRLING DRIVE, WILTON	Residential	NCA02	52	55	57	54	56	51	39	32	25	37	55	43	44	30	39	41	54
R0123	26 STIRLING DRIVE, WILTON	Residential	NCA02	51	54	57	53	55	51	41	34	27	39	55	43	44	31	37	39	54
R0124	23 SUTTON CRESCENT, WILTON	Residential	NCA02	46	47	48	46	48	44	38	32	24	37	48	36	37	27	39	38	44
R0125	50 BALMORAL RISE, WILTON	Residential	NCA04	44	46	48	46	48	43	35	29	21	31	47	35	36	27	36	35	41
R0126	22 SUTTON CRESCENT, WILTON	Residential	NCA02	43	47	48	46	48	44	42	35	27	40	48	36	37	24	36	41	45
R0127	94 CONDELL PARK ROAD, WILTON	Residential	NCA04	44	53	55	52	54	49	44	37	29	42	53	41	42	26	37	46	38
R0128	39 BALMORAL RISE, WILTON	Residential	NCA02	41	46	47	45	47	43	39	32	25	37	47	35	36	27	38	38	43
R0129	95 CONDELL PARK ROAD, WILTON	Residential	NCA04	46	54	56	53	55	51	44	37	29	42	55	43	44	24	37	47	36
R0130	8 PENROSE STREET, WILTON	Residential	NCA02	45	48	49	47	49	45	39	32	24	35	49	37	38	27	39	38	45
R0131	10 PENROSE STREET, WILTON	Residential	NCA02	44	49	51	48	50	46	38	31	24	35	50	38	39	27	39	38	47
R0132	21 SUTTON CRESCENT, WILTON	Residential	NCA02	47	47	48	46	48	44	37	31	23	34	48	36	36	27	40	37	44
R0133	12 PENROSE STREET, WILTON	Residential	NCA02	46	50	52	50	52	47	39	32	25	37	51	39	40	27	40	38	48
R0134	14 PENROSE STREET, WILTON	Residential	NCA02	46	51	54	51	53	48	38	32	24	36	52	40	41	29	37	39	49
R0135	52 BALMORAL RISE, WILTON	Residential	NCA04	45	46	47	45	47	43	38	31	24	34	47	35	36	26	37	37	38
R0136	41 BALMORAL RISE, WILTON	Residential	NCA02	45	49	50	48	50	46	42	35	28	41	50	37	38	27	39	42	44
R0137	20 SUTTON CRESCENT, WILTON	Residential	NCA02	40	46	47	45	47	43	43	36	28	41	47	35	36	26	37	41	42
R0138	15 STIRLING DRIVE, WILTON	Residential	NCA02	50	52	55	51	53	49	40	33	25	37	53	41	41	28	39	38	53
R0139	92 CONDELL PARK ROAD, WILTON	Residential	NCA04	42	50	52	50	52	47	43	35	28	41	51	39	40	25	34	44	36
R0140	22 STIRLING DRIVE, WILTON	Residential	NCA02	51	55	57	54	56	52	41	34	26	38	56	44	44	31	39	41	54
R0141	17 SUTTON CRESCENT, WILTON	Residential	NCA02	46	49	51	48	50	46	42	35	27	40	50	38	39	28	40	42	45
R0142	7 ELMWOOD WAY, WILTON	Residential	NCA02	44	49	50	48	50	45	39	33	25	35	49	37	38	27	37	35	46
R0143	54 BALMORAL RISE, WILTON	Residential	NCA04	43	46	47	46	48	43	33	26	18	31	47	35	36	25	35	36	37
R0144	18 SUTTON CRESCENT, WILTON	Residential	NCA02	46	49	51	49	51	46	43	36	28	41	50	38	39	29	39	44	46
R0145	13 STIRLING DRIVE, WILTON	Residential	NCA02	50	53	54	52	54	49	39	33	25	36	53	41	42	30	38	41	49
R0146	8 ELMWOOD WAY, WILTON	Residential	NCA02	44	49	50	48	50	46	39	32	24	37	50	38	38	29	37	35	46
R0147	43 BALMORAL RISE, WILTON	Residential	NCA04	42	45	46	44	46	42	38	32	24	36	46	34	35	27	38	38	41
R0148	90 CONDELL PARK ROAD, WILTON	Residential	NCA04	44	52	54	51	53	49	42	35	27	41	53	41	42	26	35	44	37
R0149	20 STIRLING DRIVE, WILTON	Residential	NCA02	48	54	56	53	55	51	40	33	25	37	55	43	43	28	37	40	51
R0150	3 ALBATROSS BEND, WILTON	Residential	NCA02	51	55	57	54	56	52	43	35	27	39	56	44	44	32	40	39	53
R0151	15 SUTTON CRESCENT, WILTON	Residential	NCA02	45	47	48	46	48	44	39	32	24	37	48	36	37	27	38	37	45
R0152	5 ELMWOOD WAY, WILTON	Residential	NCA02	43	48	49	47	49	44	38	31	23	35	48	36	37	28	36	36	45
R0153	16 SUTTON CRESCENT, WILTON	Residential	NCA02	44	46	47	45	47	43	42	35	27	39	47	35	36	27	38	41	40
R0154	6 ELMWOOD WAY, WILTON	Residential	NCA02	45	48	49	47	49	45	39	32	24	37	49	37	38	28	38	36	47
R0155	7 ALBATROSS BEND, WILTON	Residential	NCA02	52	54	56	53	55	51	41	34	26	39	55	43	44	32	41	37	52
R0156	56 BALMORAL RISE, WILTON	Residential	NCA04	41	48	49	47	49	45	36	29	21	29	49	37	38	25	37	37	37
R0157	45 BALMORAL RISE, WILTON	Residential	NCA04	44	46	47	45	47	43	40	33	25	37	47	35	36	27	36	37	41
R0158	88 CONDELL PARK ROAD, WILTON	Residential	NCA04	44	52	54	52	54	49	41	34	26	40	53	41	42	25	34	43	36
R0159	11 STIRLING DRIVE, WILTON	Residential	NCA02	48	51	52	50	52	47	37	30	22	35	51	39	40	30	38	38	48
R0160	3 ELMWOOD WAY, WILTON	Residential	NCA02	42	47	48	46	48	44	39	32	24	36	48	36	37	26	35	36	44
R0161	13 SUTTON CRESCENT, WILTON	Residential	NCA04	43	46	47	45	47	43	40	33	25	38	47	35	36	27	36	37	43
R0162	4 ELMWOOD WAY, WILTON	Residential	NCA02	45	49	50	48	50	46	40	33	25	36	50	38	39	28	38	37	47
R0163	14 SUTTON CRESCENT, WILTON	Residential	NCA02	42	46	47	45	47	43	40	33	25	38	47	35	36	27	37	36	44
R0164	9 ALBATROSS BEND, WILTON	Residential	NCA02	50	54	56	53	55	51	40	32	25	37	55	43	43	32	39	36	52
R0165	58 BALMORAL RISE, WILTON	Residential	NCA04	39	47	49	46	48	44	34	29	20	30	48	36	37	25	33	37	37
R0166	9 STIRLING DRIVE, WILTON	Residential	NCA02	47	49	51	48	50	46	38	31	23	33	50	38	39	29	36	36	

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0192	6 ALBATROSS BEND, WILTON	Residential	NCA02	43	49	50	48	50	46	36	30	22	33	50	38	38	32	36	32	44
R0193	51 BALMORAL RISE, WILTON	Residential	NCA04	42	49	51	49	51	46	38	31	23	36	50	38	39	24	34	38	39
R0194	8 BOWRAL STREET, WILTON	Residential	NCA02	42	47	48	46	48	44	40	33	25	38	48	36	37	28	36	38	42
R0195	10 BOWRAL STREET, WILTON	Residential	NCA02	43	46	48	45	47	43	39	33	25	37	47	35	36	28	38	37	43
R0196	2 BOWRAL STREET, WILTON	Residential	NCA04	40	45	46	44	46	42	39	32	24	37	46	34	34	26	36	36	42
R0197	6 BOWRAL STREET, WILTON	Residential	NCA02	40	45	47	45	47	42	39	32	24	37	46	34	35	28	37	38	42
R0198	12 BOWRAL STREET, WILTON	Residential	NCA02	42	48	49	47	49	45	39	32	24	37	49	37	37	27	36	39	45
R0199	12 STIRLING DRIVE, WILTON	Residential	NCA02	45	48	50	48	50	45	38	31	24	35	49	37	38	26	37	37	44
R0200	5 SUTTON CRESCENT, WILTON	Residential	NCA04	38	46	47	45	47	43	36	30	22	34	47	35	36	27	36	36	40
R0201	4 BOWRAL STREET, WILTON	Residential	NCA04	41	46	47	45	47	43	38	32	24	35	47	35	36	28	35	37	43
R0202	8 ALBATROSS BEND, WILTON	Residential	NCA02	44	50	51	49	51	47	34	28	20	32	51	39	40	32	36	34	46
R0203	14 BOWRAL STREET, WILTON	Residential	NCA02	43	48	50	47	49	45	37	31	23	33	49	37	38	28	38	37	45
R0204	80 CONDELL PARK ROAD, WILTON	Residential	NCA04	44	52	54	51	53	49	40	33	25	39	53	41	42	26	33	42	34
R0205	10 ALBATROSS BEND, WILTON	Residential	NCA02	44	50	52	49	51	47	36	30	22	34	51	39	40	31	34	35	45
R0206	8 SUTTON CRESCENT, WILTON	Residential	NCA04	38	45	46	44	46	42	38	32	24	36	46	34	35	27	35	35	38
R0207	40 STIRLING DRIVE, WILTON	Residential	NCA02	44	49	50	48	50	46	38	32	24	36	50	38	38	28	37	36	44
R0208	12 BERRIMA ROAD, WILTON	Residential	NCA04	42	50	51	49	51	47	37	31	23	28	51	39	40	25	33	37	36
R0209	19 ALBATROSS BEND, WILTON	Residential	NCA02	47	53	55	52	54	50	39	32	25	36	54	42	42	33	37	37	50
R0210	6 BERRIMA ROAD, WILTON	Residential	NCA04	39	46	48	46	48	43	38	32	24	37	47	35	36	26	34	38	36
R0211	1/280055	Passive recreation	NCA02	46	53	56	52	54	50	39	32	24	36	54	42	42	29	35	36	48
R0212	12 ALBATROSS BEND, WILTON	Residential	NCA02	43	50	52	49	51	47	36	30	22	34	51	39	39	31	33	33	44
R0213	4 BERRIMA ROAD, WILTON	Residential	NCA04	40	47	48	46	48	44	32	28	19	29	48	36	37	25	33	33	36
R0214	2 BERRIMA ROAD, WILTON	Residential	NCA04	40	48	49	47	49	44	35	29	22	33	48	36	37	27	37	36	40
R0215	8 BERRIMA ROAD, WILTON	Residential	NCA04	41	47	48	46	48	44	38	31	23	33	48	36	37	25	34	36	33
R0216	21 ALBATROSS BEND, WILTON	Residential	NCA02	47	53	55	52	54	50	38	31	23	35	54	42	42	33	37	37	49
R0217	10 BERRIMA ROAD, WILTON	Residential	NCA04	40	48	49	47	49	44	37	30	22	34	48	36	37	26	36	40	39
R0218	8 STIRLING DRIVE, WILTON	Residential	NCA02	43	48	49	47	49	45	39	32	24	36	49	37	38	28	37	36	43
R0219	6 SUTTON CRESCENT, WILTON	Residential	NCA04	40	48	49	48	50	45	38	31	23	36	49	37	38	28	35	38	37
R0220	3 STIRLING DRIVE, WILTON	Residential	NCA02	42	47	48	46	48	44	37	30	23	34	48	36	36	29	36	35	43
R0221	23 ALBATROSS BEND, WILTON	Residential	NCA02	47	53	54	52	54	50	39	33	25	36	54	42	42	33	37	40	49
R0222	14 ALBATROSS BEND, WILTON	Residential	NCA02	43	50	52	49	51	47	39	32	25	36	51	39	39	31	38	38	44
R0223	6 STIRLING DRIVE, WILTON	Residential	NCA02	42	47	49	46	48	44	38	31	24	34	48	36	37	30	36	35	42
R0224	60 CONDELL PARK ROAD, WILTON	Residential	NCA04	44	52	54	51	53	49	41	34	26	40	53	41	42	24	34	42	35
R0225	16 ALBATROSS BEND, WILTON	Residential	NCA02	42	51	52	50	52	48	37	30	23	35	52	39	40	31	33	35	44
R0226	13 FAIRWAY DRIVE, WILTON	Residential	NCA04	42	48	48	47	49	45	41	34	26	38	49	37	37	29	37	41	44
R0227	26 ALBATROSS BEND, WILTON	Residential	NCA02	47	52	54	52	54	49	40	33	25	37	53	41	42	30	37	39	49
R0228	24 ALBATROSS BEND, WILTON	Residential	NCA02	46	52	54	52	54	49	39	33	25	36	53	41	42	30	37	37	48
R0229	20 ALBATROSS BEND, WILTON	Residential	NCA02	43	51	53	51	53	48	37	31	23	34	52	40	41	30	37	35	46
R0230	22 ALBATROSS BEND, WILTON	Residential	NCA02	45	52	53	51	53	49	39	32	25	36	53	41	41	30	37	36	47
R0231	28 ALBATROSS BEND, WILTON	Residential	NCA02	46	54	56	53	55	51	41	33	26	38	55	42	43	32	37	40	49
R0232	18 ALBATROSS BEND, WILTON	Residential	NCA02	42	50	52	49	51	47	33	28	20	30	51	38	39	28	33	30	45
R0233	4 STIRLING DRIVE, WILTON	Residential	NCA02	42	46	48	46	48	43	38	31	24	36	47	35	36	29	36	36	43
R0234	27 ALBATROSS BEND, WILTON	Residential	NCA02	46	53	54	52	54	50	37	30	23	33	54	41	42	35	37	39	49
R0235	11 FAIRWAY DRIVE, WILTON	Residential	NCA04	37	45	45	44	46	41	39	32	25	37	45	34	34	26	35	38	40
R0236	4 SUTTON CRESCENT, WILTON	Residential	NCA04	40	48	48	47	49	44	35	30	22	33	48	37	37	25	32	35	39
R0237	15 FAIRWAY DRIVE, WILTON	Residential	NCA04	40	47	48	46	48	43	39	32	25	37	47	35	36	29	35	37	42
R0238	13 BERRIMA ROAD, WILTON	Residential	NCA04	43	51	52	50	52	48	40	33	25	37	52	40	41	24	31	40	34
R0239	11 BERRIMA ROAD, WILTON	Residential	NCA04	40	48	50	47	49	45	32	27	18	27	49	37	38	23	30	37	34
R0240	5 BERRIMA ROAD, WILTON	Residential	NCA04	38	46	49	45	47	43	37	31	23	35	47	35	36	24	31	37	36
R0241	9 BERRIMA ROAD, WILTON	Residential	NCA04	40	49	50	48	50	45	34	29	21	31	49	37	38	23	34	37	34
R0242	3 BERRIMA ROAD, WILTON	Residential	NCA04	37	45	47	45	47	42	32	27	19	28	46	34	35	24	32	35	38
R0243	7 BERRIMA ROAD, WILTON	Residential	NCA04	40	48	50	47	49	45	35	30	22	32	49	37	38	25	31	36	34
R0244	1 BERRIMA ROAD, WILTON	Residential	NCA04	38	46	47	45	47	42	33	27	19	28	46	35	35	26	34	34	37
R0245	29 ALBATROSS BEND, WILTON	Residential	NCA02	46	53	54	52	54	50	36	29	22	33	54	42	42	34	37	36	48
R0246	30 ALBATROSS BEND, WILTON	Residential	NCA02	42	51	53	50	52	47	35	28	20	29	51	39	40	34	34	31	45
R0247	40 CONDELL PARK ROAD, WILTON	Residential	NCA03	57	65	69	64	66	61	41	34	26	39	65	53	54	25	34	41	35
R0248	9 FAIRWAY DRIVE, WILTON	Residential	NCA04	38	46	47	45	47	43	34	28	20	30	47	35	36	28	33	36	39
R0249	2 STIRLING DRIVE, WILTON	Residential	NCA04	43	47	47	46	48	43	38	31	23	35	47	36	36	29	36	37	44
R0250	19 FAIRWAY DRIVE, WILTON	Residential	NCA02	44	47	48	46	48	44	38	31	23	35	48	36	37	29	36	35	43
R0251	21 FAIRWAY DRIVE, WILTON	Residential	NCA02	40	46	47	46	48	43	38	31	23	35	47	36	36	30	34	37	43
R0252	31 FAIRWAY DRIVE, WILTON	Residential	NCA02	44	51	53	51	53	48	39	32	24	36	52	40	41	33	30	39	47
R0253	25 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	47	47	46	48	44	37	30	22	34	48	36	37	29	33	35	43
R0254	23 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	46	47	45	47	43	37	30	23	33	47	35	36	30	34	34	42
R0255	33 FAIRWAY DRIVE, WILTON	Residential	NCA02	45	51	53	50	52	48	36	30	22	25	52	40	41	33	36	28	47
R0256	27 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	47	47	46	48	44	34	29	21	32	48	36	37	31	36	35	42
R0257	35 FAIRWAY DRIVE, WILTON	Residential	NCA02	45	53	54	52	54	50	39	32	24	35	54	42	42	34	36	37	48
R0258	37 FAIRWAY DRIVE, WILTON	Residential	NCA02	45	52	53	51	53	49	38	32	24	35	53	41	42	35	36	38	47
R0259	8 KANGALOO CLOSE, WILTON	Residential	NCA04	38	46	47	45	47	43	29	25	16	25	47	35	36	24	27	31	31
R0260	32 ALBATROSS BEND, WILTON	Residential	NCA02	44	51	53	51	53	48	36	30	22	34	52	40	41	32	33	35	46
R0261	10 KANGALOO CLOSE, WILTON	Residential	NCA04	42	50	51	49	51	46	38	32	24	36	50	38	39	23	27	39	30
R0262	6 KANGALOO CLOSE, WILTON	Residential	NCA04	40	48	48	47	49	45	36	30	22	34	49	37	37	27	31	36	38
R0263	4 KANGALOO CLOSE, WILTON	Residential	NCA04	37	45	46	44	46	42	31	26	18	26	46	34	35	25	29	32	31
R0264	2 KANGALOO CLOSE, WILTON	Residential	NCA04	37	45	46	44	46	42	31	25	17	25	46	34	35	25	26	35	31
R0265	5 FAIRWAY DRIVE, WILTON	Residential	NCA04	38	47	48	46	48	44	31	26	18	28	48	36	36	25	27	35	33
R0266	10 CONDELL PARK ROAD, WILTON	Residential																		

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0291	70 CONDELL PARK ROAD, WILTON	Residential	NCA04	46	54	56	53	55	51	40	33	25	37	55	43	43	25	35	40	38
R0292	9 PEMBROKE PARADE, WILTON	Residential	NCA04	51	59	62	58	60	55	39	33	25	37	59	47	48	27	34	40	35
R0293	11 KIRKWOOD CHASE, WILTON	Residential	NCA04	39	45	46	44	46	42	36	29	22	33	46	34	35	32	34	33	41
R0294	40 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	52	50	52	47	36	30	22	33	51	39	40	34	34	36	45
R0295	6 KIRKWOOD CHASE, WILTON	Residential	NCA04	39	47	48	46	48	44	33	27	19	29	48	36	37	26	31	35	38
R0296	19 KIRKWOOD CHASE, WILTON	Residential	NCA02	39	47	49	46	48	44	36	30	22	33	48	36	37	34	33	35	42
R0297	21 KIRKWOOD CHASE, WILTON	Residential	NCA02	42	50	52	49	51	47	37	31	23	34	51	39	40	34	34	35	43
R0298	11 PEMBROKE PARADE, WILTON	Residential	NCA04	47	55	59	54	56	52	39	32	25	37	56	44	45	26	33	39	35
R0299	15 KIRKWOOD CHASE, WILTON	Residential	NCA02	39	45	46	44	46	42	37	30	22	34	46	34	35	30	33	35	40
R0300	17 KIRKWOOD CHASE, WILTON	Residential	NCA02	38	45	46	44	46	42	34	28	20	32	46	34	35	29	32	32	41
R0301	13 KIRKWOOD CHASE, WILTON	Residential	NCA04	40	46	46	45	47	43	37	30	23	35	47	35	35	31	35	36	42
R0302	8 KIRKWOOD CHASE, WILTON	Residential	NCA04	38	46	46	45	47	43	36	30	22	33	47	35	36	29	34	35	37
R0303	42 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	52	50	52	47	34	28	20	32	51	39	40	35	34	35	45
R0304	14 KIRKWOOD CHASE, WILTON	Residential	NCA04	37	45	45	44	46	42	38	31	23	35	46	34	35	28	33	36	39
R0305	18 KIRKWOOD CHASE, WILTON	Residential	NCA04	36	43	44	43	45	40	36	29	21	32	44	32	33	26	32	33	39
R0306	16 KIRKWOOD CHASE, WILTON	Residential	NCA04	39	45	45	44	46	42	38	32	24	36	46	34	35	30	35	38	41
R0307	10 KIRKWOOD CHASE, WILTON	Residential	NCA04	37	45	46	44	46	42	37	30	23	35	46	34	34	29	32	35	38
R0308	12 KIRKWOOD CHASE, WILTON	Residential	NCA04	38	43	44	42	44	40	36	29	22	33	44	32	33	27	32	36	38
R0309	36 KIRKWOOD CHASE, WILTON	Residential	NCA02	42	49	51	49	51	46	36	30	22	33	50	38	39	34	33	35	44
R0310	20 KIRKWOOD CHASE, WILTON	Residential	NCA04	38	46	46	45	47	43	39	32	24	36	47	35	35	31	35	39	41
R0311	44 FAIRWAY DRIVE, WILTON	Residential	NCA02	43	51	52	50	52	48	37	30	23	33	52	40	40	35	34	36	44
R0312	22 KIRKWOOD CHASE, WILTON	Residential	NCA04	36	44	44	43	45	41	35	28	21	32	45	33	34	30	32	33	39
R0313	13 PEMBROKE PARADE, WILTON	Residential	NCA04	46	54	58	53	55	51	39	32	24	37	55	43	44	26	32	38	35
R0314	4 PEMBROKE PARADE, WILTON	Residential	NCA03	60	68	73	67	69	65	39	32	24	37	69	57	57	27	32	39	32
R0315	2 PEMBROKE PARADE, WILTON	Residential	NCA03	67	75	80	75	77	72	39	32	24	36	76	64	65	29	31	38	33
R0316	6A PEMBROKE PARADE, WILTON	Residential	NCA04	54	62	67	61	63	59	39	32	24	37	63	51	52	29	32	39	33
R0317	32 KIRKWOOD CHASE, WILTON	Residential	NCA02	41	49	51	48	50	46	36	30	22	33	50	38	39	33	33	34	44
R0318	24 KIRKWOOD CHASE, WILTON	Residential	NCA04	39	46	46	45	47	43	38	31	23	35	47	35	35	31	35	38	41
R0319	15 PEMBROKE PARADE, WILTON	Residential	NCA04	46	54	57	54	56	51	39	32	25	37	55	43	44	28	35	40	36
R0320	30 KIRKWOOD CHASE, WILTON	Residential	NCA02	40	48	51	48	50	45	35	28	21	32	49	37	38	32	34	32	41
R0321	6 GREEN COURT, WILTON	Residential	NCA02	41	47	48	46	48	44	36	29	22	33	48	36	36	34	34	34	43
R0322	8 PEMBROKE PARADE, WILTON	Residential	NCA04	50	57	62	57	59	54	38	32	24	36	58	46	47	26	32	38	33
R0323	46 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	51	49	51	47	37	30	22	33	51	39	40	35	34	36	43
R0324	17 PEMBROKE PARADE, WILTON	Residential	NCA04	46	54	55	53	55	51	39	32	24	36	55	42	43	27	34	39	37
R0325	10 PEMBROKE PARADE, WILTON	Residential	NCA04	47	55	58	54	56	52	38	32	24	36	56	44	45	27	32	38	34
R0326	48 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	49	51	49	51	46	35	28	21	32	50	38	39	34	30	35	42
R0327	3 GREEN COURT, WILTON	Residential	NCA02	41	48	50	47	49	45	36	30	22	33	49	37	38	31	34	33	42
R0328	5 HORNBY STREET, WILTON	Residential	NCA03	68	76	82	75	77	73	37	30	22	34	77	65	66	29	31	36	32
R0329	4 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	58	66	72	66	68	63	37	31	23	35	67	55	56	22	31	36	32
R0330	12 PEMBROKE PARADE, WILTON	Residential	NCA04	46	54	57	53	55	51	38	31	23	35	55	43	44	27	32	38	33
R0331	7 HORNBY STREET, WILTON	Residential	NCA03	68	76	81	75	77	72	33	27	19	31	76	64	65	29	30	35	31
R0332	50 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	49	50	48	50	46	35	28	20	33	50	38	39	34	31	34	44
R0333	1 CHISOLM STREET, WILTON	Residential	NCA04	54	62	66	61	63	59	38	31	23	35	63	51	52	29	31	37	33
R0334	9 HORNBY STREET, WILTON	Residential	NCA03	67	75	80	74	76	72	37	31	23	35	76	64	64	29	31	37	32
R0335	6 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	60	68	73	67	69	65	37	31	23	35	69	57	57	30	31	37	33
R0336	14 PEMBROKE PARADE, WILTON	Residential	NCA04	45	53	56	52	54	50	38	31	24	36	54	42	43	28	32	37	34
R0337	59 FAIRWAY DRIVE, WILTON	Residential	NCA02	43	51	52	50	52	48	36	30	22	32	52	40	41	35	34	35	44
R0338	3 CHISOLM STREET, WILTON	Residential	NCA04	52	60	64	59	61	57	37	31	23	35	61	49	50	29	31	37	32
R0339	61 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	52	49	51	47	36	29	21	32	51	39	40	35	33	34	43
R0340	26 PEMBROKE PARADE, WILTON	Residential	NCA04	42	50	51	49	51	47	38	31	23	35	51	39	40	25	33	38	36
R0341	1 AMBROSE DRIVE, WILTON	Residential	NCA02	41	49	50	48	50	46	35	29	21	32	50	38	39	34	33	34	43
R0342	16 PEMBROKE PARADE, WILTON	Residential	NCA04	43	51	54	51	53	48	38	31	23	35	52	40	41	27	32	38	35
R0343	24 PEMBROKE PARADE, WILTON	Residential	NCA04	42	50	53	50	52	47	38	31	23	35	51	39	40	25	32	38	36
R0344	11 HORNBY STREET, WILTON	Residential	NCA03	65	73	79	72	74	70	34	28	20	31	74	62	63	29	30	34	31
R0345	5 CHISOLM STREET, WILTON	Residential	NCA04	49	57	60	56	58	54	37	31	23	35	58	46	46	27	31	37	33
R0346	65 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	51	49	51	46	35	29	21	32	50	39	39	36	33	34	42
R0347	67 FAIRWAY DRIVE, WILTON	Residential	NCA02	42	50	51	49	51	47	35	29	21	32	51	39	40	36	33	34	42
R0348	18 PEMBROKE PARADE, WILTON	Residential	NCA04	42	50	51	49	51	47	38	31	23	35	51	39	39	26	32	37	35
R0349	8 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	58	66	71	65	67	63	36	30	22	34	67	55	56	30	31	36	34
R0350	20 PEMBROKE PARADE, WILTON	Residential	NCA04	41	49	51	49	51	46	38	31	23	35	50	38	39	26	33	37	36
R0351	40/270536	Residential	NCA02	38	46	48	46	48	43	35	28	21	31	47	35	36	43	32	33	41
R0352	54 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	49	50	48	50	46	36	29	22	32	50	38	39	35	33	35	43
R0353	22 PEMBROKE PARADE, WILTON	Residential	NCA04	42	50	52	49	51	47	38	31	23	35	51	39	40	24	33	37	36
R0354	13 HORNBY STREET, WILTON	Residential	NCA03	64	72	78	71	73	69	36	29	22	34	73	61	62	31	30	36	32
R0355	73 FAIRWAY DRIVE, WILTON	Residential	NCA02	38	46	49	45	47	43	35	28	20	31	47	35	36	36	32	33	38
R0356	7 CHISOLM STREET, WILTON	Residential	NCA04	50	58	60	57	59	55	37	31	23	35	59	46	47	29	31	37	34
R0357	75 FAIRWAY DRIVE, WILTON	Residential	NCA02	37	45	46	44	46	42	33	27	19	30	46	34	35	36	30	32	38
R0358	77 FAIRWAY DRIVE, WILTON	Residential	NCA02	37	45	46	45	47	42	34	28	20	31	46	34	35	36	31	32	38
R0359	15 HORNBY STREET, WILTON	Residential	NCA03	64	72	77	71	73	69	36	29	21	33	73	61	61	30	29	35	31
R0360	9 CHISOLM STREET, WILTON	Residential	NCA04	48	54	57	53	55	51	37	31	23	34	55	43	44	27	31	36	34
R0361	5 OXENBRIDGE AVENUE, WILTON	Residential	NCA04	53	61	66	61	63	58	37	30	22	34	62	50	51	29	30	36	33
R0362	79 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	49	50	48	50	46	35	29	21	31	50	38	39	37	33	34	42
R0363	10 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	57	65	70	64	66	62	34	28	20	31	66	54	55	29	29	34	31
R0364	83 FAIRWAY DRIVE, WILTON	Residential	NCA02	41	49	50	49	51	46	35	29	21	31	50	38	39	38	32	34	42

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0390	85 THE IRONS DRIVE, WILTON	Residential	NCA02	39	47	48	46	48	44	35	28	20	31	48	36	36	37	32	33	41
R0391	6 CLUBHOUSE ROAD, WILTON	Residential	NCA02	35	43	45	43	45	40	32	26	18	30	44	32	33	34	30	32	38
R0392	10 CHISOLM STREET, WILTON	Residential	NCA04	42	50	52	49	51	47	37	30	22	34	51	39	40	25	30	36	33
R0393	21 HORNBY STREET, WILTON	Residential	NCA03	62	70	75	69	71	67	35	28	21	32	71	59	59	31	29	33	30
R0394	14 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	56	64	69	64	66	61	35	29	21	32	65	53	54	31	30	34	31
R0395	3 CLUBHOUSE ROAD, WILTON	Residential	NCA02	40	48	49	47	49	45	35	28	21	32	49	37	38	35	33	33	40
R0396	12 CHISOLM STREET, WILTON	Residential	NCA04	43	51	54	50	52	48	36	30	22	34	52	40	41	28	31	35	33
R0397	5 CLUBHOUSE ROAD, WILTON	Residential	NCA02	37	45	46	44	46	42	34	28	20	30	46	34	35	35	31	32	37
R0398	83 THE IRONS DRIVE, WILTON	Residential	NCA02	37	44	44	44	46	41	32	27	18	29	45	33	34	35	27	33	36
R0399	23 HORNBY STREET, WILTON	Residential	NCA03	61	69	75	69	71	66	35	29	21	32	70	58	59	31	29	33	29
R0400	22 CHISOLM STREET, WILTON	Residential	NCA04	39	47	48	46	48	44	37	30	23	34	48	36	36	29	32	37	37
R0401	1 COOPER STREET, WILTON	Residential	NCA04	43	51	54	51	53	48	36	30	22	33	52	40	41	27	31	35	33
R0402	9-9A OXENBRIDGE AVENUE, WILTON	Residential	NCA04	53	61	65	60	62	58	35	29	21	33	62	50	51	34	30	35	32
R0403	3 GOODWIN STREET, WILTON	Residential	NCA04	45	53	56	52	54	50	36	30	22	33	54	42	43	29	31	35	33
R0404	4 GOODWIN STREET, WILTON	Residential	NCA04	50	56	60	55	57	53	36	30	22	34	57	45	45	33	31	36	34
R0405	20 CHISOLM STREET, WILTON	Residential	NCA04	40	48	49	47	49	45	37	30	22	34	49	37	38	26	31	36	34
R0406	18 CHISOLM STREET, WILTON	Residential	NCA04	42	50	52	50	52	47	37	30	23	34	51	39	40	28	32	36	35
R0407	16 CHISOLM STREET, WILTON	Residential	NCA04	43	51	53	50	52	48	36	30	22	34	52	40	41	26	31	35	34
R0408	81 THE IRONS DRIVE, WILTON	Residential	NCA02	35	43	43	42	44	40	33	27	19	29	44	32	33	35	31	29	37
R0409	7 CLUBHOUSE ROAD, WILTON	Residential	NCA02	36	44	45	44	46	41	34	28	20	30	45	33	34	35	31	32	37
R0410	16 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	55	63	67	62	64	59	33	27	19	30	63	51	52	32	30	34	31
R0411	25 HORNBY STREET, WILTON	Residential	NCA03	61	69	74	68	70	66	34	27	20	30	70	58	59	33	29	32	29
R0412	2 JEFFREY STREET, WILTON	Residential	NCA04	38	46	46	45	47	43	36	30	22	33	47	35	35	25	31	36	35
R0413	9 CLUBHOUSE ROAD, WILTON	Residential	NCA02	37	45	47	45	47	42	34	28	20	30	46	34	35	35	31	32	37
R0414	3 COOPER STREET, WILTON	Residential	NCA04	41	48	50	48	50	45	35	28	20	32	49	38	38	27	30	34	32
R0415	4 JEFFREY STREET, WILTON	Residential	NCA04	37	45	46	45	47	42	36	30	22	33	46	34	35	25	31	36	36
R0416	16 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	55	63	66	62	64	59	35	29	21	33	63	51	52	31	27	35	28
R0417	4 COOPER STREET, WILTON	Residential	NCA04	40	48	49	47	49	44	36	30	22	33	48	37	37	28	31	35	33
R0418	6 JEFFREY STREET, WILTON	Residential	NCA04	37	45	46	45	47	42	36	30	22	34	46	34	35	24	31	36	36
R0419	8 JEFFREY STREET, WILTON	Residential	NCA04	37	45	46	44	46	41	36	30	22	33	45	33	34	25	31	36	36
R0420	5 GOODWIN STREET, WILTON	Residential	NCA04	45	53	55	52	54	50	36	30	22	33	54	42	43	32	31	35	34
R0421	4 DONELEY STREET, WILTON	Residential	NCA04	40	47	48	47	49	44	35	28	20	32	48	36	37	26	31	34	33
R0422	78 THE IRONS DRIVE, WILTON	Residential	NCA02	40	48	48	47	49	45	34	28	20	30	49	37	37	36	32	33	39
R0423	77 THE IRONS DRIVE, WILTON	Residential	NCA02	36	44	45	43	45	40	33	27	19	30	44	33	33	34	31	30	37
R0424	11 OXENBRIDGE AVENUE, WILTON	Residential	NCA04	53	61	64	60	62	58	34	28	21	31	62	50	50	33	30	34	32
R0425	6 GOODWIN STREET, WILTON	Residential	NCA04	47	55	58	55	57	52	36	29	21	33	56	44	45	32	29	35	32
R0426	3 DONELEY STREET, WILTON	Residential	NCA04	39	46	47	45	47	43	36	30	22	33	47	35	36	27	30	35	34
R0427	4 HORDERN STREET, WILTON	Residential	NCA04	40	48	49	48	50	45	35	29	21	33	49	37	38	26	30	35	35
R0428	75 THE IRONS DRIVE, WILTON	Residential	NCA02	37	45	45	44	46	41	28	24	15	24	45	34	34	34	26	29	36
R0429	27 HORNBY STREET, WILTON	Residential	NCA03	59	67	73	66	68	64	35	28	20	32	68	56	57	33	29	32	29
R0430	5 COOPER STREET, WILTON	Residential	NCA04	41	49	51	48	50	46	36	30	22	33	50	38	39	29	31	35	35
R0431	6 COOPER STREET, WILTON	Residential	NCA04	42	50	51	49	51	47	33	27	19	30	51	39	40	30	28	33	32
R0432	18 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	55	63	68	62	64	60	32	26	18	29	64	52	53	35	28	33	30
R0433	3 HORDERN STREET, WILTON	Residential	NCA04	38	46	46	45	47	43	34	27	20	30	47	35	36	26	28	34	34
R0434	10 JEFFREY STREET, WILTON	Residential	NCA04	35	43	44	42	44	40	34	28	19	31	44	32	32	25	30	33	35
R0435	6 DONELEY STREET, WILTON	Residential	NCA04	43	51	52	50	52	48	36	30	22	33	52	39	40	30	31	35	34
R0436	6 HORDERN STREET, WILTON	Residential	NCA04	37	45	45	44	46	42	34	28	20	32	46	34	35	26	28	34	33
R0437	7 GOODWIN STREET, WILTON	Residential	NCA04	45	53	55	52	54	50	33	27	19	30	54	42	43	30	30	34	32
R0438	5 DONELEY STREET, WILTON	Residential	NCA04	38	45	47	45	47	42	33	27	19	30	46	34	35	29	30	32	33
R0439	5 HORDERN STREET, WILTON	Residential	NCA04	35	43	43	42	44	40	33	27	19	30	44	32	33	27	29	32	32
R0440	29 HORNBY STREET, WILTON	Residential	NCA03	58	66	72	65	67	63	35	28	20	32	67	55	56	30	29	33	30
R0441	74 THE IRONS DRIVE, WILTON	Residential	NCA02	35	43	44	42	44	40	34	28	20	30	44	32	33	36	31	32	36
R0442	13 OXENBRIDGE AVENUE, WILTON	Residential	NCA04	49	57	61	56	58	54	34	27	20	32	58	46	47	31	29	34	31
R0443	8 GOODWIN STREET, WILTON	Residential	NCA04	47	55	58	54	56	52	33	27	19	30	56	44	44	32	29	33	31
R0444	7 COOPER STREET, WILTON	Residential	NCA04	43	51	52	50	52	48	36	30	22	33	52	40	40	30	32	36	35
R0445	12 JEFFREY STREET, WILTON	Residential	NCA04	34	41	43	41	43	38	32	26	18	30	42	31	31	25	30	34	34
R0446	8 HORDERN STREET, WILTON	Residential	NCA04	35	43	43	42	44	39	33	27	19	30	43	31	32	26	30	34	33
R0447	30 HORNBY STREET, WILTON	Residential	NCA03	64	72	78	71	73	69	35	28	20	32	73	61	62	34	28	34	29
R0448	8 COOPER STREET, WILTON	Residential	NCA04	43	51	53	50	52	48	35	29	21	32	52	40	41	30	31	34	33
R0449	8 DONELEY STREET, WILTON	Residential	NCA04	40	48	49	47	49	45	35	29	21	32	49	37	38	29	31	35	34
R0450	7 HORDERN STREET, WILTON	Residential	NCA04	36	44	44	43	45	41	36	29	21	33	45	33	33	25	30	35	34
R0451	9 GOODWIN STREET, WILTON	Residential	NCA04	45	53	55	52	54	50	33	26	18	29	54	42	42	31	29	34	30
R0452	7 DONELEY STREET, WILTON	Residential	NCA04	38	46	48	45	47	43	35	28	21	32	47	35	36	27	30	35	33
R0453	10 HORDERN STREET, WILTON	Residential	NCA04	38	46	47	45	47	43	34	28	20	32	47	35	36	26	28	34	32
R0454	40 HORNBY STREET, WILTON	Residential	NCA03	64	72	77	71	73	68	36	29	22	33	72	60	61	36	30	35	31
R0455	9 HORDERN STREET, WILTON	Residential	NCA04	35	43	43	42	44	40	34	27	19	30	44	32	32	26	28	33	33
R0456	20 OXENBRIDGE AVENUE, WILTON	Residential	NCA03	57	65	71	65	67	62	35	28	20	32	66	54	55	34	29	34	30
R0457	9 COOPER STREET, WILTON	Residential	NCA04	42	50	52	49	51	46	34	28	20	32	50	39	39	30	29	33	31
R0458	10 COOPER STREET, WILTON	Residential	NCA04	44	52	54	51	53	48	32	26	18	29	52	41	41	30	29	33	31
R0459	12 HORDERN STREET, WILTON	Residential	NCA04	36	44	44	43	45	40	33	27	19	31	44	32	33	24	28	33	32
R0460	10 DONELEY STREET, WILTON	Residential	NCA04	39	47	48	46	48	44	35	28	21	31	48	36	36	29	31	34	33
R0461	1 BEATTY STREET, WILTON	Residential	NCA04	47	55	59	54	56	52	31	25	17	27	56	44	45	31	29	34	31
R0462	10 GOODWIN STREET, WILTON	Residential	NCA04	46	54	57	54	56	51	35	28	20	31	55	43	44	31	29	33	31
R0463	11 GOODWIN STREET, WILTON	Residential	NCA04	46	54	57	53	55	51	33	27	19	30	55	43	44	34	30	33	31
R0464	11 HORDERN STREET, WILTON	Residential	NCA04	35	43	4														

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0489	22 HORDERN STREET, WILTON	Residential	NCA04	36	44	44	43	45	41	33	27	19	31	45	33	34	25	27	33	32
R0490	16 DONELEY STREET, WILTON	Residential	NCA04	40	49	51	48	50	46	32	26	18	30	50	37	38	30	28	32	31
R0491	6 BEATTY STREET, WILTON	Residential	NCA04	47	55	59	55	57	52	34	28	20	31	56	44	45	34	28	33	30
R0492	15 DONELEY STREET, WILTON	Residential	NCA04	41	49	50	48	50	46	34	27	20	31	50	37	38	30	30	34	33
R0493	8 BEATTY STREET, WILTON	Residential	NCA04	48	56	58	55	57	53	34	28	20	31	57	45	45	37	28	33	29
R0494	24 HORDERN STREET, WILTON	Residential	NCA04	36	44	45	44	46	41	32	26	18	28	45	33	34	30	29	33	32
R0495	21 BEATTY STREET, WILTON	Residential	NCA04	37	45	45	44	46	42	32	26	18	29	46	34	34	30	28	32	31
R0496	10 BEATTY STREET, WILTON	Residential	NCA04	46	54	57	53	55	51	34	28	20	31	55	43	43	32	28	33	29
R0497	12 BEATTY STREET, WILTON	Residential	NCA04	44	52	55	51	53	49	34	28	20	31	53	41	42	32	28	33	29
R0498	14 BEATTY STREET, WILTON	Residential	NCA04	44	53	55	52	54	49	33	27	19	30	53	41	42	32	28	32	29
R0499	26 HORDERN STREET, WILTON	Residential	NCA04	41	49	50	48	50	46	33	27	19	30	50	38	38	30	29	33	33
R0500	16 BEATTY STREET, WILTON	Residential	NCA04	42	50	52	49	51	47	34	28	20	31	51	39	40	32	28	33	30
R0501	18 BEATTY STREET, WILTON	Residential	NCA04	43	51	53	50	52	48	32	26	18	28	52	40	41	33	29	33	30
R0502	20 BEATTY STREET, WILTON	Residential	NCA04	43	51	53	50	52	48	34	28	20	31	52	40	41	32	28	33	30
R0503	22 BEATTY STREET, WILTON	Residential	NCA04	42	51	53	50	52	48	34	28	20	31	52	40	41	31	29	33	31
R0504	24 BEATTY STREET, WILTON	Residential	NCA04	42	50	52	50	52	47	34	28	20	31	51	39	40	33	28	33	30
R0505	26 BEATTY STREET, WILTON	Residential	NCA04	40	48	50	47	49	45	34	28	20	31	49	37	38	33	28	33	31
R0506	28 BEATTY STREET, WILTON	Residential	NCA04	41	49	51	49	51	46	34	28	20	30	50	38	39	35	29	33	31
R0507	30 BEATTY STREET, WILTON	Residential	NCA04	40	49	51	48	50	46	34	28	20	31	50	38	38	33	29	33	30
R0508	32 BEATTY STREET, WILTON	Residential	NCA04	41	49	50	48	50	46	33	26	18	29	50	38	38	34	29	33	31
R0509	34 BEATTY STREET, WILTON	Residential	NCA04	41	49	50	48	50	46	35	28	21	31	50	38	38	33	30	34	33
R0510	1010 PICTON ROAD, WILTON	Residential	NCA06	63	71	76	70	72	68	33	26	19	30	72	60	61	39	27	31	27
R0511	55 HORNBY STREET, WILTON	Residential	NCA04	49	57	59	56	58	53	33	27	19	30	57	45	46	33	28	31	29
R0512	70 HORNBY STREET, WILTON	Residential	NCA06	63	72	76	71	73	68	32	26	18	28	72	60	61	46	26	31	27
R0513	65 HORNBY STREET, WILTON	Residential	NCA05	50	58	63	57	59	55	32	26	18	28	59	47	48	40	26	31	28
R0514	80 HORNBY STREET, WILTON	Residential	NCA05	54	63	66	62	64	59	32	26	18	29	63	51	52	44	26	30	27
R0515	88 HORNBY STREET, WILTON	Residential	NCA06	57	65	69	64	66	62	31	25	17	27	66	54	55	48	25	29	26
R0516	92 HORNBY STREET, WILTON	Residential	NCA05	51	59	63	58	60	56	28	23	14	24	60	47	48	44	24	26	26
R0517	85 HORNBY STREET, WILTON	Residential	NCA05	46	54	56	53	55	51	31	25	17	27	55	43	44	38	26	30	28
R0518	96 HORNBY STREET, WILTON	Residential	NCA05	51	59	62	58	60	55	30	25	17	27	59	47	48	43	25	29	26
R0519	96 HORNBY STREET, WILTON	Residential	NCA05	52	60	63	59	61	57	30	25	16	26	61	49	49	42	25	29	25
R0520	100 HORNBY STREET, WILTON	Residential	NCA05	52	60	63	59	61	57	30	25	16	26	61	49	49	46	25	29	26
R0521	102 HORNBY STREET, WILTON	Residential	NCA06	63	71	75	70	72	68	30	24	16	26	72	60	60	55	25	28	26
R0522	106 HORNBY STREET, WILTON	Residential	NCA05	50	58	62	58	60	55	30	24	16	26	59	47	48	45	25	28	26
R0523	110 HORNBY STREET, WILTON	Residential	NCA05	53	61	64	60	62	58	30	24	16	26	62	50	50	46	25	28	26
R0524	114 HORNBY STREET, WILTON	Residential	NCA05	50	57	62	57	59	54	29	23	15	25	58	46	47	47	23	27	25
R0525	118 HORNBY STREET, WILTON	Residential	NCA05	49	56	59	56	58	53	29	24	16	25	57	45	46	46	25	28	26
R0526	30 BROUGHTON STREET, WILTON	Passive recreation	NCA05	42	50	51	49	51	47	31	24	16	26	51	39	39	36	25	29	27
R0527	20 BROUGHTON STREET, WILTON	Passive recreation	NCA05	42	51	53	50	52	48	29	24	16	25	52	40	40	40	25	28	26
R0528	122 HORNBY STREET, WILTON	Residential	NCA05	49	57	60	56	58	54	28	23	15	24	58	46	46	48	24	27	24
R0529	68 ALMOND STREET, WILTON	Residential	NCA06	61	69	73	68	70	65	29	23	15	24	69	57	58	88	24	27	25
R0530	122 HORNBY STREET, WILTON	Residential	NCA05	48	56	60	56	58	53	28	22	14	22	57	45	46	48	23	26	25
R0531	121 HORNBY STREET, WILTON	Residential	NCA05	47	55	58	54	56	52	29	23	15	24	56	44	45	44	24	27	25
R0532	126 HORNBY STREET, WILTON	Residential	NCA05	49	57	60	56	58	54	28	22	14	24	58	46	47	50	23	26	24
R0533	33B BROUGHTON STREET, WILTON	Residential	NCA05	41	49	51	49	51	46	29	23	15	25	50	38	39	39	24	27	26
R0534	33A BROUGHTON STREET, WILTON	Residential	NCA05	42	50	52	49	51	47	29	24	16	25	51	39	40	41	25	28	26
R0535	123 HORNBY STREET, WILTON	Residential	NCA05	46	54	56	53	55	51	29	23	15	24	55	43	44	45	24	27	26
R0536	43 CAMPSIE STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	29	23	15	24	50	38	39	37	24	26	25
R0537	27 BROUGHTON STREET, WILTON	Residential	NCA05	40	48	49	47	49	45	29	23	15	25	49	37	37	35	24	27	26
R0538	125 HORNBY STREET, WILTON	Residential	NCA05	44	52	54	52	54	49	24	20	11	15	53	41	42	45	18	24	23
R0539	33C BROUGHTON STREET, WILTON	Residential	NCA05	42	50	52	49	51	47	26	21	13	22	51	39	40	42	23	26	25
R0540	41 CAMPSIE STREET, WILTON	Residential	NCA05	39	47	49	46	48	44	26	21	13	22	48	36	37	40	23	26	26
R0541	29 BROUGHTON STREET, WILTON	Residential	NCA05	40	48	49	47	49	45	29	23	15	25	49	37	38	37	24	27	26
R0542	127 HORNBY STREET, WILTON	Residential	NCA05	45	53	55	52	54	50	28	22	14	24	54	42	43	45	24	27	25
R0543	130 HORNBY STREET, WILTON	Residential	NCA05	49	58	61	57	59	54	28	23	14	24	58	46	47	51	23	26	24
R0544	54 CAMPSIE STREET, WILTON	Residential	NCA05	39	47	49	46	48	44	27	22	13	23	48	36	36	37	23	25	26
R0545	72 ALMOND STREET, WILTON	Residential	NCA06	71	79	84	78	80	76	27	21	13	23	80	68	68	66	22	25	24
R0546	60 ALMOND STREET, WILTON	Residential	NCA05	53	61	65	61	63	58	28	23	14	24	62	50	51	64	23	27	25
R0547	129 HORNBY STREET, WILTON	Residential	NCA05	45	53	55	52	54	50	28	23	14	24	54	42	43	45	23	26	25
R0548	37 CAMPSIE STREET, WILTON	Residential	NCA05	40	48	49	47	49	44	26	21	13	22	48	37	37	40	23	26	25
R0549	52 CAMPSIE STREET, WILTON	Residential	NCA05	38	46	47	45	47	43	26	21	13	22	47	35	36	36	23	24	24
R0550	35 CAMPSIE STREET, WILTON	Residential	NCA05	42	50	51	49	51	47	28	22	14	24	51	39	40	41	23	26	25
R0551	131 HORNBY STREET, WILTON	Residential	NCA05	46	54	56	53	55	51	25	20	12	22	55	43	43	45	21	23	21
R0552	70 ALMOND STREET, WILTON	Residential	NCA06	56	64	68	63	65	61	27	22	14	23	65	53	54	91	22	26	24
R0553	50 CAMPSIE STREET, WILTON	Residential	NCA05	38	46	46	45	47	43	24	19	11	20	47	35	36	37	19	23	22
R0554	33 CAMPSIE STREET, WILTON	Residential	NCA05	42	50	51	49	51	47	26	20	12	22	51	39	40	41	23	24	24
R0555	64 ALMOND STREET, WILTON	Residential	NCA05	53	61	66	60	62	58	27	22	14	23	62	50	51	92	23	26	24
R0556	133 HORNBY STREET, WILTON	Residential	NCA05	46	53	56	53	55	50	25	20	11	20	54	42	43	43	23	21	23
R0557	50 ALMOND STREET, WILTON	Residential	NCA05	51	59	62	58	60	56	28	23	14	24	60	48	48	54	23	26	24
R0558	60 ALMOND STREET, WILTON	Residential	NCA05	52	60	64	60	62	57	28	22	14	23	61	49	50	68	23	26	24
R0559	48 CAMPSIE STREET, WILTON	Residential	NCA05	38	47	48	46	48	43	25	20	11	20	47	35	36	37	21	23	24
R0560	31 CAMPSIE STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	26	21	12	23	50	38	39	40	22	25	24
R0561	56 ALMOND STREET, WILTON	Residential	NCA05	51	59	62	58	60	56	28	23	15	24	60	48	48	60	23	27	25
R0562	137 HORNBY STREET, WILTON	Residential	NCA05	44	52	55	52	54	49	26	21	13	22	53	41	42	45	23	25	24
R0563	11																			

Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0588	47 ALMOND STREET, WILTON	Residential	NCA05	45	53	54	52	54	50	27	22	14	23	54	42	42	44	23	26	24
R0589	51 ALMOND STREET, WILTON	Residential	NCA05	45	53	55	52	54	50	27	22	14	23	54	42	43	44	23	26	24
R0590	43 ALMOND STREET, WILTON	Residential	NCA05	40	48	51	47	49	45	27	22	14	23	49	37	38	40	23	25	24
R0591	41 ALMOND STREET, WILTON	Residential	NCA05	40	49	51	48	50	46	28	22	14	23	50	38	38	39	23	26	24
R0592	1095 ARGYLE STREET, WILTON	Place of worship	NCA05	55	63	66	62	64	60	27	22	14	23	64	51	52	58	23	26	24
R0593	39 ALMOND STREET, WILTON	Residential	NCA05	39	47	48	46	48	44	27	22	14	23	48	36	37	38	23	26	25
R0594	31 FITZROY STREET, WILTON	Residential	NCA05	47	55	58	54	56	52	27	22	13	22	56	43	44	55	22	25	24
R0595	1095 ARGYLE STREET, WILTON	Place of worship	NCA05	58	66	70	65	67	63	27	22	14	22	67	55	56	58	22	25	24
R0596	45 ALMOND STREET, WILTON	Residential	NCA05	39	47	48	46	48	44	27	22	14	23	48	36	37	38	23	26	24
R0597	28 WONSON STREET, WILTON	Residential	NCA05	45	53	56	53	55	50	27	22	13	23	54	42	43	52	22	25	23
R0598	37 ALMOND STREET, WILTON	Residential	NCA05	37	45	46	45	47	42	27	22	14	23	46	34	35	36	23	26	24
R0599	27 ALMOND STREET, WILTON	Residential	NCA05	38	46	46	45	47	43	28	22	14	23	47	34	35	37	23	26	25
R0600	29 FITZROY STREET, WILTON	Residential	NCA05	45	53	55	52	54	50	25	19	11	20	54	42	42	53	21	24	23
R0601	22 CAMPSIE STREET, WILTON	Residential	NCA05	38	46	46	45	47	42	25	20	11	21	46	35	35	37	20	24	24
R0602	1100 ARGYLE STREET, WILTON	Commercial	NCA05	62	70	75	69	71	67	26	21	13	22	71	59	60	55	22	25	22
R0603	18 SWAINE DRIVE, WILTON	Residential	NCA05	39	47	49	46	48	44	27	22	14	23	48	36	37	38	23	26	24
R0604	36 CAMPSIE STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	27	22	14	23	46	34	34	36	23	26	25
R0605	10 SWAINE DRIVE, WILTON	Residential	NCA05	40	48	49	47	49	45	28	22	14	23	49	37	38	40	23	26	25
R0606	12 SWAINE DRIVE, WILTON	Residential	NCA05	40	48	50	47	49	45	27	22	13	23	49	37	38	39	22	25	24
R0607	1095 ARGYLE STREET, WILTON	Residential	NCA05	56	64	69	63	65	61	26	21	13	22	65	52	53	52	21	25	23
R0608	14 SWAINE DRIVE, WILTON	Residential	NCA05	39	47	48	47	49	44	27	22	14	23	48	36	37	39	23	25	24
R0609	27 FITZROY STREET, WILTON	Residential	NCA05	46	54	56	53	55	50	27	22	13	22	54	42	43	50	22	25	24
R0610	6 SWAINE DRIVE, WILTON	Residential	NCA05	38	46	46	45	47	43	27	22	14	23	47	35	35	39	23	26	24
R0611	24 WONSON STREET, WILTON	Residential	NCA05	43	51	52	50	52	47	28	22	13	23	51	40	40	46	23	26	24
R0612	4 SWAINE DRIVE, WILTON	Residential	NCA05	36	44	44	43	45	41	27	22	14	23	45	33	33	31	23	26	25
R0613	8 SWAINE DRIVE, WILTON	Residential	NCA05	35	43	43	42	44	40	27	22	14	23	44	32	33	32	23	25	24
R0614	34 CAMPSIE STREET, WILTON	Residential	NCA05	36	44	45	43	45	41	24	19	11	21	45	33	34	36	22	23	23
R0615	1101 ARGYLE STREET, WILTON	Residential	NCA05	54	62	67	62	64	59	22	17	8	17	63	51	52	51	20	23	22
R0616	22 WONSON STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	27	22	13	22	50	38	39	41	22	25	23
R0617	26 FITZROY STREET, WILTON	Residential	NCA05	49	57	60	56	58	54	26	21	13	22	58	46	46	46	21	25	22
R0618	25 FITZROY STREET, WILTON	Residential	NCA05	45	53	56	53	55	50	26	20	12	21	54	42	43	45	21	24	23
R0619	32 CAMPSIE STREET, WILTON	Residential	NCA05	36	44	45	43	45	41	26	20	12	22	45	33	34	36	22	24	24
R0620	6 ARGYLE STREET, WILTON	Residential	NCA05	60	68	72	67	69	65	26	21	12	21	69	56	57	51	0	25	22
R0621	1103 ARGYLE STREET, WILTON	Residential	NCA05	52	60	65	59	61	57	26	21	13	21	61	49	49	48	21	24	22
R0622	20 WONSON STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	26	20	12	22	50	38	38	40	22	25	24
R0623	24 FITZROY STREET, WILTON	Residential	NCA05	49	57	60	56	58	54	27	21	13	23	58	46	47	46	21	24	22
R0624	13 SWAINE DRIVE, WILTON	Residential	NCA05	40	48	50	47	49	45	27	22	13	22	49	37	38	41	22	25	24
R0625	151 HORNBY STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	27	22	13	22	50	38	39	42	22	25	23
R0626	23 FITZROY STREET, WILTON	Residential	NCA05	46	54	57	53	55	51	26	20	12	21	55	43	44	45	21	24	23
R0627	30 CAMPSIE STREET, WILTON	Residential	NCA05	36	44	44	43	45	40	24	19	11	20	44	33	33	35	21	23	24
R0628	11 SWAINE DRIVE, WILTON	Residential	NCA05	40	48	50	47	49	45	26	22	13	22	49	37	38	40	22	25	23
R0629	5 SWAINE DRIVE, WILTON	Residential	NCA05	39	47	47	46	48	44	27	22	14	23	48	36	36	39	23	26	24
R0630	1105 ARGYLE STREET, WILTON	Commercial	NCA05	53	61	65	60	62	58	26	21	13	22	62	50	51	49	0	25	23
R0631	7 SWAINE DRIVE, WILTON	Residential	NCA05	39	48	48	47	49	44	27	22	13	22	48	36	37	40	23	25	24
R0632	1 SWAINE DRIVE, WILTON	Residential	NCA05	36	44	44	43	45	41	27	22	13	22	45	33	34	37	22	25	23
R0633	3 SWAINE DRIVE, WILTON	Residential	NCA05	38	46	47	45	47	43	26	22	13	22	47	35	35	37	22	25	23
R0634	153 HORNBY STREET, WILTON	Residential	NCA05	40	48	49	47	49	45	22	18	10	18	49	37	38	41	20	21	22
R0635	22 FITZROY STREET, WILTON	Residential	NCA05	47	55	57	54	56	52	26	21	13	21	56	44	45	44	21	25	22
R0636	21 FITZROY STREET, WILTON	Residential	NCA05	46	54	56	53	55	51	26	20	12	20	55	42	43	42	17	23	22
R0637	17 CAMDEN STREET, WILTON	Residential	NCA05	39	46	47	46	48	43	26	22	13	22	47	35	36	36	22	25	23
R0638	19-21 CAMDEN STREET, WILTON	Residential	NCA05	40	48	49	47	49	45	26	21	13	22	49	37	38	40	22	24	24
R0639	28 CAMPSIE STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	27	22	13	22	46	34	34	35	23	25	25
R0640	155 HORNBY STREET, WILTON	Residential	NCA05	40	48	49	47	49	44	25	19	11	20	48	37	37	40	21	23	23
R0641	9 CAMDEN STREET, WILTON	Residential	NCA05	38	46	47	45	47	43	26	21	13	22	47	35	36	37	22	25	23
R0642	56 PEEL STREET, WILTON	Residential	NCA05	54	62	67	61	63	59	26	21	12	21	63	51	52	48	0	24	22
R0643	26 CAMPSIE STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	24	20	11	19	45	33	34	34	20	22	22
R0644	13 CAMDEN STREET, WILTON	Residential	NCA05	37	45	45	44	46	41	26	21	13	21	45	34	34	33	22	24	23
R0645	11 CAMDEN STREET, WILTON	Residential	NCA05	38	46	47	45	47	42	26	21	13	22	46	35	35	36	21	24	23
R0646	1109A ARGYLE STREET, WILTON	Commercial	NCA05	51	59	63	59	61	56	27	21	13	23	60	48	49	48	0	26	24
R0647	7 CAMDEN STREET, WILTON	Residential	NCA05	37	45	46	44	46	42	25	21	12	21	46	34	35	36	21	23	22
R0648	1 CAMDEN STREET, WILTON	Residential	NCA05	36	44	44	43	45	40	27	22	13	23	44	33	33	35	22	25	24
R0649	5 CAMDEN STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	24	19	11	20	46	34	34	35	22	23	23
R0650	3 CAMDEN STREET, WILTON	Residential	NCA05	37	45	46	44	46	42	26	21	13	22	46	34	35	37	22	24	23
R0651	20 FITZROY STREET, WILTON	Residential	NCA05	47	55	58	55	57	52	26	21	12	21	56	44	45	42	0	24	22
R0652	24 CAMPSIE STREET, WILTON	Residential	NCA05	35	43	43	42	44	40	24	19	11	20	44	32	33	34	21	23	23
R0653	19 FITZROY STREET, WILTON	Residential	NCA05	43	51	53	51	53	48	26	21	13	21	52	40	41	40	0	25	23
R0654	1109B ARGYLE STREET, WILTON	Residential	NCA05	50	58	62	58	60	55	23	18	10	18	59	47	48	44	0	20	16
R0655	18 FITZROY STREET, WILTON	Residential	NCA05	46	54	57	53	55	51	20	16	8	15	55	43	44	42	0	23	21
R0656	60 PEEL STREET, WILTON	Residential	NCA05	53	61	65	61	63	58	0	0	0	0	62	50	51	47	0	24	21
R0657	17 FITZROY STREET, WILTON	Residential	NCA05	43	51	52	50	52	48	24	19	11	19	52	40	40	39	0	24	22
R0658	1111 ARGYLE STREET, WILTON	Residential	NCA05	51	59	63	58	60	56	22	17	9	0	60	48	49	46	0	18	19
R0659	16 FITZROY STREET, WILTON	Residential	NCA05	47	55	57	54	56	52	26	21	12	19	56	44	45	42	0	24	22
R0660	20 CAMDEN STREET, WILTON	Residential	NCA05	39	47	48	46	48	44	27	21	13	23	48	36	36	39	22	25	23
R0661	18 CAMDEN STREET, WILTON	Residential	NCA05	38	46	46	45	47	43	26	21	13	21	47	35	35	39	22	24	23
R0662	16 CAMDEN STREET, WILTON	Residential	NCA05	38	46	47	45</													

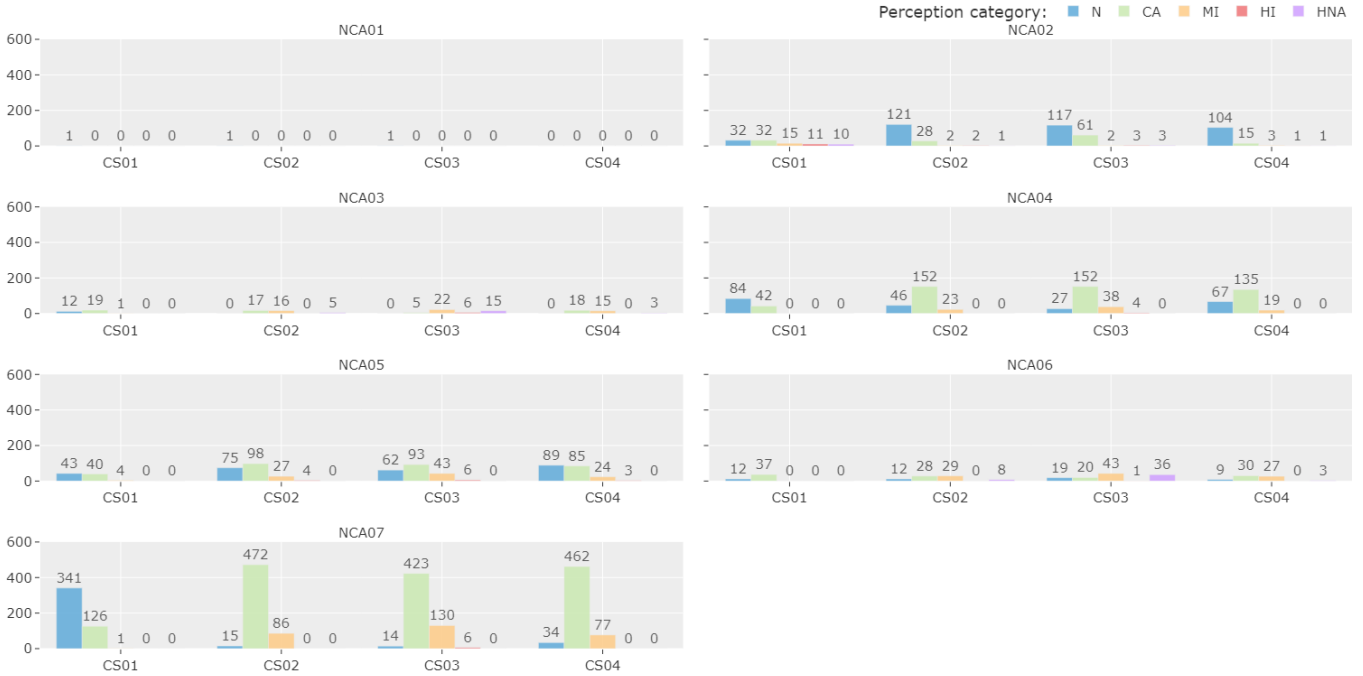
Appendix B-2 Construction noise levels (OOHW Period 2 Night)

Receiver ID	Address	Receiver Type	NCA	CS01	CS02	CS03	CS04	CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17
R0687	1119 ARGYLE STREET, WILTON	Residential	NCA05	48	56	59	55	57	53	0	0	0	0	57	45	46	42	0	22	21
R0688	8 MIRIAM STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	26	21	13	21	45	33	34	37	22	24	23
R0689	58 PEEL STREET, WILTON	Residential	NCA05	50	58	61	57	59	55	0	0	0	0	59	47	48	44	0	24	0
R0690	6 MIRIAM STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	26	21	13	21	46	34	34	37	22	24	23
R0691	4 MIRIAM STREET, WILTON	Residential	NCA05	37	45	45	44	46	41	26	21	13	21	45	34	34	37	22	24	23
R0692	8 FITZROY STREET, WILTON	Residential	NCA05	45	53	55	53	55	50	0	0	0	0	54	42	43	41	0	22	20
R0693	11 CAMPSIE STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	26	21	13	22	45	33	33	36	21	24	23
R0694	7 FITZROY STREET, WILTON	Residential	NCA05	42	50	51	49	51	47	0	0	0	0	51	39	39	38	0	22	21
R0695	8 FITZROY STREET, WILTON	Residential	NCA05	42	50	51	49	51	47	0	0	0	0	51	39	39	38	0	22	21
R0696	1121 ARGYLE STREET, WILTON	Residential	NCA05	48	56	58	55	57	52	0	0	0	0	56	44	45	42	0	21	20
R0697	4 WONSON STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	26	21	12	0	45	33	34	32	0	24	22
R0698	54 PEEL STREET, WILTON	Residential	NCA05	49	57	60	56	58	54	0	0	0	0	58	46	47	44	0	25	0
R0699	5 FITZROY STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	0	0	0	0	50	38	39	37	0	23	22
R0700	7 WILTON STREET, WILTON	Residential	NCA05	38	46	47	45	47	43	26	21	12	0	47	35	35	37	0	24	22
R0701	1123 ARGYLE STREET, WILTON	Residential	NCA05	47	55	58	55	57	52	0	0	0	0	56	44	45	42	0	24	22
R0702	9 MIRIAM STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	26	21	12	0	45	33	34	37	0	24	23
R0703	4 FITZROY STREET, WILTON	Residential	NCA05	43	51	52	50	52	48	0	0	0	0	52	40	40	39	0	23	21
R0704	7 MIRIAM STREET, WILTON	Residential	NCA05	36	44	44	43	45	41	26	21	12	0	45	33	34	37	0	24	23
R0705	3 MIRIAM STREET, WILTON	Residential	NCA05	36	44	45	44	46	41	26	21	12	0	45	33	34	37	0	24	23
R0706	36 PEEL STREET, WILTON	Residential	NCA05	38	46	48	45	47	43	0	0	0	0	47	35	36	35	0	24	23
R0707	5 MIRIAM STREET, WILTON	Residential	NCA05	36	45	45	44	46	41	26	21	12	0	45	33	34	37	0	24	23
R0708	3 FITZROY STREET, WILTON	Residential	NCA05	41	49	51	49	51	46	0	0	0	0	50	38	39	37	0	21	21
R0709	5 WILTON STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	22	18	9	0	46	34	34	36	0	21	22
R0710	4 WONSON STREET, WILTON	Residential	NCA05	39	47	47	46	48	44	26	21	13	0	48	36	36	37	0	24	24
R0711	1125 ARGYLE STREET, WILTON	Residential	NCA05	47	55	57	54	56	52	0	0	0	0	56	44	45	42	0	22	21
R0712	42 PEEL STREET, WILTON	Residential	NCA05	39	48	49	47	49	44	0	0	0	0	48	36	37	37	0	24	23
R0713	50 PEEL STREET, WILTON	Residential	NCA05	41	49	51	49	51	46	0	0	0	0	50	38	39	38	0	22	21
R0714	2 FITZROY STREET, WILTON	Residential	NCA05	42	50	51	49	51	47	0	0	0	0	51	39	39	37	0	23	21
R0715	38 PEEL STREET, WILTON	Residential	NCA05	39	47	49	46	48	44	0	0	0	0	48	36	37	36	0	24	23
R0716	46 PEEL STREET, WILTON	Residential	NCA05	38	46	46	45	47	43	0	0	0	0	47	35	36	34	0	24	22
R0717	44 PEEL STREET, WILTON	Residential	NCA05	38	45	47	45	47	42	0	0	0	0	46	34	35	36	0	24	22
R0718	1 FITZROY STREET, WILTON	Residential	NCA05	40	48	49	47	49	45	0	0	0	0	49	37	37	36	0	22	22
R0719	2C WONSON STREET, WILTON	Residential	NCA05	38	46	46	45	47	42	0	0	0	0	46	35	35	36	0	24	23
R0720	40 PEEL STREET, WILTON	Residential	NCA05	36	44	45	44	46	41	0	0	0	0	45	33	34	33	0	22	22
R0721	3 WILTON STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	0	0	0	0	46	34	34	36	0	24	23
R0722	1130 ARGYLE STREET, WILTON	Residential	NCA05	47	55	57	54	56	52	0	0	0	0	56	43	44	41	0	23	0
R0723	34 PEEL STREET, WILTON	Residential	NCA05	37	45	46	45	47	42	0	0	0	0	46	34	35	36	0	23	21
R0724	28 WONSON STREET, WILTON	Residential	NCA05	34	42	41	41	43	39	0	0	0	0	43	31	32	30	0	23	22
R0725	97 PEEL STREET, WILTON	Residential	NCA05	47	55	57	54	56	52	0	0	0	0	56	44	44	42	0	23	0
R0726	1 WILTON STREET, WILTON	Residential	NCA05	37	45	45	44	46	42	0	0	0	0	46	34	34	36	0	23	22
R0727	28 PEEL STREET, WILTON	Residential	NCA05	36	44	44	43	45	40	0	0	0	0	44	32	33	34	0	23	22
R0728	2A WONSON STREET, WILTON	Residential	NCA05	32	40	39	39	41	37	0	0	0	0	41	29	29	29	0	23	21
R0729	65 PEEL STREET, WILTON	Residential	NCA05	41	49	50	48	50	46	0	0	0	0	50	37	38	36	0	23	21
R0730	55 PEEL STREET, WILTON	Residential	NCA05	38	46	47	45	47	43	0	0	0	0	47	34	35	34	0	23	21
R0731	75 PEEL STREET, WILTON	Residential	NCA05	43	50	52	50	52	47	0	0	0	0	51	39	40	36	0	23	0
R0732	1150 ARGYLE STREET, WILTON	Residential	NCA05	42	50	52	50	52	47	0	0	0	0	51	39	40	38	0	22	0

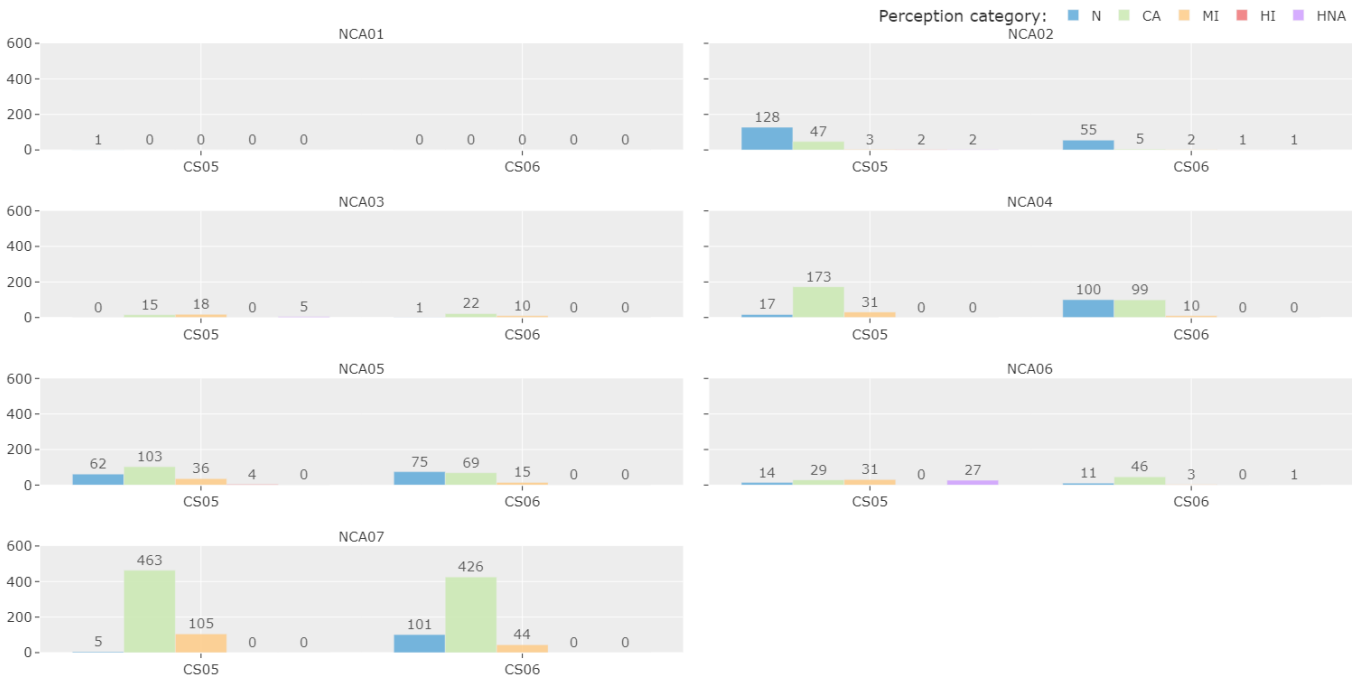
B-3 Construction noise level exceedances

B-3-1 Standard construction hours

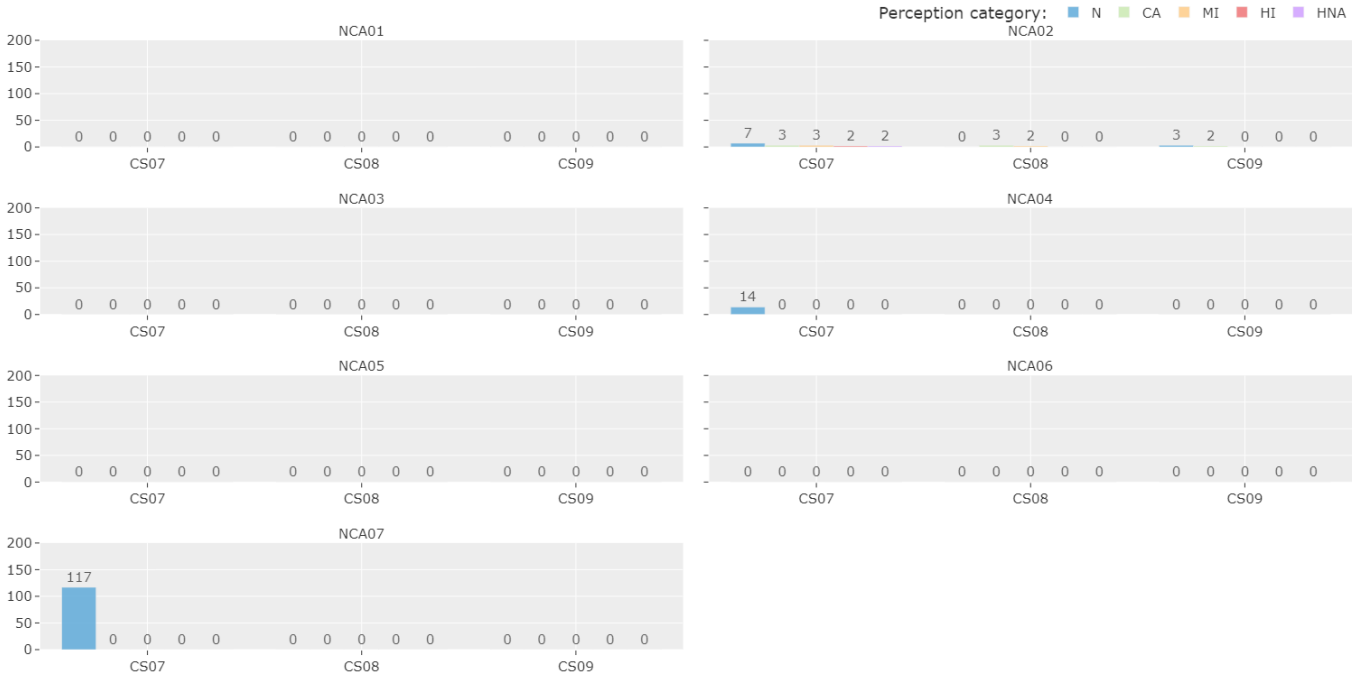
Standard hours – Activity group 1



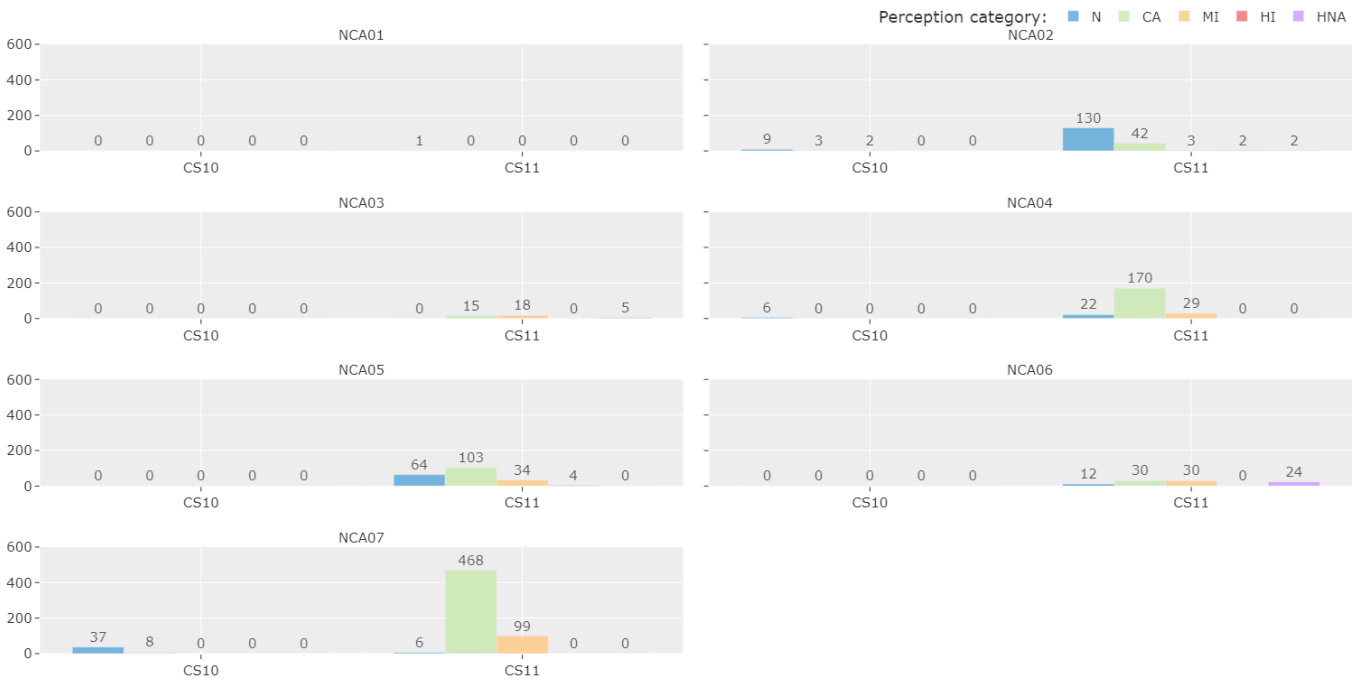
Standard hours – Activity group 2



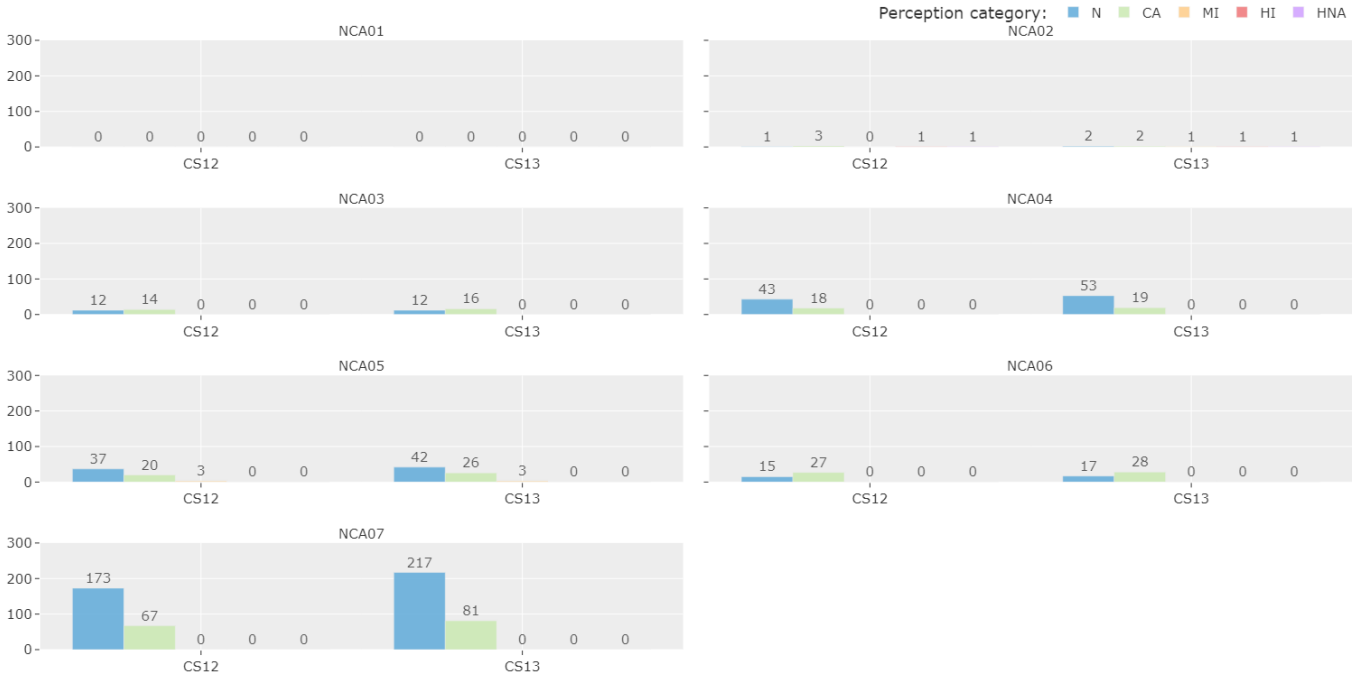
Standard hours – Activity group 3



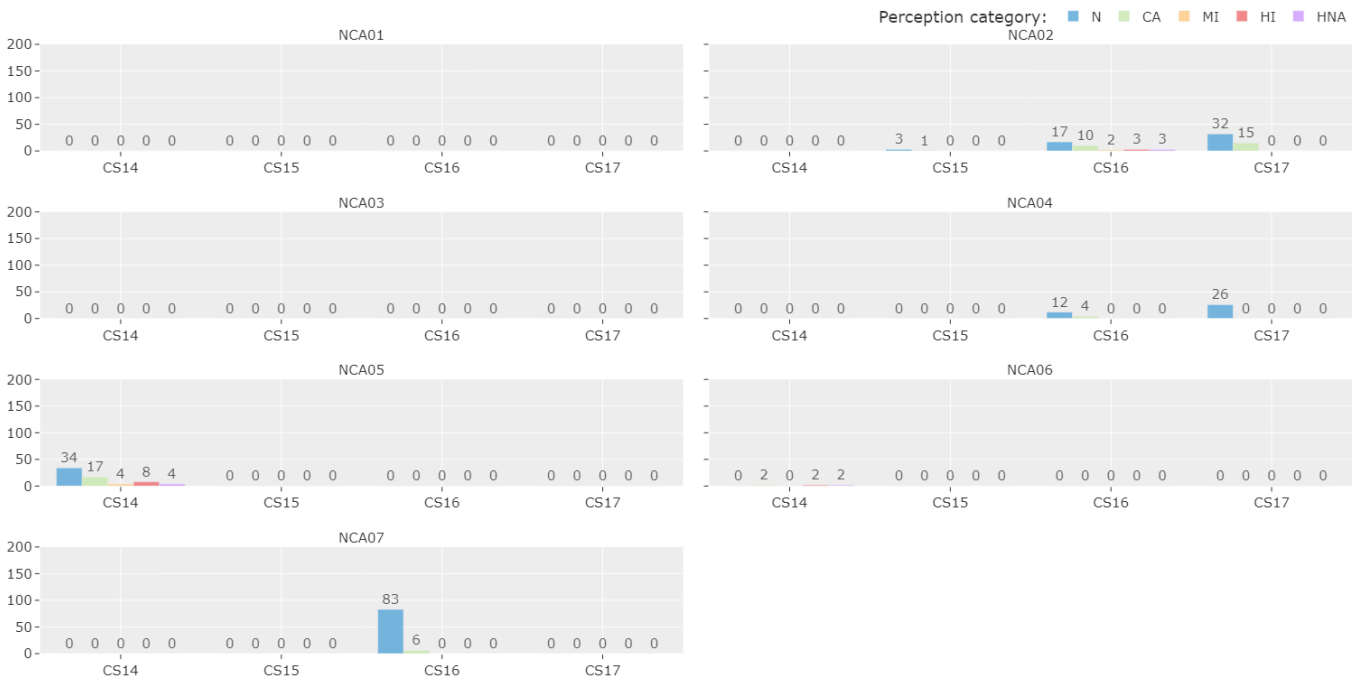
Standard hours – Activity group 4



Standard hours – Activity group 5

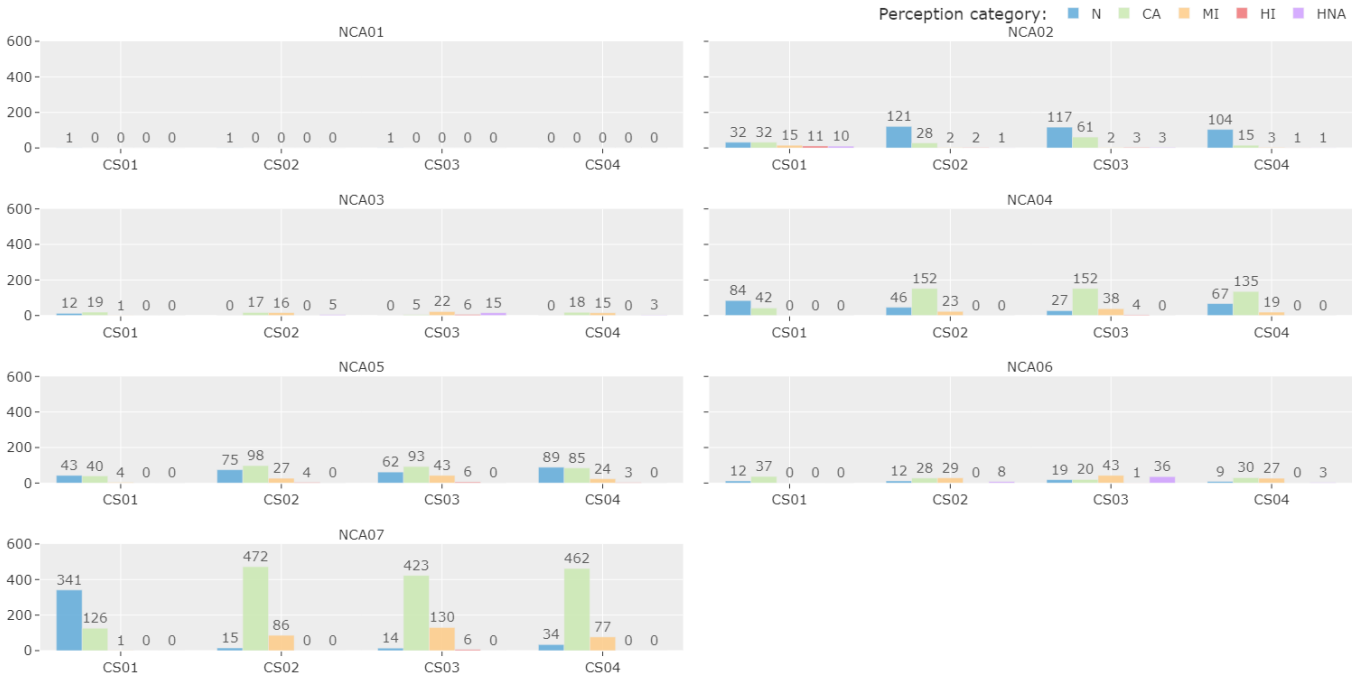


Standard hours – Compound operations

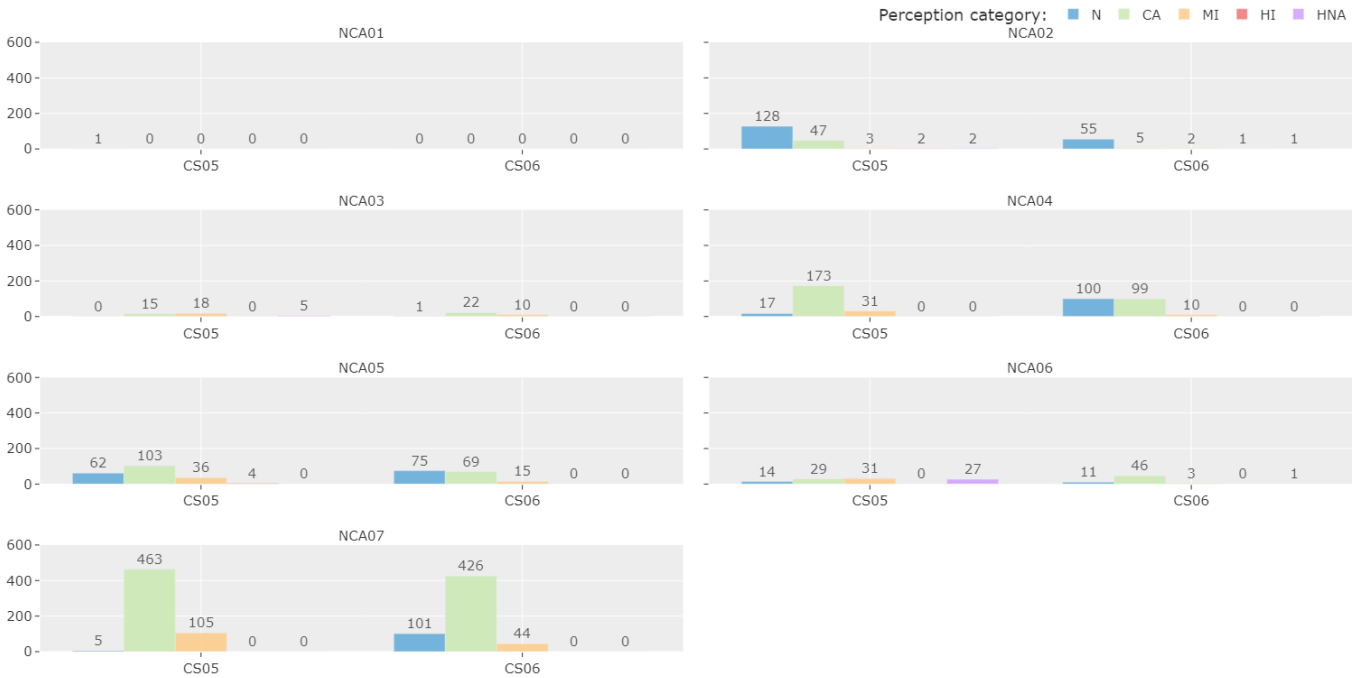


B-3-2 OOHW (Day)

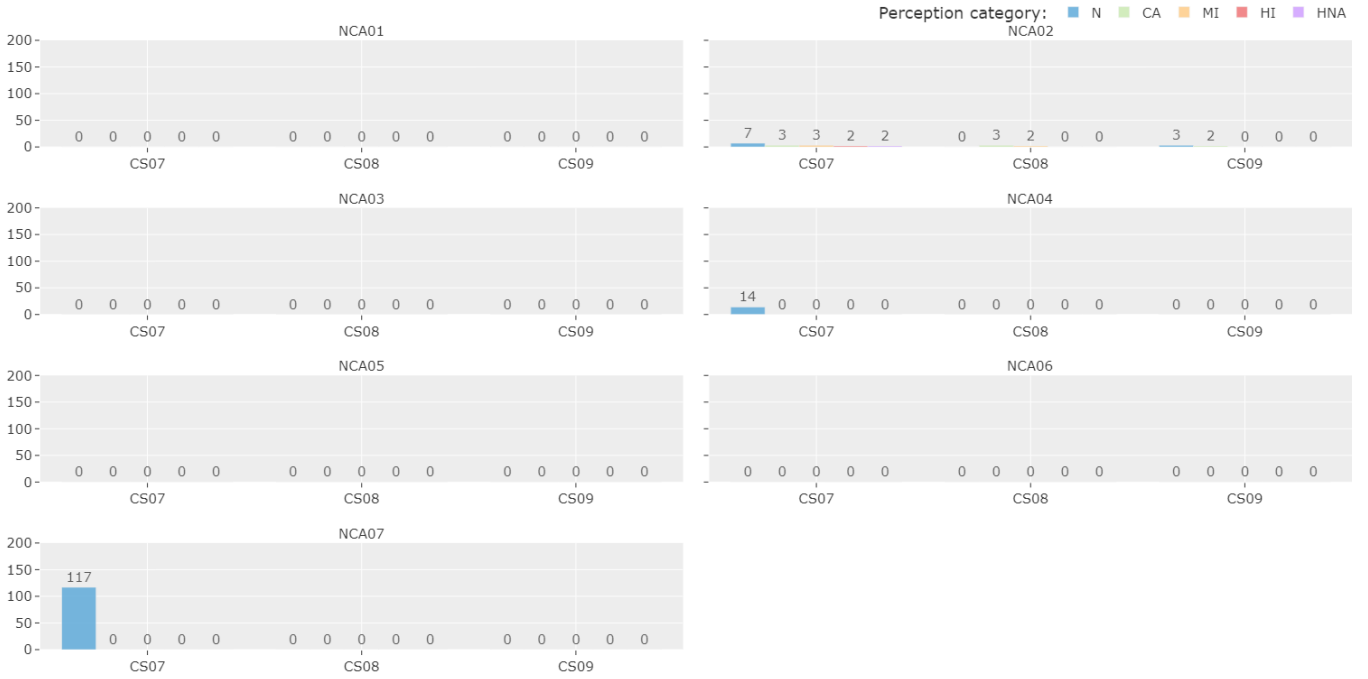
OOHW (Day) – Activity group 1



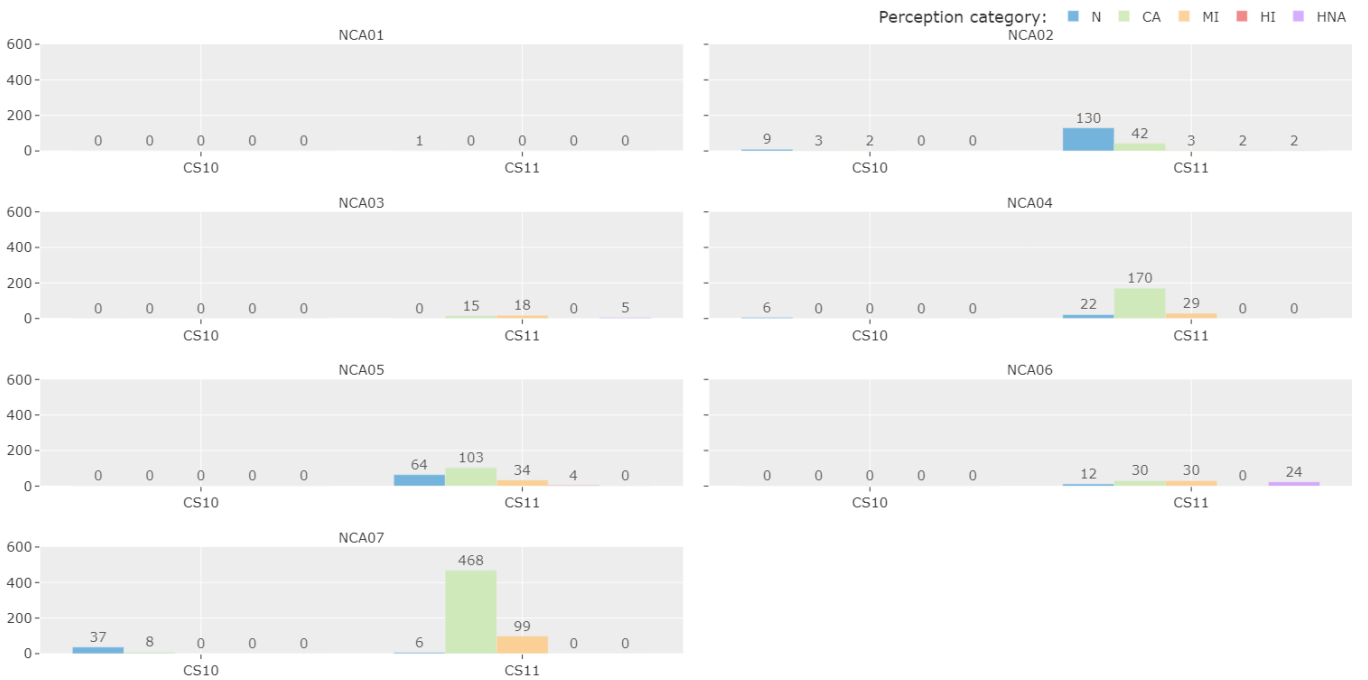
OOHW (Day) – Activity group 2



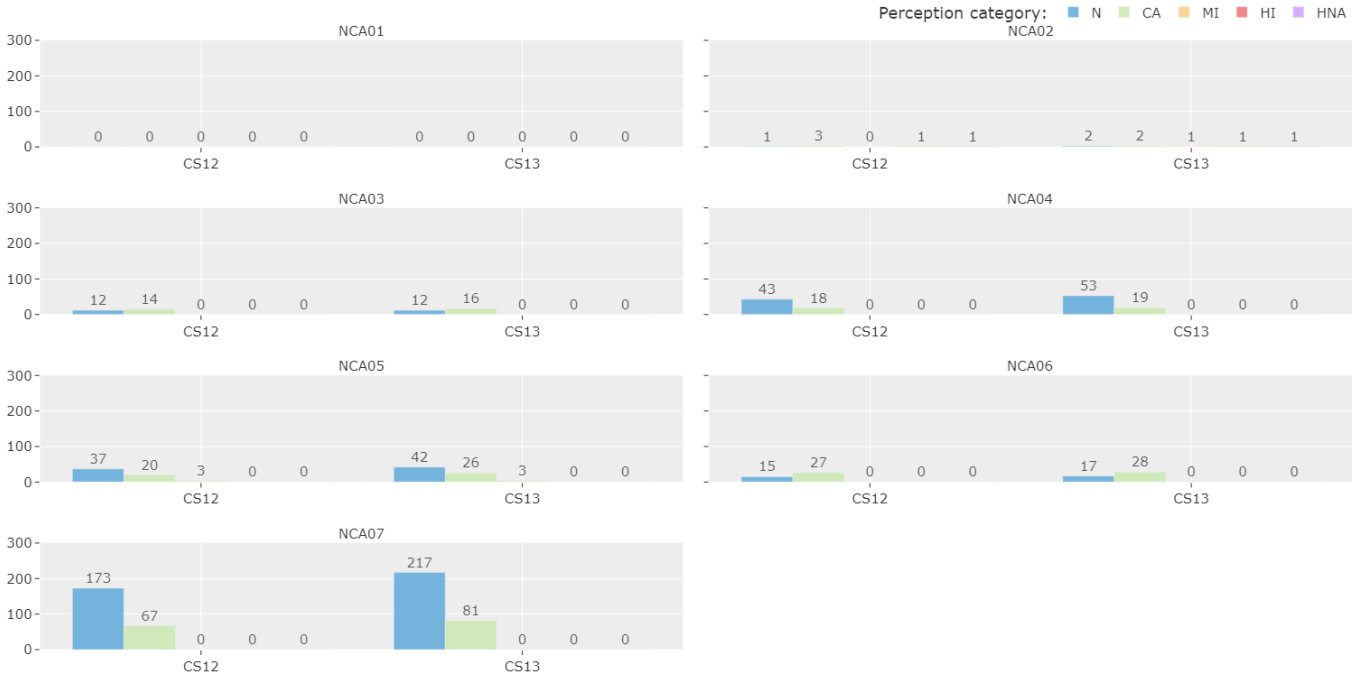
OOHW (Day) – Activity group 3



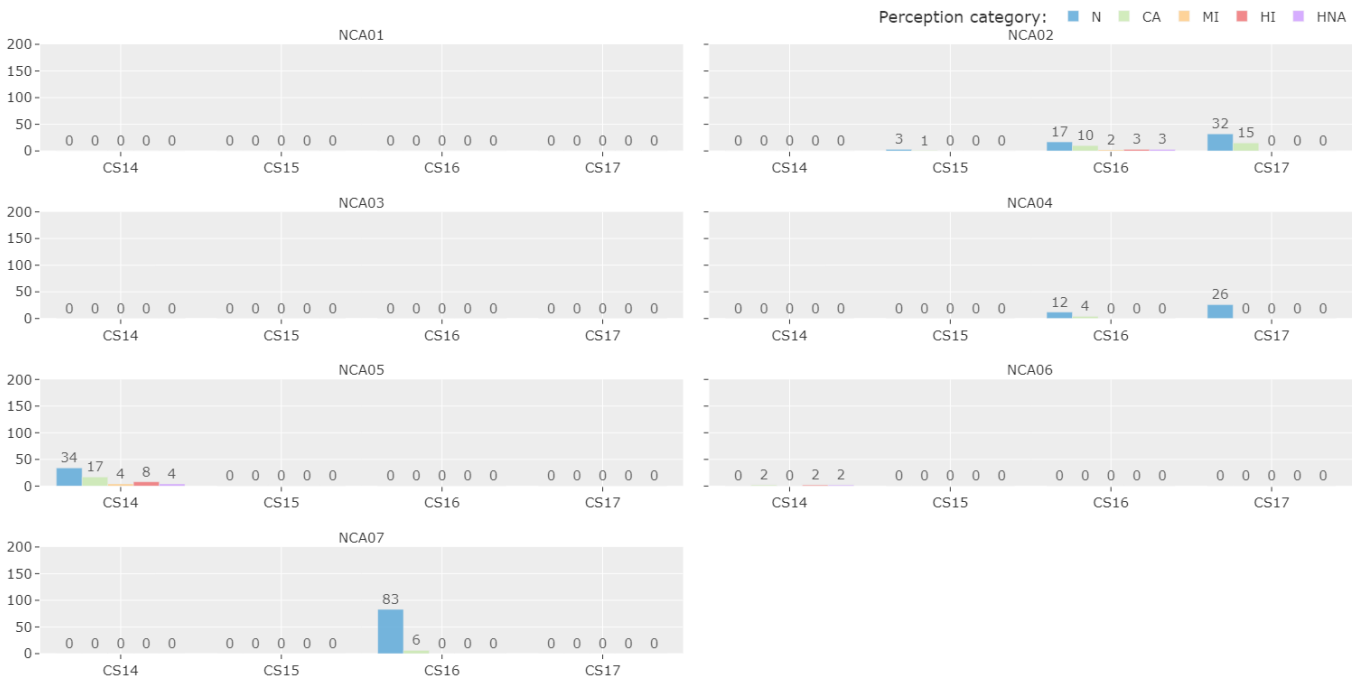
OOHW (Day) – Activity group 4



OOHW (Day) – Activity group 5

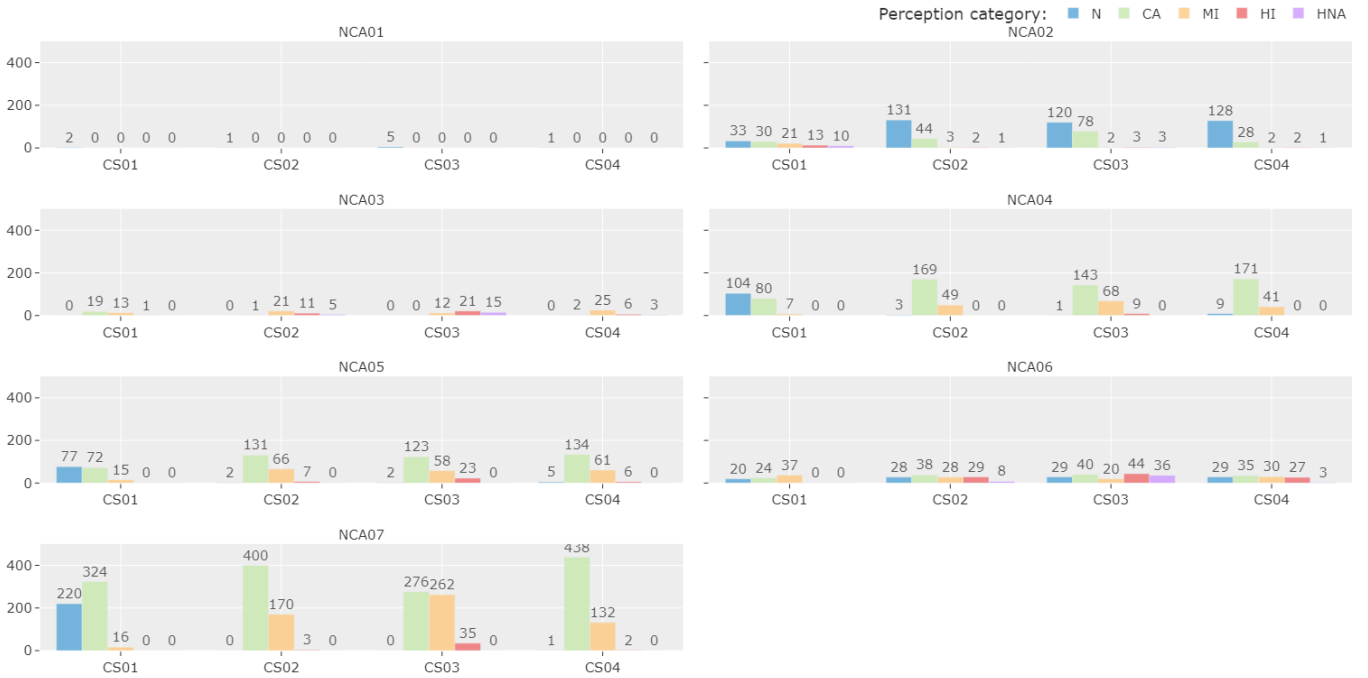


OOHW (Day) – Compound operations

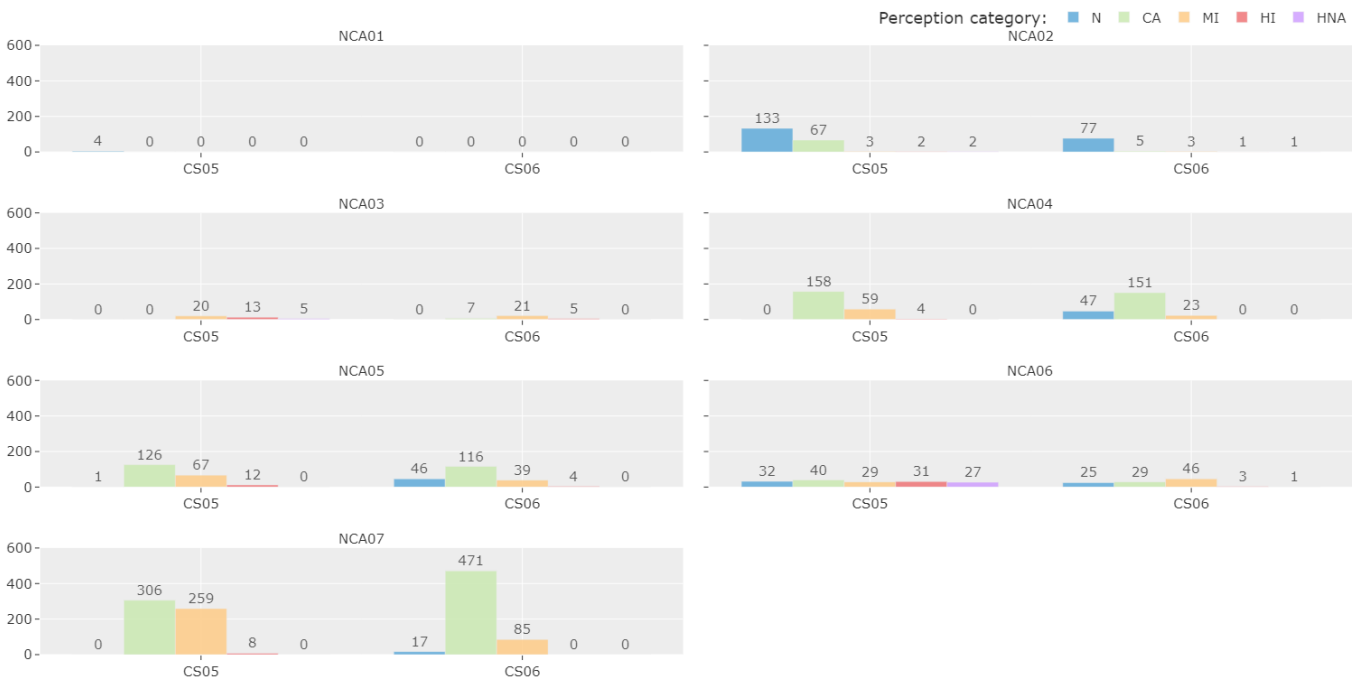


B-3-3 OOHV (Evening)

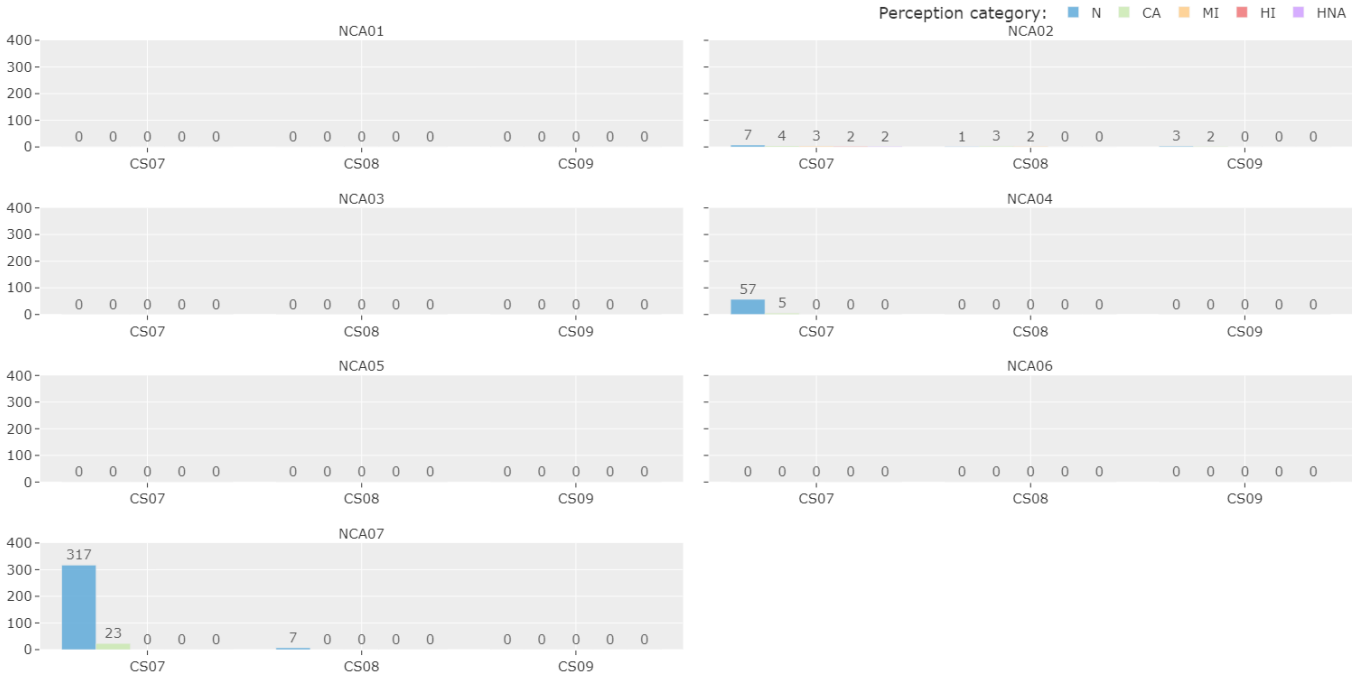
OOHV (Evening) – Activity group 1



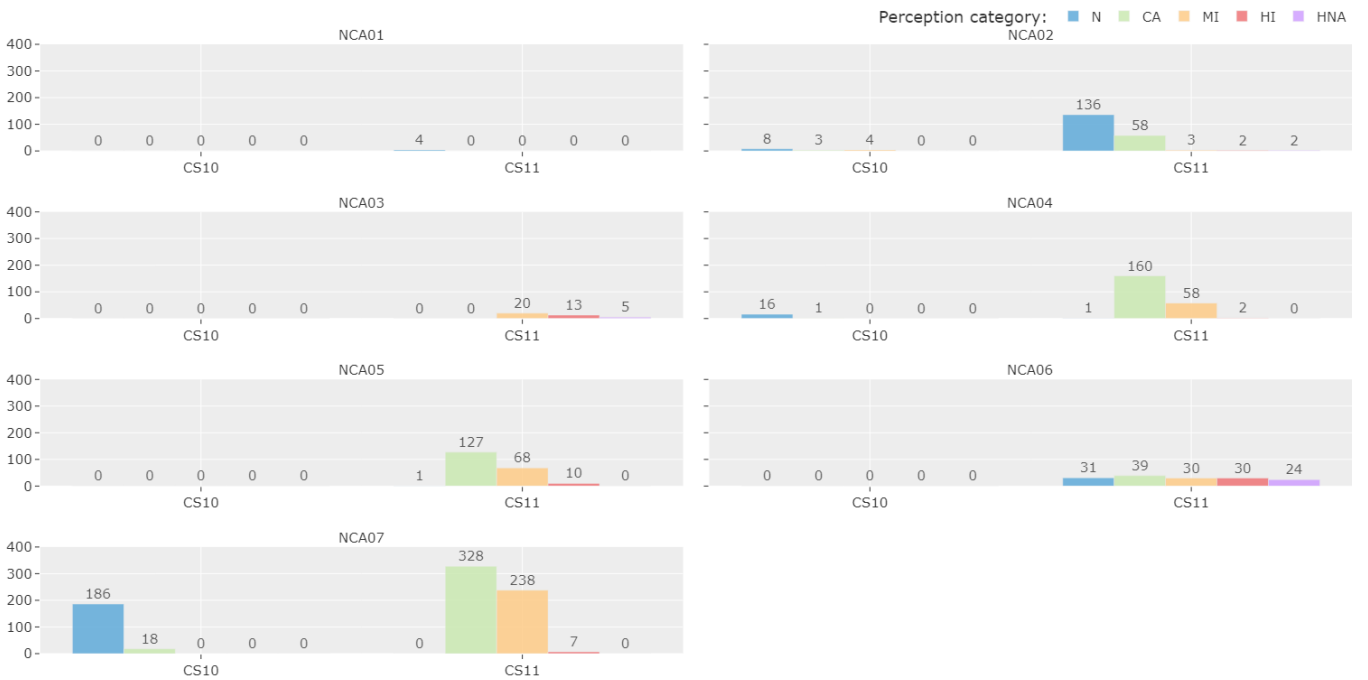
OOHV (Evening) – Activity group 2



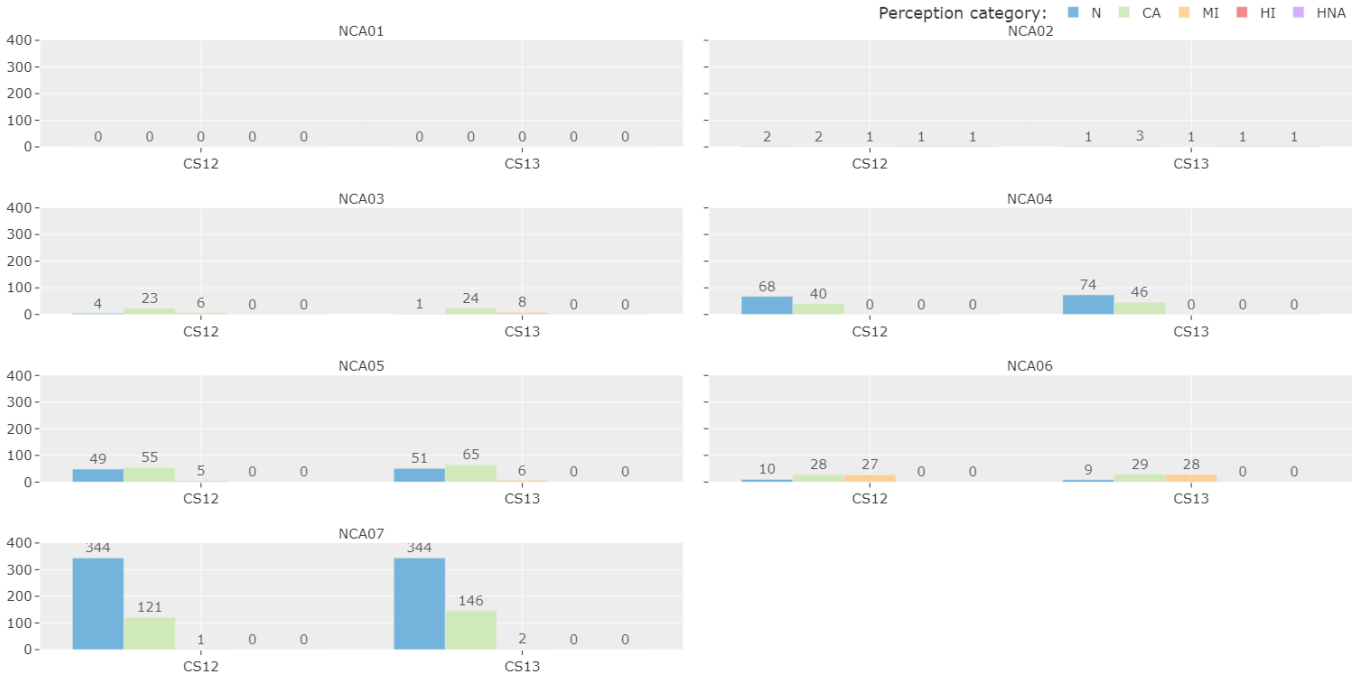
OOHW (Evening) – Activity group 3



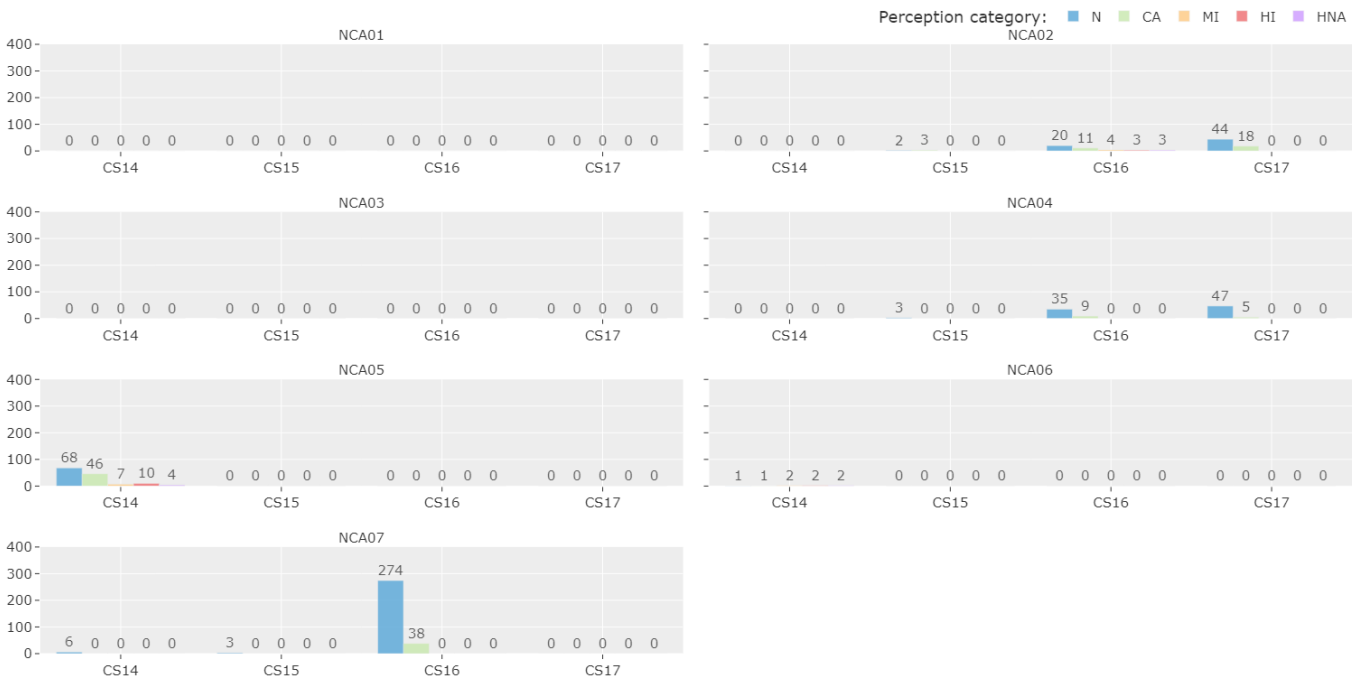
OOHW (Evening) – Activity group 4



OOHW (Evening) – Activity group 5

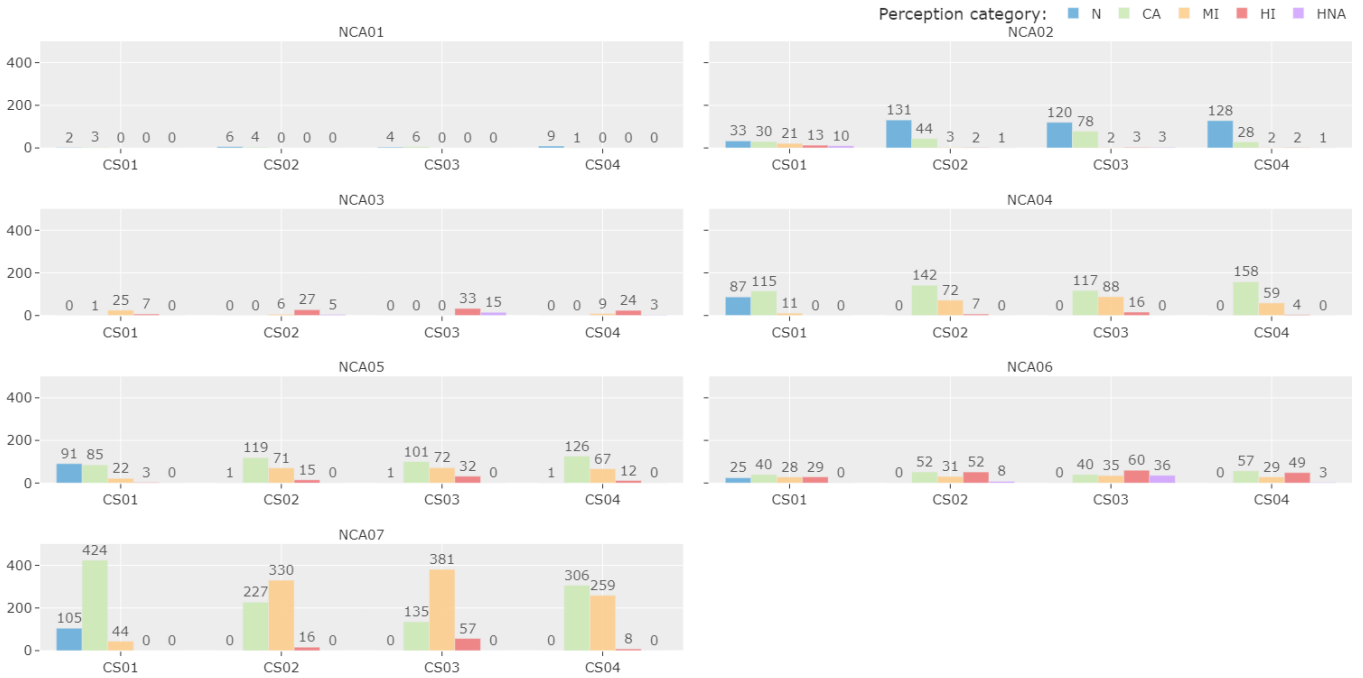


OOHW (Evening) – Compound operations

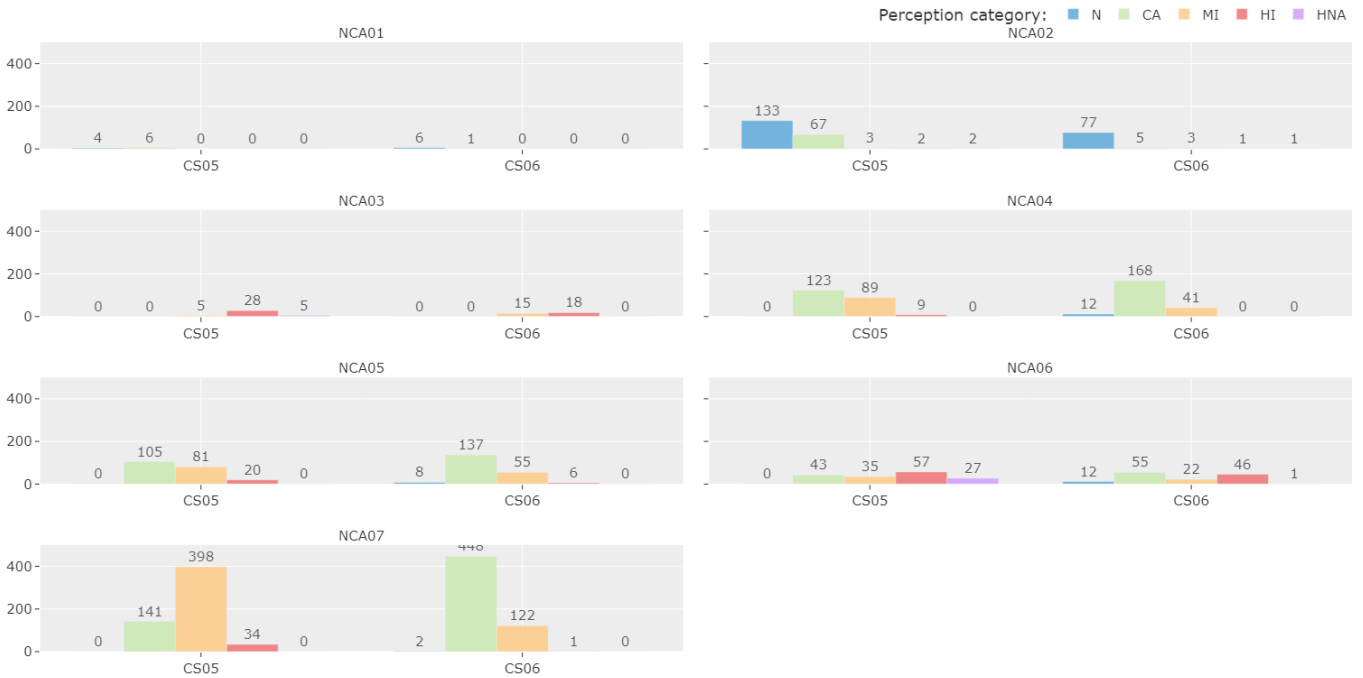


B-3-4 OOHW (Night)

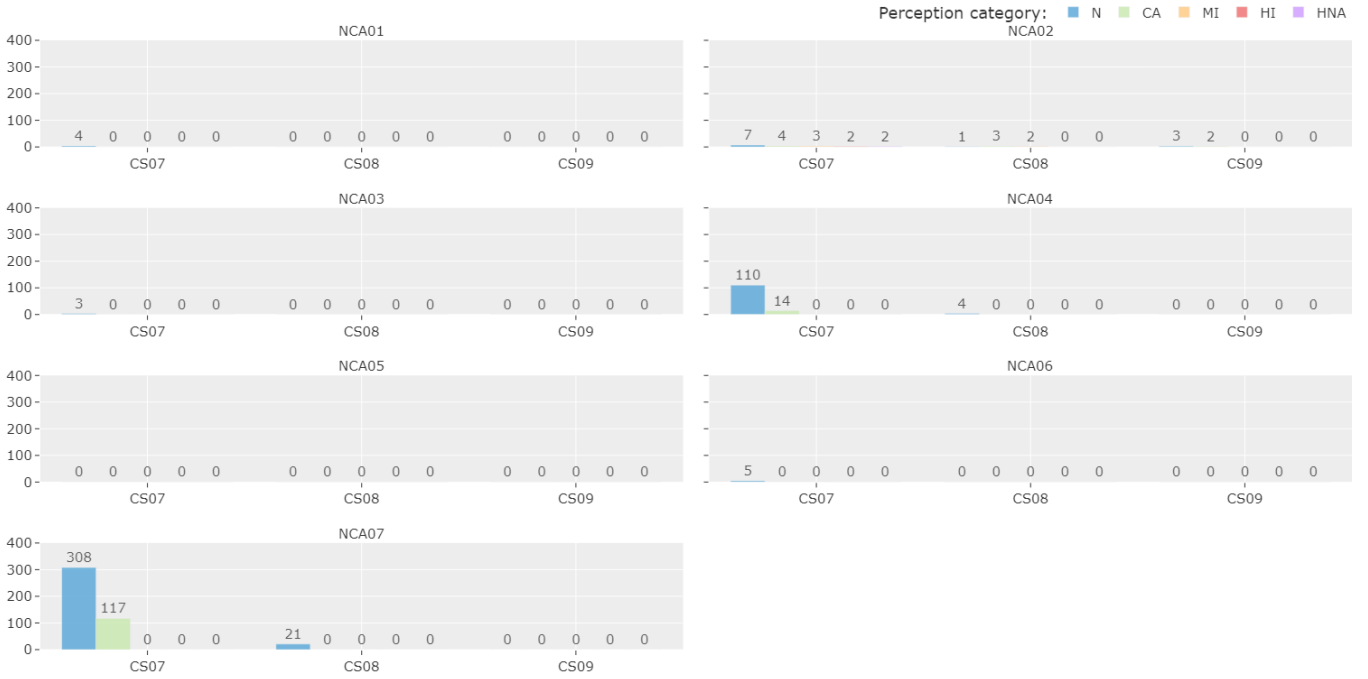
OOHW (Night) – Activity group 1



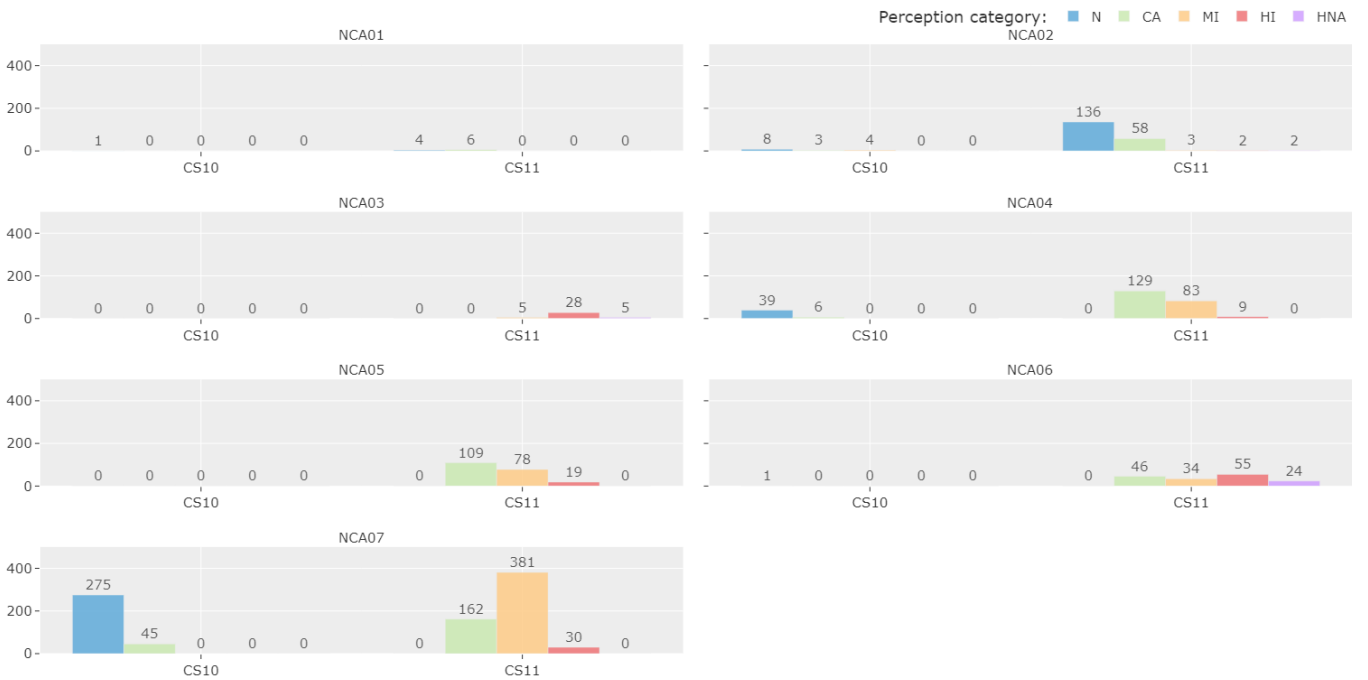
OOHW (Night) – Activity group 2



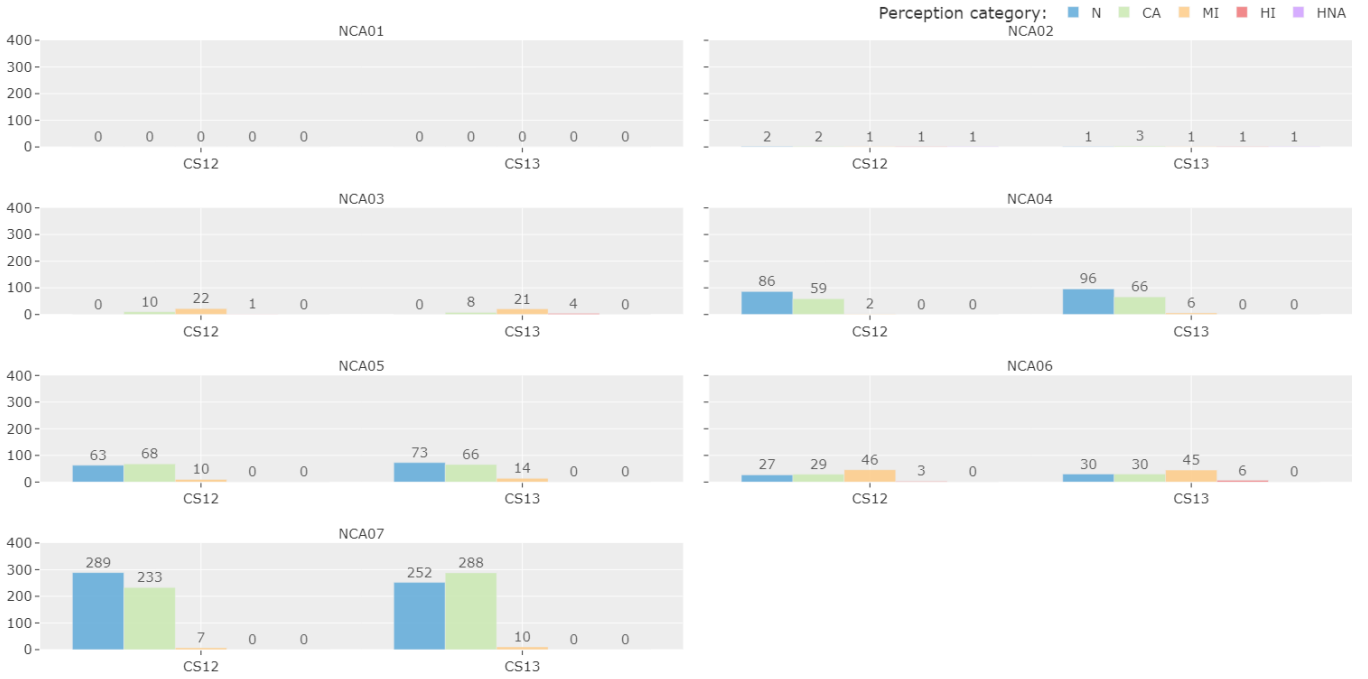
OOHW (Night) – Activity group 3



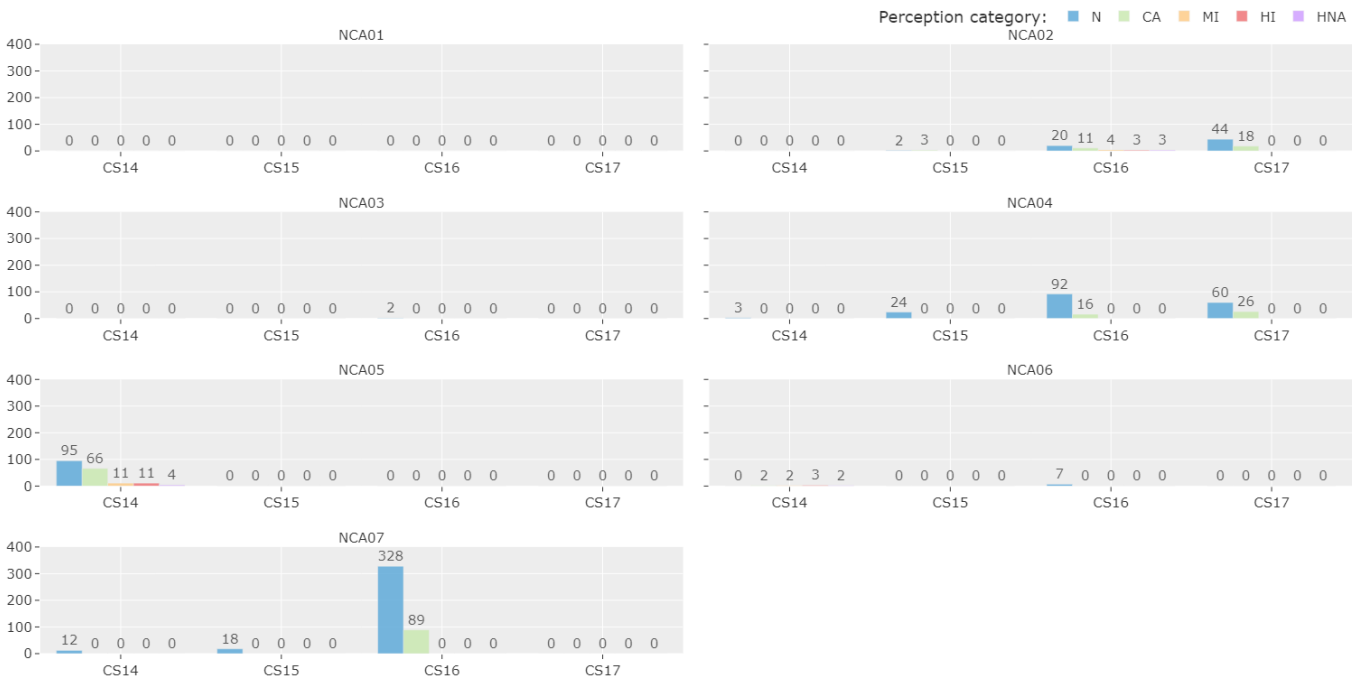
OOHW (Night) – Activity group 4



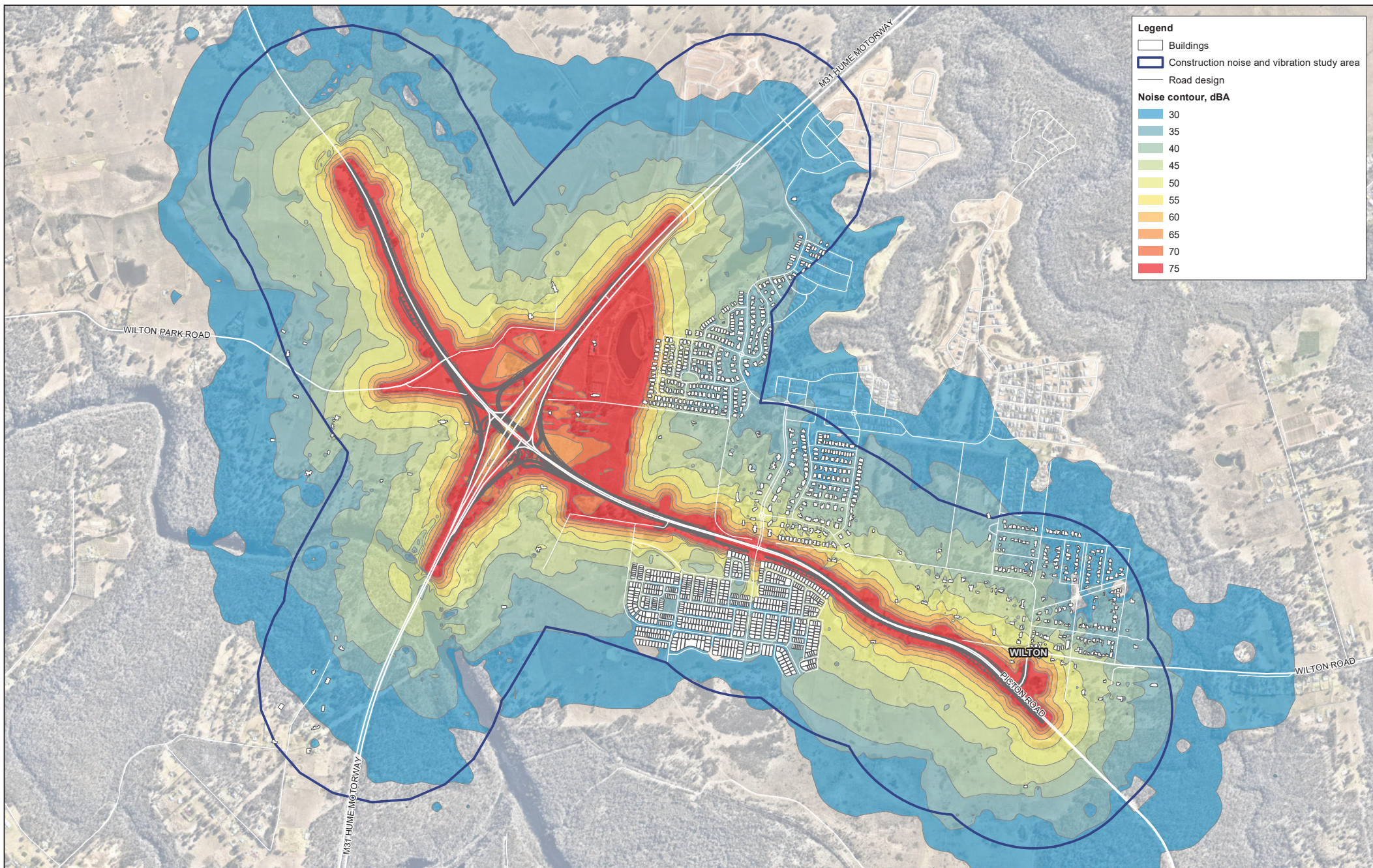
OOHW (Night) – Activity group 5



OOHW (Night) – Compound operations



B-4 Construction noise contours



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



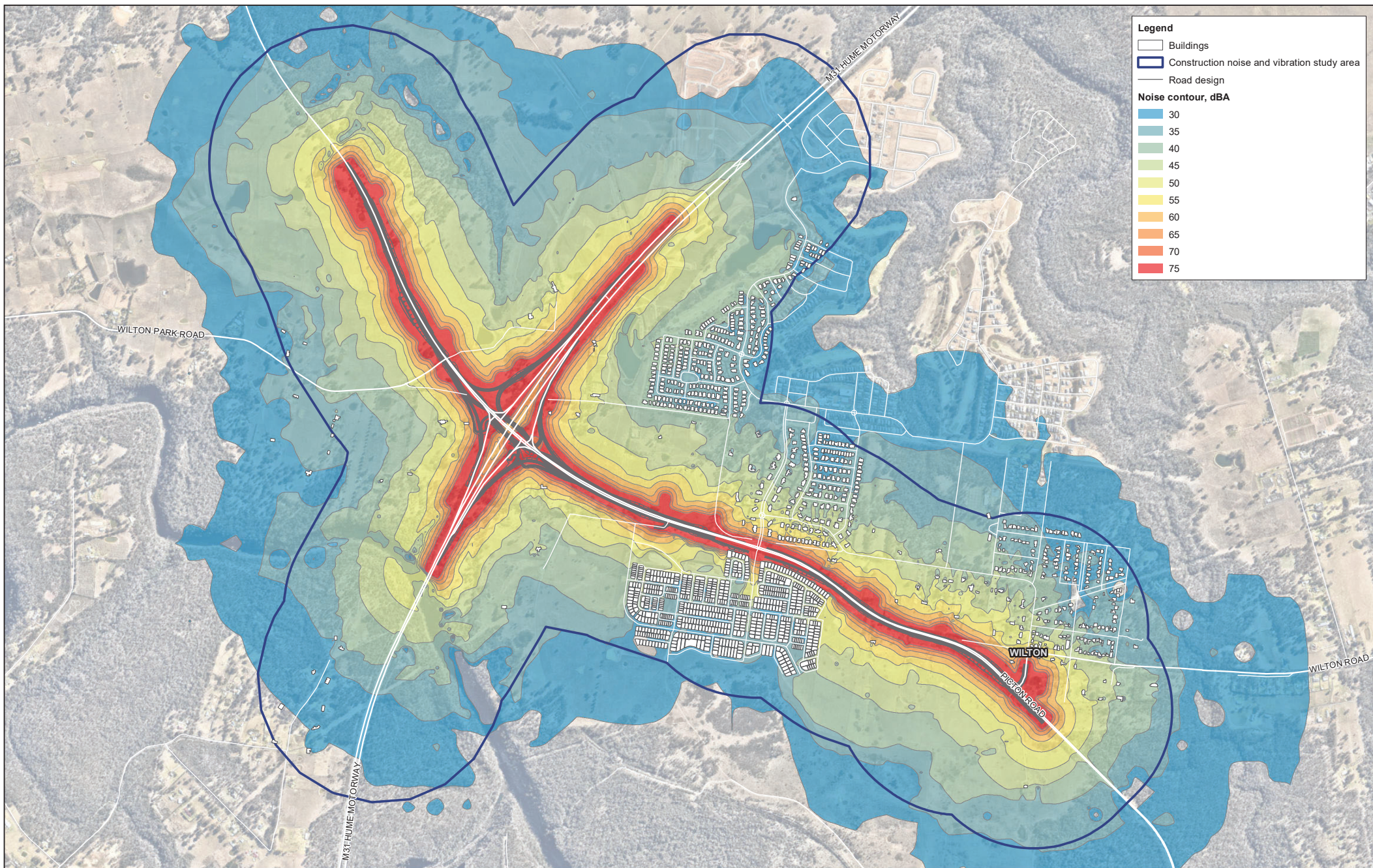
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS01 Predicted construction
 noise levels, dBA**

Figure B-4.1

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

Paper Size ISO A3
 0 100 200 300 400 500
 Meters
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



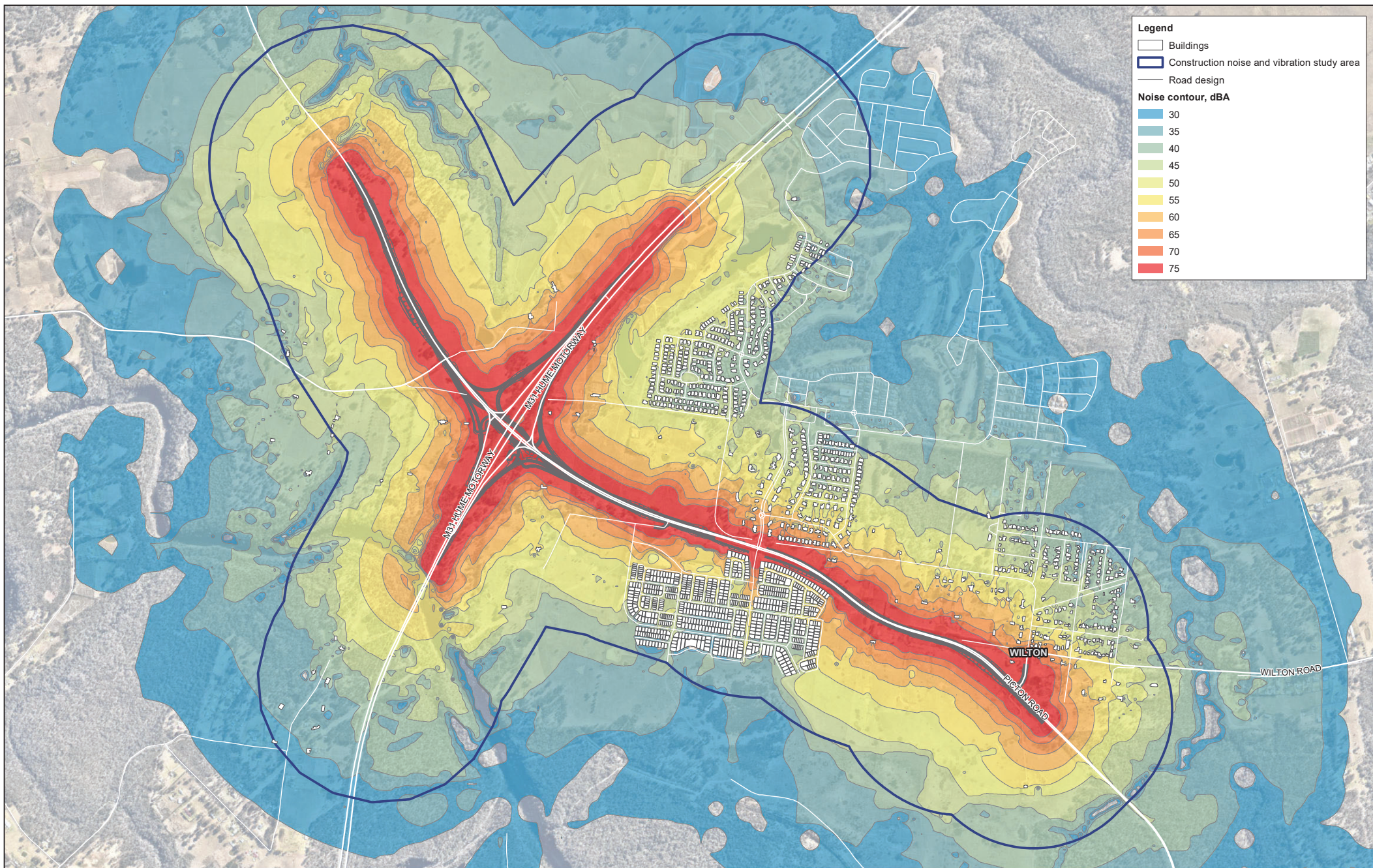
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS02 Predicted construction
 noise levels, dBA**

Figure B-4.2

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apm/er



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



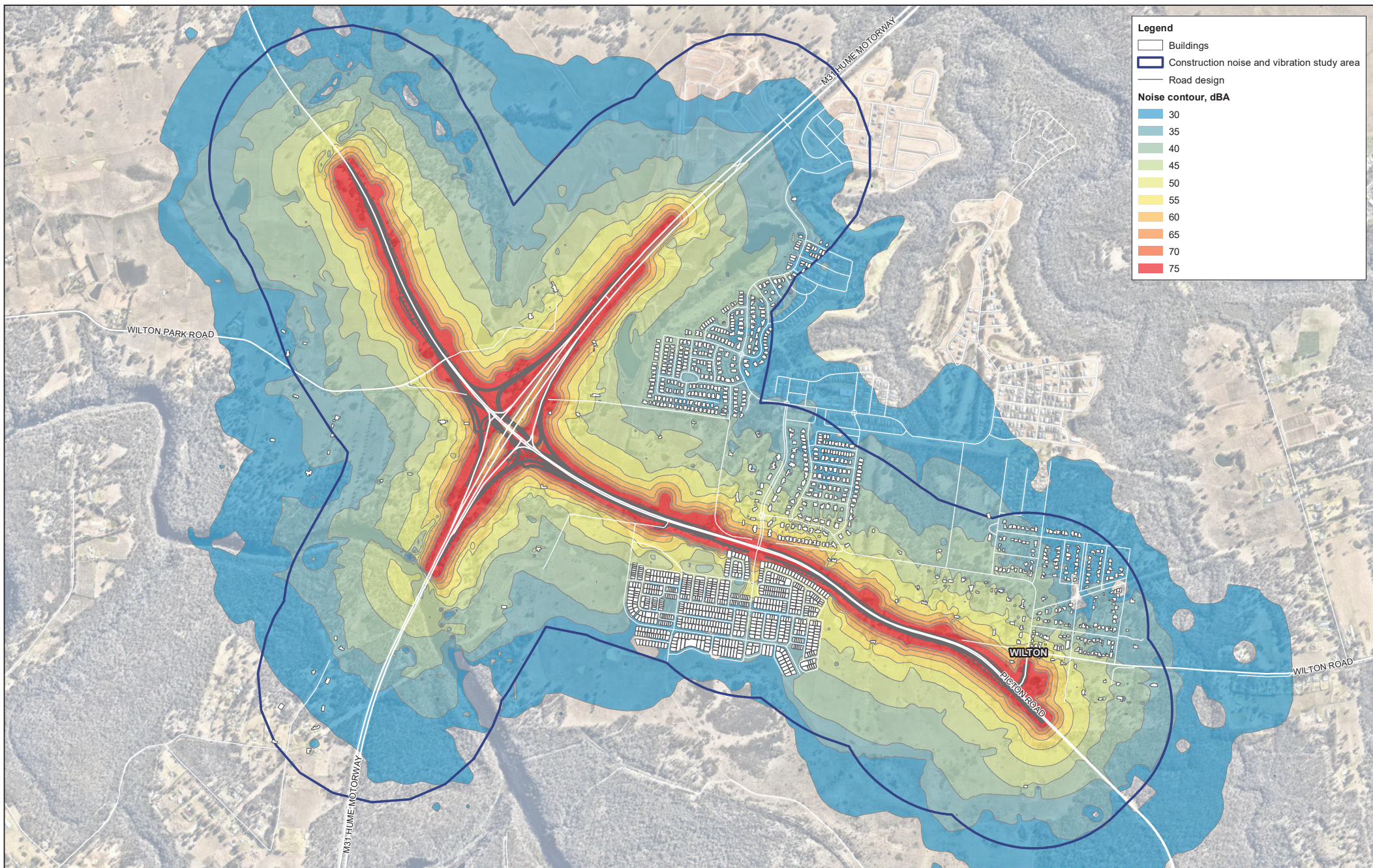
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS03 Predicted construction
 noise levels, dBA**

Figure B-4.3

Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



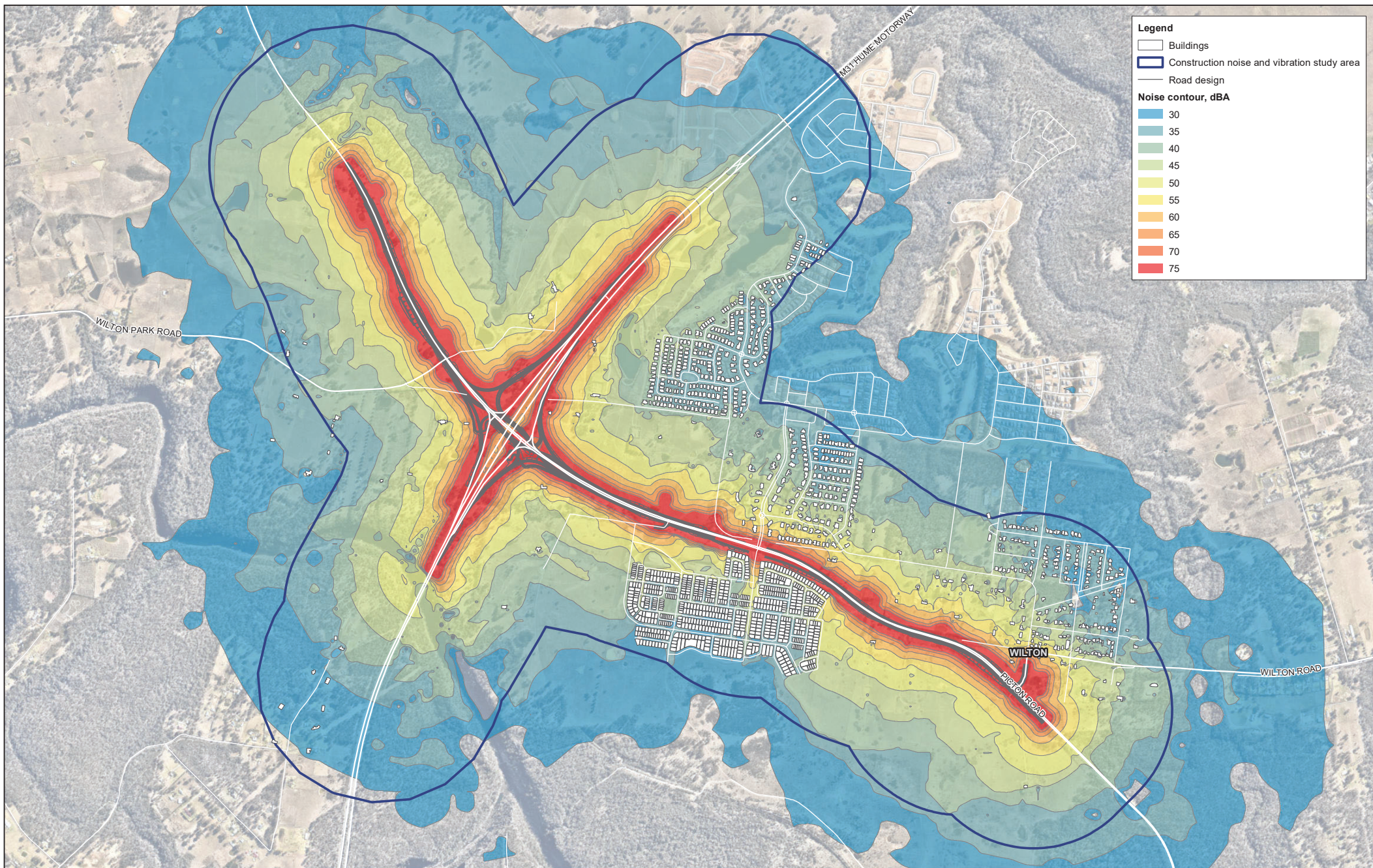
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS04 Predicted construction
 noise levels, dBA**

Figure B-4.4

Data source: Neemap, Aerial imagery, 2023, SS-505, Topographic base data, 2023. Created by: apm/llr



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

Paper Size ISO A3
 0 100 200 300 400 500
 Meters
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



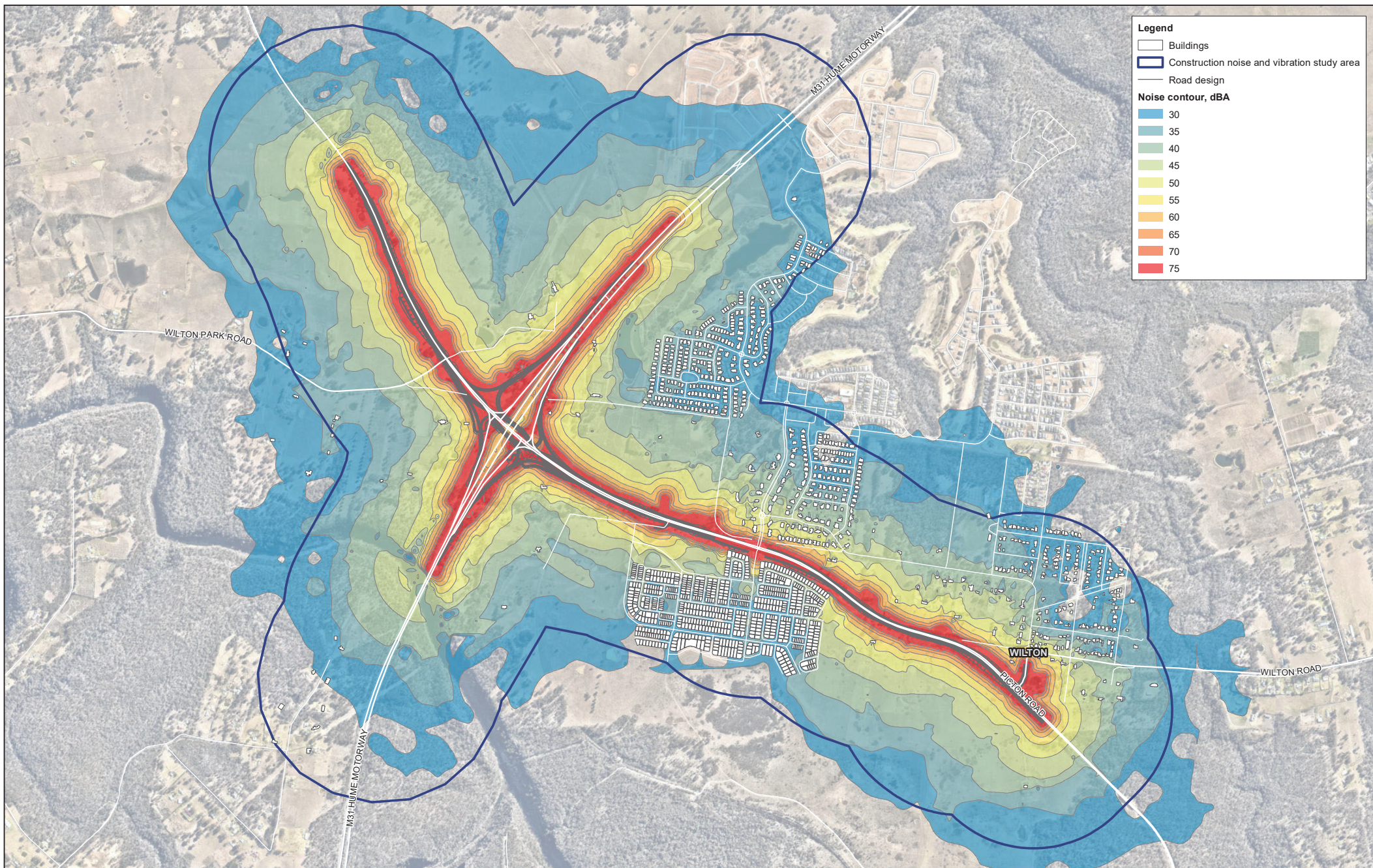
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS05 Predicted construction
 noise levels, dBA**

Figure B-4.5

Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



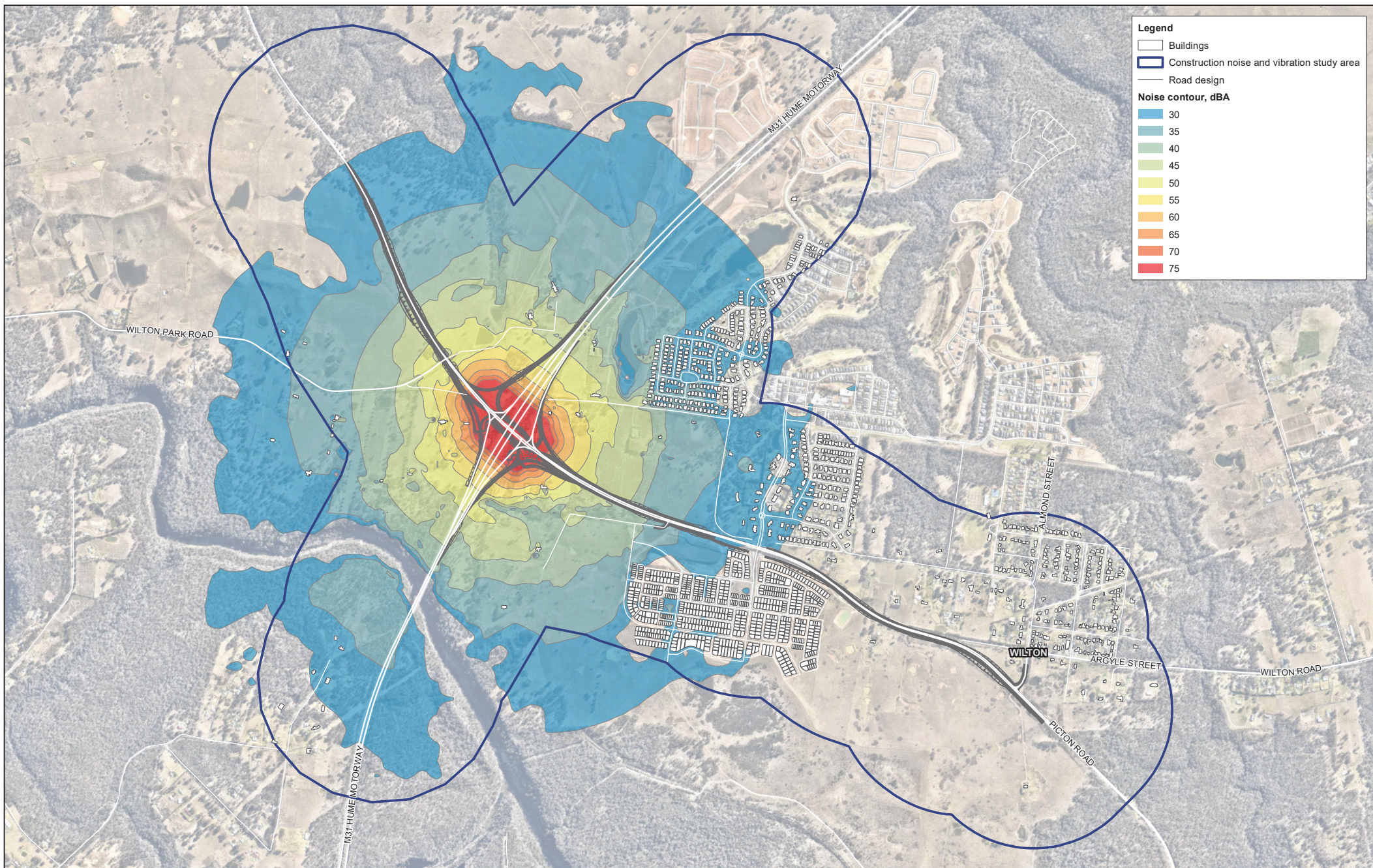
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS06 Predicted construction
 noise levels, dBA**

Figure B-4.6

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



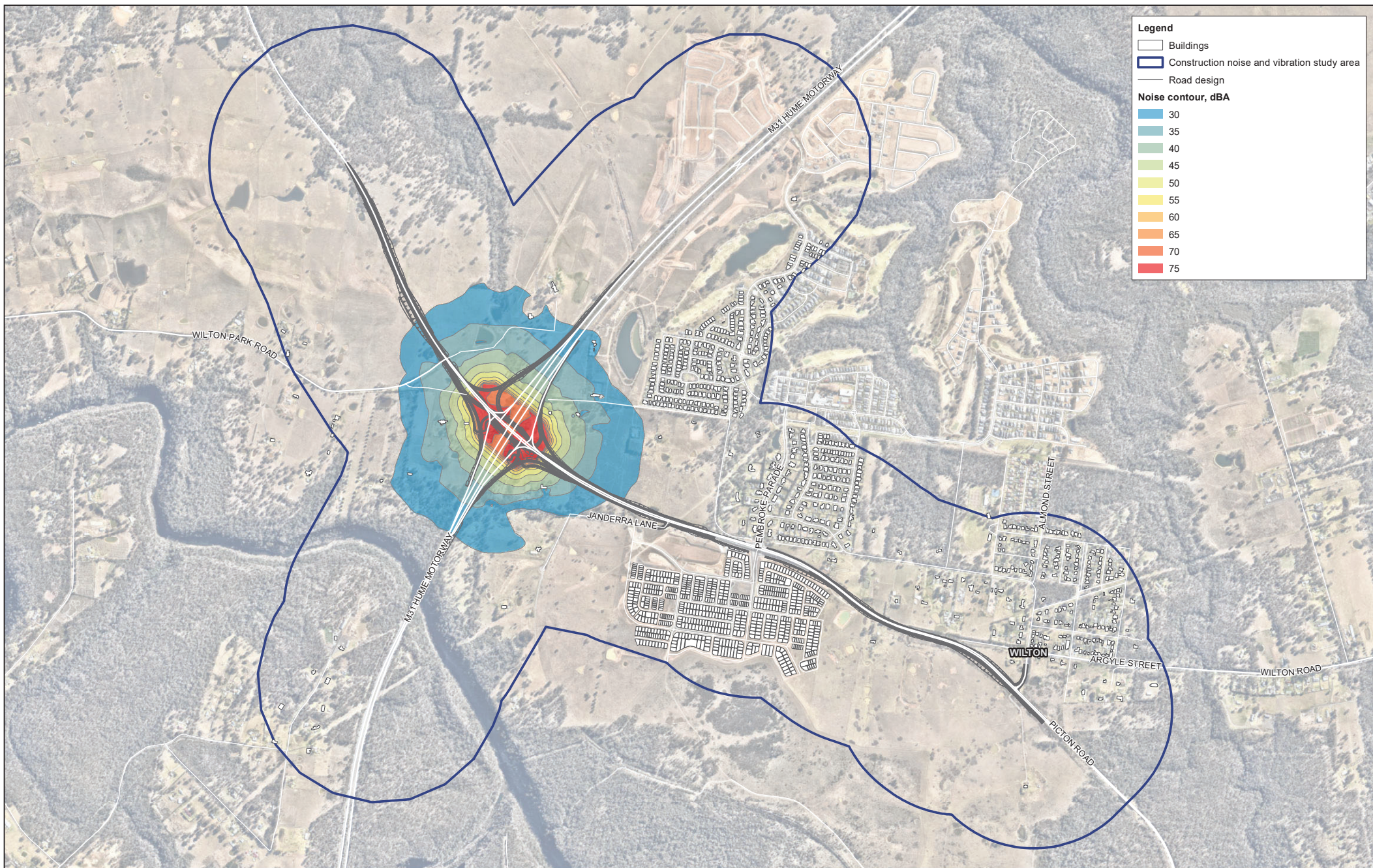
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS07 Predicted construction
 noise levels, dBA**

Figure B-4.7

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmlr



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



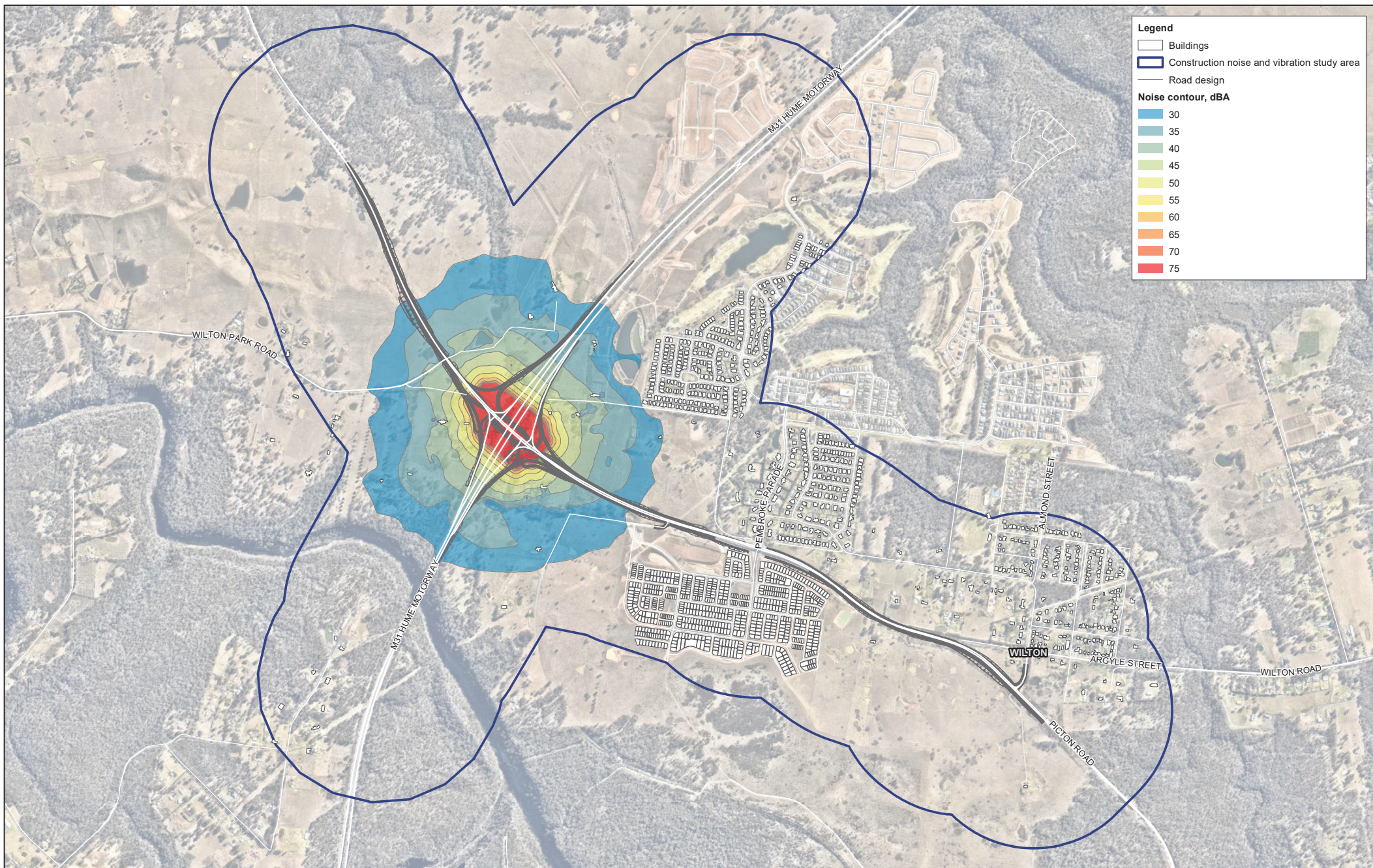
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS08 Predicted construction
 noise levels, dBA**

Figure B-4.8

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



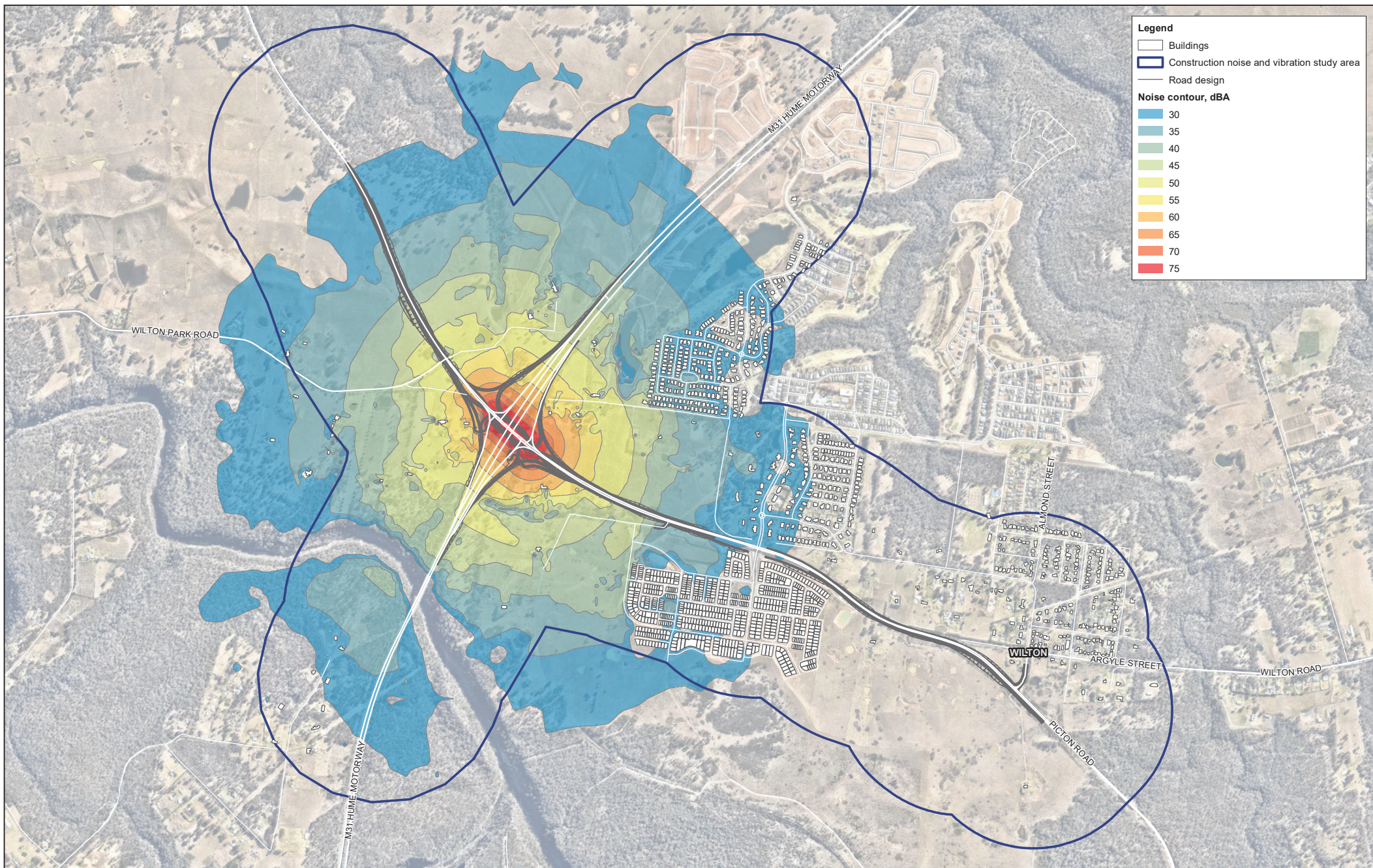
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS09 Predicted construction
 noise levels, dBA**

Figure B-4.9

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

Paper Size ISO A3
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 Meters
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



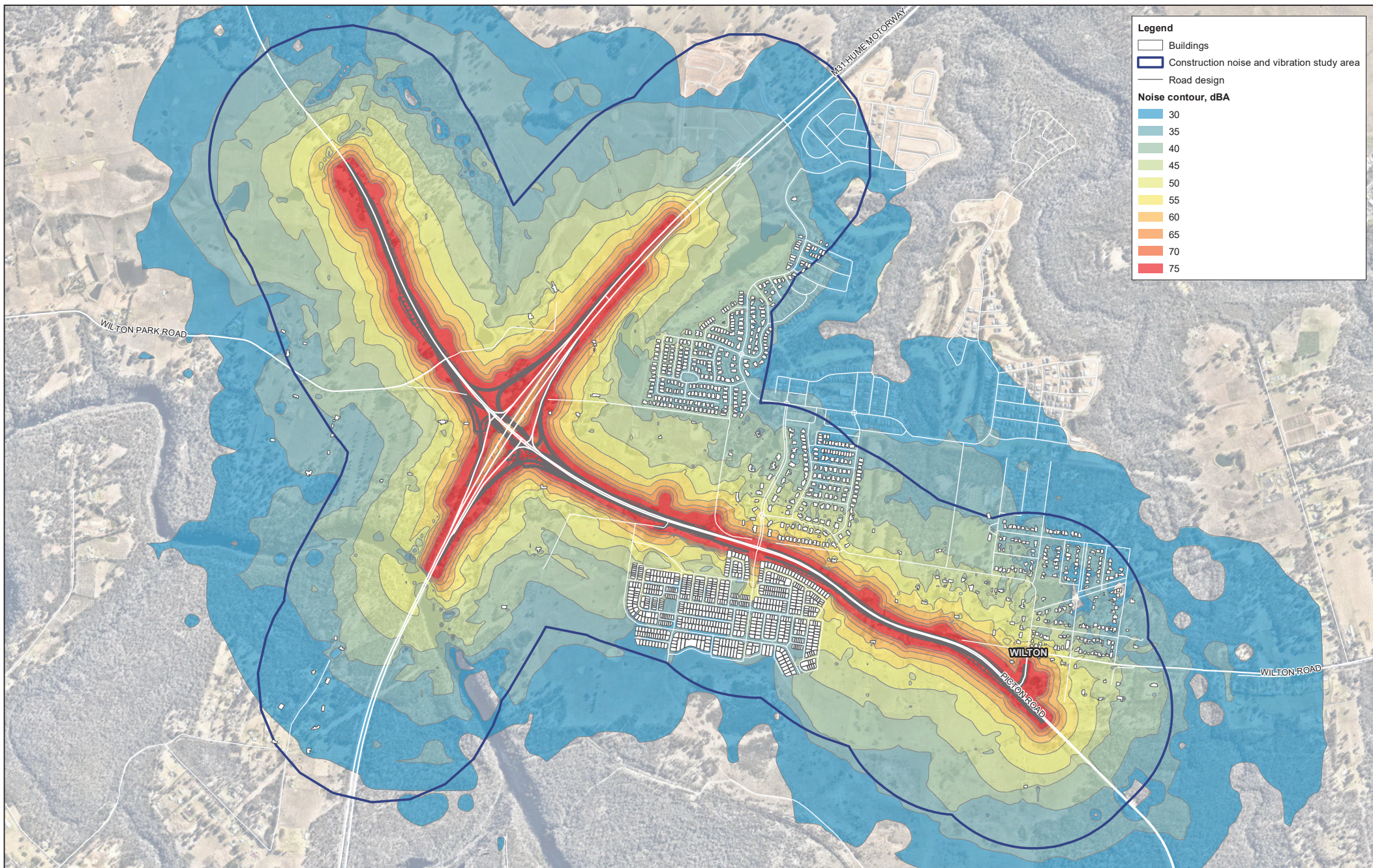
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS10 Predicted construction
 noise levels, dBA**

Figure B-4.10

Data source: Neemap, Aerial imagery, 2023, SS-505, Topographic base data, 2023. Created by: ajmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

Paper Size ISO A3
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 Meters
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



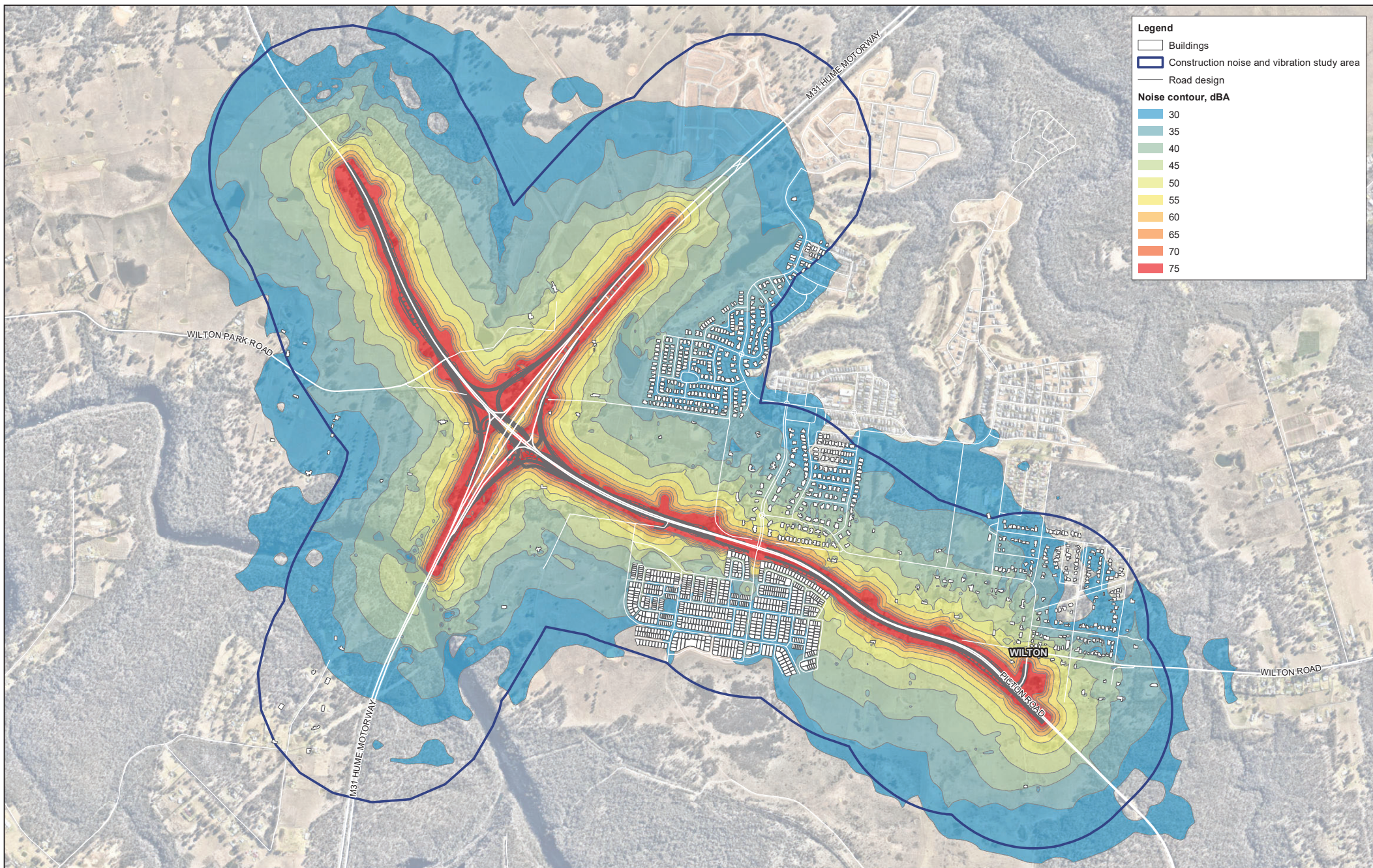
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS11 Predicted construction
 noise levels, dBA**

Figure B-4.11

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



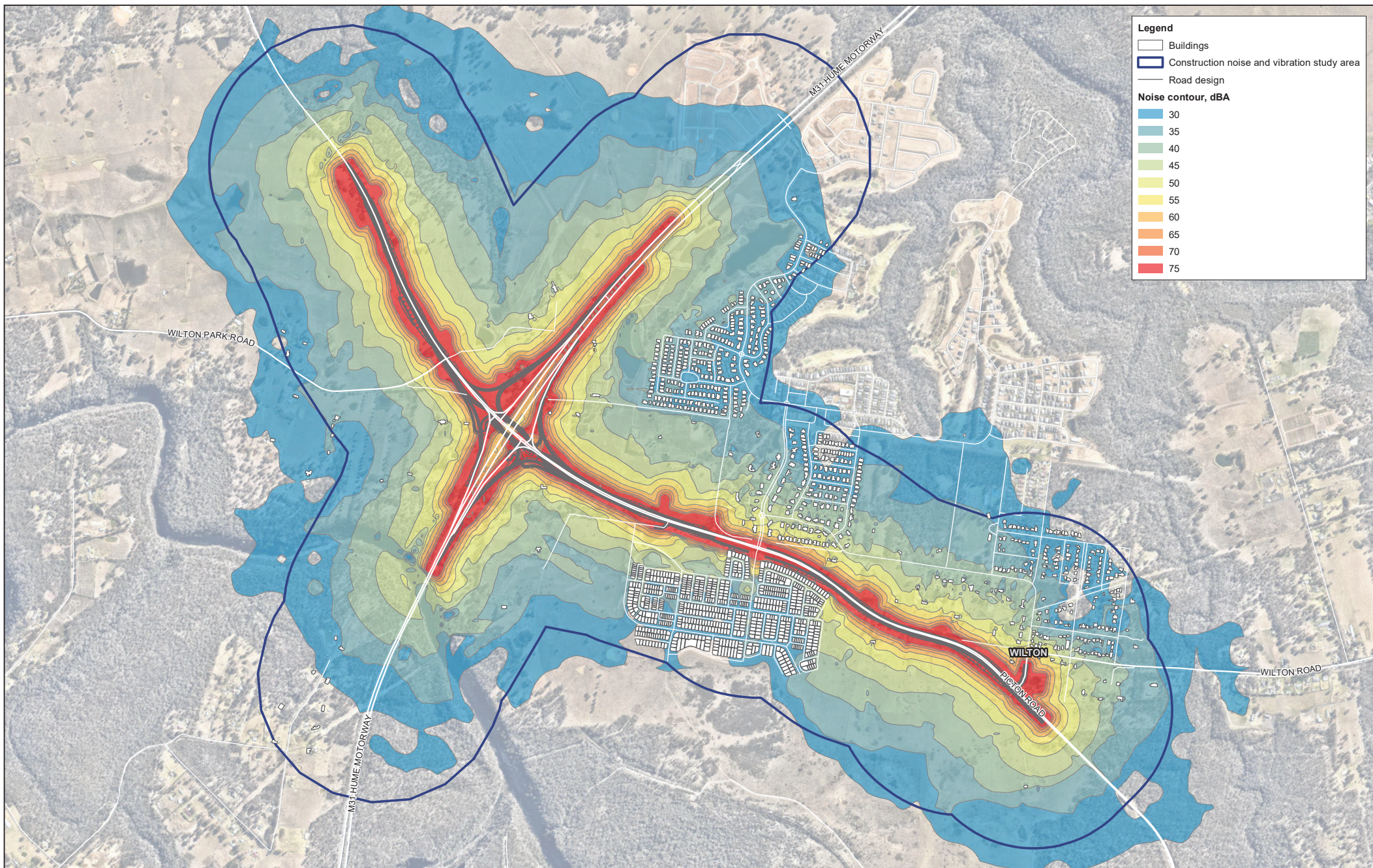
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS12 Predicted construction
 noise levels, dBA**

Figure B-4.12

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



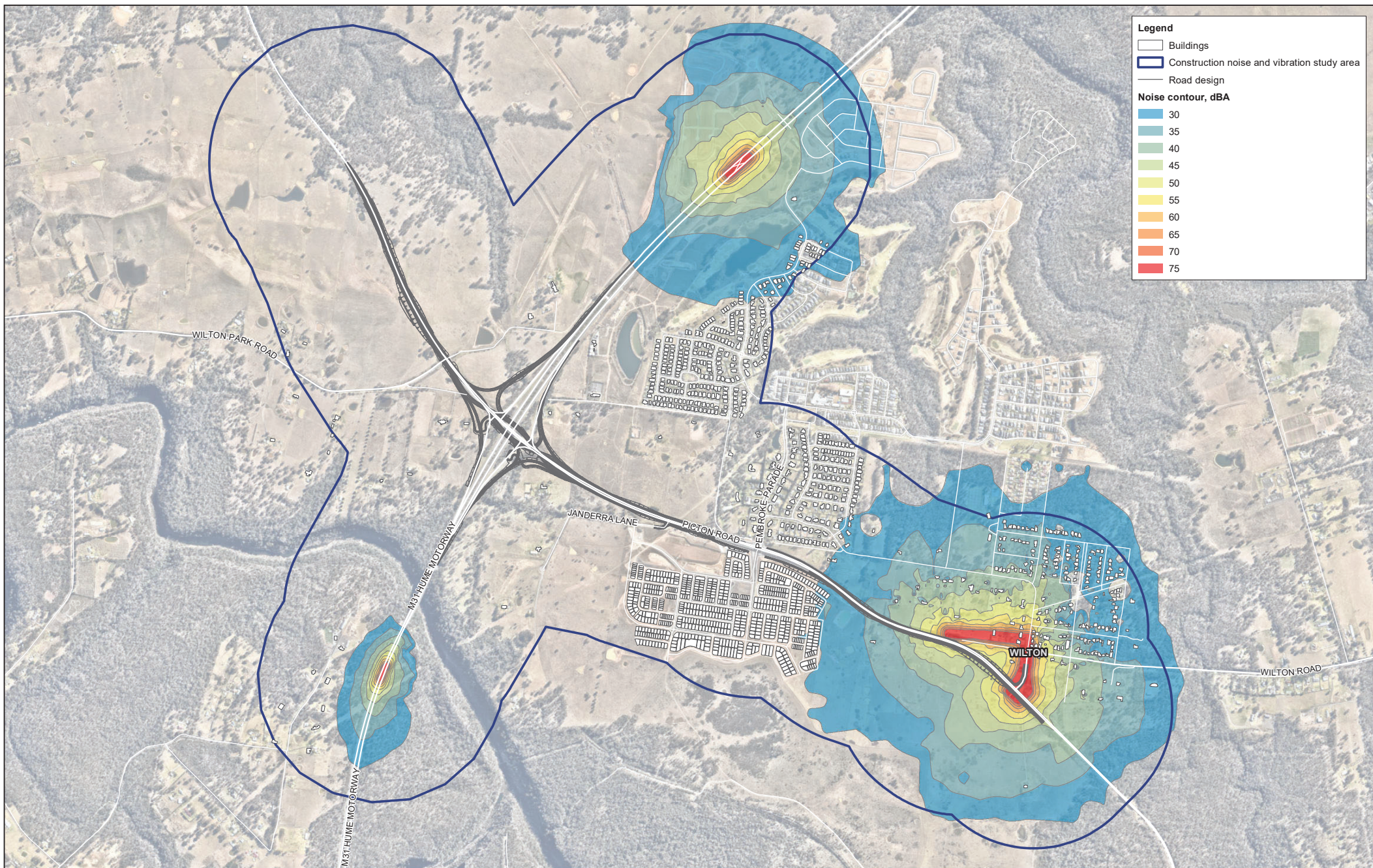
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS13 Predicted construction
 noise levels, dBA**

Figure B-4.13

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



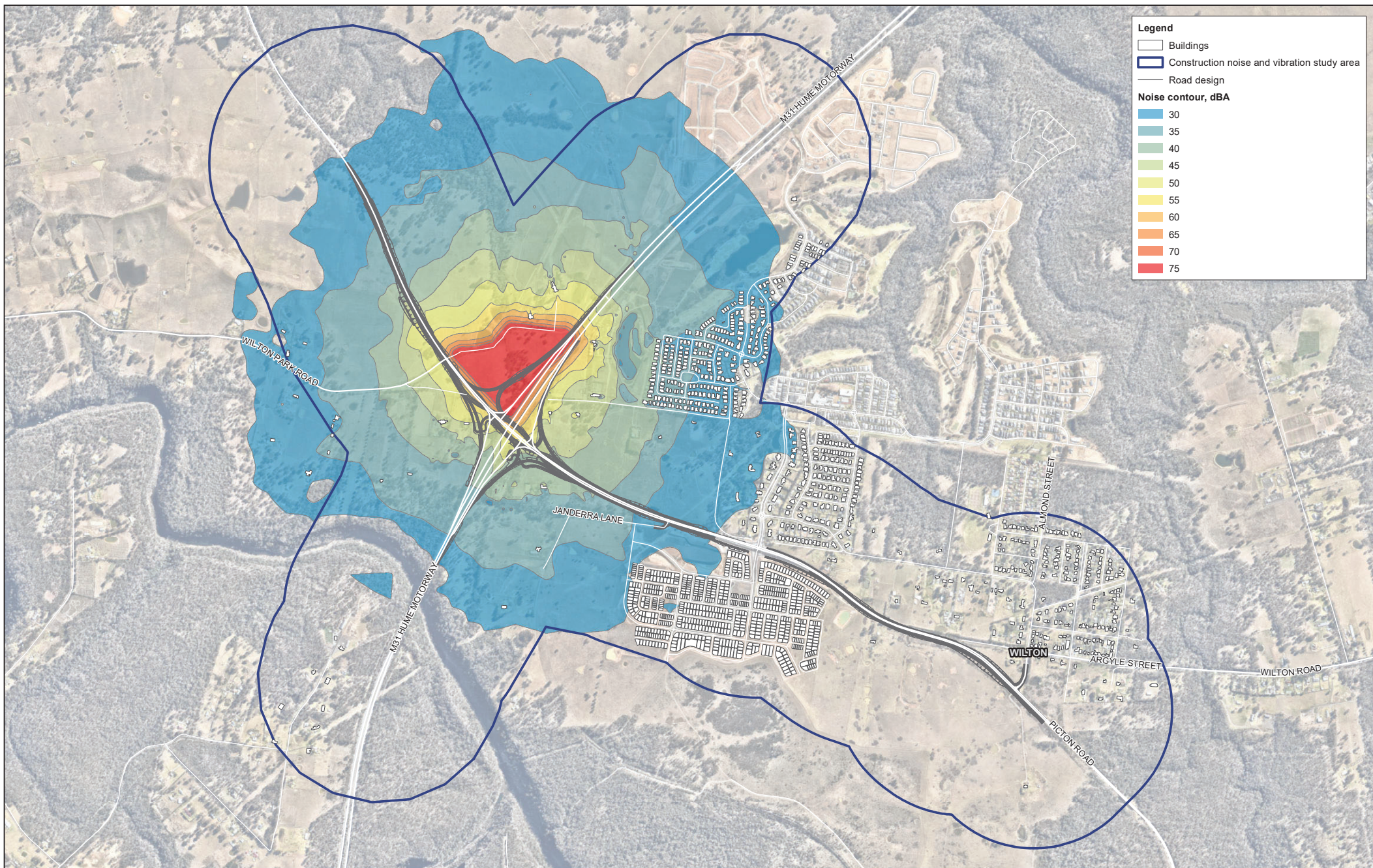
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS14 Predicted construction
 noise levels, dBA**

Figure B-4.14

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apm/llr



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

Paper Size ISO A3
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 Meters
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



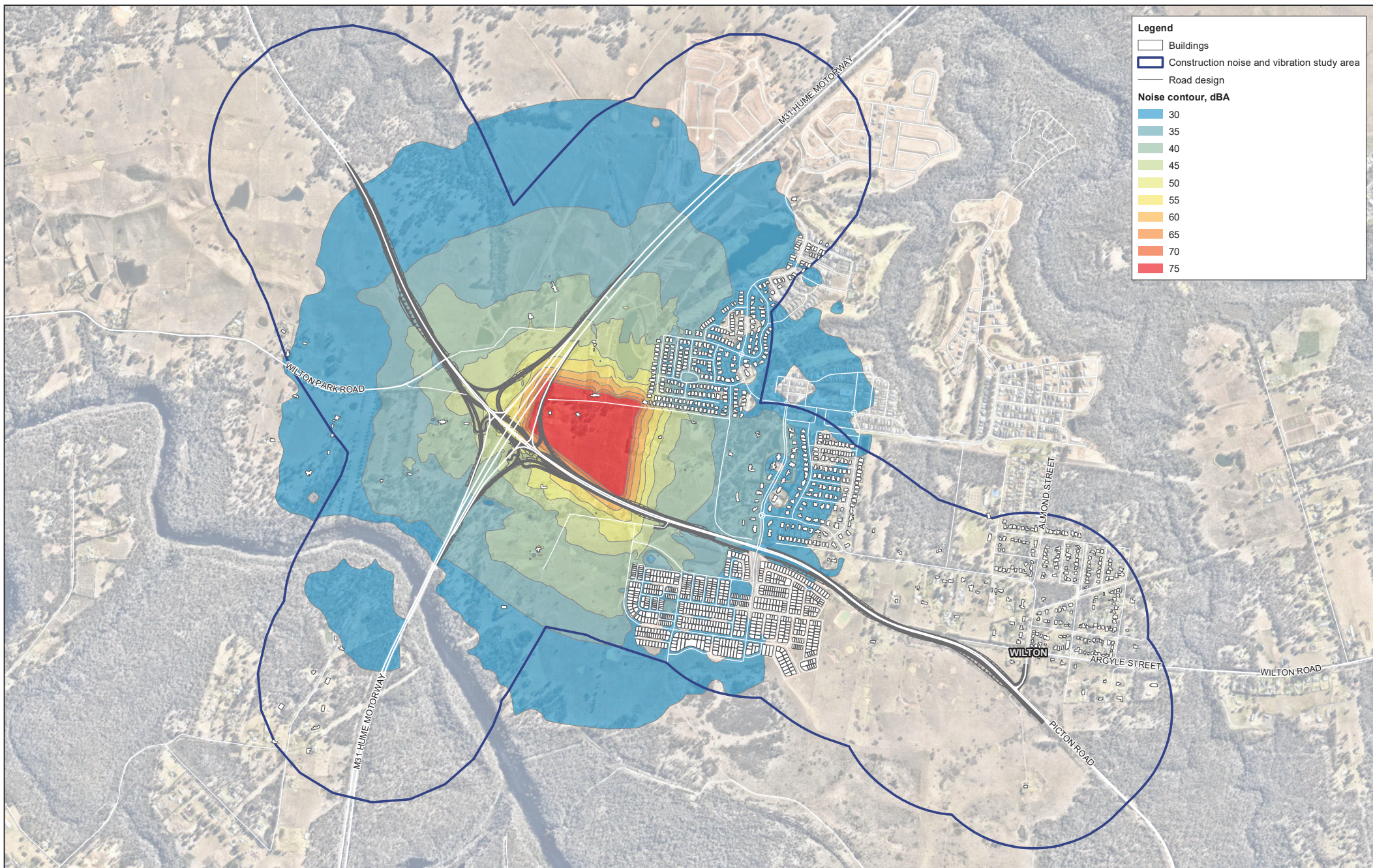
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS15 Predicted construction
 noise levels, dBA**

Figure B-4.15

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: ajmiller



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



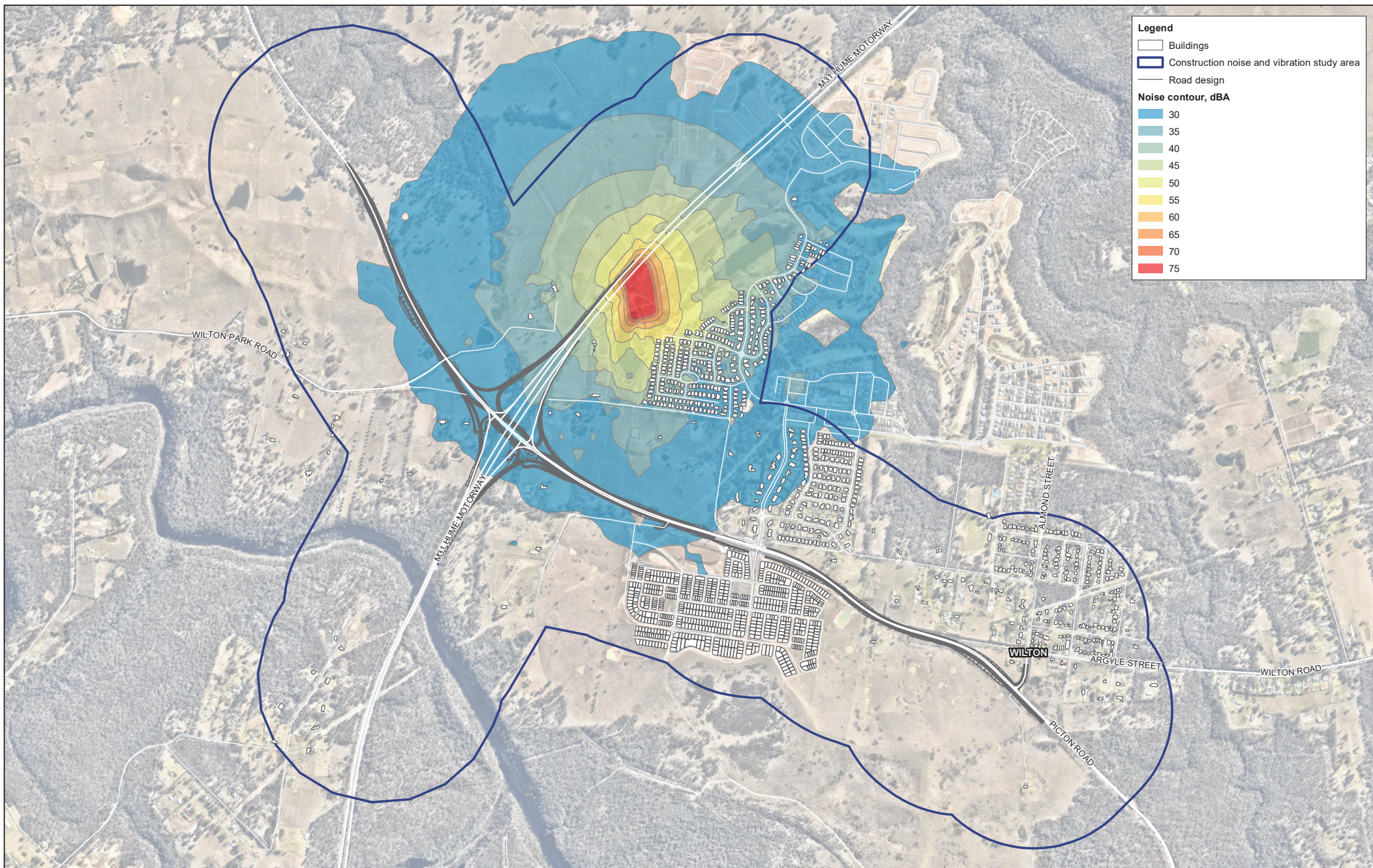
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS16 Predicted construction
 noise levels, dBA**

Figure B-4.16

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: apmlr



Legend

- Buildings
- Construction noise and vibration study area
- Road design

Noise contour, dBA

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

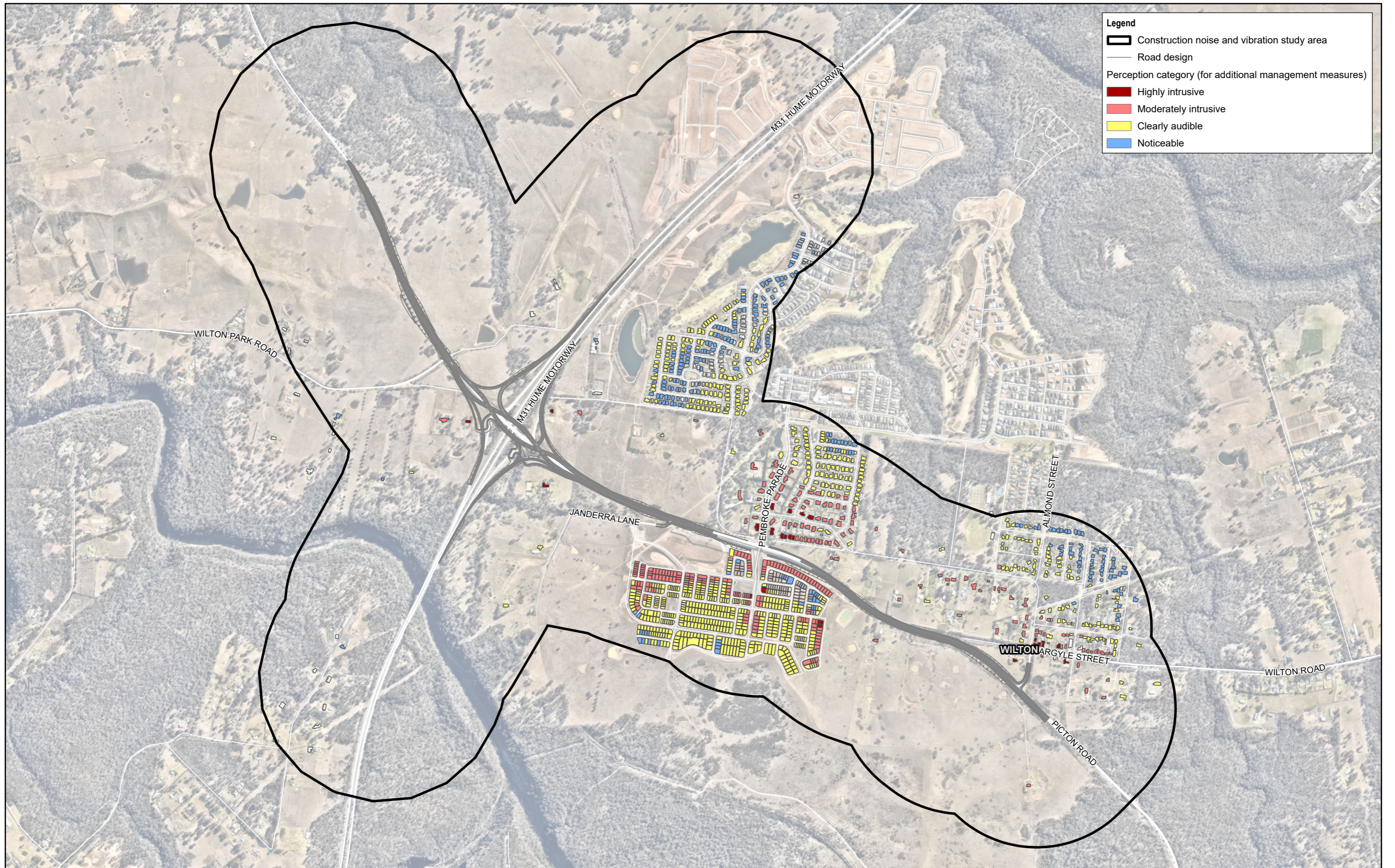
Project No. 12560200
 Revision No. C
 Date 26/10/2023

**CS17 Predicted construction
 noise levels, dBA**

Figure B-4.17

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by: ajmiller

B-5 Construction noise additional management measures



Legend

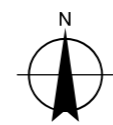
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

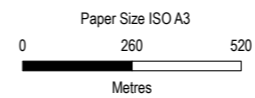
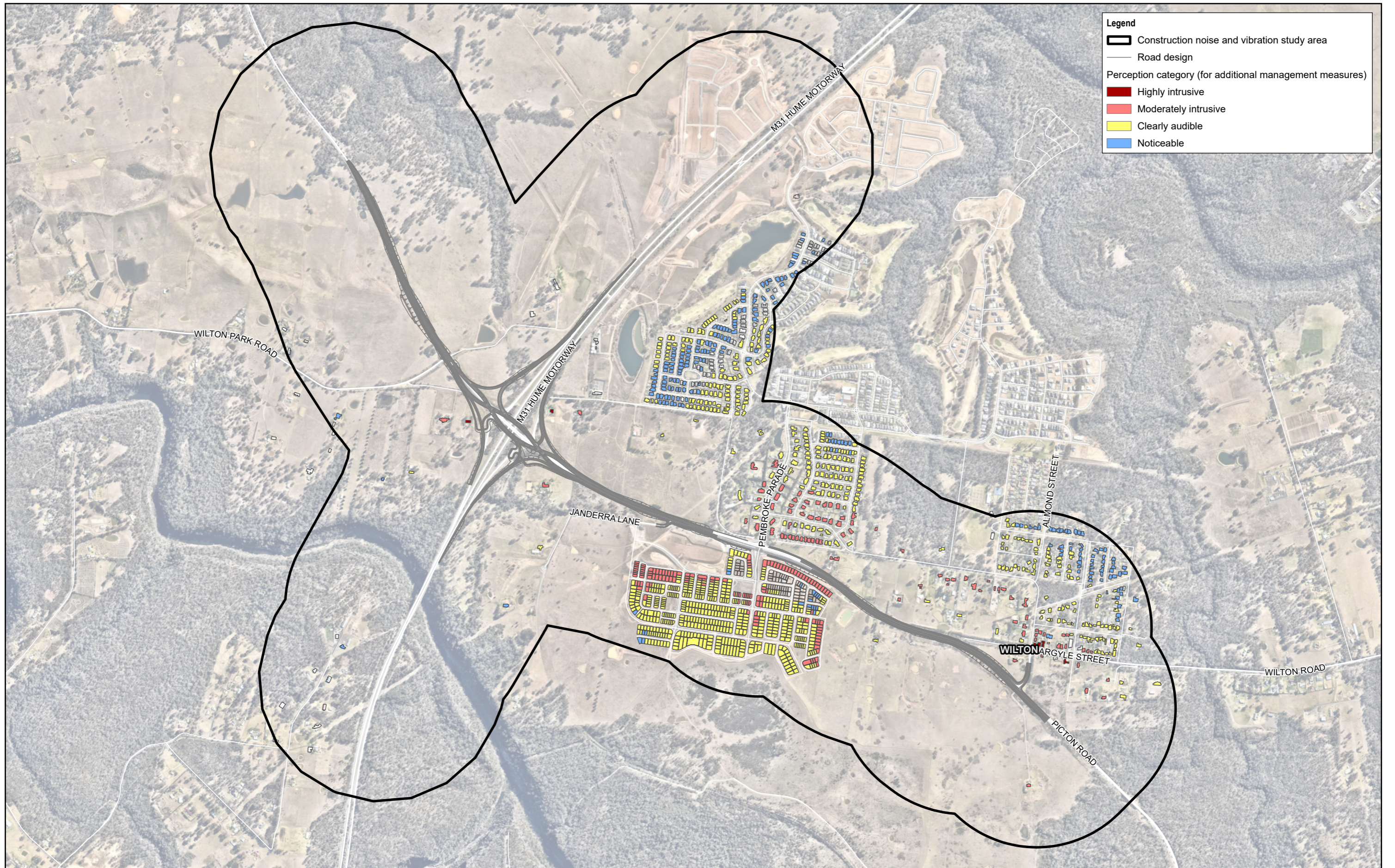


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

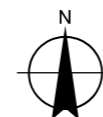
Project No. 12560200
 Revision No. C
 Date 10/26/2023

Additional noise management measures

Figure B-5.1



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

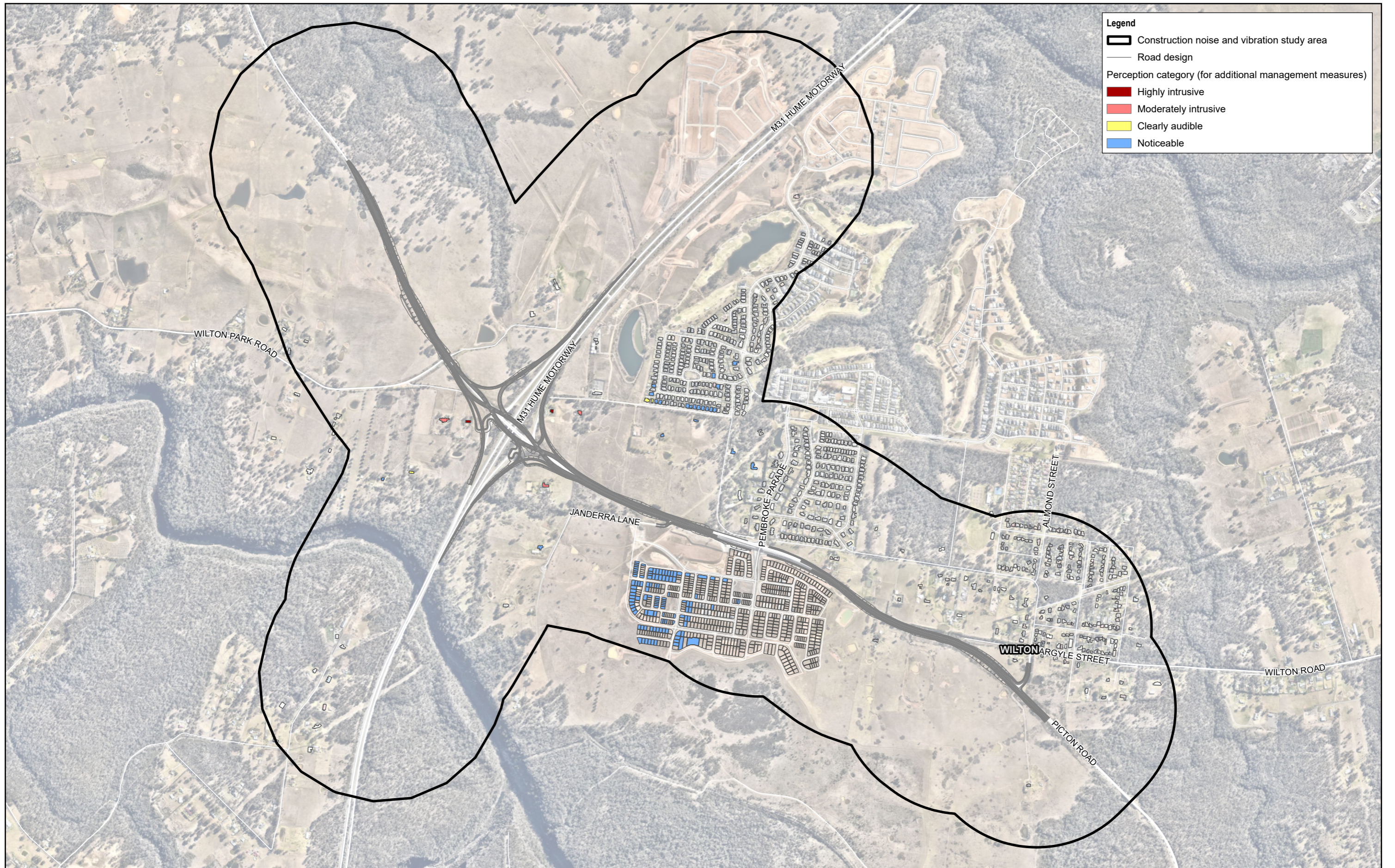


Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

**Additional noise management measures
during standard hours
Stage 1 (CS05)**

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure B-5.2



Legend

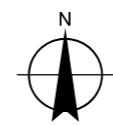
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

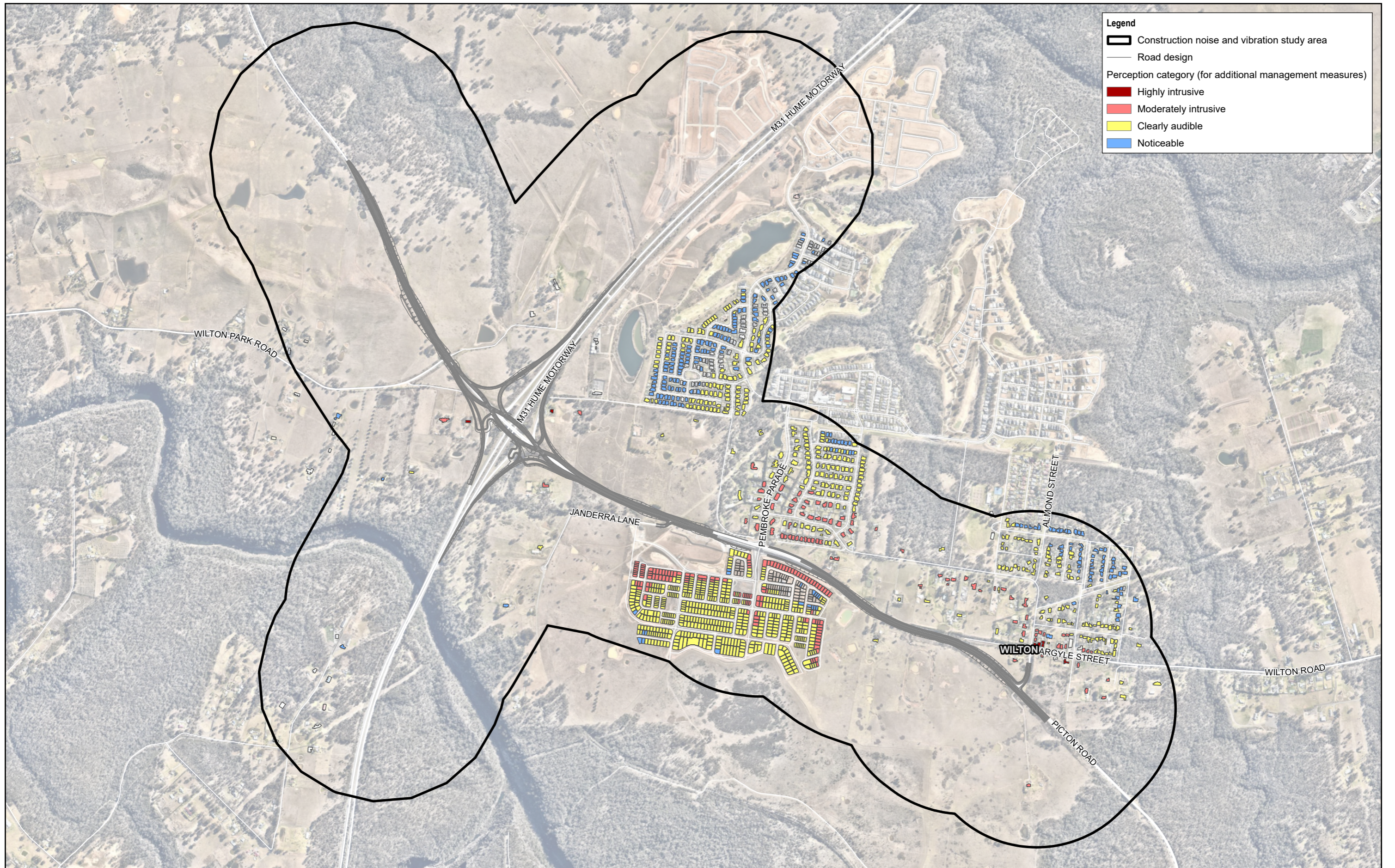


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during standard hours
 Stage 2 (CS07)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.3



Legend

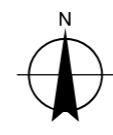
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

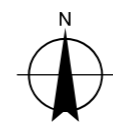
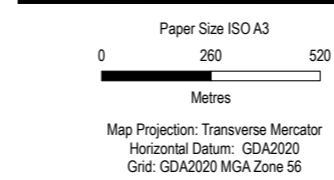
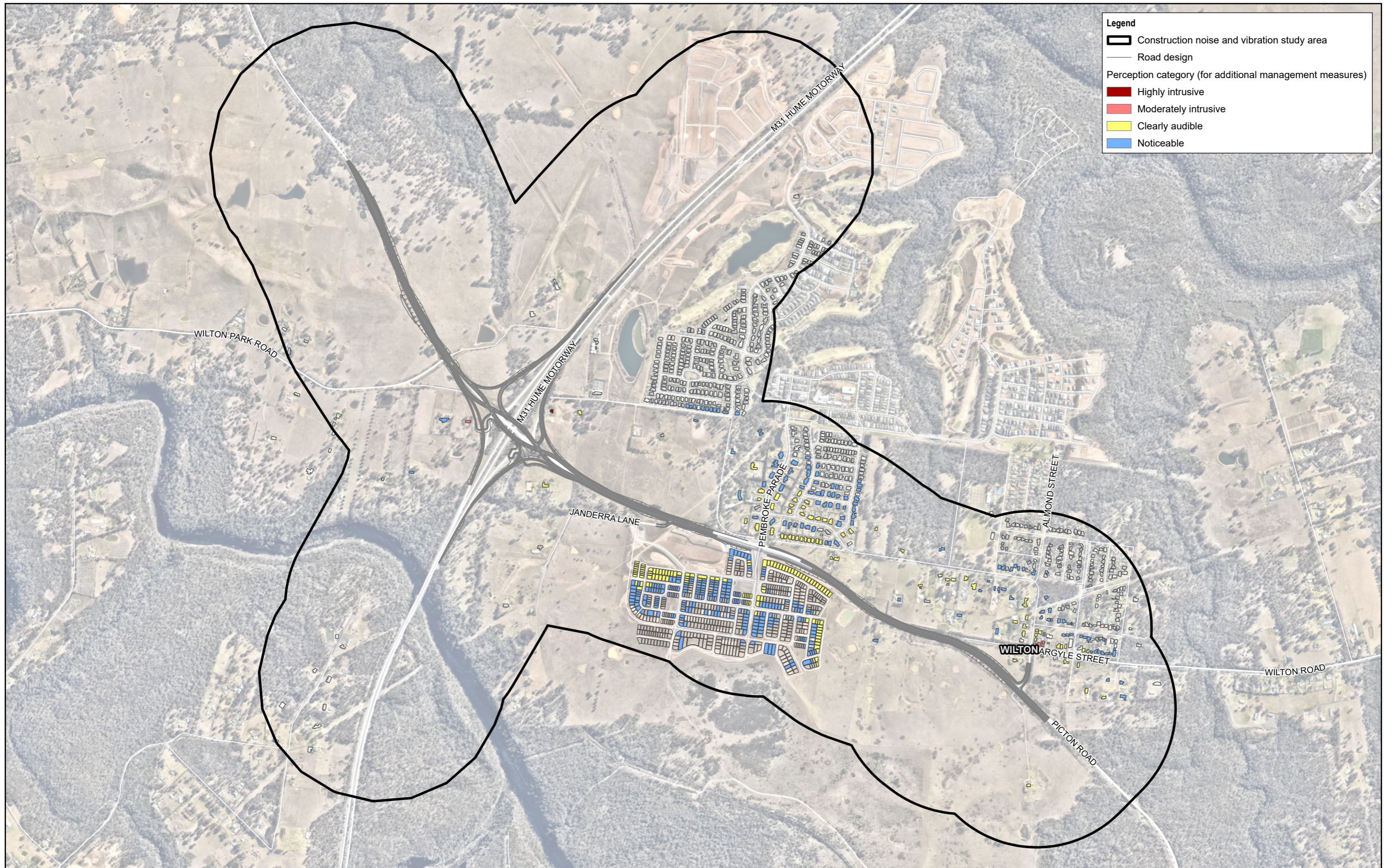


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during standard hours
 Stage 3 (CS11)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.4

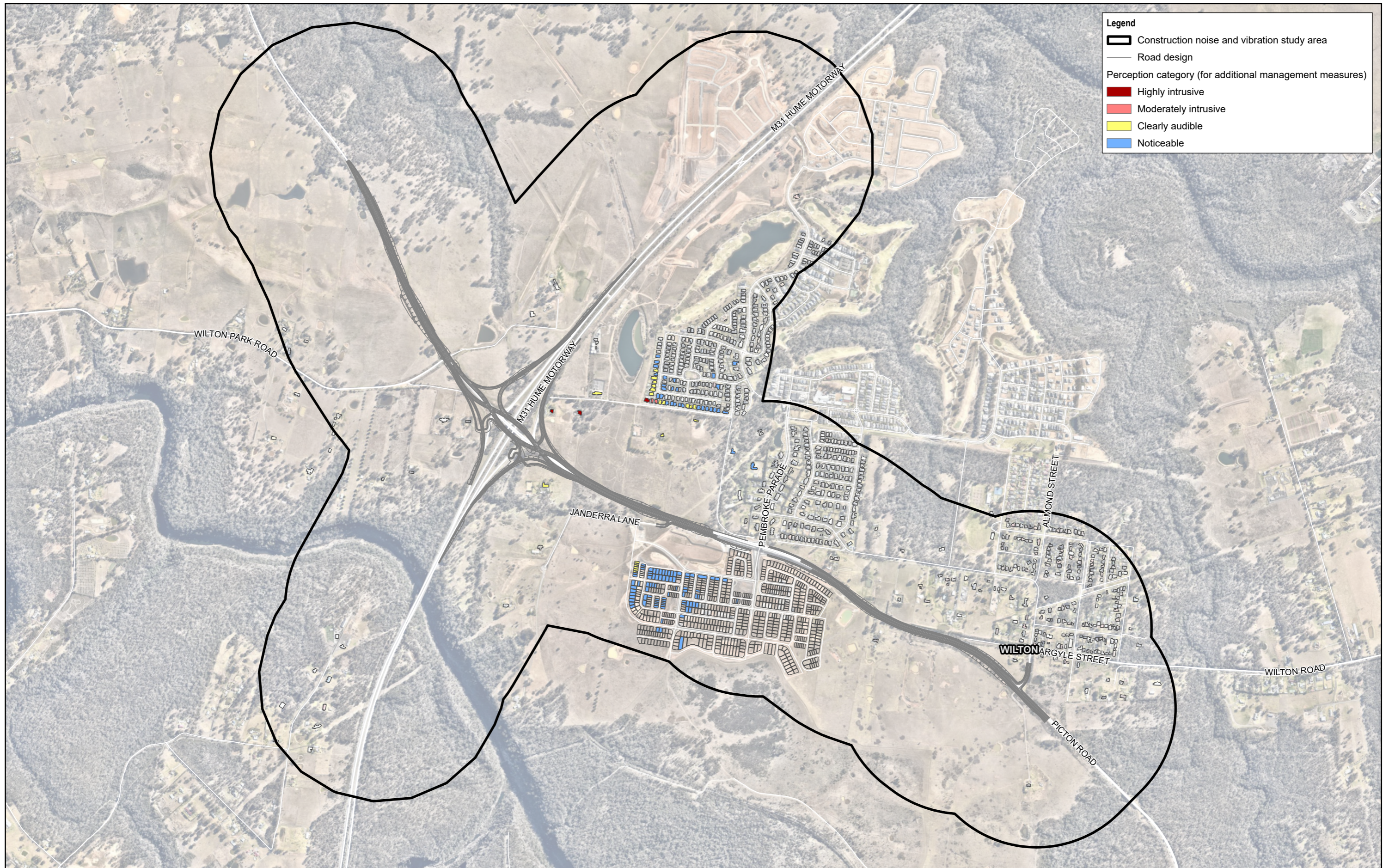


Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

**Additional noise management measures
during standard hours
Stage 4 (CS13)**

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure B-5.5



Legend

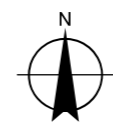
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

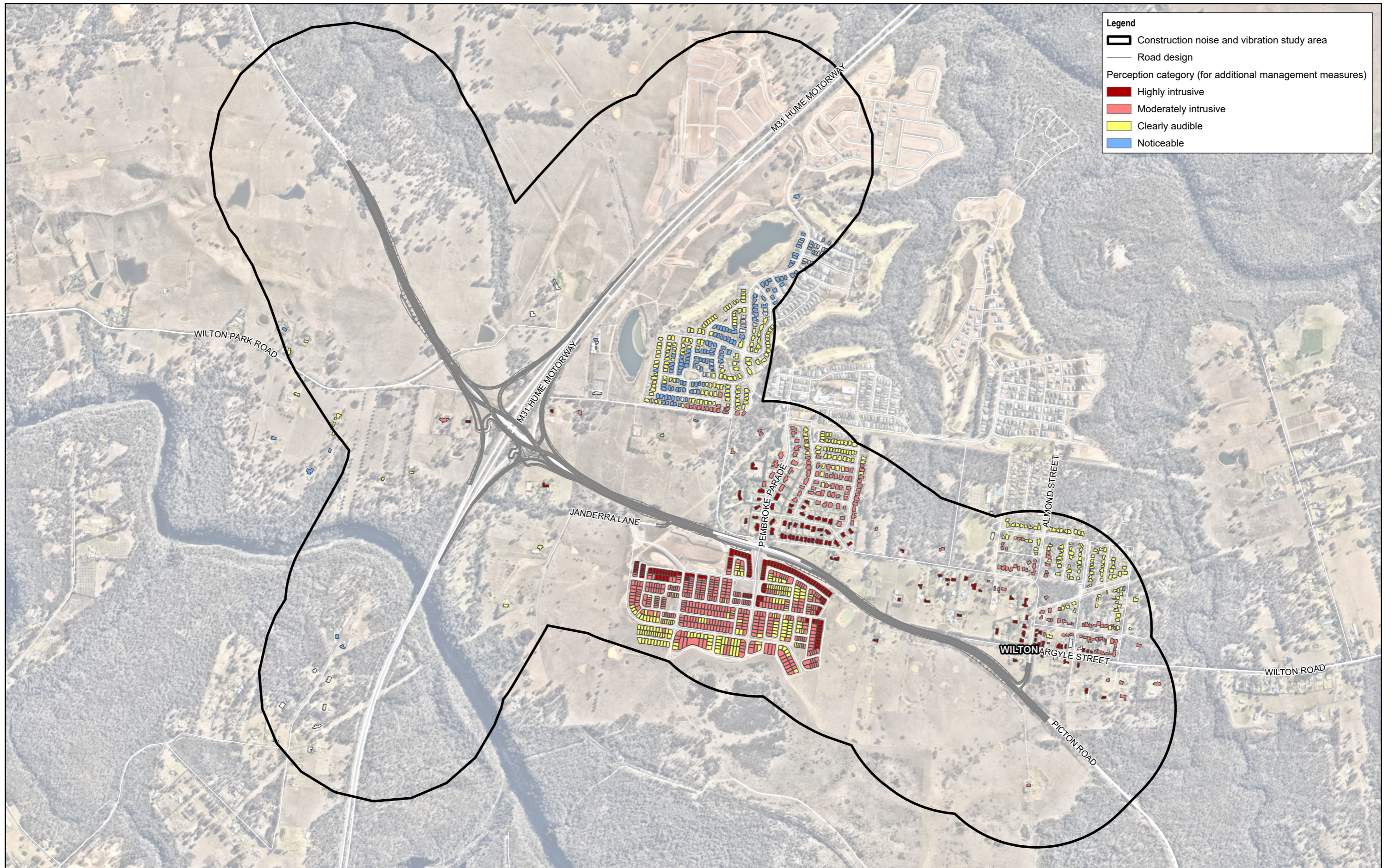


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during standard hours
 Compound operations (CS16)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.6



Legend

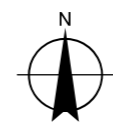
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

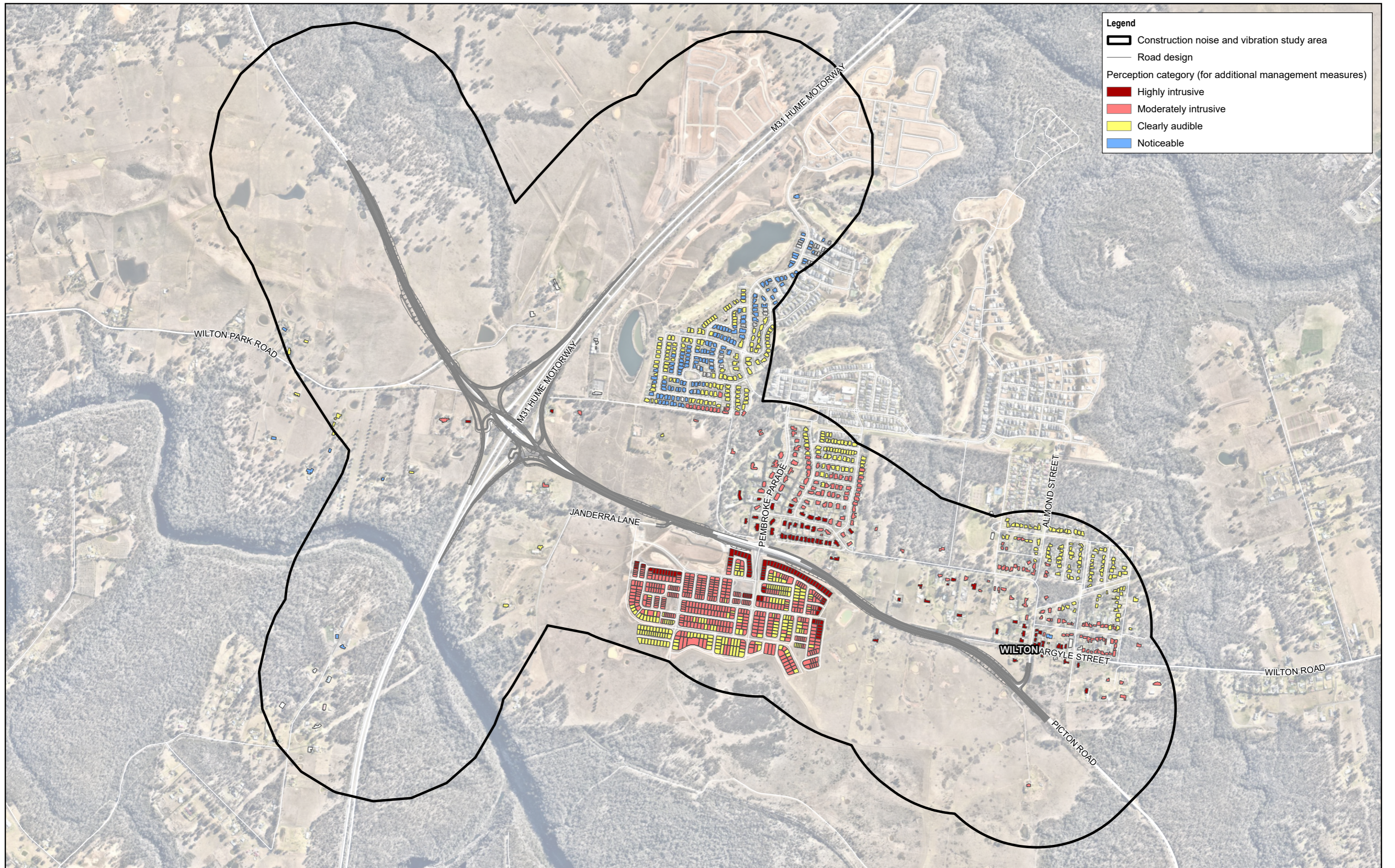


Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

**Additional noise management measures
during OOHV Period 2 (Night)
Stage 0 (CS03)**

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure B-5.7



Legend

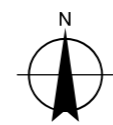
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

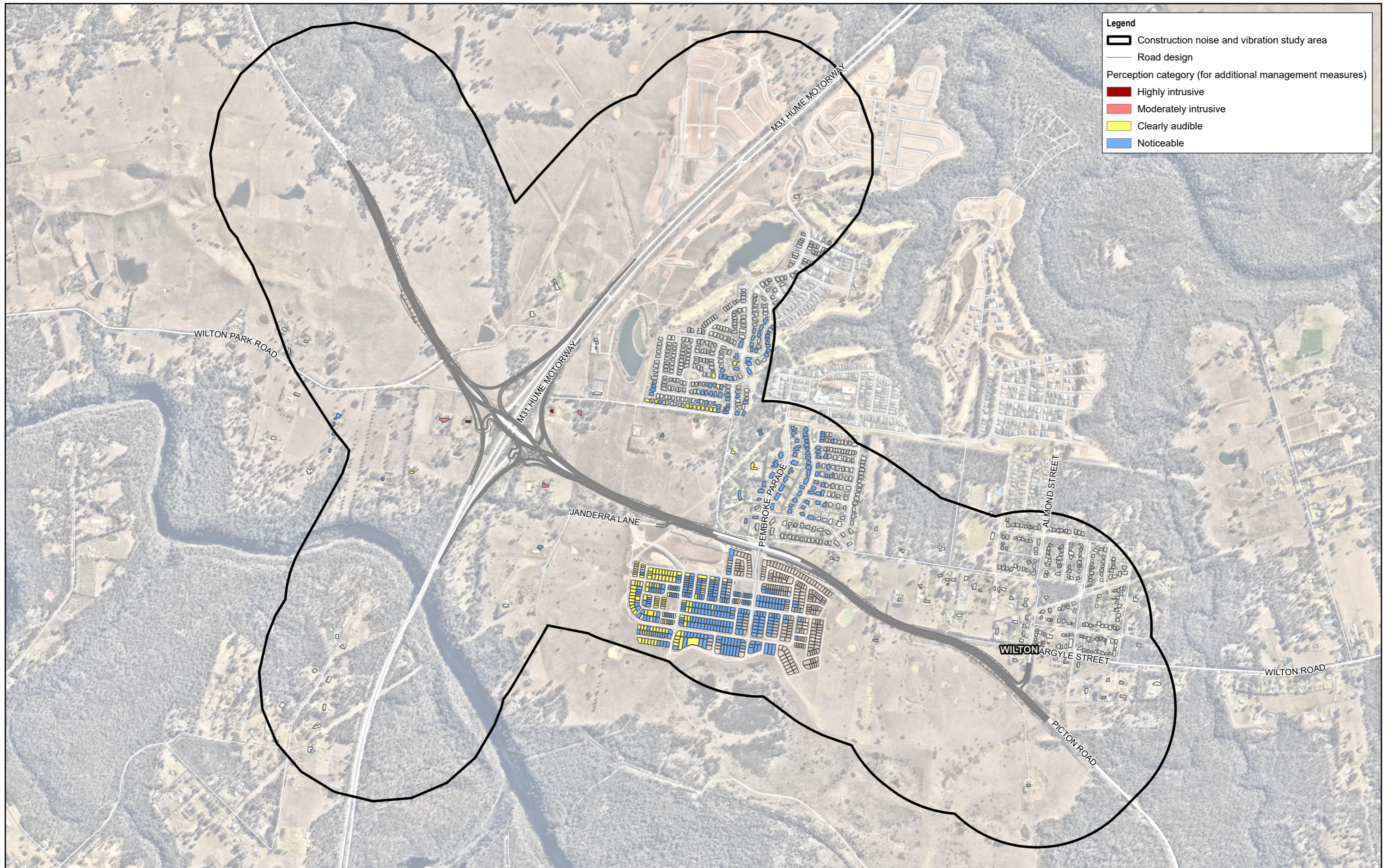


Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

**Additional noise management measures
during OOHV Period 2 (Night)
Stage 1 (CS05)**

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure B-5.8



Legend

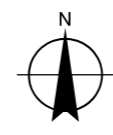
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

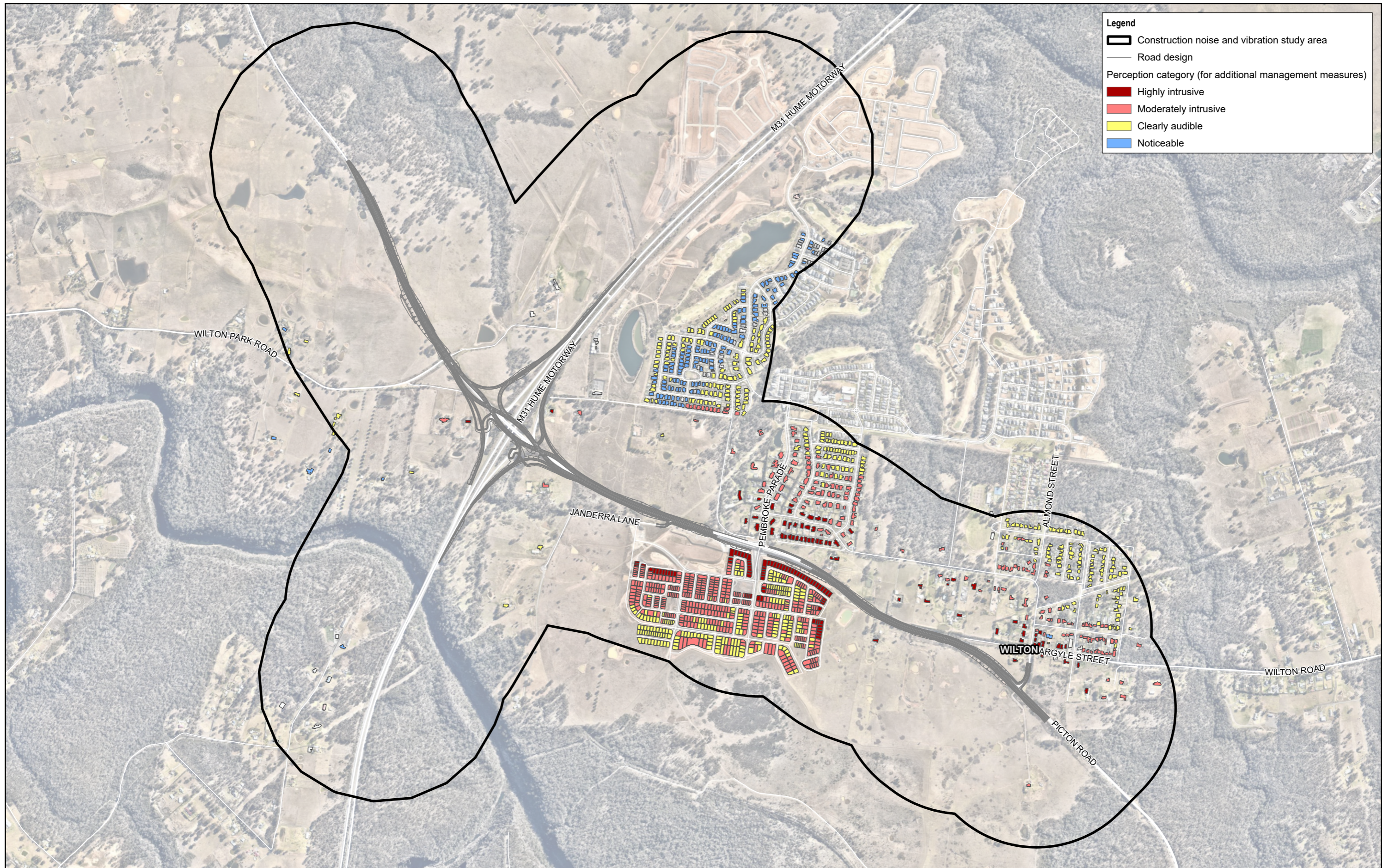


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during OOHV Period 2 (Night)
 Stage 2 (CS07)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.9



Legend

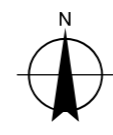
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

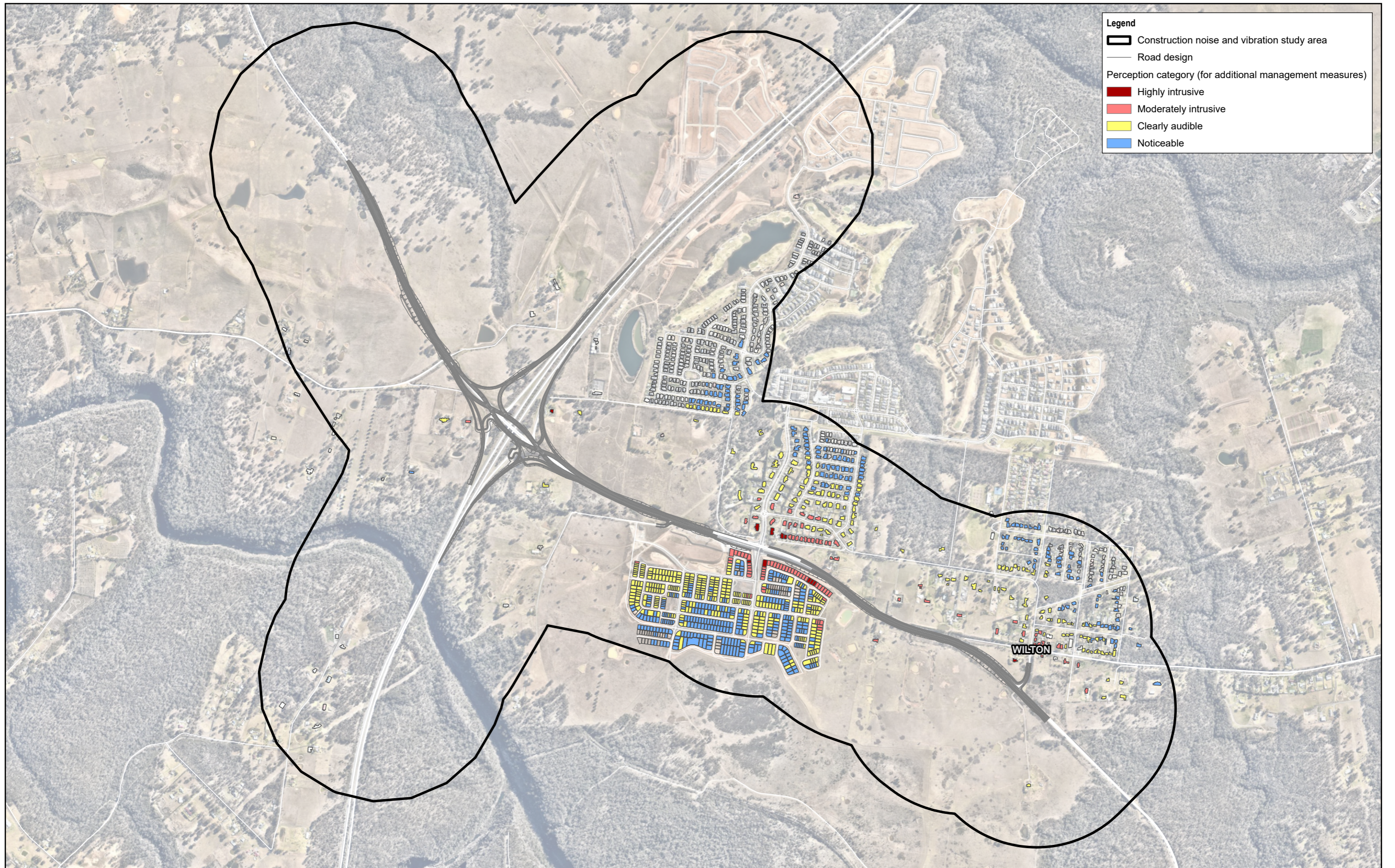


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during OOHV Period 2 (Night)
 Stage 3 (CS11)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.10



Legend

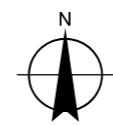
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

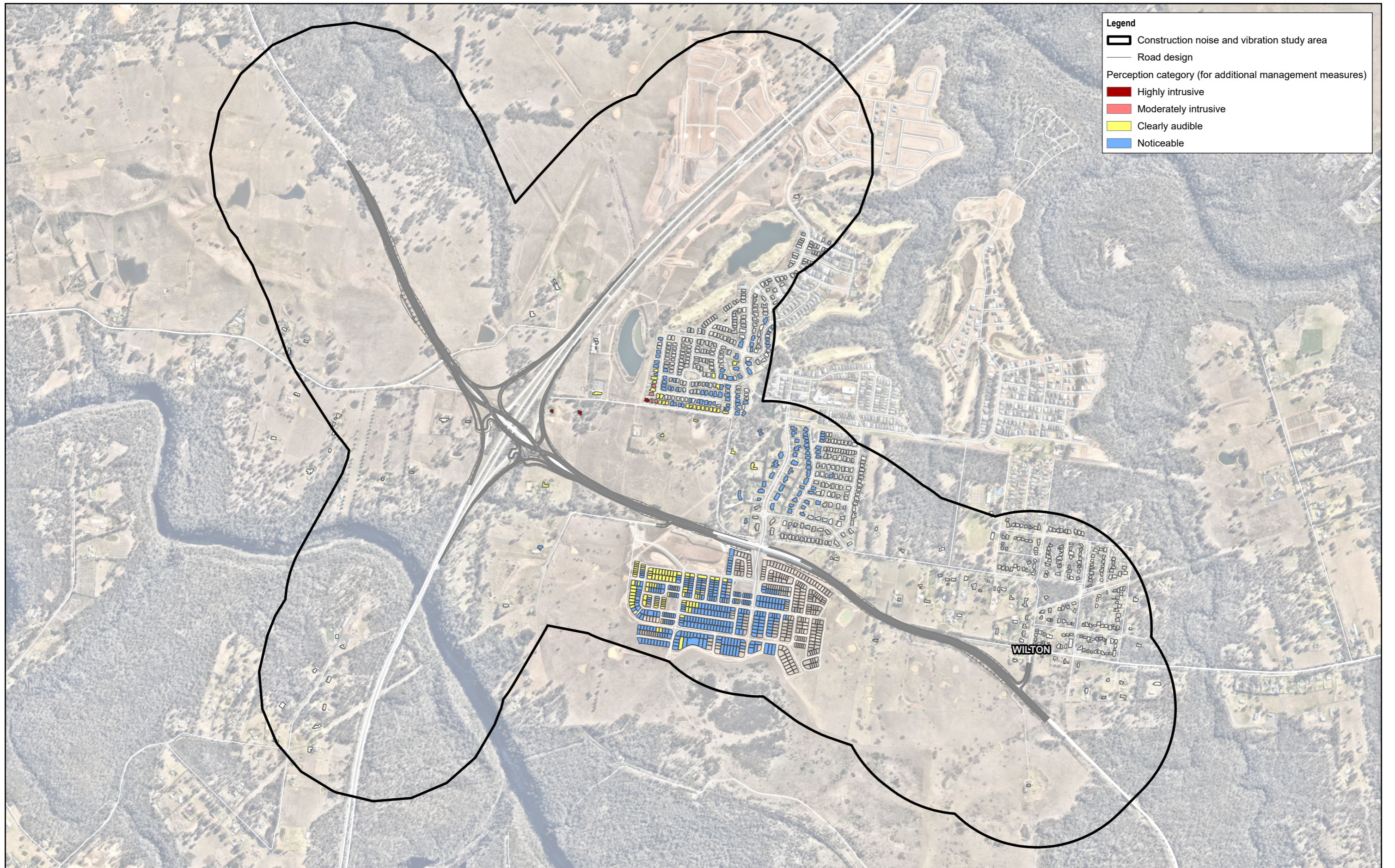


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

**Additional noise management measures
 during OOHV Period 2 (Night)
 Stage 4 (CS13)**

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Figure B-5.11



Legend

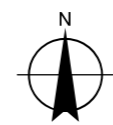
- Construction noise and vibration study area
- Road design

Perception category (for additional management measures)

- Highly intrusive
- Moderately intrusive
- Clearly audible
- Noticeable



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

**Additional noise management measures
during OOHV Period 2 (Night)
Compound operations (CS16)**

Project No. 12560200
Revision No. C
Date 10/26/2023

Figure B-5.12

Appendix C

Operational impact assessment

C-1 Project and non-project roads



Legend

- Operational study area
- Road design
- Project road alignment
- Non-project road alignment



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

Project No. 12560200
Revision No. C
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Project and non-project roads

Figure C-1.1

C-2 Traffic volumes

C-2-1 Existing (2022) traffic volumes – day

Road	Road segment	Direction	Day (15 hour), 7 am to 10 pm										
			LV volume	LV speed, km/h	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV Speed, km/h	HV correction
Picton Road	West of the M31 Hume Motorway	Eastbound	4154	96.3	1948	1404	127	104	166	143	5	95.9	-0.42
		Westbound	4138	95.1	976	542	105	70	127	114	18	89.7	0.00
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	6994	85.8	2118	1139	184	196	289	239	71	82.8	0.03
		Westbound	6291	83.8	1758	827	188	188	256	217	81	80.4	0.10
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	9834	75.2	2287	875	241	287	411	336	137	69.6	-0.14
		Westbound	8444	72.5	2541	1113	271	307	385	321	144	71.2	-0.19
Picton Road	Pembroke Parade to Almond Street	Eastbound	1975	63.4	518	237	57	46	94	77	7	64.5	-0.77
		Westbound	6926	57.1	2481	1105	241	227	484	403	22	56.6	-1.35
Picton Road	East of Almond Street	Eastbound	8237	77.0	2261	853	232	243	484	424	25	75.7	0.32
		Westbound	6999	76.4	2362	955	238	252	488	406	23	75.3	0.16
M31 Hume Motorway	South of Picton Road	Northbound	13463	106.6	5133	2330	306	398	789	1231	79	101.9	1.42
		Southbound	13009	108.0	4390	1565	245	299	879	1336	67	101.7	2.01
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	11279	93.1	3370	1665	183	249	483	743	49	89.5	0.72
		Southbound	9398	103.5	3092	812	181	181	745	1146	27	97.0	2.10
M31 Hume Motorway	North of Picton Road	Northbound	9094	79.6	1607	1000	59	99	176	254	19	77.1	-0.51
		Southbound	17089	99.0	5546	1986	424	426	1202	1439	70	92.3	1.30
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	6641	71.9	2069	857	258	182	436	310	25	64.7	-0.82
		Southbound off-ramp	2074	73.6	679	264	64	54	161	124	13	71.2	-0.50
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	1103	73.6	755	261	89	81	190	123	11	71.2	0.33
		Southbound on-ramp	3611	71.9	1298	753	64	118	134	190	40	64.7	-1.28

C-2-2 Existing (2022) traffic volumes - night

Road	Road segment	Direction	Night (9 hour), 10 pm to 7 am										
			LV volume	LV speed, km/h	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV Speed, km/h	HV correction
Picton Road	West of the M31 Hume Motorway	Eastbound	487	98.2	315	198	23	14	39	39	2	96.5	0.30
		Westbound	1163	95.2	398	227	32	28	56	46	9	89.2	-0.09
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	968	87.0	505	206	48	50	101	85	15	82.2	0.66
		Westbound	1503	85.5	574	257	46	53	99	94	24	81.1	0.25
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	1450	75.8	696	214	73	86	164	131	28	67.8	0.07
		Westbound	1843	75.8	750	288	61	79	141	141	40	72.9	0.26
Picton Road	Pembroke Parade to Almond Street	Eastbound	430	64.1	161	59	20	17	36	26	2	63.3	-0.73
		Westbound	1537	60.7	674	234	55	58	160	156	9	60.8	-0.38
Picton Road	East of Almond Street	Eastbound	1236	76.1	714	205	81	88	186	144	9	75.0	0.60
		Westbound	1554	77.7	673	211	57	68	166	162	9	75.5	0.69
M31 Hume Motorway	South of Picton Road	Northbound	2687	96.4	1645	470	90	70	324	667	24	96.3	2.13
		Southbound	1932	108.6	1507	467	99	99	311	499	32	101.0	2.22
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	2287	89.7	1074	363	51	46	199	398	17	88.3	1.56
		Southbound	1436	103.3	1099	258	82	71	255	413	19	95.8	2.19
M31 Hume Motorway	North of Picton Road	Northbound	1887	83.1	502	255	13	22	73	129	10	80.2	0.43
		Southbound	2539	98.0	1854	520	171	152	445	536	30	90.6	1.59
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	2074	73.9	679	264	64	54	161	124	13	65.3	-0.56
		Southbound off-ramp	1103	76.1	755	261	89	81	190	123	11	72.2	0.16
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	400	76.1	572	107	39	24	126	269	7	72.2	1.39
		Southbound on-ramp	496	73.9	408	208	17	28	56	87	12	65.3	-0.82

C-2-3 Opening year (2031) no build traffic volumes - day

Road	Road segment	Direction	2031 Opening year – No Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
Picton Road	West of the M31 Hume Motorway	Eastbound	5320	915	500	95	64	118	125	13	-0.15	80	
		Westbound	6255	1070	584	111	75	139	146	15	-0.14	80	
Picton Road	West of the M31 Hume Motorway	Eastbound	5320	915	500	95	64	118	125	13	-0.15	80	
		Westbound	6255	1070	584	111	75	139	146	15	-0.14	80	
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	5680	955	525	100	66	122	129	13	-0.17	80	
		Westbound	4920	835	454	86	59	109	115	12	-0.13	80	
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	11000	1870	1025	195	130	241	254	26	-0.16	80	
		Westbound	11175	1905	1037	198	134	248	261	27	-0.14	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	9535	2520	995	190	267	494	521	53	0.70	80	
		Westbound	9075	2385	941	179	253	468	493	51	0.70	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	9535	2520	995	190	267	494	521	53	0.70	80	
		Westbound	9075	2385	941	179	253	468	493	51	0.70	80	
Picton Road	East of Almond Street	Eastbound	8855	2330	916	174	248	459	484	50	0.71	80	
		Westbound	7895	2050	811	154	217	401	423	43	0.69	80	
M31 Hume Motorway	South of Picton Road	Northbound	14395	2490	1348	257	177	327	345	35	1.17	110	
		Southbound	14090	2410	1315	250	169	313	330	34	1.14	110	
M31 Hume Motorway	Between Hume Motorway and Picton Road ramps	Northbound	10400	1800	974	186	128	237	250	26	1.17	110	
		Southbound	9990	1710	932	178	120	222	234	24	1.14	110	
M31 Hume Motorway	North of Picton Road	Northbound	17600	3015	1634	311	214	396	417	43	1.16	110	
		Southbound	18050	3055	1672	318	213	394	415	43	1.13	110	
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	7195	1215	659	126	86	159	168	17	-1.49	60	
		Southbound off-ramp	8060	1345	739	141	93	172	181	19	-1.53	60	
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	3995	690	374	71	49	91	96	10	-1.48	60	

Road	Road segment	Direction	2031 Opening year – No Build traffic volumes									
			Day (15 hour), 7 am to 10 pm									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
		Southbound on-ramp	4100	695	382	73	48	89	94	10	-1.53	60
Pembroke Parade	North of Picton Road	Northbound	1620	280	155	30	19	35	37	4	-2.00	50
		Southbound	1950	350	189	36	25	46	49	5	-1.90	50
Almond Street / Wilton Park Road	North of Picton Road	Northbound	1105	310	126	24	32	59	62	6	-0.72	60
		Southbound	420	120	46	9	13	24	25	3	-0.61	60

C-2-4 Opening year (2031) no build traffic volumes – night

Road	Road segment	Direction	2031 Opening year – No Build traffic volumes										Speed, km/h
			Night (9 hour), 10 pm to 7 am										
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
Picton Road	West of the M31 Hume Motorway	Eastbound	1035	255	134	31	14	34	39	4	-0.03	80	
		Westbound	1220	300	158	37	16	40	45	4	-0.04	80	
Picton Road	West of the M31 Hume Motorway	Eastbound	1035	255	134	31	14	34	39	4	-0.03	80	
		Westbound	1220	300	158	37	16	40	45	4	-0.04	80	
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	1110	270	142	33	14	36	41	4	-0.03	80	
		Westbound	960	235	117	28	14	34	39	4	0.13	80	
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	2145	525	275	65	28	70	80	7	-0.03	80	
		Westbound	2180	535	275	65	29	74	84	8	0.03	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	1805	715	227	53	65	165	187	17	1.12	80	
		Westbound	1715	675	211	49	62	158	178	17	1.15	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	1805	715	227	53	65	165	187	17	1.12	80	
		Westbound	1715	675	211	49	62	158	178	17	1.15	80	
Picton Road	East of Almond Street	Eastbound	1675	660	207	48	61	154	174	16	1.14	80	
		Westbound	1495	580	182	43	53	135	153	14	1.14	80	
M31 Hume Motorway	South of Picton Road	Northbound	2805	700	360	85	38	97	110	10	1.33	110	
		Southbound	2745	675	352	83	36	91	103	10	1.28	110	
M31 Hume Motorway	Between Hume Motorway and Picton Road ramps	Northbound	2025	505	259	61	28	70	80	7	1.34	110	
		Southbound	1950	475	247	58	26	65	73	7	1.29	110	
M31 Hume Motorway	North of Picton Road	Northbound	3430	850	437	103	47	118	133	12	1.33	110	
		Southbound	3520	855	446	105	46	116	131	12	1.28	110	
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	1400	345	178	42	19	48	54	5	-1.35	60	
		Southbound off-ramp	1570	380	198	47	20	51	58	5	-1.39	60	

Road	Road segment	Direction	2031 Opening year – No Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	780	195	101	24	11	27	30	3	-1.37	60
		Southbound on-ramp	800	195	101	24	11	27	30	3	-1.37	60
Pembroke Parade	North of Picton Road	Northbound	315	75	41	10	4	10	11	1	-2.47	50
		Southbound	380	100	53	12	5	13	15	1	-2.38	50
Almond Street / Wilton Park Road	North of Picton Road	Northbound	210	85	28	7	8	19	22	2	-0.32	60
		Southbound	80	30	8	2	3	8	9	1	-0.01	60

C-2-5 Opening year (2031) build traffic volumes - day

Road	Road segment	Direction	2031 Opening year – Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
Picton Road	West of the M31 Hume Motorway (80 km/h)	Eastbound	6298	1050	602	115	67	123	130	13	-0.32	80	
		Westbound	6923	1163	656	125	76	141	149	15	-0.26	80	
Picton Road	West of the M31 Hume Motorway (60 km/h)	Eastbound	6298	1050	602	115	67	123	130	13	-1.68	60	
		Westbound	6923	1163	656	125	76	141	149	15	-1.62	60	
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	4616	828	428	82	64	118	124	13	-1.33	60	
		Westbound	3744	702	343	65	59	109	115	12	-1.16	60	
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	10914	1878	1030	196	130	241	254	26	-1.52	60	
		Westbound	10667	1866	999	190	135	250	264	27	-1.44	60	
Picton Road	Pembroke Parade to Almond Street (60 km/h)	Eastbound	9577	2532	1005	191	267	494	521	53	-0.67	60	
		Westbound	9196	2403	958	182	253	467	493	51	-0.68	60	
Picton Road	Pembroke Parade to Almond Street (80 km/h)	Eastbound	9577	2532	1005	191	267	494	521	53	0.69	80	
		Westbound	9196	2403	958	182	253	467	493	51	0.68	80	
Picton Road	East of Almond Street	Eastbound	8854	2331	917	175	248	459	484	50	0.70	80	
		Westbound	7895	2051	809	154	217	402	424	43	0.70	80	
M31 Hume Motorway	South of Picton Road	Northbound	14397	2490	1350	257	177	327	344	35	1.16	110	
		Southbound	14089	2408	1315	250	169	312	329	34	1.14	110	
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	7315	1278	703	134	88	163	172	18	1.11	110	
		Southbound	9989	1710	932	178	120	222	234	24	1.14	110	
M31 Hume Motorway	North of Picton Road	Northbound	17487	3013	1622	309	216	400	422	43	1.19	110	
		Southbound	18051	3056	1672	318	213	394	416	43	1.13	110	
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	3993	689	375	71	49	90	95	10	-1.49	60	
		Southbound off-ramp	8062	1347	740	141	93	172	182	19	-1.53	60	

Road	Road segment	Direction	2031 Opening year – Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	7082	1212	647	123	88	164	172	18	-1.43	60	
		Southbound on-ramp	4100	698	383	73	48	90	94	10	-1.52	60	
Pembroke Parade	North of Picton Road	Northbound	736	182	73	14	19	35	37	4	-1.11	50	
		Southbound	761	231	75	14	28	52	55	6	-0.74	50	
Almond Street / Wilton Park Road	North of Picton Road	Northbound	1139	316	132	25	32	59	62	6	-0.77	60	
		Southbound	415	115	44	8	13	23	25	3	-0.58	60	

C-2-6 Opening year (2031) build traffic volumes - night

Road	Road segment	Direction	2031 Opening year – Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
Picton Road	West of the M31 Hume Motorway (80 km/h)	Eastbound	1228	295	161	38	14	36	41	4	-0.17	80
		Westbound	1349	327	175	41	17	42	47	4	-0.11	80
Picton Road	West of the M31 Hume Motorway (60 km/h)	Eastbound	1228	295	161	38	14	36	41	4	-1.54	60
		Westbound	1349	327	175	41	17	42	47	4	-1.48	60
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	900	233	114	27	14	35	39	4	-1.19	60
		Westbound	730	198	92	21	13	32	36	3	-1.02	60
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	2127	527	275	65	28	71	81	7	-1.38	60
		Westbound	2079	524	267	63	29	74	84	8	-1.30	60
Picton Road	Pembroke Parade to Almond Street (60 km/h)	Eastbound	1812	716	226	53	66	166	188	17	-0.23	60
		Westbound	1740	679	216	51	62	157	177	17	-0.24	60
Picton Road	Pembroke Parade to Almond Street (80 km/h)	Eastbound	1812	716	226	53	66	166	188	17	1.13	80
		Westbound	1740	679	216	51	62	157	177	17	1.12	80
Picton Road	East of Almond Street	Eastbound	1675	660	207	48	61	154	174	16	1.14	80
		Westbound	1494	581	182	43	53	135	153	14	1.14	80
M31 Hume Motorway	South of Picton Road	Northbound	2806	700	361	85	38	97	109	10	1.32	110
		Southbound	2746	676	352	82	36	92	104	10	1.29	110
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	1426	359	188	44	19	48	55	5	1.27	110
		Southbound	1947	480	249	58	26	66	74	7	1.30	110
M31 Hume Motorway	North of Picton Road	Northbound	3409	847	434	102	47	118	134	12	1.34	110
		Southbound	3518	859	447	105	46	117	132	12	1.29	110
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	778	194	100	23	10	27	30	3	-1.35	60
		Southbound off-ramp	1571	378	198	46	20	51	58	5	-1.39	60

Road	Road segment	Direction	2031 Opening year – Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	1381	341	173	41	19	48	55	5	-1.29	60
		Southbound on-ramp	799	196	102	24	10	26	30	3	-1.38	60
Pembroke Parade	North of Picton Road	Northbound	143	52	19	5	4	10	12	1	-1.47	50
		Southbound	148	66	20	5	6	16	18	2	-1.09	50
Almond Street / Wilton Park Road	North of Picton Road	Northbound	215	89	30	7	8	20	22	2	-0.32	60
		Southbound	79	33	10	2	3	8	9	1	-0.16	60

C-2-7 Design year (2041) no build traffic volumes - day

Road	Road segment	Direction	2041 Design year – No Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
Picton Road	West of the M31 Hume Motorway	Eastbound	6153	941	524	100	64	118	124	13	-0.21	80	
		Westbound	7646	1179	649	124	81	150	158	16	-0.17	80	
Picton Road	West of the M31 Hume Motorway	Eastbound	6153	941	524	100	64	118	124	13	-0.21	80	
		Westbound	7646	1179	649	124	81	150	158	16	-0.17	80	
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	7400	1192	670	128	79	146	154	16	-0.24	80	
		Westbound	6155	972	548	104	64	118	125	13	-0.25	80	
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	13553	2134	1194	227	142	264	278	28	-0.23	80	
		Westbound	13800	2151	1197	228	145	269	283	29	-0.21	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	11085	2695	1084	206	281	520	548	56	0.66	80	
		Westbound	10247	2517	1009	192	263	487	513	53	0.66	80	
Picton Road	Pembroke Parade to Almond Street	Eastbound	11085	2695	1084	206	281	520	548	56	0.66	80	
		Westbound	10247	2517	1009	192	263	487	513	53	0.66	80	
Picton Road	East of Almond Street	Eastbound	10358	2594	1035	197	272	504	531	54	0.68	80	
		Westbound	8970	2230	894	170	233	431	455	47	0.67	80	
M31 Hume Motorway	South of Picton Road	Northbound	16379	2770	1509	287	195	361	380	39	1.15	110	
		Southbound	16109	2681	1476	281	185	342	360	37	1.11	110	
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	11425	1972	1067	203	140	259	274	28	1.17	110	
		Southbound	10870	1858	1012	193	131	242	255	26	1.15	110	
M31 Hume Motorway	North of Picton Road	Northbound	19222	3254	1769	337	230	425	448	46	1.15	110	
		Southbound	20197	3385	1859	354	234	434	457	47	1.12	110	
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	7796	1282	702	134	89	165	174	18	-1.52	60	
		Southbound off-ramp	9327	1527	847	161	104	192	202	21	-1.56	60	

Road	Road segment	Direction	2041 Design year – No Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	4954	799	442	84	55	101	106	11	-1.55	60	
		Southbound on-ramp	5239	822	464	88	54	100	105	11	-1.63	60	
Pembroke Parade	North of Picton Road	Northbound	2450	291	191	36	13	23	25	3	-2.70	50	
		Southbound	3242	382	249	47	17	32	33	3	-2.66	50	
Almond Street / Wilton Park Road	North of Picton Road	Northbound	1602	312	134	26	30	56	59	6	-0.84	60	
		Southbound	874	211	85	16	22	41	43	4	-0.69	60	

C-2-8 Design year (2041) no build traffic volumes – night

Road	Road segment	Direction	2041 Design year – No Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
Picton Road	West of the M31 Hume Motorway	Eastbound	1199	264	140	33	14	34	39	4	-0.07	80
		Westbound	1491	331	174	41	17	44	50	5	-0.04	80
Picton Road	West of the M31 Hume Motorway	Eastbound	1199	264	140	33	14	34	39	4	-0.07	80
		Westbound	1491	331	174	41	17	44	50	5	-0.04	80
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	1443	335	180	42	17	43	49	5	-0.10	80
		Westbound	1200	273	145	34	14	36	40	4	-0.07	80
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	2642	599	320	75	31	78	88	8	-0.09	80
		Westbound	2691	604	319	75	31	80	90	8	-0.06	80
Picton Road	Pembroke Parade to Almond Street	Eastbound	2098	761	245	57	69	174	197	18	1.10	80
		Westbound	1938	711	227	53	65	164	185	17	1.11	80
Picton Road	Pembroke Parade to Almond Street	Eastbound	2098	761	245	57	69	174	197	18	1.10	80
		Westbound	1938	711	227	53	65	164	185	17	1.11	80
Picton Road	East of Almond Street	Eastbound	1960	733	233	55	67	169	191	18	1.12	80
		Westbound	1698	630	201	47	57	145	164	15	1.11	80
M31 Hume Motorway	South of Picton Road	Northbound	3192	779	403	95	42	107	121	11	1.30	110
		Southbound	3140	752	395	93	40	101	114	11	1.26	110
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	2226	554	285	67	30	77	87	8	1.33	110
		Southbound	2120	520	270	63	28	71	80	7	1.30	110
M31 Hume Motorway	North of Picton Road	Northbound	3747	915	473	111	50	126	142	13	1.31	110
		Southbound	3937	950	497	116	51	128	145	13	1.27	110
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	1519	361	188	44	19	49	55	5	-1.38	60
		Southbound off-ramp	1818	430	227	53	22	57	64	6	-1.42	60

Road	Road segment	Direction	2041 Design year – No Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	966	225	119	28	12	30	34	3	-1.42	60
		Southbound on-ramp	1022	231	124	29	12	30	33	3	-1.48	60
Pembroke Parade	North of Picton Road	Northbound	477	80	51	12	3	7	8	1	-3.18	50
		Southbound	632	107	67	16	4	9	10	1	-3.13	50
Almond Street / Wilton Park Road	North of Picton Road	Northbound	304	86	30	7	7	19	21	2	-0.40	60
		Southbound	165	58	18	4	5	14	15	1	-0.23	60

C-2-9 Design year (2041) build traffic volumes – day

Road	Road segment	Direction	2041 Design year – Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
Picton Road	West of the M31 Hume Motorway (80 km/h)	Eastbound	7064	1091	614	117	72	133	140	14	-0.25	80	
		Westbound	7794	1202	669	127	81	150	158	16	-0.21	80	
Picton Road	West of the M31 Hume Motorway (60 km/h)	Eastbound	7064	1091	614	117	72	133	140	14	-1.62	60	
		Westbound	7794	1202	669	127	81	150	158	16	-1.57	60	
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	6317	1031	572	109	70	129	136	14	-1.57	60	
		Westbound	5783	934	513	98	65	120	126	13	-1.53	60	
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	13381	2122	1187	226	142	262	276	28	-1.59	60	
		Westbound	13576	2136	1182	225	146	270	284	29	-1.55	60	
Picton Road	Pembroke Parade to Almond Street (60 km/h)	Eastbound	10906	2685	1077	205	281	519	547	56	-0.69	60	
		Westbound	10243	2520	1013	193	263	486	512	53	-0.69	60	
Picton Road	Pembroke Parade to Almond Street (80 km/h)	Eastbound	10906	2685	1077	205	281	519	547	56	0.66	80	
		Westbound	10243	2520	1013	193	263	486	512	53	0.66	80	
Picton Road	East of Almond Street	Eastbound	10268	2578	1027	196	271	501	529	54	0.68	80	
		Westbound	8948	2229	892	170	233	432	455	47	0.67	80	
M31 Hume Motorway	South of Picton Road	Northbound	16380	2770	1509	287	195	360	380	39	1.15	110	
		Southbound	16109	2680	1476	281	185	342	360	37	1.11	110	
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	10396	1798	977	186	127	235	248	25	1.16	110	
		Southbound	10870	1858	1012	193	131	242	255	26	1.15	110	
M31 Hume Motorway	North of Picton Road	Northbound	19923	3378	1833	349	239	443	467	48	1.16	110	
		Southbound	20186	3385	1858	354	235	434	457	47	1.12	110	
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	7467	1232	675	128	86	159	167	17	-1.52	60	
		Southbound off-ramp	9317	1527	847	161	104	192	202	21	-1.56	60	

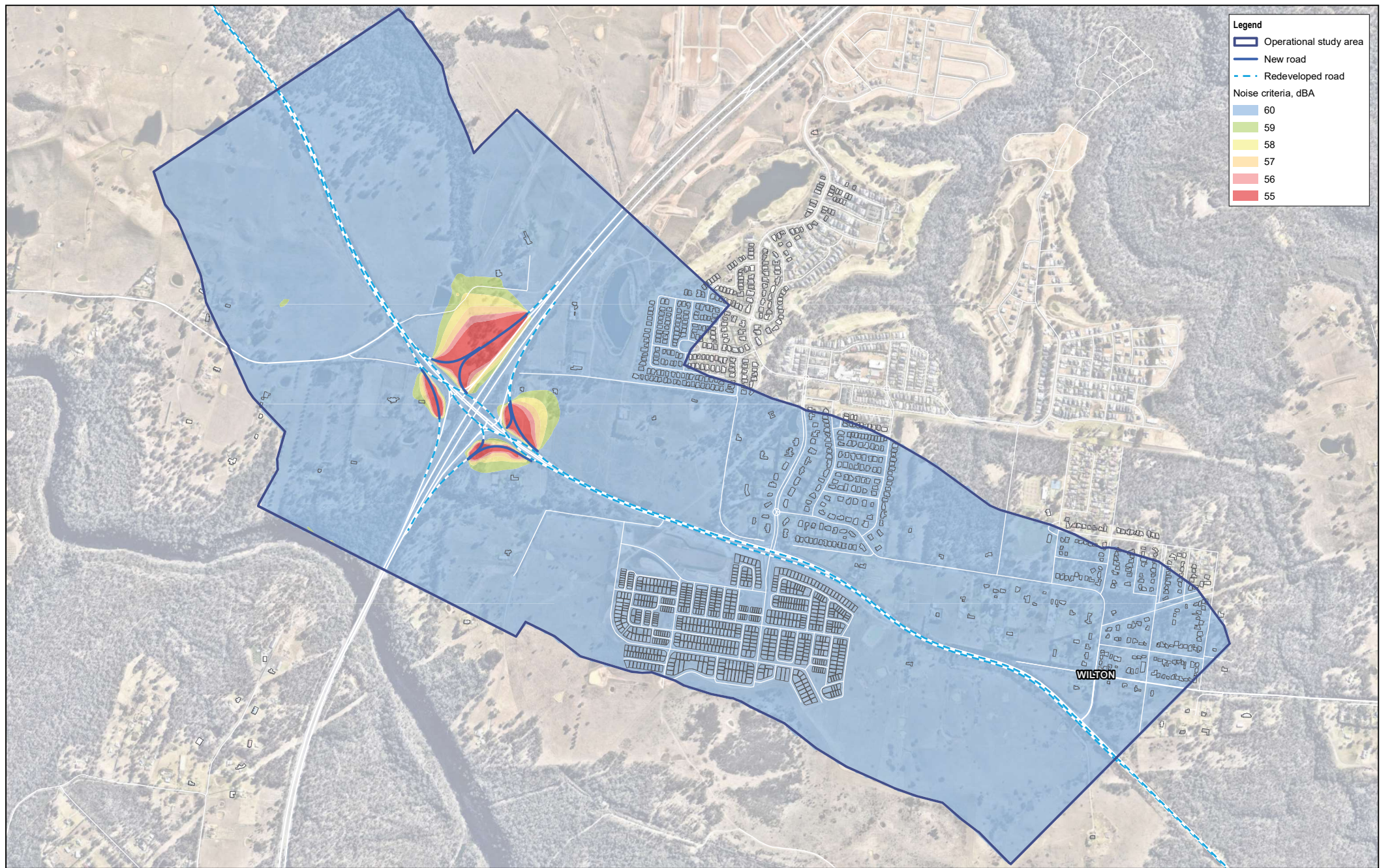
Road	Road segment	Direction	2041 Design year – Build traffic volumes										
			Day (15 hour), 7 am to 10 pm										Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction		
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	5984	973	533	101	68	125	132	14	-1.52	60	
		Southbound on-ramp	5239	823	464	88	54	100	105	11	-1.62	60	
Pembroke Parade	North of Picton Road	Northbound	2077	248	157	30	12	22	24	2	-3.10	50	
		Southbound	2587	317	194	37	17	32	33	3	-2.93	50	
Almond Street / Wilton Park Road	North of Picton Road	Northbound	1529	311	134	26	30	56	59	6	-0.85	60	
		Southbound	890	204	84	16	21	38	40	4	-0.75	60	

C-2-10 Design year (2041) build traffic volumes - night

Road	Road segment	Direction	2041 Design year – Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
Picton Road	West of the M31 Hume Motorway (80 km/h)	Eastbound	1377	306	164	39	16	39	44	4	-0.11	80
		Westbound	1519	337	179	42	18	44	50	5	-0.06	80
Picton Road	West of the M31 Hume Motorway (60 km/h)	Eastbound	1377	306	164	39	16	39	44	4	-1.48	60
		Westbound	1519	337	179	42	18	44	50	5	-1.43	60
Picton Road	Between the M31 Hume Motorway and Picton Road ramps	Eastbound	1231	290	153	36	15	38	43	4	-1.43	60
		Westbound	1127	263	137	32	14	35	40	4	-1.39	60
Picton Road	M31 Hume Motorway to Pembroke Parade	Eastbound	2608	596	317	74	31	78	88	8	-1.45	60
		Westbound	2646	600	316	74	31	80	90	8	-1.41	60
Picton Road	Pembroke Parade to Almond Street (60 km/h)	Eastbound	2064	758	243	57	69	174	197	18	-0.25	60
		Westbound	1938	711	228	54	64	163	185	17	-0.26	60
Picton Road	Pembroke Parade to Almond Street (80 km/h)	Eastbound	2064	758	243	57	69	174	197	18	1.11	80
		Westbound	1938	711	228	54	64	163	185	17	1.10	80
Picton Road	East of Almond Street	Eastbound	1943	729	231	54	66	168	190	18	1.12	80
		Westbound	1693	629	201	47	57	145	164	15	1.11	80
M31 Hume Motorway	South of Picton Road	Northbound	3193	778	404	95	42	106	120	11	1.30	110
		Southbound	3140	753	395	93	40	101	114	11	1.26	110
M31 Hume Motorway	Between the M31 Hume Motorway and Picton Road ramps	Northbound	2026	505	261	61	27	69	79	7	1.31	110
		Southbound	2119	522	271	63	28	71	81	8	1.30	110
M31 Hume Motorway	North of Picton Road	Northbound	3883	949	490	115	52	131	148	14	1.32	110
		Southbound	3935	951	497	117	51	128	145	13	1.27	110
M31 Hume Motorway	Interchange ramps north of Picton Road	Northbound on-ramp	1455	346	180	42	19	47	53	5	-1.38	60
		Southbound off-ramp	1816	429	226	53	22	57	64	6	-1.42	60

Road	Road segment	Direction	2041 Design year – Build traffic volumes									
			Night (9 hour), 10 pm to 7 am									Speed, km/h
			LV	HV volume, total	HV volume, HV1	HV volume, HV2	HV volume, HV3	HV volume, HV4	HV volume, HV5	HV volume, HV6	HV correction	
M31 Hume Motorway	Interchange ramps south of Picton Road	Northbound off-ramp	1166	273	142	33	15	37	42	4	-1.38	60
		Southbound on-ramp	1021	231	124	29	12	30	33	3	-1.48	60
Pembroke Parade	North of Picton Road	Northbound	405	69	42	10	3	7	7	1	-2.96	50
		Southbound	504	89	52	12	4	9	11	1	-2.80	50
Almond Street / Wilton Park Road	North of Picton Road	Northbound	289	87	30	7	7	19	21	2	-0.40	60
		Southbound	168	57	19	4	5	13	15	1	-0.31	60

C-3 Operational noise criteria

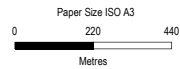


Legend

- Operational study area
- New road
- Redeveloped road

Noise criteria, dBA

- 60
- 59
- 58
- 57
- 56
- 55



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

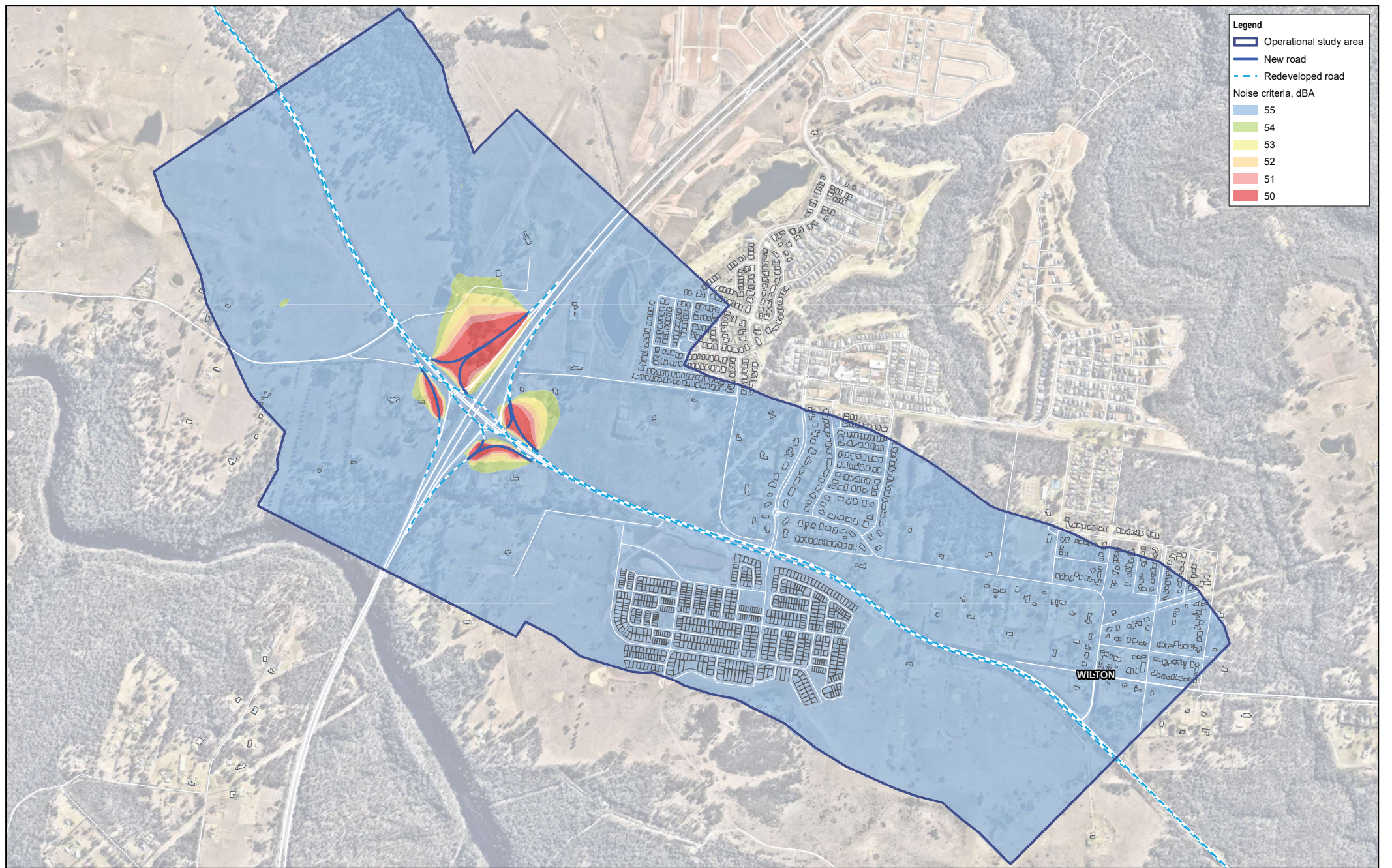


Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 10/26/2023

Operational noise criteria – Day

Figure C-3.1

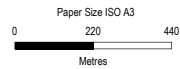


Legend

- Operational study area
- New road
- Redeveloped road

Noise criteria, dBA

- 55
- 54
- 53
- 52
- 51
- 50



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
Noise and Vibration Impact Assessment

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Revision No. C
Date 10/26/2023

Operational noise criteria – Night

Figure C-3.2

C-4 Modelled speeds



Legend

- Operational study area
- Road design

Road alignment, speed zone (km/h)

- 50
- 60
- 80
- 110



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

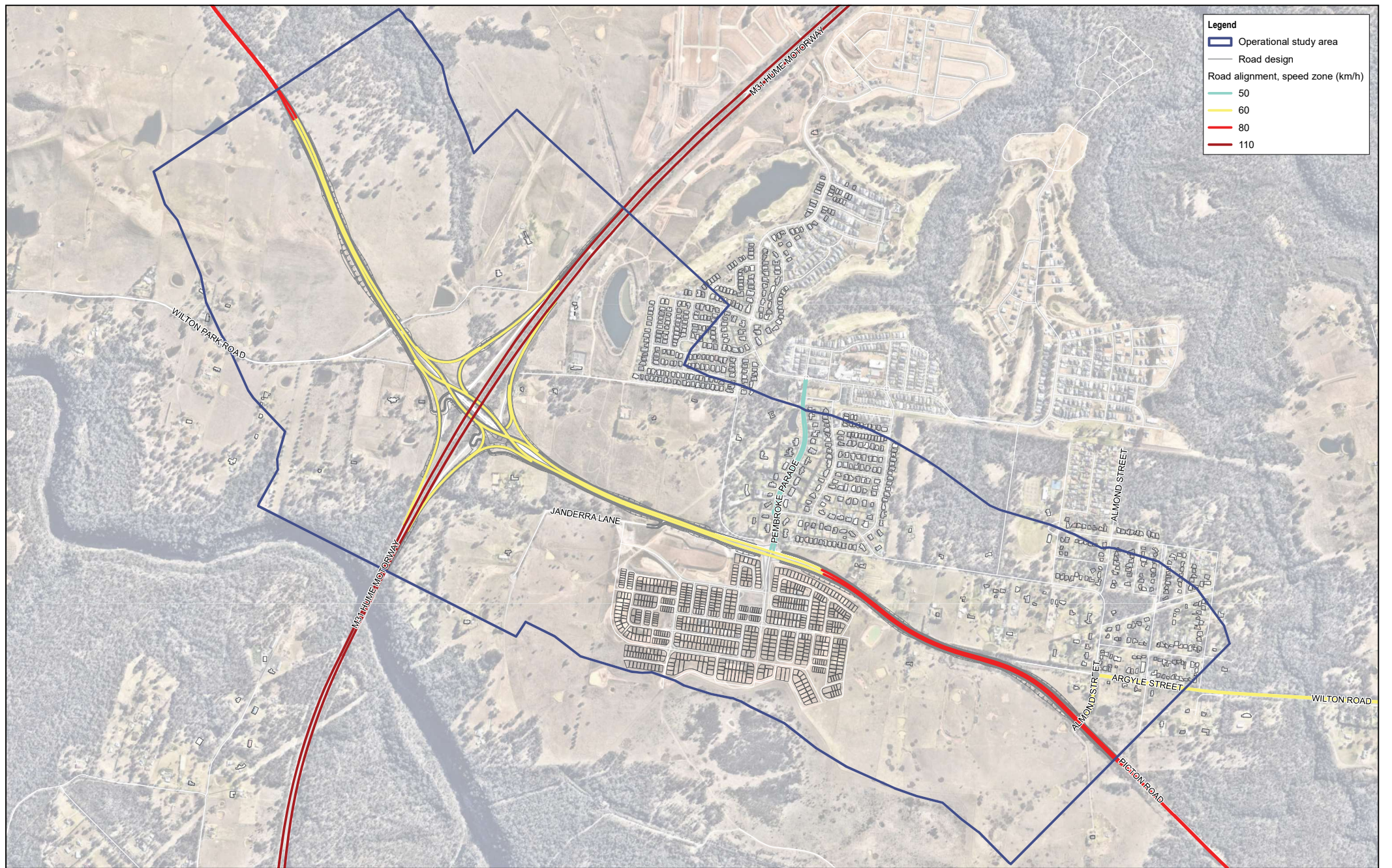


Transport for New South Wales
Picton Road upgrade Nepean River to Almond Street
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Modelled speeds – No-build

Figure C-4.1



Legend

- Operational study area
- Road design

Road alignment, speed zone (km/h)

- 50
- 60
- 80
- 110



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



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Noise and Vibration Impact Assessment

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Modelled speeds – Build

Figure C-4.2

C-5 Operational noise levels

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade		Predicted noise level Opening year								Road contributions Opening year								Change in noise level (Build - No Build)				RNC noise criteria		RNC noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment													
					Floor	Direction	x	y	No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night			Day	Night	Day	Night									
									Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																			Day	Night	Day	Night					
FO959	1829/1232553	1829/1232553	NC07	Residential	F	W	286654.5	6208940	49	45	44	42	45	45	44	42	45	45	44	42	45	45	44	42	45	45	44	42	-1.1	-1.1	-1	60	55	-	-	-	-	-	-	-	-	-	-								
FO959	1829/1232553	1829/1232553	NC07	Residential	F.1	W	286654.5	6208940	51	48	50	47	46	43	48	45	52	48	51	47	47	43	49	45	-0.9	-0.9	-0.9	-0.8	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
FO600	1804/1232553	1804/1232553	NC07	Residential	F.O	E	286677.4	6209004	50	46	49	46	38	34	49	46	50	47	50	46	39	35	49	46	-0.4	-0.3	-0.4	-0.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
FO600	1804/1232553	1804/1232553	NC07	Residential	F.1	E	286677.4	6209004	52	49	52	49	42	39	52	48	53	49	52	49	43	39	52	48	-0.4	-0.4	-0.5	-0.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
FO600	1804/1232553	1804/1232553	NC07	Residential	F.O	N	286677.4	6209004	47	43	46	43	35	31	47	43	46	43	42	38	48	41	42	38	45	-0.6	-0.5	-0.6	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
FO600	1804/1232553	1804/1232553	NC07	Residential	F.1	N	286663.6	6209014	51	48	51	47	43	39	50	47	52	48	51	48	43	39	50	47	-0.6	-0.6	-0.5	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
FO600	1804/1232553	1804/1232553	NC07	Residential	F.O	S	286653.9	6208999	47	44	47	43	37	33	46	43	48	44	44	47	44	37	33	47	43	-0.6	-0.6	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO600	1804/1232553	1804/1232553	NC07	Residential	F.1	S	286653.9	6208999	50	47	50	46	41	37	49	46	51	47	50	47	41	37	49	46	-0.5	-0.7	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO600	1804/1232553	1804/1232553	NC07	Residential	F.O	S	286667.8	6208997	48	45	47	44	37	33	47	44	48	45	48	44	37	33	47	44	-0.5	-0.6	-0.6	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO600	1804/1232553	1804/1232553	NC07	Residential	F.1	S	286667.8	6208997	51	47	50	47	40	37	50	46	51	48	47	41	37	50	47	47	-0.6	-0.5	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO600	1804/1232553	1804/1232553	NC07	Residential	F.O	W	286647.7	6209008	50	46	49	45	42	38	48	44	50	46	49	46	42	38	48	45	-0.9	-0.9	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO601	1442/1232553	1442/1232553	NC06	Residential	F.O	NE	286660.1	6209134	53	49	52	48	42	38	51	48	53	50	52	49	43	39	52	48	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
FO601	1442/1232553	1442/1232553	NC06	Residential	F.1	NE	286660.1	6209134	55	52	54	51	45	41	53	50	53	52	54	51	46	42	54	50	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO601	1442/1232553	1442/1232553	NC06	Residential	F.O	NW	286649.2	6209126	48	45	47	44	36	30	47	44	49	45	48	44	37	33	47	44	-1	-1	-1	-1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO601	1442/1232553	1442/1232553	NC06	Residential	F.1	NW	286649.2	6209126	52	48	51	47	41	37	50	47	52	49	51	48	41	37	51	47	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO601	1442/1232553	1442/1232553	NC06	Residential	F.O	SE	286658.8	6209121	48	45	47	44	36	30	47	44	49	45	48	44	36	33	47	44	-0.9	-0.9	-1	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO601	1442/1232553	1442/1232553	NC06	Residential	F.1	SE	286658.8	6209121	52	48	51	47	40	37	50	47	52	49	51	48	41	37	51	47	-0.9	-0.9	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO601	1442/1232553	1442/1232553	NC06	Residential	F.O	SW	286648	6209112	47	44	46	43	38	34	46	42	48	44	47	43	38	35	46	43	-1	-1	-1	-1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO601	1442/1232553	1442/1232553	NC06	Residential	F.1	SW	286648	6209112	52	48	51	47	42	38	50	46	52	49	51	47	43	39	50	47	-1.2	-1.2	-1.2	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO602	1730/1232553	1730/1232553	NC07	Residential	F.O	E	286657.3	6208805	43	40	43	39	36	30	42	38	44	40	43	40	36	33	42	39	-0.4	-0.4	-0.4	-0.5	56	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
FO602	1730/1232553	1730/1232553	NC07	Residential	F.1	E	286657.3	6208805	47	44	47	43	41	37	45	42	48	44	47	44	41	37	46	42	-0.5	-0.5	-0.4	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO602	1730/1232553	1730/1232553	NC07	Residential	F.O	W	286654.6	6208818	48	45	48	45	42	37	45	42	49	45	48	45	42	38	48	45	-0.4	-0.4	-0.3	-0.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO602	1730/1232553	1730/1232553	NC07	Residential	F.1	N	286654.6	6208818	52	48	52	48	45	41	51	47	52	49	52	48	45	42	51	47	-0.4	-0.4	-0.4	-0.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO602	1730/1232553	1730/1232553	NC07	Residential	F.O	S	286651.1	6208793	43	40	43	39	35	31	43	40	43	40	43	40	39	35	41	38	-0.3	-0.3	-0.3	-0.3	56	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO602	1730/1232553	1730/1232553	NC07	Residential	F.1	S	286651.1	6208793	47	44	47	43	42	38	45	42	48	44	47	44	42	38	46	42	-0.3	-0.3	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO602	1730/1232553	1730/1232553	NC07	Residential	F.O	W	286648.2	6208806	43	40	43	39	36	30	42	38	43	39	46	42	39	36	42	38	-0.5	-0.5	-0.5	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FO602	1730/1232553	1730/1232553	NC07	Residential	F.1	W	286648.2	6208806	47	43	46	43	40	37	45	42	47	44	47	43	41	37	46	42	-0.5	-0.5	-0.5	-0.5	59	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO603	1805/1232553	1805/1232553	NC06	Residential	F.O	E	286679.6	6209020	53	49	53	49	38	35	52	49	53	50	53	49	35	33	53	49	-0.2	-0.2	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FO603	1805/1232553	1805/1232553	NC06	Residential	F.1	E	286679.6	6209020	54	51	54	51	42	39	54	50	55	51	54	51	43	39	54																												

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade				Predicted noise level				Road contributions				Change in noise level				RNCG noise criteria		RNCG noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment												
					Floor	Direction	x	y	No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Opening year		Design year		Day	Night			Day	Night	Day	Night	Day	Night	Day	Night				
									Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																		
									Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																		
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	E	286187.3	62102029	50	46	49	45	47	43	51	47	43	45	41	-2.5	-0.8	-0.3	-0.7	60	55	-	-	-	-	-	-	-	-	-	-									
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	E	286188.5	62100108	52	48	50	46	47	43	48	44	52	48	51	47	47	43	48	45	-1.4	-1.4	-1.3	-1.3	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	N	286177.9	62100307	49	45	49	45	48	44	41	38	50	46	49	46	48	45	42	38	-0.4	-0.4	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	N	286171	62100203	48	44	47	44	46	42	41	37	48	45	48	44	47	43	42	38	-0.5	-0.6	-0.5	-0.4	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	N	286188.2	62100203	48	44	48	44	44	40	41	37	48	45	48	44	47	43	42	38	-0.1	-0.1	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	N	286184.5	62100307	50	46	50	46	49	45	42	38	50	47	50	46	49	46	42	39	-0.4	-0.4	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	S	286172.8	62100105	54	50	52	48	46	42	50	47	54	50	53	49	47	43	51	47	-1.7	-1.6	-1.5	-1.6	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	S	286183.9	62100104	53	50	52	48	46	42	51	47	54	50	52	49	47	43	51	47	-1.6	-1.6	-1.6	-1.5	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	S	286169.8	62100106	53	50	52	48	46	42	50	47	54	50	52	49	47	43	51	47	-1.6	-1.6	-1.6	-1.6	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	S	286177.2	62100104	54	50	52	48	46	42	51	47	54	50	49	49	47	43	51	47	-1.6	-1.6	-1.5	-1.6	60	55	-	-	-	-	-	-	-	-	-					
R0158	88 CONDELL PARK ROAD, WILTON	188/28029	NCA04	Residential	F	W	286168.1	62100200	52	48	51	47	46	42	43	49	45	53	49	51	47	47	43	49	45	-1.5	-1.5	-1.4	-1.5	60	55	-	-	-	-	-	-	-	-	-				
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	E	286187.4	62103661	47	43	51	47	46	42	40	36	48	44	47	44	47	46	43	40	37	-0.4	-0.3	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-				
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	N	286175.3	62103766	54	50	54	50	54	50	54	50	50	46	55	51	55	51	55	51	40	36	0	0	0.2	0.1	0.1	0.1	60	55	-	-	-	-	-	-	-	-	-	
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	N	286182.4	62103777	54	50	54	50	54	50	54	50	40	36	55	51	55	51	54	51	41	37	-0.1	0	0	0.1	0.1	0.1	0.1	60	55	-	-	-	-	-	-	-	-	-
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	N	286187.3	62103747	51	47	51	47	51	47	38	34	52	48	52	48	51	48	39	35	-0.1	-0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-				
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	S	286171	62103667	48	44	48	44	46	42	42	38	49	45	48	44	47	43	43	39	-0.6	-0.6	-0.5	-0.5	60	55	-	-	-	-	-	-	-	-	-	-				
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	S	286173.8	62103554	49	45	48	44	47	43	42	39	49	45	49	45	49	45	47	43	39	-0.6	-0.6	-0.6	-0.5	-0.4	60	55	-	-	-	-	-	-	-	-	-			
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	S	286190.2	62103509	49	45	48	44	47	43	43	39	49	45	46	49	45	48	44	43	39	-0.6	-0.6	-0.4	-0.4	60	55	-	-	-	-	-	-	-	-	-	-			
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	W	286177	62103766	54	51	54	50	54	50	54	50	40	36	55	51	55	51	51	41	37	0	-0.1	0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-		
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	W	286175.8	62103533	49	45	48	44	47	43	42	38	49	45	49	45	47	43	44	43	39	-0.5	-0.6	-0.5	-0.4	60	55	-	-	-	-	-	-	-	-	-	-			
R0159	11 STIRLING DRIVE, WILTON	70/280029	NCA02	Residential	F	W	286170	62103562	50	46	50	46	49	45	42	38	51	47	50	47	50	46	43	39	-0.4	-0.4	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-	-				
R0160	3 ELMWOOD WAY, WILTON	42/280029	NCA02	Residential	F	N	286169.9	62103772	52	48	52	48	47	43	41	37	52	48	52	48	52	48	43	42	38	-0.1	-0.1	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-	-			
R0160	3 ELMWOOD WAY, WILTON	42/280029	NCA02	Residential	F	N	286175.5	62102883	52	48	52	48	52	48	40	36	52	49	52	48	49	52	48	41	37	-0.1	-0.1	0	-0.1	60	55	-	-	-	-	-	-	-	-	-	-			
R0160	3 ELMWOOD WAY, WILTON	42/280029	NCA02	Residential	F	N	286181.2	62102883	53	49	53	49	52	48	41	38	53	49	53	49	53	49	53	49	42	38	-0.1	-0.1	0	0.1	60	55	-	-	-	-	-	-	-	-	-	-		
R0160	3 ELMWOOD WAY, WILTON	42/280029	NCA02	Residential	F	W	286170	62102868	49	45	48	44	47	43	42	38	49	45	49	45	48	44	42	39	-0.5	-0.5	-0.4	-0.4	60	55	-	-	-	-	-	-	-	-	-	-				
R0160	3 ELMWOOD WAY, WILTON	42/280029	NCA02	Residential	F	W	286171.3	62102799	49	45	48	44	47	43	42	38	49	45	48	44	45	48	44	42	39	-0.5	-0.5	-0.4	-0.4	60	55	-	-	-	-	-	-	-	-	-	-			
R0162	4 ELMWOOD WAY, WILTON	75/280029	NCA02	Residential	F	E	286193.5	62103221	48	45	48	44	47	43	44	40	36	49	45	49	45	48	44	40	37	-0.3	-0.4	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-	-			
R0162	4 ELMWOOD WAY, WILTON	75/280029	NCA02	Residential	F	E	286190.9	62103113	47	44	46	42	45	41	41	38	48	44	47	43	45	42	42	38	-0.8	-0.9	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-				
R0162	4 ELMWOOD WAY, WILTON	75/280029	NCA02	Residential	F	N	286186.1	62103228	54	50	54	50	54	50	38	34	54	50	54	50	54	50	39	35	-0.1	-0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-				
R0162	4 ELMWOOD WAY, WILTON	75/280029	NCA02	Residential	F	S	286182.8	62103088	49	46	48	45	46	42	45	41	50	46	49	45	46	43	46	42	-0.9	-0.9	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-				
R0162	4 ELMWOOD WAY, WILTON	75/280029	NCA02	Residential	F	W	286176.6	62103119	50	46	49	45	48	44	41	37	50	46	49	45	48	44	45	41	38	-0.2	-0.2	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-	-			
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	E	286201.8	62100406	48	45	47	44	46	42	43	39	49	45	48	44	46	42	44	40	-0.9	-0.8	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	E	286204	62100555	49	45	48	45	46	42	44	40	50	46	49	45	47	43	45	41	-0.9	-0.8	-0.7	-0.8	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	N	286187.7	62100663	48	44	48	44	47	43	40	36	49	45	49	45	48	44	40	36	-0.3	-0.3	-0.2	-0.3	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	N	286198.2	62100664	49	46	49	45	48	45	41	37	50	46	49	45	48	44	40	36	-0.3	-0.3	-0.2	-0.3	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	N	286192.2	62100663	49	45	49	45	48	44	40	36	50	46	49	45	48	44	40	36	-0.3	-0.3	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	S	286186.7	62100554	47	43	46	42	43	39	42	39	47	43	46	42	43	39	43	39	-1.2	-1.2	-1.1	-1.1	59	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105/280029	NCA04	Residential	F	S	286193.8	62100403	48	44	47	43	44	40	44	40	49	45	48	44	45	41	45	41	-1.2	-1.2	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-				
R0165	58 BALMORAL RISE, WILTON	105																																										

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade		Predicted noise level Opening year								Road contributions Design year								Change in noise level (Build - No Build)				RNC noise criteria		RNC noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment														
					Floor	Direction	x		y		No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Opening year		Design year		Day	Night	Day	Night	Day	Night			Day	Night	Day	Night	Day	Night								
							Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night															Day	Night	Day	Night	Day	Night		
R0359	15 HORNBY STREET, WILTON	29/280010	NCA03	Residential	F	S	286654.8	6209342	50	56	55	44	40	58	55	57	57	59	55	41	55	55	-1.8	-1.4	-1.4	-1.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
R0359	15 HORNBY STREET, WILTON	29/280010	NCA03	Residential	F	S	286657.9	6209344	60	56	58	55	44	40	58	55	60	57	59	55	41	58	55	-1.3	-1.3	-1.4	-1.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
R0359	15 HORNBY STREET, WILTON	29/280010	NCA03	Residential	F	W	286658.5	6209358	55	51	53	50	46	43	52	49	55	52	54	50	47	43	53	49	-1.6	-1.6	-1.5	-1.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0359	15 HORNBY STREET, WILTON	29/280010	NCA03	Residential	F	W	286660.3	6209364	55	51	53	50	47	43	52	49	55	52	54	50	48	44	52	49	-1.5	-1.5	-1.4	-1.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0359	15 HORNBY STREET, WILTON	29/280010	NCA03	Residential	F	W	286661.1	6209349	56	53	55	51	48	44	52	49	57	54	51	52	48	44	52	49	-1.6	-1.6	-1.5	-1.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	NE	286664.2	6209631	51	47	50	47	50	46	41	37	51	48	51	47	51	47	42	38	-0.5	-0.4	-0.2	-0.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	NE	286671.1	6209628	50	47	50	46	50	46	40	36	51	47	51	47	50	46	40	37	-0.4	-0.4	-0.3	-0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	NE	286679.4	6209626	50	46	50	46	49	45	40	37	51	47	50	46	50	46	41	37	-0.4	-0.4	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	NW	286675.2	6209628	54	50	53	49	51	47	49	45	55	51	54	50	52	48	50	46	-1.2	-1.1	-1	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	SE	286681.8	6209621	47	44	47	43	39	35	46	42	48	45	42	36	46	43	46	43	-0.6	-0.6	-0.6	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	SE	286679.7	6209614	49	45	48	44	38	34	47	44	49	46	48	45	38	35	47	44	-1.1	-1.1	-1	-1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	SW	286666.8	6209614	53	49	51	47	45	41	50	46	53	49	52	48	46	42	50	47	-1.4	-1.4	-1.3	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0360	9 CHISOLM STREET, WILTON	163/280010	NCA04	Residential	F	SW	286656.4	6209621	54	50	52	49	48	45	50	47	54	51	53	49	49	45	51	47	-1.4	-1.3	-1.2	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	NE	286669.3	6209492	52	48	51	48	49	45	47	44	52	48	51	48	45	48	44	-0.8	-0.7	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	NE	286680.7	6209484	50	46	49	46	45	42	47	43	51	47	50	46	46	42	47	44	-1	-0.8	-0.8	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	NW	286658.4	6209490	55	52	54	50	50	46	52	48	56	52	54	51	50	47	52	49	-1.5	-1.5	-1.3	-1.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	NW	286670.6	6209492	52	49	52	48	49	45	48	45	53	49	52	48	49	46	49	45	-0.9	-0.8	-0.8	-0.8	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SE	286683.5	6209476	52	48	50	47	42	39	50	46	50	48	51	47	49	39	50	46	-1.2	-1.2	-1.3	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SE	286677.9	6209488	50	47	49	46	43	39	48	45	51	47	50	46	43	40	49	45	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SW	286678.5	6209473	53	50	52	48	44	40	51	48	54	50	52	49	45	41	52	48	-1.2	-1.2	-1.1	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SW	286661.5	6209479	55	52	54	50	47	43	53	49	56	52	55	51	48	44	54	50	-1.5	-1.4	-1.4	-1.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SW	286664.8	6209476	55	52	54	50	46	42	54	50	56	52	54	51	47	42	54	50	-1.5	-1.5	-1.4	-1.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SW	286658.8	6209483	55	52	54	50	46	43	53	49	56	52	54	51	47	44	53	50	-1.5	-1.5	-1.5	-1.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0361	5 OXENBRIDGE AVENUE, WILTON	158/280010	NCA04	Residential	F	SW	286671.7	6209474	55	51	54	50	46	42	53	49	55	52	54	50	47	43	53	50	-1.4	-1.5	-1.4	-1.4	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0363	10 OXENBRIDGE AVENUE, WILTON	36/280010	NCA03	Residential	F	E	286677.1	6209421	51	47	50	47	41	37	49	46	51	48	50	47	42	38	50	46	-0.9	-0.8	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0363	10 OXENBRIDGE AVENUE, WILTON	36/280010	NCA03	Residential	F	N	286675.3	6209435	51	47	50	47	41	37	49	46	51	48	50	47	42	38	50	46	-0.9	-0.8	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0363	10 OXENBRIDGE AVENUE, WILTON	36/280010	NCA03	Residential	F	N	286665.8	6209437	52	48	51	48	48	45	48	45	44	53	49	52	48	49	45	49	45	-0.9	-0.8	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0363	10 OXENBRIDGE AVENUE, WILTON	36/280010	NCA03	Residential	F	N	286670.1	6209438	52	48	51	48	49	45	48	44	53	49	52	48	49	45	49	45	-0.9	-0.8	-0.8	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0363	10 OXENBRIDGE AVENUE, WILTON	36/280010	NCA03	Residential	F	S	286667	6209409	55	52	54	50	43	39	53	50	55	52	54	51																																

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade		Predicted noise level Opening year								Road contributions Opening year								Change in noise level (Build - No Build)				RNC noise criteria		RNC noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment																
					Floor	Direction	x	y	No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Opening year		Design year		Day	Night	Day	Night	Day	Night	Day	Night			Day	Night														
					Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																												
R0375	27 CHISOLM STREET, WILTON	50/280010	NC404	Residential	F	S	286682.1	6209854	52	48	51	47	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	41	34	45	-	-	-	-	-	-	-	-				
R0375	27 CHISOLM STREET, WILTON	50/280010	NC404	Residential	F	S	286682.1	6209854	54	50	53	49	50	46	50	46	55	51	53	50	51	47	50	46	-1.4	-1.4	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1						
R0375	27 CHISOLM STREET, WILTON	50/280010	NC404	Residential	F	W	286679.9	6209860	54	50	53	49	51	48	47	44	54	51	54	50	52	48	48	44	-1.1	-1.1	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7				
R0375	27 CHISOLM STREET, WILTON	50/280010	NC404	Residential	F	W	286679.9	6209860	56	52	54	51	53	49	49	45	56	52	55	52	54	50	50	46	-1.1	-0.9	-0.8	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7			
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NE	286705	6209537	47	44	46	43	47	44	47	44	46	43	48	44	47	44	49	45	42	-0.6	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4				
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NE	286689.9	6209556	50	46	50	46	48	44	45	41	51	47	50	47	49	45	45	42	-0.5	-0.6	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3			
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NE	286695.5	6209555	50	47	50	46	48	44	45	41	51	47	50	47	49	45	46	42	-0.5	-0.6	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NE	286700	6209550	48	45	48	44	46	42	44	40	49	45	48	45	46	43	44	40	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NE	286706.1	6209550	50	47	50	46	48	44	45	42	51	47	50	47	49	45	46	42	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NW	286692	6209555	50	46	50	46	48	44	45	41	51	47	46	46	49	45	45	42	-0.6	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NW	286682.1	6209553	54	51	53	49	49	45	51	47	55	51	54	50	49	45	51	48	-1.4	-1.3	-1.2	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NW	286681.4	6209547	54	50	53	49	48	44	51	47	54	51	53	49	49	45	51	47	-1.4	-1.4	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	NW	286701.5	6209550	49	46	49	45	47	44	44	40	50	46	49	46	48	44	44	41	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	SE	286706.4	6209542	49	46	49	45	47	44	44	40	50	46	49	46	48	44	44	41	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	SE	286706.4	6209533	51	48	50	46	42	38	49	46	51	48	50	47	43	39	49	46	-1.1	-1.1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	SW	286689.9	6209538	53	49	52	48	45	41	50	47	53	49	52	48	46	42	51	47	-1.1	-1.1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		
R0376	6 CHISOLM STREET, WILTON	156/280010	NC404	Residential	F	SW	286701.9	6209532	53	49	51	48	44	40	51	47	53	49	52	48	45	41	51	47	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	E	286710.1	6209412	50	47	49	46	39	35	49	46	50	47	50	46	39	36	49	46	-0.4	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	E	286710.1	6209412	53	50	53	49	43	39	52	49	52	50	53	50	43	40	53	49	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286691	6209424	50	46	49	45	47	43	44	40	50	46	49	46	48	44	44	41	-0.7	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286691	6209424	53	49	52	48	49	45	49	45	53	49	52	49	50	46	49	45	-0.9	-0.9	-1	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286705.4	6209424	49	45	48	45	46	43	44	40	50	46	49	45	47	43	45	41	-0.6	-0.7	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286705.4	6209424	52	48	51	48	49	45	48	44	53	49	52	48	45	48	45	41	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286696.8	6209425	53	49	52	48	49	45	49	45	53	50	52	49	50	46	49	46	-1	-1	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	
R0377	12 OXENBRIDGE AVENUE, WILTON	35/280010	NC403	Residential	F	N	286701.7	6209426	50</																																													

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade				Predicted noise level Opening year								Road contributions Design year								Change in noise level (Build - No Build)				RNCG noise criteria		RNCG noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment												
					Floor	Direction	x	y	No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Opening year		Design year		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night			Day	Night										
									Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night															Day	Night								
					Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	E	2867013	6209756	48	45	48	45	44	41	44	40	49	45	48	45	46	42	44	41	-0.6	-0.7	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	E	2867144	6209750	48	45	48	44	45	41	44	40	49	45	48	45	46	42	44	41	-0.6	-0.7	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	E	2867139	6209739	48	45	48	44	44	41	44	40	49	45	48	45	46	42	44	41	-0.6	-0.7	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	N	2866973	6209760	50	46	49	45	47	43	45	41	51	47	50	46	48	44	45	41	-0.9	-0.7	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	N	2867022	6209755	48	44	47	44	44	41	44	40	49	45	48	45	46	42	44	41	-0.7	-0.7	-0.6	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	N	2867100	6209758	50	46	49	45	47	43	44	40	50	46	50	46	48	44	45	41	-0.8	-0.8	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	S	2867019	6209738	49	45	48	44	45	41	45	41	50	46	49	45	46	42	46	42	-1.1	-1.1	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0383	17 CHISOLM STREET, WILTON	45/28010	NC04	Residential	F	W	2866916	6209750	54	50	53	49	50	47	49	45	54	51	53	50	51	47	50	46	-1.1	-1.1	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	E	2867117	6209338	56	53	55	52	42	38	55	52	56	53	56	52	43	39	56	52	-0.6	-0.6	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	E	2867125	6209342	54	51	53	50	42	38	53	50	55	51	50	43	39	53	50	-0.7	-0.7	-0.8	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	E	2867136	6209350	53	49	52	49	42	38	52	48	53	50	53	49	43	39	52	49	-0.6	-0.6	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	N	2867115	6209357	51	48	50	47	45	41	49	45	52	48	51	47	46	42	49	46	-0.9	-1.1	-0.9	-0.9	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	N	2867003	6209359	51	48	50	47	45	41	49	45	52	48	51	47	46	42	49	46	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	S	2866978	6209338	58	55	57	54	43	39	57	54	58	55	57	54	44	40	57	54	-0.9	-0.9	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	S	2867088	6209336	58	55	57	54	43	39	57	53	58	55	57	54	44	40	57	54	-0.9	-0.9	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	S	2867055	6209336	59	55	58	54	43	40	57	54	59	56	58	55	44	40	58	54	-1.1	-1.1	-1.1	-1.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	S	2867022	6209335	59	55	58	54	44	40	58	54	59	56	58	55	45	41	58	54	-1.2	-1.1	-1.3	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	W	2866942	6209343	54	51	53	50	43	39	53	50	54	50	54	50	44	40	53	50	-1.2	-1.2	-1.2	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0384	19 HORNBY STREET, WILTON	31/28010	NC03	Residential	F	W	2866956	6209353	53	50	52	48	42	39	51	48	53	50	52	49	43	39	52	48	-1.2	-1.1	-1.1	-1.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	E	2867278	6209460	53	49	53	49	41	37	52	49	53	50	53	49	41	38	53	49	-0.2	-0.1	-0.2	-0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	E	2867272	6209457	53	50	53	49	41	37	52	49	53	50	53	49	41	38	53	49	-0.3	-0.3	-0.3	-0.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	E	2867173	6209474	48	44	47	40	44	40	49	45	48	44	45	42	44	40	45	41	-0.7	-0.6	-0.7	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	E	2867304	6209466	51	48	50	47	41	37	50	47	51	48	51	47	41	38	50	47	-0.5	-0.5	-0.6	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	N	2867184	6209474	48	45	48	44	46	42	44	40	49	45	48	45	46	43	44	41	-0.6	-0.6	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	N	2867149	6209477	50	46	50	46	48	44	45	41	51	47	50	46	48	44	46	42	-0.6	-0.6	-0.5	-0.5	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	N	2867272	6209472	48	45	47	44	44	40	45	41	48	44	45	41	48	44	46	42	-0.7	-0.7	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	N	2867079	6209479	50	47	50	46	48	44	46	42	51	47	50	47	48	44	46	42	-0.7	-0.7	-0.6	-0.6	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	NW	286721	6209474	49	45	48	44	45	42	45	41	49	46	49	45	46	42	45	42	-0.9	-0.8	-0.7	-0.7	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0386	7 OXENBRIDGE AVENUE, WILTON	43/28010	NC04	Residential	F	S	2867063	6209456	55																																											

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade	Predicted noise level																Change in noise level				RNCG noise criteria		RNCG noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment																																																																																																																																				
						Opening year				Non-project				Project				Design year				Build - No Build		Design year		Day		Night		Day		Night																																																																																																																																									
						No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Open year	Design year	Day	Night	Day	Night	Day	Night	Day	Night																																																																																																																																										
						Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																																																																																																																																										
R0452	7 DONELEY STREET, WILTON	81/280010	NC04	Residential	F	S	286831.2	6209793	50	46	45	44	43	42	41	40	39	48	44	47	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100					
R0452	7 DONELEY STREET, WILTON	81/280010	NC04	Residential	F	S	286825.8	6209769	51	47	50	47	48	44	47	43	52	48	51	47	48	44	47	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100	
R0452	7 DONELEY STREET, WILTON	81/280010	NC04	Residential	F	W	286827.9	6209775	51	47	50	46	48	44	46	42	43	52	48	51	47	48	45	47	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100
R0452	7 DONELEY STREET, WILTON	81/280010	NC04	Residential	F	W	286829.7	6209782	51	47	50	47	48	44	46	42	43	52	48	51	47	49	45	47	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100
R0453	10 HORDERN STREET, WILTON	72/280010	NC04	Residential	F	E	286831.2	6209812	46	42	45	43	42	41	40	39	47	43	45	41	42	38	42	39	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100		
R0453	10 HORDERN STREET, WILTON	72/280010	NC04	Residential	F	N	286831.1	6209823	49	46	49	45	48	44	41	38	50	46	50	46	49	45	42	38	43	40	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100	
R0453	10 HORDERN STREET, WILTON	72/280010	NC04	Residential	F	S	286832.7	6209824	50	46	49	45	48	44	42	39	50	46	50	46	49	45	42	39	44	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100		
R0453	10 HORDERN STREET, WILTON	72/280010	NC04	Residential	F	S	286832.8	6209824	49	46	48	45	43	40	47	43	50	46	49	45	44	40	47	44	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60	-61	-62	-63	-64	-65	-66	-67	-68	-69	-70	-71	-72	-73	-74	-75	-76	-77	-78	-79	-80	-81	-82	-83	-84	-85	-86	-87	-88	-89	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-100			
R0453	10 HORDERN STREET, WILTON	72/280010	NC04	Residential	F	S	286832.9	6209824	47	43	46	42	42	39	44	40	48	44	47	43	39	44	40	41	39	44	40	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24																																																																													

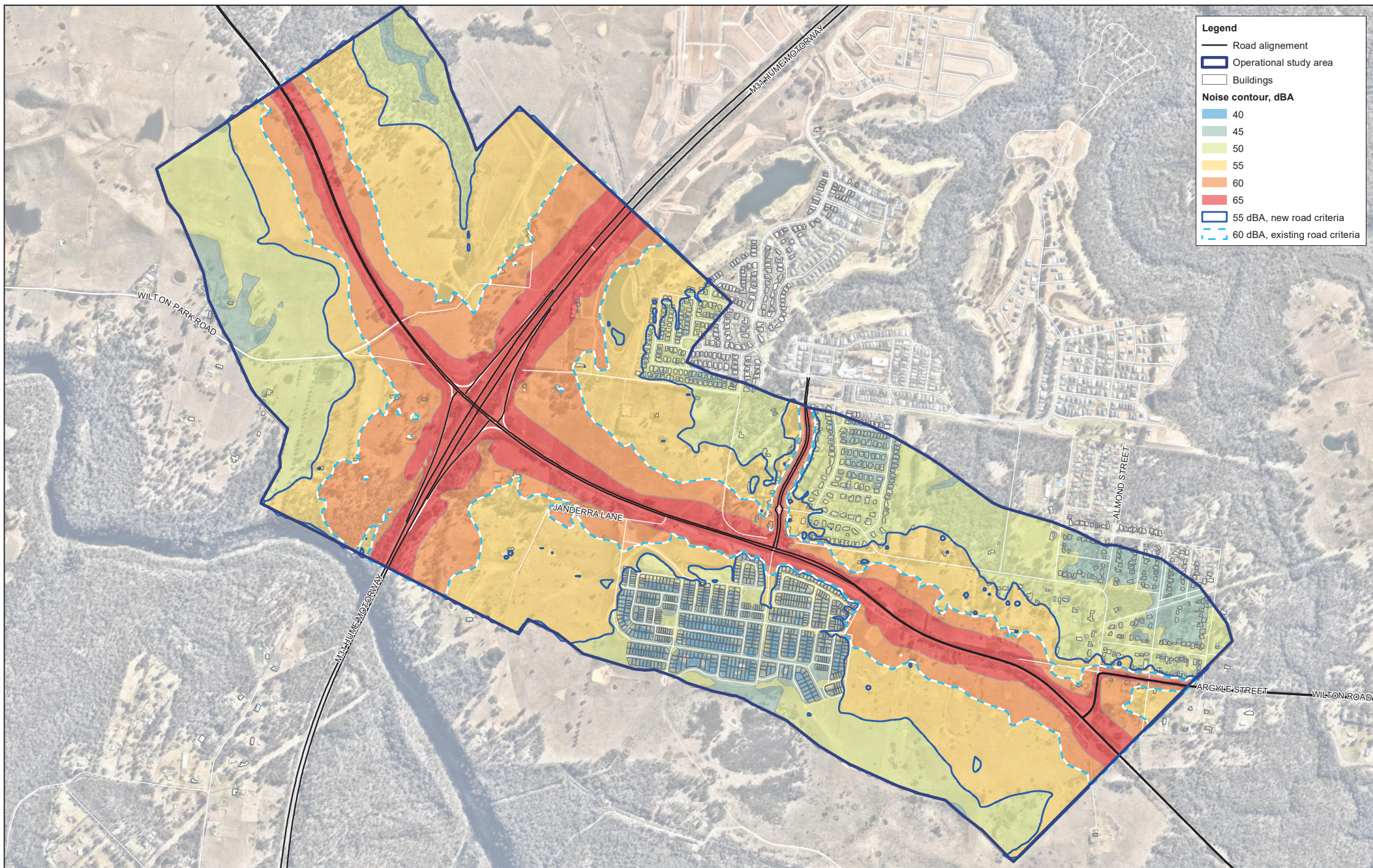
Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade		Predicted noise level Opening year								Road contributions Design year								Change in noise level (Build - No Build)				RNC noise criteria		RNGC noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment																	
							No Build				Build				No Build				Build				Opening year		Design year																														
							Day		Night		Day		Night		Day		Night		Day		Night		Day		Night														Day	Night	Day	Night													
					x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y	Day	Night	Day	Night																													
R0514	80 HORNBY STREET, WILTON	1/207392	NC405	Residential	F	W	287274	6209106	56	53	55	43	39	56	53	53	57	53	43	40	55	53	0	0	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-												
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	E	287308	6209042	51	47	51	47	40	37	50	47	51	48	51	47	37	51	47	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-											
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	E	287286	6209030	59	56	59	55	40	37	59	55	60	56	59	56	41	37	59	56	-0.5	-0.4	-0.6	-0.5	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-									
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	N	287317	6209039	51	47	51	47	44	41	50	46	51	48	45	41	50	46	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	N	287303	6209047	49	45	49	45	42	39	49	45	49	42	41	37	49	45	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	S	287312	6209026	61	58	61	58	41	38	61	58	61	58	61	58	42	38	61	58	-0.2	-0.2	-0.2	-0.3	0	0	0	0	60	55	1	3	-	-	-	-	-	-	-	-	-	-	-	-							
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	W	287294	6209035	59	55	59	55	45	41	59	55	59	56	59	56	45	41	59	55	0.2	0.2	0.1	0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
R0515	88 HORNBY STREET, WILTON	2/207392	NC406	Residential	F	W	287298	6209043	58	55	58	55	45	41	58	55	58	55	58	55	45	41	58	55	0.1	0.1	0.1	0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	E	287387	6209160	54	51	54	51	40	37	54	51	54	51	54	51	41	37	54	51	-0.1	-0.1	-0.1	-0.2	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	E	287380	6209158	54	51	54	51	42	37	54	51	55	51	55	51	41	37	54	51	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	E	287391	6209164	53	49	53	49	40	36	52	49	53	50	53	50	41	37	53	49	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	E	287392	6209168	52	48	52	48	42	38	51	48	52	49	52	49	52	49	51	48	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	E	287380	6209173	49	45	49	45	45	41	46	43	49	46	49	46	46	42	47	43	-0.2	-0.2	-0.2	-0.2	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	S	287382	6209158	48	44	48	44	41	37	48	45	48	45	48	45	48	45	41	37	48	45	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	S	287370	6209164	55	52	55	52	40	37	55	52	56	52	56	52	41	37	55	52	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	S	287388	6209161	54	51	54	51	40	37	54	51	55	51	55	51	41	37	54	51	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	S	287375	6209157	56	53	56	53	42	38	56	53	57	53	57	53	42	39	56	53	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	W	287372	6209161	55	52	55	52	42	38	55	52	56	52	56	52	43	39	55	52	0	0	0	0	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	W	287367	6209172	53	50	53	50	49	43	52	49	53	50	53	50	49	43	53	49	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0516	92 HORNBY STREET, WILTON	3/207392	NC405	Residential	F	W	287367	6209167	54	51	54	51	42	38	54	51	55	51	55	51	43	39	54	51	-0.2	-0.2	-0.2	-0.2	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	E	287403	6209306	49	45	49	45	43	39	47	44	49	46	49	45	43	40	48	44	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	E	287404	6209299	51	47	50	47	43	39	50	46	51	47	51	47	43	40	50	46	-0.2	-0.2	-0.2	-0.2	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	E	287385	6209295	51	48	51	48	42	37	51	48	51	48	51	48	42	38	51	48	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	N	287394	6209311	49	45	48	45	46	42	45	42	49	46	49	45	46	42	46	42	-0.3	-0.3	-0.3	-0.2	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	N	287381	6209306	49	45	49	45	46	42	46	42	49	46	49	45	46	42	46	42	-0.3	-0.3	-0.3	-0.3	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	S	287393	6209296	48	45	48	45	41	37	47	44	49	45	49	45	42	38	48	44	-0.2	-0.2	-0.2	-0.3	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	S	287379	6209291	54	51	54	51	44	38	54	51	54	51	54	51	43	39	54	51	0	0	0	0	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential	F	W	287374	6209299	54	51	54	51	46	42	53	50	54	51	54	51	46	42	54	50	-0.1	-0.1	-0.1	-0.1	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0517	85 HORNBY STREET, WILTON	72/751297	NC405	Residential																																																			

Appendix C-5 Operational noise levels

Receiver ID	Address	Lot / DP	NCA	Receiver type	Facade		Predicted noise level Opening year								Road contributions Design year								Change in noise level (Build - No Build)				RNG noise criteria		RNG noise criteria exceedance, dB		Trigger 1: Change in noise level		Trigger 2: Cumulative limit		Trigger 3: Acute limit		Qualifies	Category of treatment						
					Floor	Direction	x	y	No Build		Build		Non-project		Project		No Build		Build		Non-project		Project		Opening year		Design year		Day	Night	Day	Night	Day	Night	Day	Night			Day	Night	Day	Night		
									Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night																
R0542	127 HORNBY STREET, WILTON	4/10/75904	NCA05	Residential	F	W	287741.4	6209203	49	45	49	45	42	40	47	43	45	41	49	45	49	45	42	40	45	41	-0.1	-0.1	-0.1	-0.2	60	55	-	-	-	-	-	-	-	-	-	-		
R0542	127 HORNBY STREET, WILTON	4/10/75904	NCA05	Residential	F	E	287738.6	6209198	49	45	48	45	42	39	47	44	49	45	49	45	43	39	48	44	-0.2	-0.1	-0.1	-0.2	60	55	-	-	-	-	-	-	-	-	-	-	-			
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	E	287761.9	6209046	45	45	48	45	43	39	46	43	48	45	48	45	43	40	47	43	0	0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-			
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	E	287748.9	6209058	46	43	46	43	40	37	45	41	47	43	46	43	42	38	45	42	-0.2	-0.2	-0.3	-0.2	59	55	-	-	-	-	-	-	-	-	-	-	-			
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	N	287744.2	6209063	45	45	48	45	42	39	46	43	48	45	48	45	43	40	47	43	0	0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-		
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	N	287751.3	6209055	46	43	46	43	41	38	44	41	47	43	47	43	42	38	45	41	-0.2	-0.2	-0.1	-0.2	59	55	-	-	-	-	-	-	-	-	-	-	-	-		
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	N	287758.1	6209051	47	43	47	43	43	40	44	41	47	44	47	44	44	40	45	41	-0.1	-0.1	0	-0.1	59	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	S	287756.7	6209042	51	48	51	48	43	39	51	47	52	48	52	48	43	40	51	48	-0.1	-0.1	0	-0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	S	287754.9	6209043	48	45	48	45	42	39	47	44	49	45	49	45	43	40	47	44	0.1	0.2	0.1	0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0543	130 HORNBY STREET, WILTON	12/207392	NCA05	Residential	F	S	287745.9	6209041	52	49	52	49	43	40	51	48	52	49	52	49	44	40	51	48	0	0	0	-0.1	-0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	E	287774.4	6208732	55	51	55	52	53	50	51	47	56	52	56	52	54	50	51	47	0	0.1	-0.1	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-		
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	E	287761.6	6208736	54	50	54	50	51	47	51	47	54	51	54	51	52	48	51	48	-0.1	-0.1	-0.1	-0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	N	287779.3	6208720	63	59	62	59	58	55	60	57	63	60	63	59	59	55	61	57	-0.3	-0.3	-0.3	-0.3	60	55	3	4	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	N	287765.6	6208739	56	52	56	53	51	47	55	51	56	53	57	53	52	48	55	52	0.3	0.3	0.2	0.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	N	287766.9	6208735	54	51	54	51	51	48	55	51	58	55	51	55	52	48	52	48	0.1	0.1	0	0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	N	287776.8	6208730	55	51	55	51	52	49	50	47	55	52	55	52	53	50	51	47	0	0.1	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	S	287772.3	6208722	63	60	63	60	57	54	62	58	64	60	63	60	58	54	62	59	-0.1	-0.1	-0.2	-0.2	60	55	3	5	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	S	287763.8	6208720	60	63	60	63	60	57	53	62	64	60	64	60	58	54	62	59	-0.1	-0.2	-0.1	-0.1	60	55	4	5	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	S	287758.8	6208721	63	60	63	60	56	53	62	59	63	60	63	60	57	53	62	59	-0.1	0	-0.1	0	60	55	3	5	-	-	-	-	-	-	-	-	-	-	-	
R0545	72 ALMOND STREET, WILTON	1/1018965	NCA06	Residential	F	W	287754.4	6208727	59	56	60	56	43	39	60	56	60	56	60	57	64	60	60	57	0.3	0.3	0.3	0.3	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	E	287779.9	6208935	48	44	48	45	42	38	46	43	49	45	48	45	44	39	45	43	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	N	287774.8	6208935	45	45	49	45	44	40	47	43	49	46	49	46	45	41	47	44	-0.1	-0.2	-0.1	-0.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	N	287763.2	6208935	49	45	49	45	44	40	47	44	49	46	49	46	44	41	47	44	-0.1	-0.1	-0.1	-0.2	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	S	287771.9	6208919	52	48	52	49	42	39	51	48	52	49	52	49	43	39	52	48	0.1	0.1	0	0.1	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	S	287762.9	6208921	48	45	49	45	45	42	49	45	49	46	49	46	43	39	45	43	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0546	60 ALMOND STREET, WILTON	15/207392	NCA05	Residential	F	W	287754.9	6208929	52	49	52	49	44	40	52	48	53	49	53	49	44	41	52	49	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	E	287778.8	6209213	47	43	47	43	42	39	45	42	47	44	47	44	43	39	45	42	0	0	0	0	59	55	-	-	-	-	-	-	-	-	-	-	-	-		
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	E	287773.9	6209207	47	44	47	44	42	39	46	42	48	44	48	44	43	39	46	43	0	0	0	0	60	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	N	287775.4	6209220	44	41	44	41	40	37	42	39	45	41	45	41	41	37	43	39	0	-0.1	-0.1	-0.1	57	53	-	-	-	-	-	-	-	-	-	-	-	-		
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	N	287765.3	6209225	47	43	47	43	42	39	47	43	47	43	47	44	45	41	43	40	-0.1	-0.2	-0.2	-0.2	59	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	N	287772.4	6209224	47	43	46	43	44	41	43	39	47	44	47	43	45	41	43	39	-0.3	-0.3	-0.1	-0.2	59	55	-	-	-	-	-	-	-	-	-	-	-	-	-	
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	N	287776.6	6209218	44	41	44	40	36	32	38	34	41	44	41	41	37	42	38	-0.2	-0.2	-0.1	-0.2	56	53	-	-	-	-	-	-	-	-	-	-	-	-	-		
R0547	129 HORNBY STREET, WILTON	5/10/759094	NCA05	Residential	F	S	287774.9	6209210	47	43	47	43	42	39	45	42	47	4																										

C-6 Operational noise contours



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- Noise contour, dBA**
- 40
- 45
- 50
- 55
- 60
- 65
- ▭ 55 dBA, new road criteria
- ▭ 60 dBA, existing road criteria

Paper Size ISO A3
 0 100 200 300 400
 Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



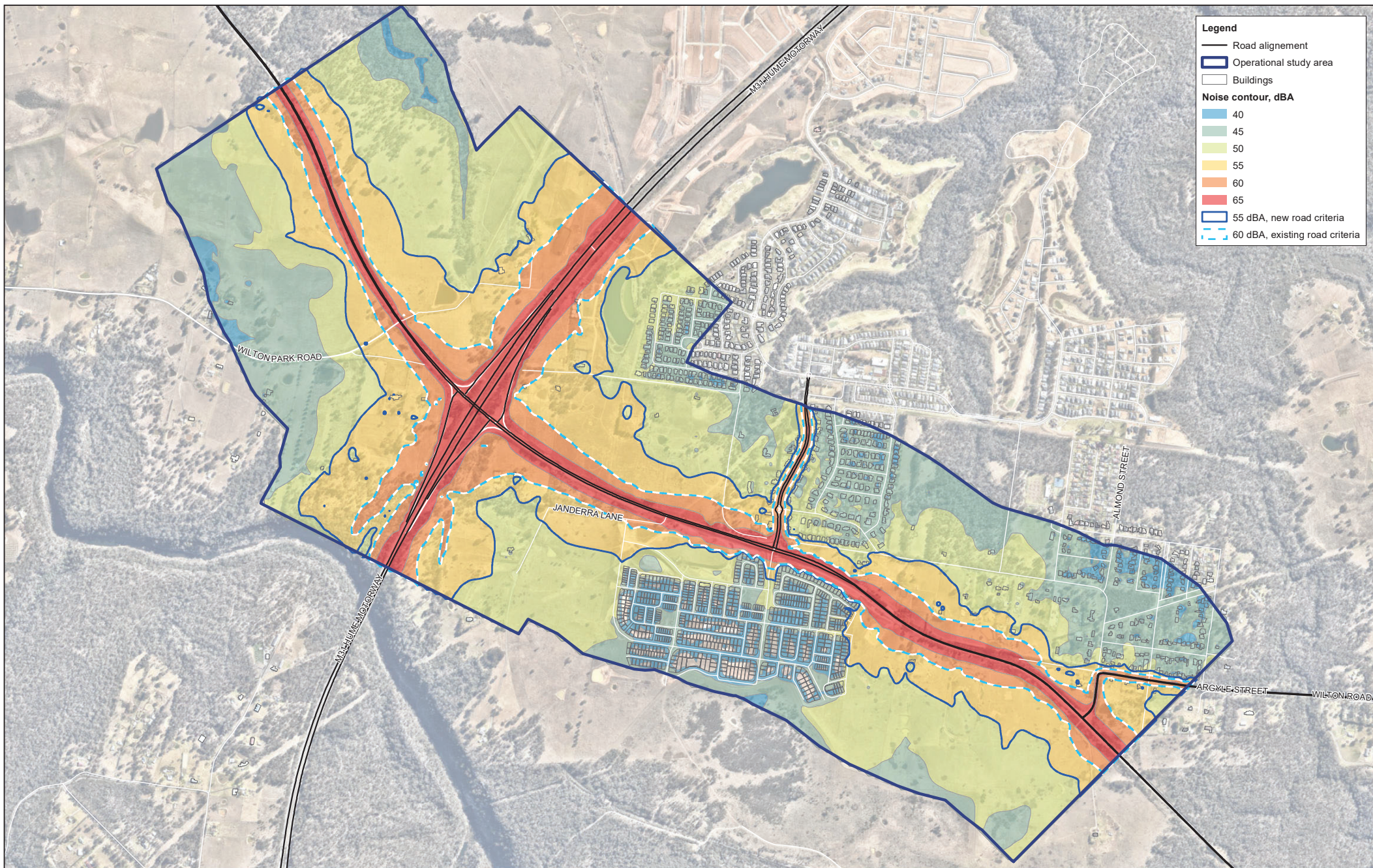
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**Road traffic noise contours 2031
 No-Build (day) LAeq(15 hour)**

FIGURE C-6.1

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmlr



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- Noise contour, dBA**
- 40
- 45
- 50
- 55
- 60
- 65
- ▭ 55 dBA, new road criteria
- - - 60 dBA, existing road criteria



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



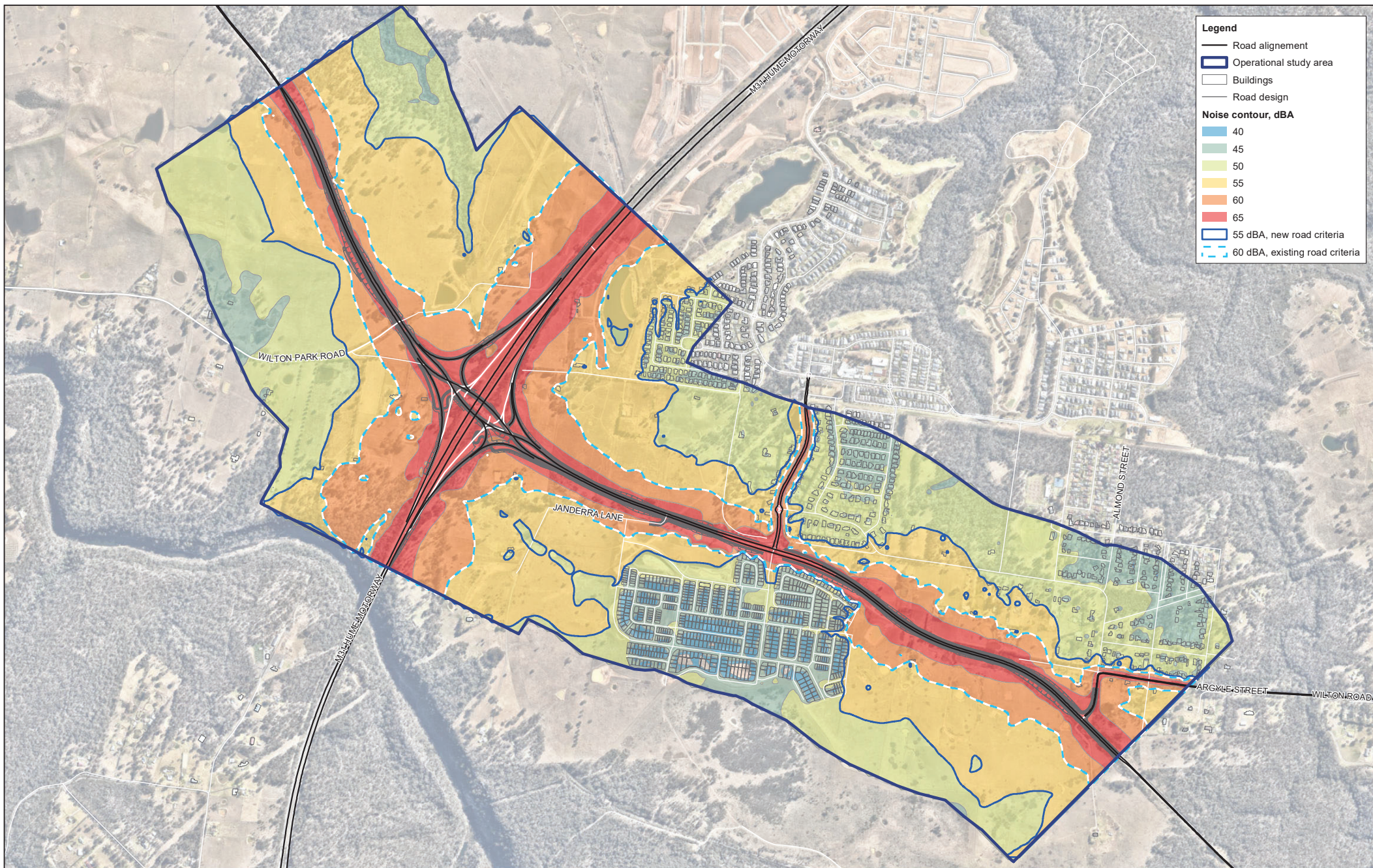
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**Road traffic noise contours 2031
 No-Build (night) LAeq(9 hour)**

FIGURE C-6.2

Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmlr



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- ▭ Road design

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65

- ▭ 55 dBA, new road criteria
- ▭ 60 dBA, existing road criteria

Paper Size ISO A3
 0 100 200 300 400
 Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



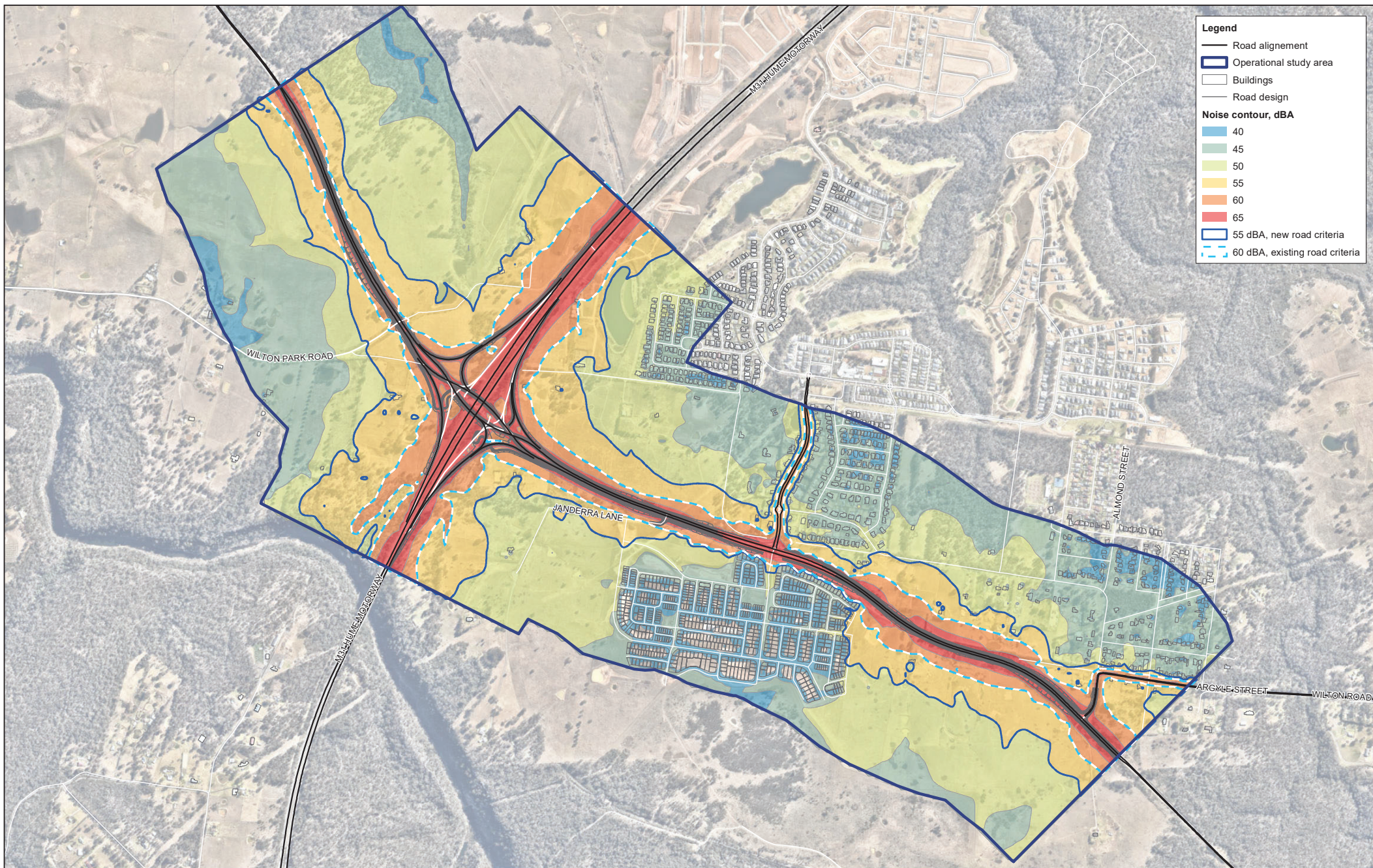
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

Road traffic noise contours 2031
 Build (day) LAeq(15 hour)

FIGURE C-6.3

Data source: Neemap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmiller



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- ▭ Road design

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65

- ▭ 55 dBA, new road criteria
- ▭ 60 dBA, existing road criteria

Paper Size ISO A3
 0 100 200 300 400
 Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



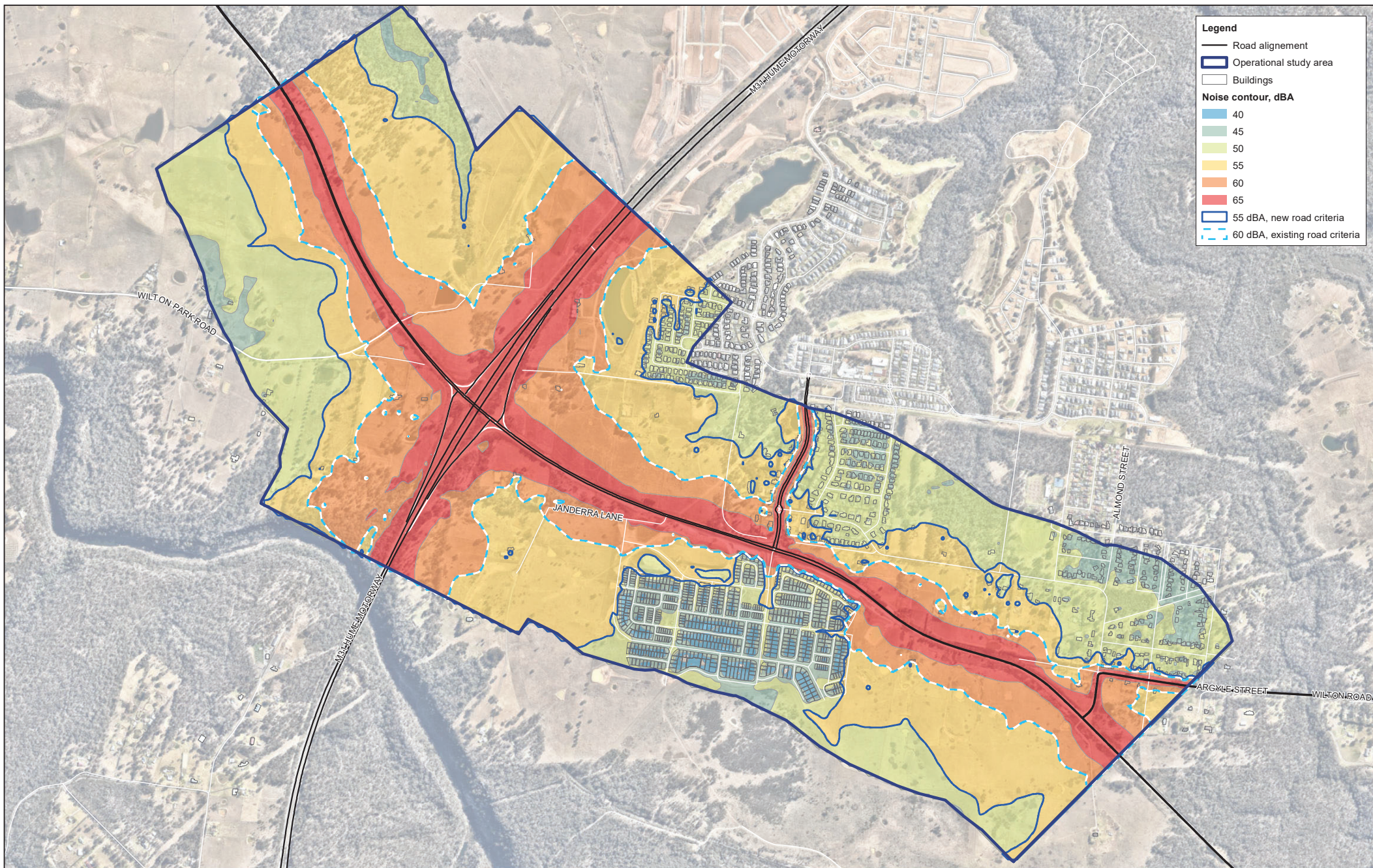
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

Road traffic noise contours 2031
 Build (night) LAeq(9 hour)

FIGURE C-6.4

Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apjmlr



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65
- ▭ 55 dBA, new road criteria
- ▭ 60 dBA, existing road criteria

Paper Size ISO A3
 0 100 200 300 400
 Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



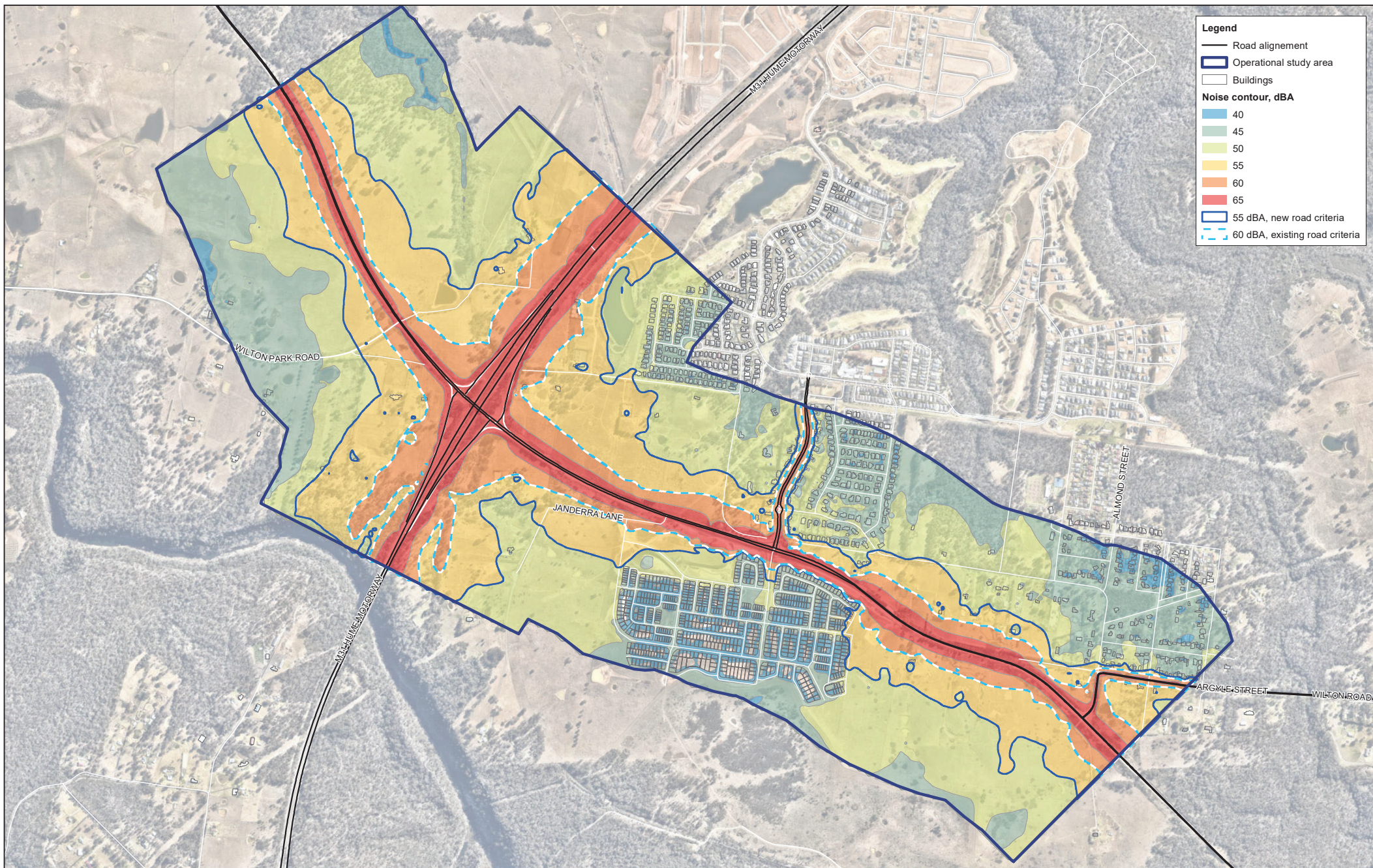
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

**Road traffic noise contours 2041
 No-Build (day) LAeq(15 hour)**

FIGURE C-6.5

Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmlr



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65

▭ 55 dBA, new road criteria
 ▭ 60 dBA, existing road criteria



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



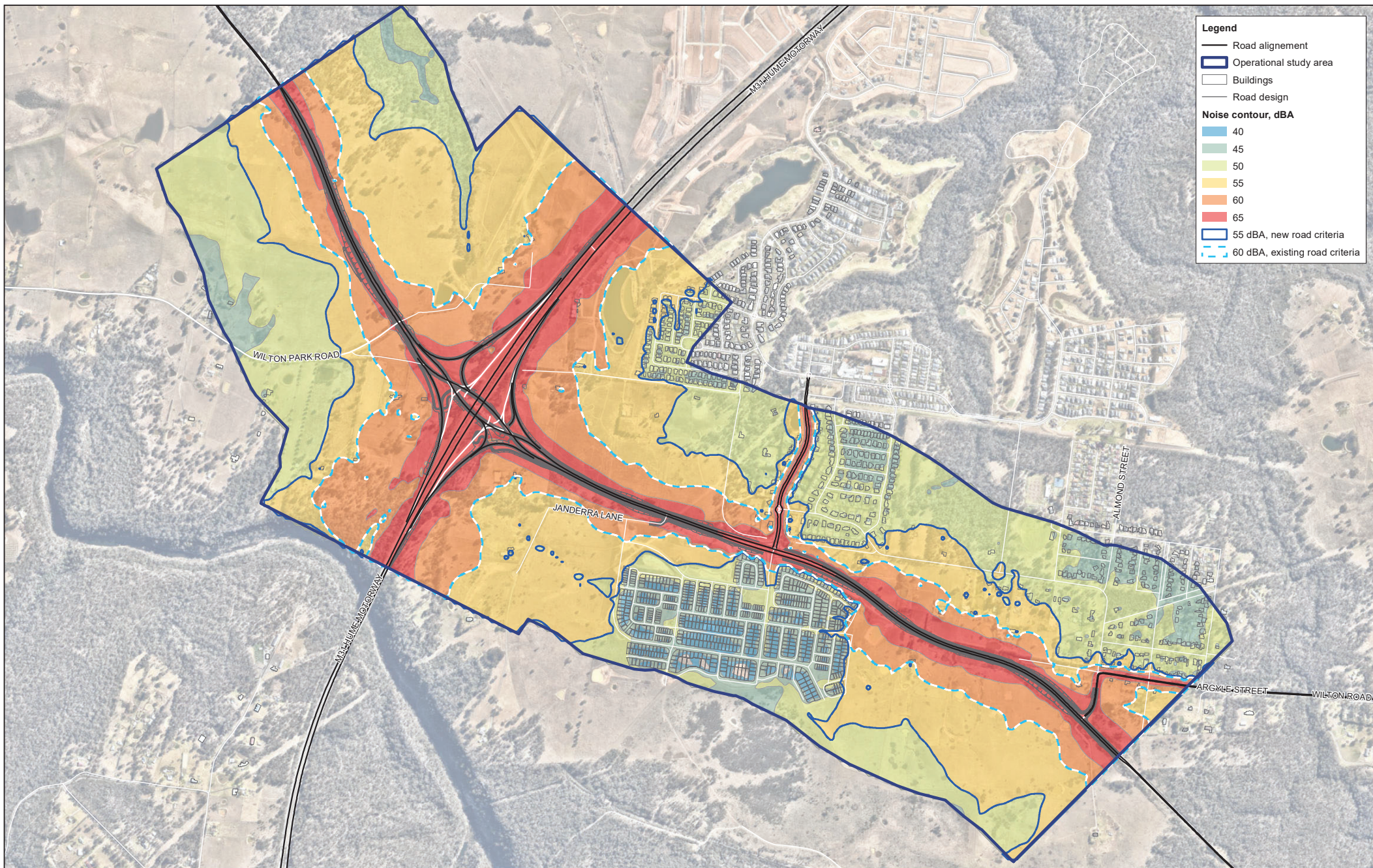
Transport for New South Wales
 Picton Road upgrade Nepean River to Almond Street
 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

Road traffic noise contours 2041
No-Build (night) LAeq(9 hour)

FIGURE C-6.6

Data source: Neamap, Aerial imagery, 2023, SS-S05, Topographic base data, 2023. Created by apmlr



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- ▭ Road design

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65

▭ 55 dBA, new road criteria

▭ 60 dBA, existing road criteria

Paper Size ISO A3
 0 100 200 300 400
 Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



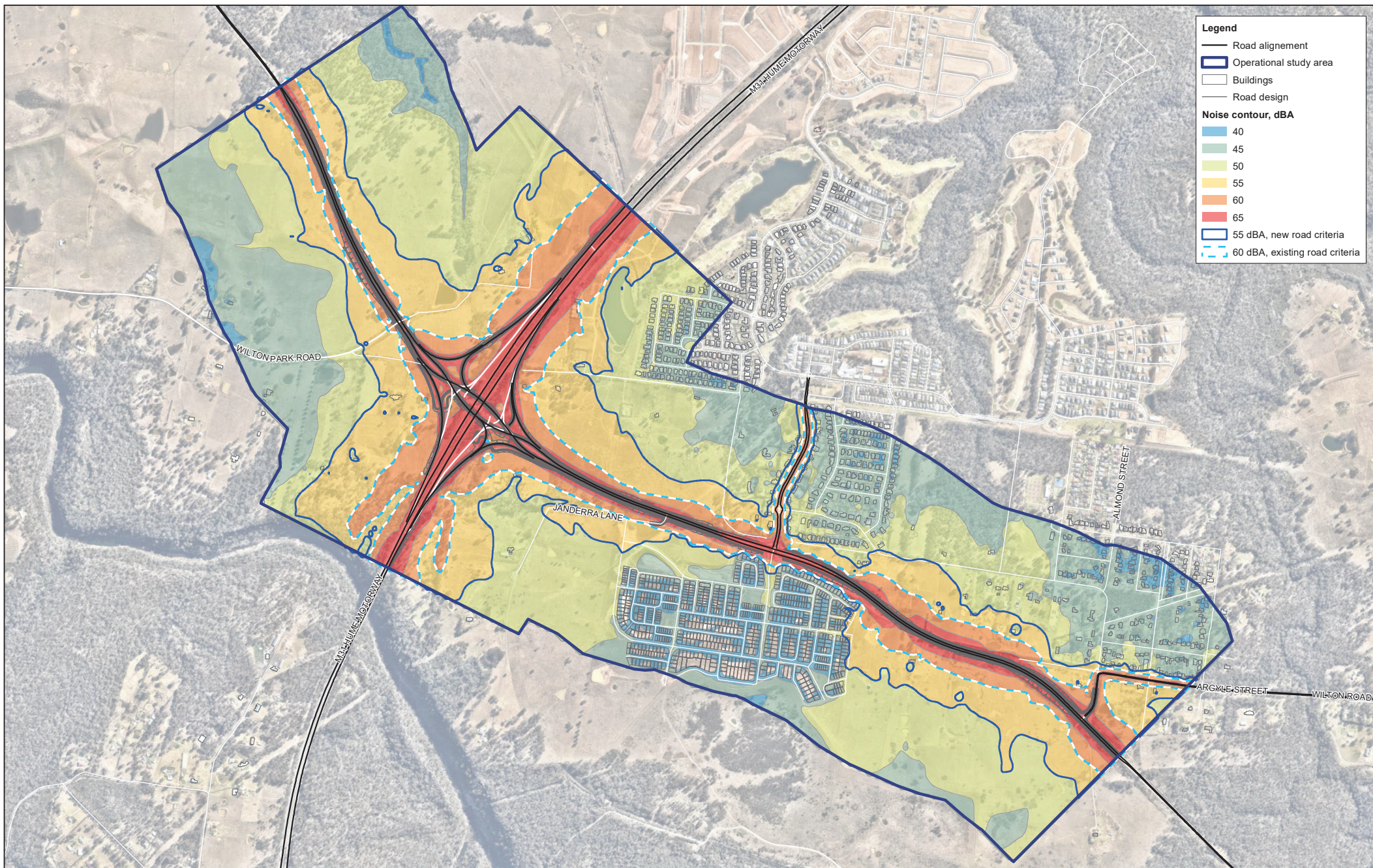
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 Noise and Vibration Impact Assessment

Project No. 12560200
 Revision No. C
 Date 26/10/2023

Road traffic noise contours 2041
 Build (day) LAeq(15 hour)

FIGURE C-6.7

Data source: Neemap, Aerial imagery, 2023, SS-505, Topographic base data, 2023. Created by apmler



Legend

- Road alignment
- ▭ Operational study area
- ▭ Buildings
- ▭ Road design

Noise contour, dBA

- 40
- 45
- 50
- 55
- 60
- 65
- 55 dBA, new road criteria
- 60 dBA, existing road criteria



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



Transport for New South Wales
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Project No. 12560200
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Road traffic noise contours 2041
Build (night) LAeq(9 hour)

FIGURE C-6.8

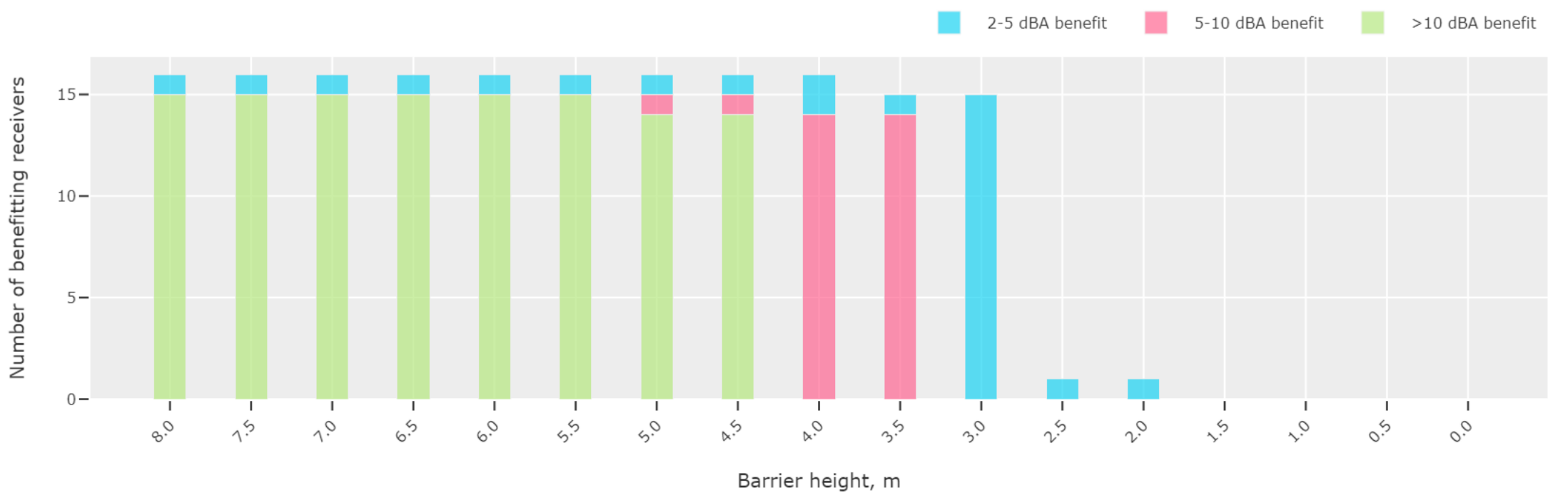
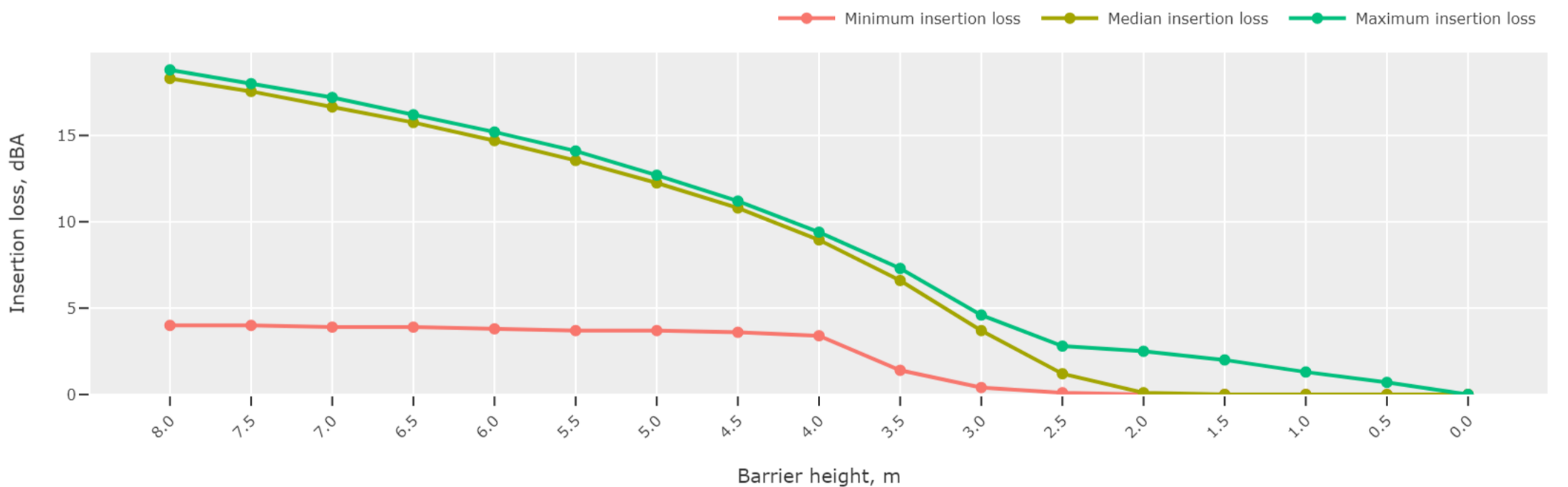
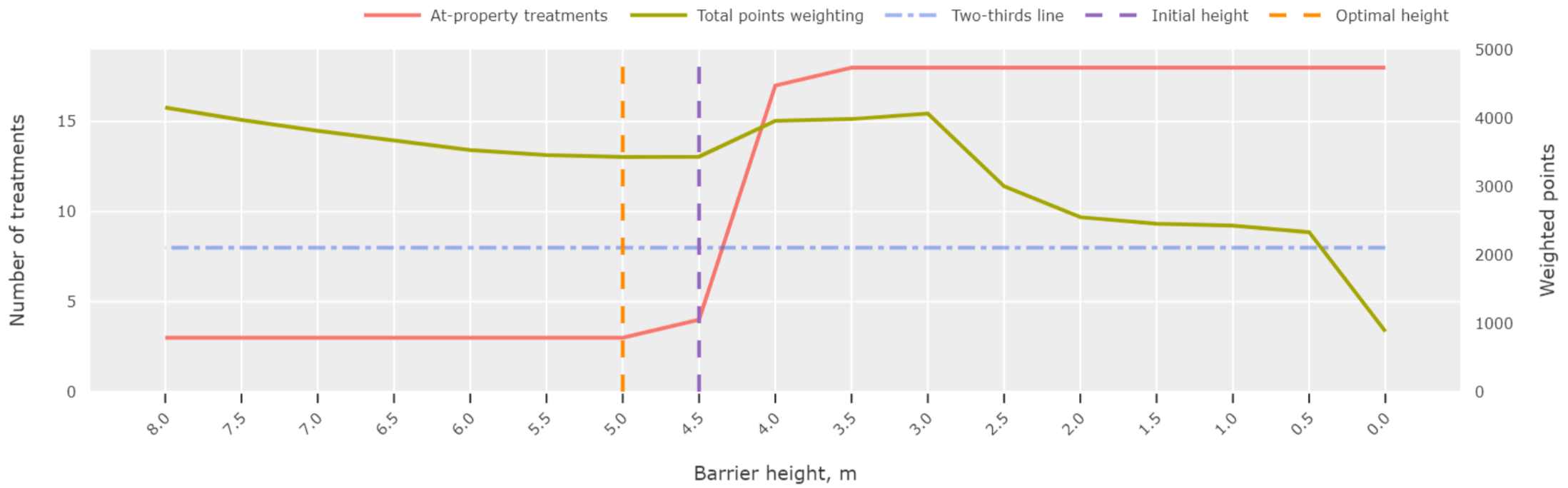
Data source: Neamap, Aerial imagery, 2023, SS-SGS, Topographic base data, 2023. Created by apmlr

C-7 Barrier analysis

Noise barrier analysis - NW.01

Controlling period - Night

Item	Value
Length	479 m
No. treatments (no barrier)	18
Initial height	4.5 m
Initial height: No. treatments	4
Initial height: No. benefitting	16
Initial height: Max insertion loss	11.2 dB
Optimised height	5.0 m
Optimised height: No. treatments	3
Optimised height: No. benefitting	16
Optimised height: Max insertion loss	12.7 dB
Maximum height	8.0 m
Maximum height: No. treatments	3
Maximum height: No. benefitting	16
Maximum height: Max insertion loss	18.8 dB





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