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ACOUSTICAL REPORT

TRAFFIC NOISE IMPACT ASSESSMENT

**LOT 1, DP 780801 WINDWARD WAY & LOT 1, DP 737576, 267
PRINCES HIGHWAY, MILTON NSW**

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ACOUSTICAL REPORT

TRAFFIC NOISE IMPACT ASSESSMENT

LOT 1, DP 780801 WINDWARD WAY & LOT 1, DP 737576, 267 PRINCES HIGHWAY, MILTON NSW

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was engaged by ANNSCA Property Group, care of In the Pink Constructions, to review road traffic noise impact resulting from a proposed partial redevelopment of Princes Highway that will include the introduction of a new roundabout.

The new roundabout is proposed to allow access to a new seniors housing development to be located at Lot 1, DP 780801 Windward Way & Lot 1, DP 737576, 267 Windward Way, Milton. As a result of the introduction of both the new roundabout and new development, it is expected that the character and level of noise generated from Princes Highway will change on account of:

- Modified vehicle operation during an approach to and departure from the roundabout
- Increased traffic volumes that will be generated by the new development

In conducting the assessment of road noise impacts, the following technical guidelines and planning documents have been reviewed when establishing project noise objectives:

- State Environmental Planning Policy (Infrastructure) 2007
- NSW Department of Planning: Development near rail corridors and busy roads – Interim Guidelines
- NSW EPA Road Noise Policy

The following sections of this report provide a brief outline of the development, establish the project noise objectives through referencing appropriate guidelines and documents, predict noise levels resulting from Princes Highway, and recommend noise mitigation measures necessary to meet the project noise objectives.

This report aims to demonstrate that the development can be designed such that future occupants of the development and existing surrounding noise-sensitive land uses will not be subject to adverse noise impacts.



2.0 THE DEVELOPMENT

The development can be considered as two (2) separate components for this assessment:

- Building works – being the construction of the new seniors housing development
- Road works – being the construction of the new roundabout and access roads

The residential component of the new seniors housing development will include an 89-bed residential aged care facility, 127 duplex-style dwellings, and 133 residential apartments. Non-residential uses include consulting rooms for visiting medical practitioners and a Clubhouse.

The road works will involve the construction of the new roundabout for Princes Highway, partial upgrade of the existing service lane east of the highway, new access roads to service the proposed seniors housing development.

The Site Plan, as prepared by Stephen Jones Architects is included in-part as Figure 1 and in full as Appendix A.

The residential component of the development is significantly removed from Princes Highway. Approximate scaling from the plan suggests that a distance of 175-180 metres separates the nearest residential building façade (Block 4 apartments) from Princes Highway.





Figure 1. Site Plan by Stephen Jones Architects

3.0 SURROUNDING LAND USES

The proposed development site is located south of the main Milton Town Centre, part-way between Milton and Mollymook. Princes Highway provides the main road connection between the towns.

Located along this section of the highway are several existing residential dwellings, Kingdom Hall of Jehovah's Witnesses (Place of worship), and Milton Valley Holiday Park (commercial/temporary residential accommodation). It is these properties that are subject to potential noise impact from the development and that are considered in the subsequent analysis of this report.

Figures 2 and 3 identify the surrounding properties north and south of the proposed roundabout location.



Figure 2. Aerial photo – Properties north of the roundabout (Image source – Google Maps)



Figure 3. Aerial photo – Properties south of the roundabout (Image source – Google Maps)

4.0 EXISTING NOISE ENVIRONMENT

Environmental noise levels (background and traffic noise) were surveyed as part of a previous acoustic report for this development (Envirotech – ref: REP-426816-A2 – dated 2 May 2017). The survey was conducted from the 2nd to the 8th December 2016 with two (2) noise loggers installed at representative site locations to survey the minimum ambient background noise level adjacent to Windward Way and the existing traffic noise levels/exposure at the nearest future façade of the residential apartments.

Figure 4 shows the noise measurement location.

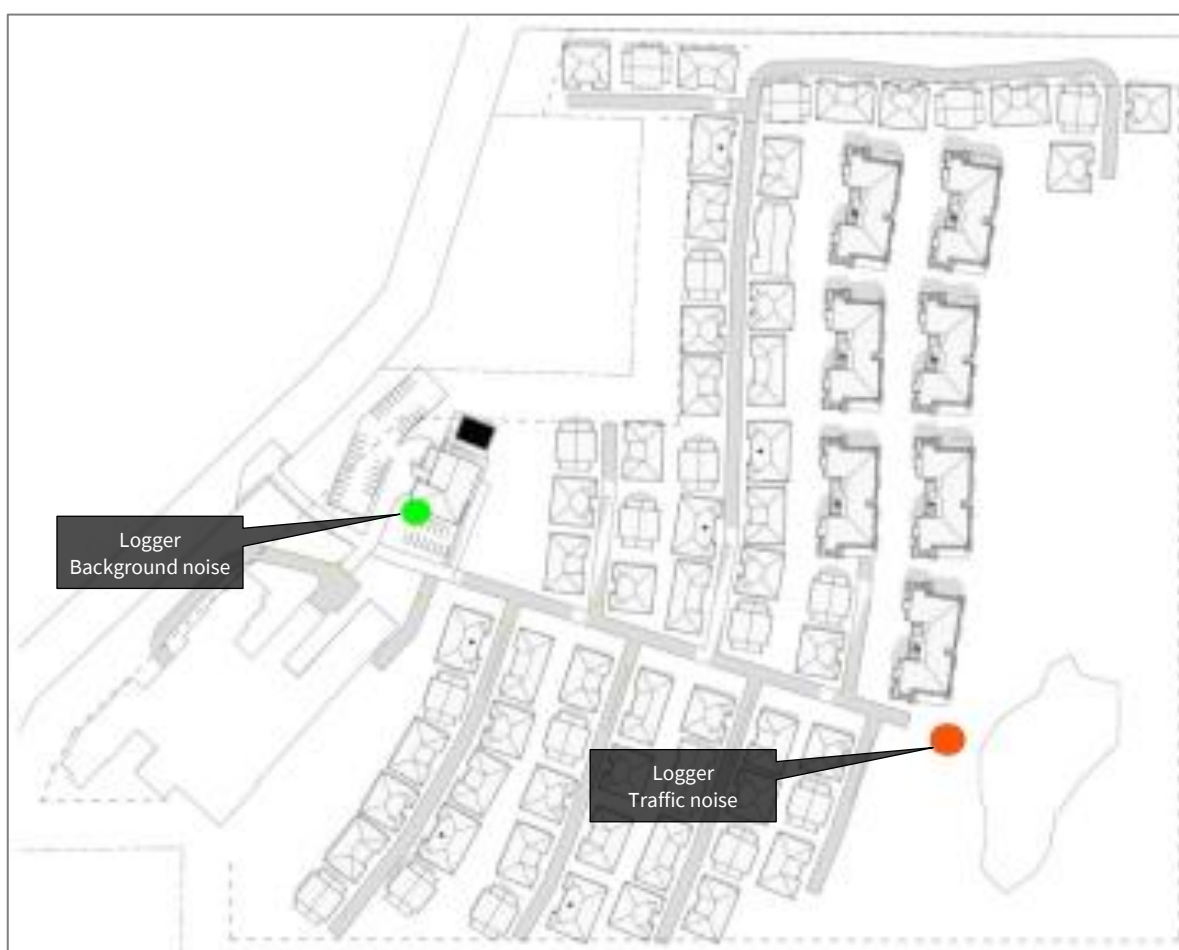


Figure 4. Logger locations (Image source – Envirotech acoustic report)

Background levels are not relevant for the scope of this report and are not included. Traffic noise levels were found to be:

- LAeq 15 hours (traffic) 53.8 dB
- LAeq 9 hours (traffic) 49.6 dB

5.0 NOISE CRITERIA

The proposal is assessed in terms of potential noise amenity impacts for future residential occupants of the development, and existing occupants of noise-sensitive land use development in the surrounding area.

5.1 INTERNAL NOISE AMENITY

The potential impact of road traffic noise on residential amenity for future occupants of the proposed development is generally assessed internally and per the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) and supporting guidelines from the NSW Department of Planning, being Development near rail corridors and busy roads – Interim guidelines (DoP guidelines).

Clause 102 of the current version of the ISEPP (dated 31 May 2019) states that:

Where the development is for residential use, and the site is adjacent to a classified road that carries an annual daily traffic volume of more than 20,000 vehicles, and that the consent authority considers is likely to be impacted by road noise or vibration, maximum allowable indoor traffic noise levels are defined as:

- *L_{Aeq} 35dB in any bedroom in the building between the hours of 10pm and 7am.*
- *L_{Aeq} 40dB elsewhere in the building (excluding a garage, kitchen bathroom or hallway) at any other time.*

To determine whether the 20,000 vehicle annual average daily traffic (AADT) threshold along Princes Highway is exceeded, thus triggering an assessment of internal traffic noise impact, the following documents/data sources have been referenced:

- GTA traffic report and traffic counts conducted at the junction of Princes Highway and Slaughterhouse Road
- RMS Traffic Volume Viewer
- Transport for NSW – Princes Highway Corridor Strategy (2016)

The published GTA traffic counts show 5,483 vehicle movements along Princes Highway at the junction of Slaughterhouse Road. This data, however, only covers five (5) hours of survey duration



from 7.30-9.30 am, and 3-6 pm. These two (2) periods were identified as the morning and afternoon peaks. To understand the AADT volumes, the above data would need to be appropriately extrapolated to 24 hours. A linear extrapolation, in this case, is not appropriate as the aforementioned 5,483 vehicle movements are during peak periods. Considerably fewer vehicle movements would be expected outside of peak periods, especially at night.

The RMS Traffic Volume Viewer shows AADT traffic volumes for the Birrull Lake station being 7,120 when averaged over the year 2018. If we were to allow a 2% p.a. forecast increase in traffic volumes until the year 2020, this would equate to approximately 7,400 vehicle movements. Over an extended planning period until 2031, we would anticipate 10,169 vehicle movements.

Perhaps a more appropriate reference is the Transport for NSW (TfNSW) Princes Highway Corridor Strategy (2016) that provides traffic volumes for the 2013 design year and at a monitoring station in Ulladulla that is more proximate to the development site than Birrull Lake. The Ulladulla AADT volumes show 11,093 vehicle movements. Again, accounting for a 2% p.a. forecast increase in traffic volumes, this equates to 13,672 in 2020 and 17,000 considering an extended planning period until 2031.

It should be noted that a 2% p.a. forecast increase in traffic volumes is significant and previous experience has shown that growth rates can be far lower. However, as a conservative measure, it is considered appropriate.

Considering all of the above, it is evident that the 20,000 AADT vehicle movement threshold adopted in the ISEPP is not exceeded currently nor will it into the foreseeable future. An internal traffic noise assessment under ISEPP is not warranted.

5.2 EXTERNAL TRAFFIC NOISE

As an assessment of traffic noise levels internal to the future building is not required under ISEPP, the focus of this report becomes the expected traffic noise impact external to the future building and on existing residential and other noise-sensitive properties.

Noise objectives for road re-development and new traffic generating land use development are provided in the NSW Environmental Protection Authority Road Noise Policy (RNP).



For road re-development and from additional traffic generated by new development, the RNP recommends adopting the following noise objectives:

- LAeq (15 hours) 60 dB (external) during the day, being from 7 am to 10 pm
- LAeq (9 hours) 55 dB (external) during the night, being from 10 pm to 7 am

In addition to the above, any increase in traffic noise level at a location due to a proposed project must be considered to the relative increase criteria. The relative increase criteria only apply to freeway/arterial/sub-arterial roads and transitways.

The relative increase criteria are defined in Table 1 (below) and are applied as a protective measure to regulate excessive changes in amenity due to a road project.

Table 1. EPA RNP relative increase criteria			
Road category	Type of project/development	Total traffic noise level increase – dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road	Existing traffic LAeq (15 hour) + 12 (external)	Existing traffic LAeq (9 hour) + 12 (external)

Existing traffic is taken as noise from all road categories relevant to the ‘no-build’ option.

An increase of 12 dB represents slightly more than a doubling of perceived loudness and is stated to be the point at which would trigger community reaction to noise.

It is expected that existing traffic noise generated from Princes Highway is currently exceeding the 60 dB and 55 dB criteria levels at properties that have dwellings proximate to the road corridor. In this instance, this assessment/report aims to demonstrate that the proposed development will not result in a significant increase in traffic noise exposure for existing residents. The RNP states that an increase of 2 dB represents a minor impact that is considered barely perceptible.

Therefore, the basis for determining an acceptable design outcome in this assessment is to demonstrate that existing traffic noise levels will not increase by more than 2 dB at surrounding properties.



6.0 TRAFFIC NOISE ASSESSMENT

6.1 NOISE MODEL

A predictive noise modelling program (CadnaA) has been used to assess the impact of traffic noise on the development and on surrounding land uses. The noise model predicts noise levels to receiver points based on source sound power levels, source-receiver distances, the presence of any acoustic shielding objects, and the effects of acoustic absorption of the ground and other elements. Noise propagation calculations follow *ISO 9613 Acoustics – Attenuation of sound during propagation outdoors*. Per the sound propagation algorithms adopted in the ISO standard, the output of the noise model is a downwind sound pressure level which constitutes an assessment of noise-enhancing weather conditions.

6.2 DESIGN PARAMETERS

The site and surrounding area have been established in the noise model relevant to site-specific ground contours. The existing and proposed future roads are also represented in the noise model relative to existing and future RL levels noted on the proposed roundabout engineering drawings by Footprint Sustainable Engineering (dated 25.08.2019). In this regard, the noise model accurately represents the current and future site levels.

To model the expected change in traffic noise exposure level as a result of the proposed development, traffic volume data has been referenced from data provided by GTA Consultants. Traffic volumes are provided for AM and PM peak periods with seasonal variations also provided.

PM peak periods are shown to have a higher traffic volume than AM peak periods, therefore, the PM peak period traffic volumes are used in the analysis.

The following summary data is used for traffic volume input:



Table 2. Traffic volumes – PM peak period

Description	Total approach	Right turn at roundabout	Left turn at roundabout	Continue through roundabout
Princes Highway – Southbound				
Existing peak hour traffic	709 (3.7% heavy)	-	-	709
Proposed PM peak	797 (3.7% heavy)	48	2	747
Proposed PM peak [seasonal]	924 (3.7% heavy)	48	2	874
Princes Highway – Northbound				
Existing peak hour traffic	772 (4.1% heavy)	-	-	772
Proposed PM peak	887 (4.1% heavy)	74	1	812
Proposed PM peak [seasonal]	1,025 (4.1% heavy)	74	1	950
Access Road to proposed senior housing development				
Existing peak hour traffic	0 (0% heavy)	-	-	0
Proposed PM peak	46 (0% heavy)	22	22	2
Proposed PM peak [seasonal]	46 (0% heavy)	22	22	2

In addition to the traffic volume input parameters, the introduction of the roundabout will alter the driving condition along Princes Highway. Vehicles will now be required to coast and brake when approaching the roundabout and accelerate away. Corrections for this driving activity are included in the noise model by considering calculation guidelines provided in a 2012 European Commission Joint Research Centre report entitled *Common noise assessment methods in Europe (CNOSSOS-EU)*. These guidelines are the only known reference source to Koikas Acoustics for calculating a dB correction for rolling and propulsion effects on traffic movements at roundabouts.

The corrections are distance-based, extending out to 100 metres along the road corridor from the location of the roundabout. Vehicles approaching the roundabout (rolling) have a negative dB correction applied as the vehicles slow and have no throttle input. In contrast, a positive dB correction is applied to vehicles as they depart a roundabout, largely resulting from throttle input during acceleration (propulsion).

6.3 ASSESSED RECEIVER LOCATIONS

The following receiver locations are reviewed for traffic noise impacts:

Table 3. Receiver/assessment locations		
ID	Classification	Site address
R1	Residential	267 Princes Highway
R2	Residential	265 Princes Highway
R3	Residential	263 Princes Highway
R4	Place of worship	259 Princes Highway
R5	Residential	257 Princes Highway
R6	Residential	255 Princes Highway
R7	Residential	226 Princes Highway
R8	Residential	228 Princes Highway
R9	Residential	230 Princes Highway
R10	Residential	230A Princes Highway
R11	Residential	234 Princes Highway
R12	Residential	236A Princes Highway
R13	Residential	236 Princes Highway
R14	Residential	256 Princes Highway
R15	Residential	258 Princes Highway
R16	Commercial/short-term residential	Milton Valley Holiday Park
R17	Residential	Proposed seniors housing development

6.4 PREDICTED TRAFFIC NOISE LEVELS

The traffic noise levels predicted below are a guide to show the predicted change in traffic noise level at noise-sensitive receiver locations that will result from the proposed new roadworks and the inclusion of the new development. The noise levels shown are peak hour L_{Aeq} levels and thus the values are not directly related to the general assessment criteria under the RNP that stipulates 15-hour and 9-hour noise levels. The tabled noise levels are, however, suitable for gauging the predicted increase or decrease in noise exposure for existing properties when considering the proposed new development works.

Table 4. Predicted traffic noise levels

ID	Existing traffic noise level	Future traffic noise level	Future traffic noise level - seasonal	Predicted increase in traffic noise
R1	69	71	71	2
R2	70	71	71	1
R3	70	71	71	1
R4	67	67	68	1
R5	59	60	60	1
R6	67	68	68	1
R7	64	64	65	1
R8	67	68	68	1
R9	58	58	58	1
R10	60	61	61	0
R11	63	63	62	-1
R12	64	65	64	0
R13	63	63	63	1
R14	72	72	73	1
R15	72	73	73	1
R16	70	71	71	1
R17	54	55	55	1

From the table above it can be seen that the predicted increase in traffic noise is generally at 1 dB for the majority of receivers. The most impacted receiver is predicted to experience a 2 dB increase in traffic noise at their property on account of the proposed development. As stated within the RNP, this represents a minor impact that would be barely perceptible.

On account of the above, it is the finding of this assessment that the proposed new works are acoustically compliant with the intent of the RNP.



7.0 SUPPLEMENTARY ADVICE

Although an internal assessment of traffic noise for the seniors housing development is technically not required under the provisions of ISEPP (as discussed previously), Koikas Acoustics feel it is important to clarify some identified issues with the preceding acoustic report prepared by Envirotech.

The major concern relates to the nominated indoor traffic noise target levels. The report correctly identifies that ISEPP requires L_{Aeq} 35 dB in bedrooms and L_{Aeq} 40 dB in general living areas. However, the report does not establish the natural ventilation correction that is applied to the indoor target noise levels under the DoP guidelines.

The DoP guidelines were Gazetted in 2008 to support the application of the ISEPP and, as such, are applicable per cl. 102 (2) of the ISEPP (reproduced below):

Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Secretary for the purposes of this clause and published in the Gazette”.

Subsequently, the L_{Aeq} (15 hours) and L_{Aeq} (9 hours) noise metrics are used to define traffic noise levels, and the following passage from the guideline establishes the procedure for reviewing traffic noise levels within naturally ventilated rooms:

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

Thus, the internal traffic noise objective for naturally ventilated rooms becomes 10dB above the levels provided in ISEPP. The design level for naturally ventilated rooms becomes L_{Aeq} 45 dB (bedrooms) and L_{Aeq} 50 dB (living rooms).

Therefore, internal traffic noise objectives would be summarised as:



Table 5. Internal traffic noise objectives per ISEPP and DoP guidelines [dB]

Occupancy	Room type	Noise metric	Windows closed	Windows open [natural ventilation]
Residential	Sleeping areas	LAeq (9 hours)	35	45
	Living areas	LAeq (15 hours)	40	50

Koikas Acoustics is satisfied that on account of the traffic noise survey being conducted in a location representative of the future residential facades, that the noise levels accurately represent existing traffic conditions.

Therefore, on account of the existing traffic levels being LAeq (15 hours) 54 dB and LAeq (9 hours) 50 dB, and conservatively presuming +2 dB for estimating traffic noise levels through a 10 year planning period, façade traffic noise levels would be LAeq (15 hours) 56 dB and LAeq (9 hours) 52 dB.

It is commonly accepted that 10 dB of noise reduction is achievable through an open window such that a room is naturally ventilated. Therefore, presuming open windows in the new development, indoor traffic levels would be LAeq (15 hours) 46 dB in living areas and LAeq (9 hours) 42 dB in sleeping areas, thus satisfying the ISEPP/DoP guidelines.

Should windows and doors be closed, the noise reduction through a façade constructed of standard building materials is approximately 20 dB, if not more. Internal noise levels with closed windows and doors are expected to be LAeq (15 hours) 36 dB in living areas and LAeq (9 hours) 32 dB in sleeping areas, also compliant with the ISEPP/DoP guidelines.



8.0 CONCLUSION

Koikas Acoustics was requested to prepare an acoustic report that reviews potential traffic noise impacts associated with the proposed development at Lot 1, DP 780801 Windward Way & Lot 1, DP 737576, 267 Windward Way, Milton. The report has been commissioned to demonstrate that the proposed development works will not result in an adverse impact on noise amenity for residents and other noise-sensitive sites.

Existing and future traffic conditions pertinent to Princes Highway have been reviewed to establish if a detailed noise intrusion assessment of the future residential component of the proposed development is required under the relevant clause within ISEPP. The review found that the minimum required AADT levels will not be exceeded and that an assessment of internal traffic noise per Clause 102 of ISEPP is not warranted. Furthermore, the proposed residential component of the development is significantly removed from the road corridor meaning that traffic levels are objectively low already.

In light of the above, the focus of the assessment was to identify what impact the proposed new roundabout and access road would have on existing noise amenity for residents. A review of assessment criteria contained within the RNP is included, however, the conclusions reached in the assessment are based on ensuring that any future increase in traffic noise as a result of the proposed works do not substantially raise existing traffic noise levels.

The assessment has found that the proposed new development and associated road works will generally result in traffic noise levels 1 dB higher than existing. The maximum identified increase is found to be 2 dB at one (1) receiver location. Following the wording of the RNP and in the opinion of Koikas Acoustics, this represents a minor impact that will be barely perceptible for surrounding residents.

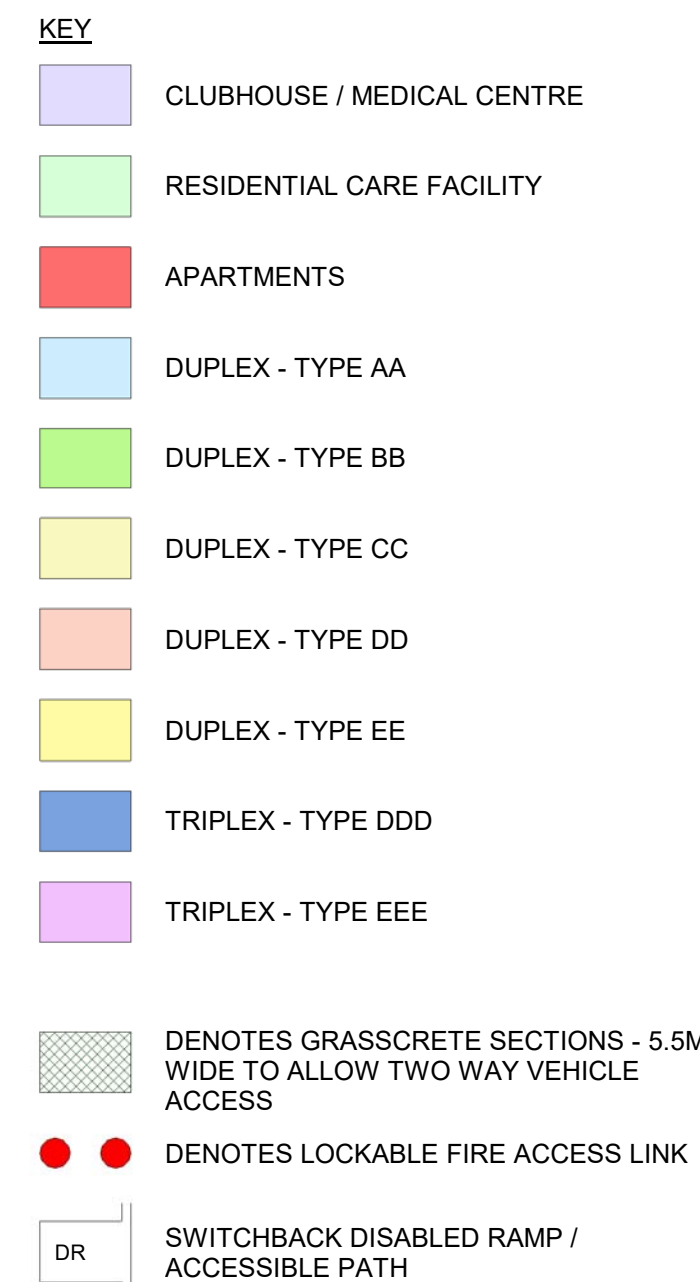
In this regard, Koikas Acoustics is satisfied that the proposed development will not result in adverse acoustic amenity impacts.



APPENDIX A

APPENDIX A

APPENDIX A



NOTE: NEW LOCAL STREET TO BE DESIGNATED TO COUNCIL WITH 16.5 METRES ROAD RESERVE WIDTH AND TO ACCOMMODATE A 7.5M CARRIAGEWAY. BUILDING SETBACKS 3M. MINIMUM IN ACCORDANCE WITH COUNCILS DCP REQUIREMENTS.

NOTE: ALL INTERNAL & EXTERNAL WORKS TO COMPLY WITH AS 1428, INCLUSIVE OF ACCESS THROUGHOUT SITE FROM ALL ACCESSIBLE UNITS

F	10.09.2019	ADDITIONAL INFORMATION
E	10.10.2018	ADDITIONAL INFORMATION
D	13.04.2018	ADDITIONAL INFORMATION
C	03.11.2017	ADDITIONAL INFORMATION
B	08.06.2017	ADDITIONAL INFORMATION
A	09.06.2017	DEVELOPMENT APPLICATION SET
NO.	DATE.	DETAILS.

Amendments:

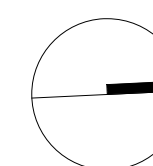
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Project:
SENIORS LIVING DEVELOPMENT
LOT 1, DP 780801
WINDWARD WAY, MILTON NSW 2538

Drawing: SITE PLAN



Scale: 1 : 1000 @A1 Job No: 1516 Drawing No:
Date: 10.09.2019
Drawn: SJ **DA06**
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APPENDIX B

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B

APPENDIX B



** NOISE SOURCES **

EXISTING PEAK HOUR TRAFFIC

~ Existing Princes Hwy road corridor alignment and traffic volumes

NOTES:

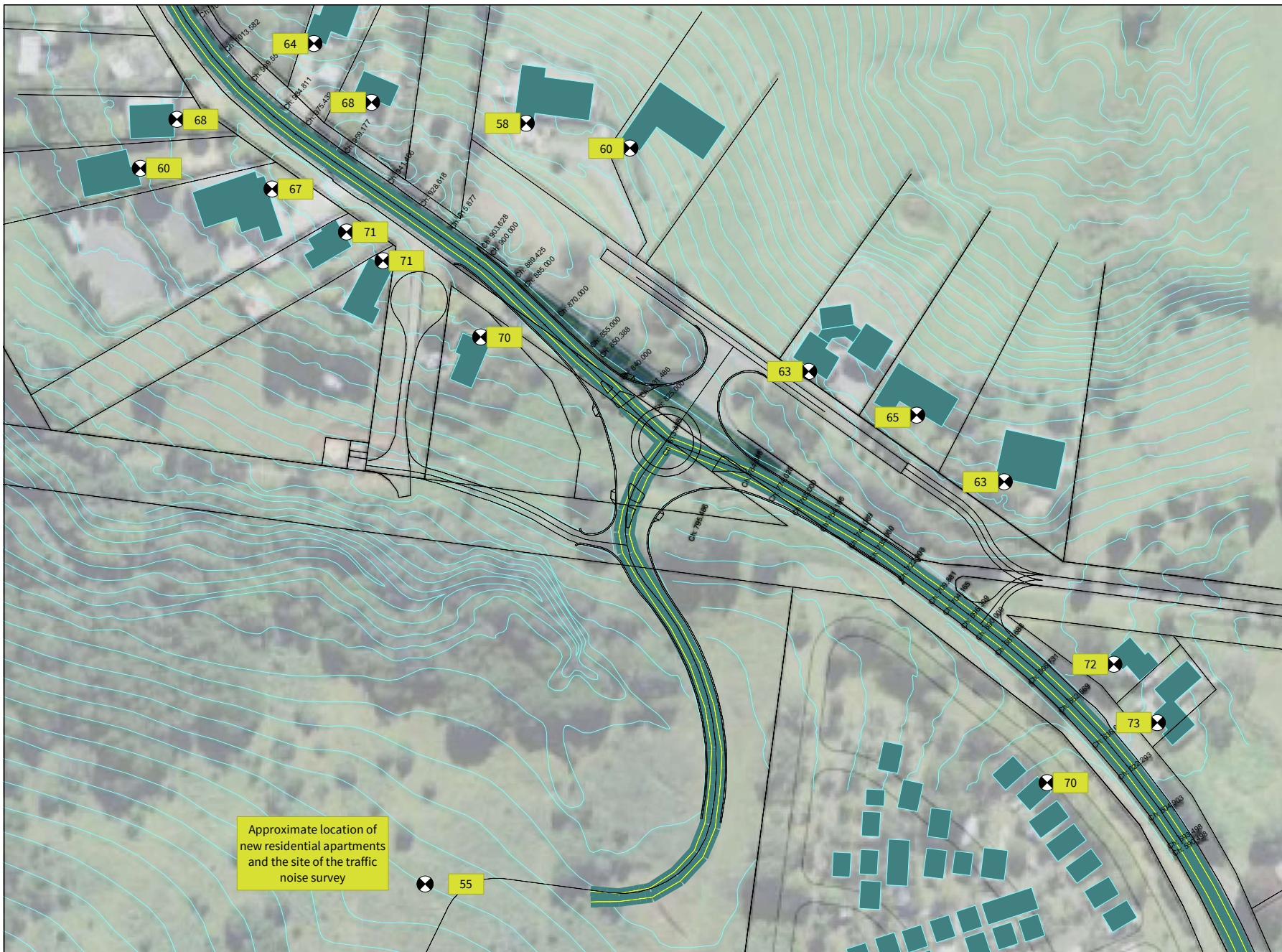
- Noise levels shown are LAeq 1 hr
- Receivers are at 1.5 m above ground and at 1 m from the building facade

PRINT DATE: 25.06.2020

VERSION: 4215 traffic - existing v1

- Road
- Building
- Contour Line
- Receiver

- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB



** NOISE SOURCES **

FUTURE PEAK HOUR TRAFFIC

~ Proposed Princes Hwy road corridor alignment and traffic volumes

NOTES:

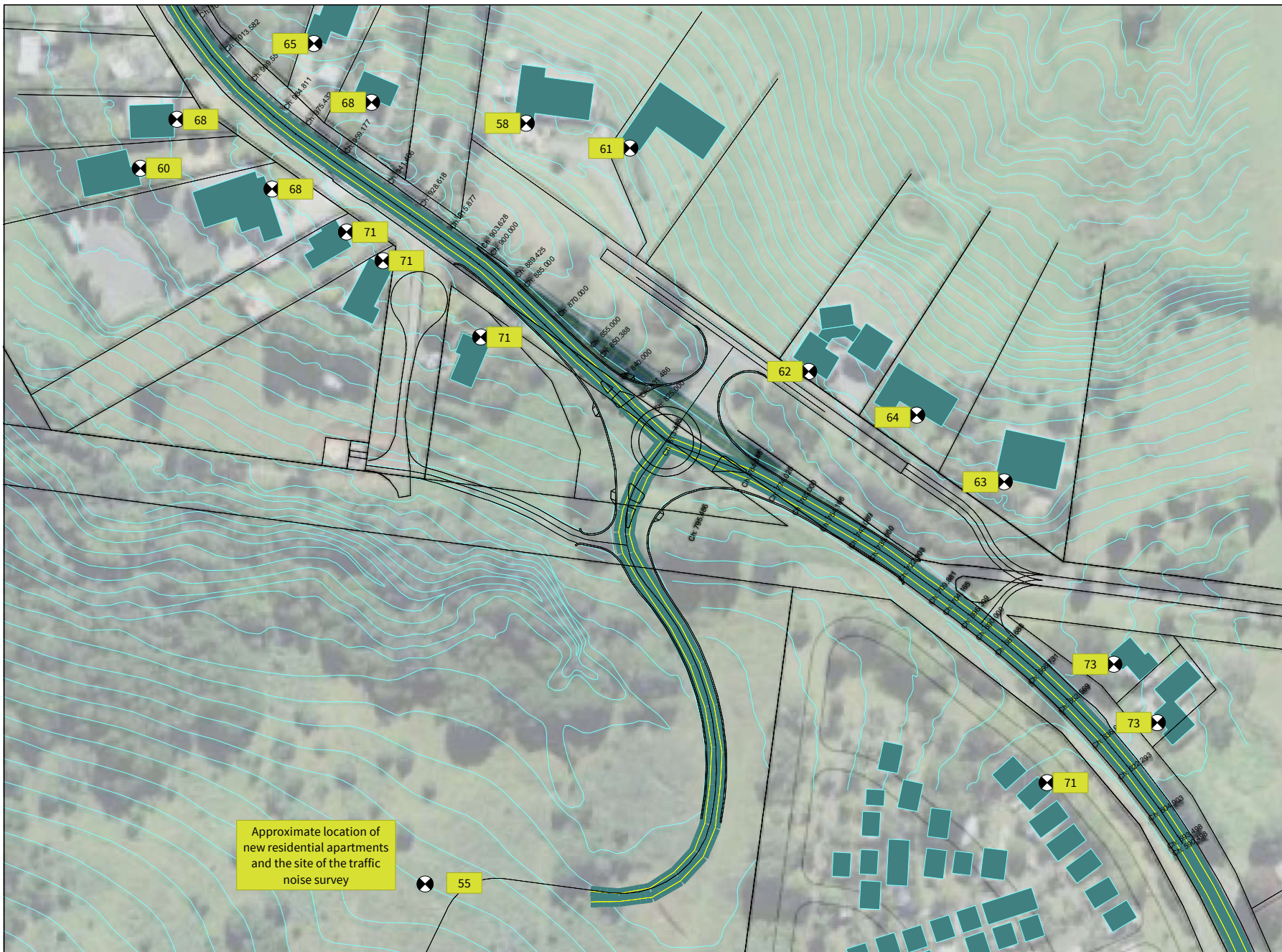
- Noise levels shown are LAeq 1 hr
- Receivers are at 1.5 m above ground and at 1 m from the building facade

PRINT DATE: 25.06.2020

VERSION: 4215 traffic - proposed v1

- Road
- Building
- Contour Line
- Receiver

- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB



** NOISE SOURCES **

FUTURE PEAK HOUR TRAFFIC
[Corrected for seasonal variation]

~ Proposed Princes Hwy road corridor
alignment and traffic volumes

NOTES:

- Noise levels shown are LAeq 1 hr
- Receivers are at 1.5 m above ground
and at 1 m from the building facade

PRINT DATE: 25.06.2020

VERSION: 4215 traffic - proposed [s] v1

- Road
- Building
- Contour Line
- Receiver

- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB