

HANRAHAN PLACE FAST FOOD COMPLEX

NOISE IMPACT ASSESSMENT

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PREPARED FOR

ORANGE SERVICE CENTRE PTY LTD
C/- PETER BASHA PLANNING & DEVELOPMENT
PO BOX 1827
ORANGE NSW 2800

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A	Draft	8 December 2014	Nic Hall	John Wassermann
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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

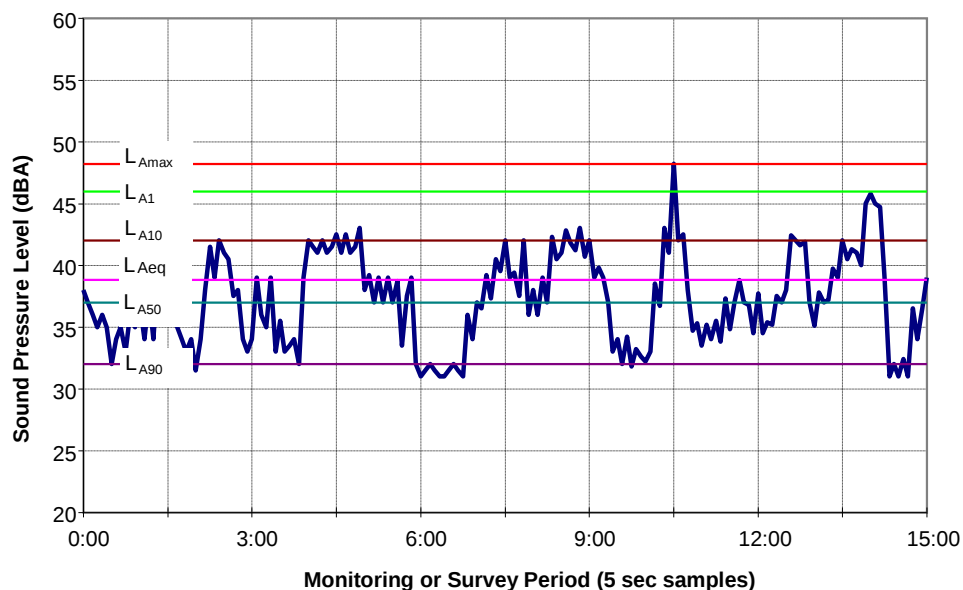
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

It is proposed to develop food and drink premises and neighbourhood shops on land describes as Lots 85 and 87 in DP 1167633, Hanrahan Place, Orange.

Wilkinson Murray Pty Ltd (WMPL) has been commissioned to conduct a noise impact assessment for the proposed development.

The following report presents potential operational noise impacts from the proposed development on nearby existing and likely future residential receivers.

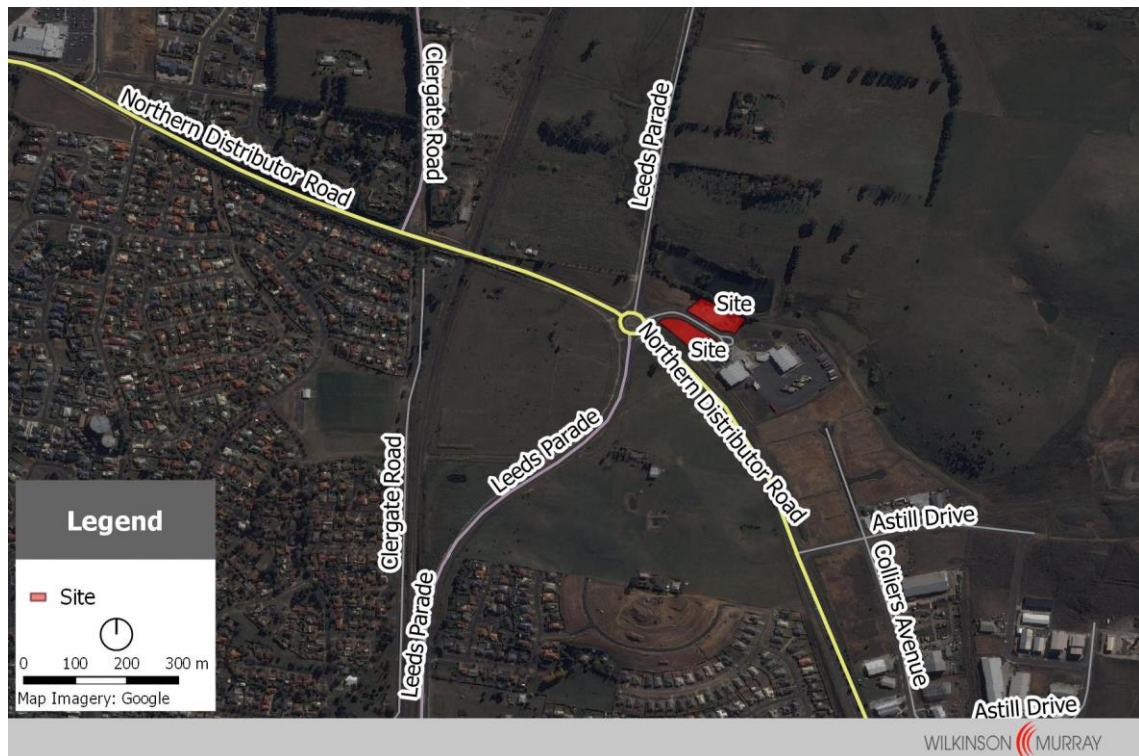
The assessment has been conducted in general accordance with the *NSW Industrial Noise Policy* (EPA, 2000).

2 THE PROJECT

2.1 Site Location

The subject land, designated as Lots 85 and 87 in DP 1167633, is located on both sides of Hanrahan Place and is adjacent to the Northern Distributor Road in North Orange. The site location is shown in Figure 2-1.

Figure 2-1 Site Location



2.2 Surrounding Land Use and Sensitive Receivers

The land use surrounding the site comprises:

- Zoned but undeveloped business land to the north;
- Zoned but undeveloped residential land to the north east;
- The Narrambla industrial estate to the east, including the Finemores truck depot which adjoins the eastern boundaries of the site;
- Zoned but largely undeveloped residential land to the south on the opposite side of the Northern Distributor Road and Leeds Parade;
- Zoned but undeveloped tourist land to the south west on the opposite side of the Northern Distributor Road and Leeds Parade; and,
- Zoned but largely undeveloped industrial land to the west north west on the opposite site of Leeds Parade.

A highway service centre is approved on Lot 86 DP 1167633 which is the land adjoining the western boundary of Lot 87 DP 1167633. It is understood that construction of this development has commenced.

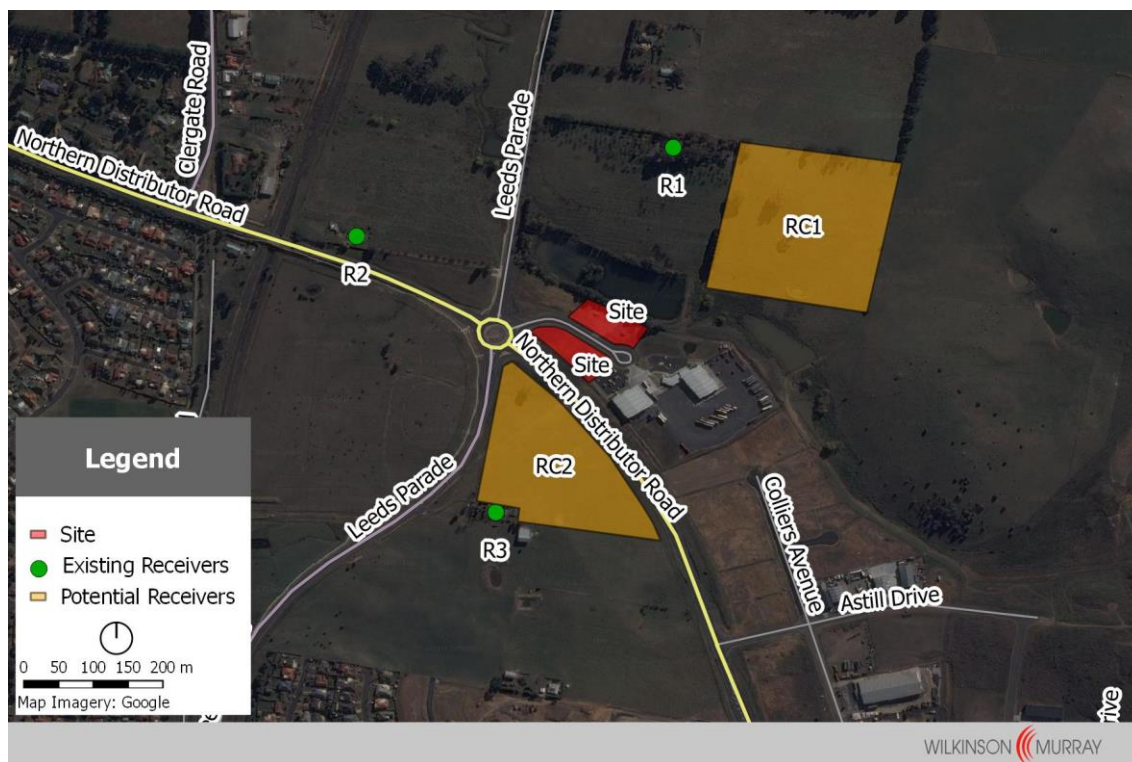
Several existing residential receivers have been identified as having the potential for being impacted by noise from the proposed development. In addition to these existing receivers, the Orange *Local Environment Plan* (LEP, 2011) identifies two nearby parcels of land zoned for future residential development.

The most sensitive receivers for this impact assessment are presented in Table 2-1 and identified in Figure 2-2.

Table 2-1 Nearby Sensitive Receivers

Receiver	Distance (m)	Description
R1	300	Existing residence – Lot 20 DP 1117081
R2	340	Existing residence – Lot 8 DP 7214
R3	270	Existing residence – Lot 6 DP 1065309
RC1	120	Potential future residential development – Lot 100 DP 1198640
RC2	60	Potential future residential development – Lot 7 DP 1065309

Figure 2-2 Nearby Sensitive Receivers



2.3 Project Description

The proposal includes:

- A fast food outlet with a drive-through facility; a neighbourhood shops complex for 4 tenants; and off-street parking all on Lot 85 DP 1167633; and,
- A neighbourhood shops complex for 3 tenants and off-street parking on Lot 87 DP 1167633.

A site plan overview for the proposal is presented in Figure 2-3.

Figure 2-3 Site Plan



2.3.1 Operating Hours

The operating hours for the various businesses within the development would be confined to 7.00am – 10.00pm seven days per week. If operation outside these hours is proposed in the future, additional noise assessment may be warranted.

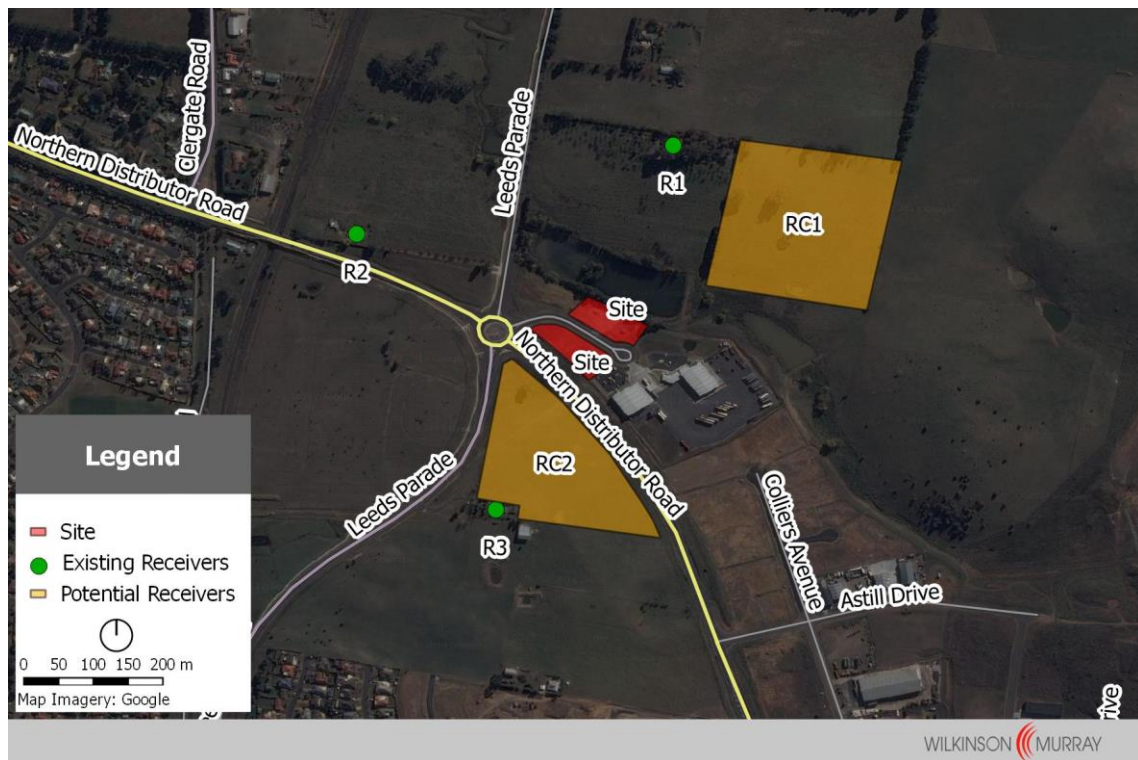
3 EXISTING ENVIRONMENT

3.1 Background Noise Levels

To establish the existing background noise levels, the results of unattended noise monitoring previously conducted by WMPL were used.

The noise monitoring was conducted at lot 97 (DP1180866) Colliers Avenue between 19 July and 29 July 2013. The monitoring location exhibits an acoustic environment comparable with the most affected receivers near the development. The position of the noise logger is presented in Figure 3-1

Figure 3-1 Noise Monitoring Location



The noise monitoring equipment used for these measurements consisted of environmental noise loggers set to A-weighted, fast response, continuously monitoring over 15-minute sampling periods. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{A1} , L_{A10} , L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1} , L_{A10} and L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Appendix A for definitions). The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional pass-by of a heavy vehicle. This is used for the assessment of sleep disturbance. The L_{A90} level is normally taken as the background noise level during the relevant period.

The Rating Background noise Levels (RBL) for the monitoring location are shown in Table 3-1

Table 3-1 Rating Background noise Levels (RBL)

Monitoring Location	RBL (dBA)		
	daytime (7.00am-6.00pm)	evening (6.00pm-10.00pm)	night time (10.00pm-7.00am)
L1	41	39	33

Daily plots of the noise logger data can be found in Appendix A.

4 NOISE CRITERIA

4.1 Operational Noise Criteria

The NSW *Industrial Noise Policy* (INP) provides the framework for establishing noise criteria and assessing impacts from sources of industrial noise. This policy seeks to promote environmental well-being through preventing and minimising noise.

There are two noise criteria which should be satisfied under the INP. The first being the "intrusiveness" criterion which assesses the likelihood of noise being intrusive above the ambient noise level. The intrusiveness criterion applies for residential receivers only. The second noise criterion, known as the "amenity" criterion ensures the total industrial noise from all sources in the area does not rise above a maximum acceptable level.

The INP stipulates that intrusiveness and amenity criteria are determined for the daytime (7.00am-6.00pm), evening (6.00pm-10.00pm) and night time (10.00pm-7.00am) periods, as relevant. The determined criteria apply at the most affected point on or within the receiver property boundary.

4.1.1 Intrusiveness

The intrusiveness criterion requires that the L_{Aeq} noise level from the source being assessed, when measured over 15 minutes, should not exceed the Rating Background Noise Level (RBL) by more than 5dBA. The RBL represents the 'background' noise in the area, and is determined from measurement of L_{A90} noise levels, in the absence of noise from the source. The definition of L_{A90} and the procedure for calculating the RBL is given in the *Glossary of Acoustic Terms*.

Where the noise level from the source varies over time due to changes in operating conditions, meteorological conditions or other factors, the upper 10th percentile of 15 minute L_{Aeq} noise levels can be used for comparison with the criterion.

The INP intrusiveness criteria are to be applied at residential receivers.

Table 4-1 shows the daytime intrusiveness criterion for nearby residential receivers, based on the measured RBLs in Table 4-1.

Table 4-1 Intrusiveness Criteria

Receiver	Intrusiveness Criteria (dBA)		
	Daytime (7.00am-6.00pm)	Evening (6.00pm-10.00pm)	Night Time (10.00pm-7.00am)
All	46	44	38

4.1.2 Amenity

The amenity criterion sets a limit on the total noise level from *all industrial noise sources* affecting a receiver. Different criteria apply for different types of receiver (e.g. residence, school classroom); different areas (e.g. rural, suburban); and different time periods, namely daytime (7.00am-6.00pm), evening (6.00pm-10.00pm) and night time (10.00pm-7.00am).

The noise level to be compared with this criterion is the L_{Aeq} noise level, measured over the time

period in question, due to all industrial noise sources, but excluding non-industrial sources such as transportation.

Where a new noise source is proposed in an area with negligible existing industrial noise, the amenity criterion for that source may be taken as being equal to the overall amenity criterion. However, if there is significant existing industrial noise, the criterion for any new source must be set at a lower value. If existing industrial noise already exceeds the relevant amenity criterion, noise from any new source must be set well below the overall criterion to ensure that any increase in noise levels is negligible. Methods for determining a source-specific amenity criterion where there is existing industrial noise are set out in the INP.

Table 4-2 shows the INP amenity criteria for various receiver types, and times of day.

Table 4-2 INP Amenity Criteria

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended $L_{Aeq, period}$ Noise Level,(dBA)	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
School classroom – internal	All	Noisiest 1-hour period when in use	35	40
Hospital Ward				
Internal	All	Noisiest 1-hour	35	40
External	All	Noisiest 1-hour	50	55
Place of Worship – internal	All	When in use	40	45
Passive recreation area (e.g. National park)	All	When in use	50	55
Active recreation area (e.g. playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

4.1.3 Project Specific Noise Criteria

Table 4-3 summarises the determined project specific noise levels, with the controlling criteria shown in bold font. The residential amenity criteria have been established using a 'suburban' classification.

Table 4-3 Project Specific Noise Levels

Receiver	Intrusiveness Criterion			Amenity Criterion		
	[L _{Aeq,15min} dBA]			[L _{Aeq,Period} dBA]		
	Day	Evening	Night	Day	Evening	Night
R1 & R2	46	44	38	55	45	40

Review of Table 4-3 reveals that the project specific intrusiveness criteria are significantly more stringent than the amenity criteria at all times of the day. Therefore, the remainder of the assessment will focus only on the intrusiveness criteria.

5 ASSESSMENT OF IMPACTS

The assessment of potential operational noise impacts on nearby receptors are detailed in the following sections.

5.1 Noise Modelling Methodology and Assumptions

Operational noise emissions from the site have been modelled using the "CadnaA" acoustic noise prediction software. Factors that are addressed in the noise modelling are:

- Equipment noise level emissions and locations;
- Shielding from ground topography and structures;
- Noise attenuation due to geometric spreading;
- Ground absorption; and
- Atmospheric absorption.

Noise predictions for potential future receivers in RC1 and RC2 are based on the assumption that a 2.1 metre boundary fence is located between the dwellings and the proposed development.

5.2 Operational Noise Assessment

The following section identifies the most significant sources of noise associated with the development and presents the predicted noise levels at nearby receivers.

5.2.1 Fixed Mechanical Plant & Equipment

It is proposed to install all mechanical plant items in dedicated plant rooms. Therefore, significant levels of mechanical plant noise are not expected to impact nearby receivers. Since not all occupants of the shops and fast food venues have been identified, there is a likelihood that a potential tenant may require the installation of additional mechanical plant items on the roof. To maintain a conservative approach in the assessment, it is assumed that a number of mechanical plant items are installed on the roof of each of the four proposed buildings. Individual sound power levels (SWL) for the plant items, based on previous measurements conducted by WMPL, are presented in Table 5-1. The combined SWL of plant items on each of the four roofs is 90 dBA.

Item	Type	Sound Power Level, dBA
Air Conditioning Plant		90 (high)
Low Temperature Refrigeration System Condensers	KRC 213-4	68
Medium Temperature Refrigeration System Condensers	WRC 185BEC	73
Refrigeration Compressor Rack	EPTA	70

It is assumed that mechanical plant items will run on a 24 hour basis. The predicted mechanical plant noise levels at nearby receivers, presented in Table 5-1, assume that the mechanical plant items are located in the centre of each roof, and are not surrounded by any type of enclosure.

Table 5-1 Predicted Mechanical Plant Noise Levels

Receiver	Predicted Noise Level ($L_{Aeq,15min}$)	Criteria ($L_{Aeq,15min}$)			Exceedance?
		Day	Evening	Night	
R1	25	46	44	38	No
R2	25	46	44	38	No
R3	26	46	44	38	No
RC1	28	46	44	38	No
RC2	37	46	44	38	No

Table 5-1 indicates that predicted mechanical plant noise levels comply with relevant noise criteria.

5.2.2 Car-park Activities

Predicted noise levels at nearby receivers are based on predicted car-park movements taken from the traffic study for this development.

The traffic study indicates that the highest levels of car-park activity occur during the Saturday afternoon peak period. During this time the hourly vehicle movements in the Lot 85 and Lot 87 car-parks is 176 and 98 vehicles respectively.

The L_{Aeq} noise level associated with car park activity is predicted as 65 dBA at 7m for 50 vehicles per hour (Bavarian State Agency for the Environment 2007, "Parking Area Noise", 6th Edition, Bavarian State Ministry for the Environment, Germany). It should be noted that this noise level incorporates all vehicle associated activities including; cars starting, doors and boots closing, trolley movements and people talking.

The predicted noise levels at nearby receivers due to peak car-park activities are presented in Table 5-2

Table 5-2 Predicted Car Park Noise Levels

Receiver	Predicted Noise Level ($L_{Aeq,15min}$)	Criteria ($L_{Aeq,15min}$)			Exceedance?
		Day	Evening	Night	
R1	27	46	44	38	No
R2	27	46	44	38	No
R3	27	46	44	38	No
RC1	29	46	44	38	No
RC2	38	46	44	38	No

Table 5-2 indicates that predicted car-park noise levels at nearby receivers comply with relevant noise criteria.

5.2.3 Truck Deliveries

The Development Application states that deliveries are expected to be made using 8.8m medium rigid vehicles. To continue the assessment in a conservative fashion, it has been assumed that truck deliveries would be conducted with 19m trucks.

The assessment of truck delivery noise considers the trucks arriving, manoeuvring and unloading at each of the buildings on Lot 85 and Lot 87.

Based on the position of the loading zones for each building and the unloading procedure mentioned above the L_{Aeq} noise levels have been predicted at the residences. For reference, the L_{Aeq} noise level when averaged over a 15-minute period associated with a truck manoeuvring is predicted as 63dBA at 7m and the potential "crashes and bangs" from the loading dock as 62dBA at 7m.

The predicted noise levels at nearby receivers due to truck deliveries are presented in Table 5-3.

Table 5-3 Predicted Truck Delivery Noise

Receiver	Predicted Noise Level ($L_{Aeq,15min}$)	Criteria ($L_{Aeq,15min}$)			Exceedance?
		Day	Evening	Night	
R1	24	46	44	38	No
R2	22	46	44	38	No
R3	23	46	44	38	No
RC1	26	46	44	38	No
RC2	34	46	44	38	No

Table 5-3 indicates that predicted truck delivery noise levels at nearby receivers comply with relevant noise criteria.

5.2.4 Cumulative Impacts

Finally, the cumulative impact of all sources operating under worst case conditions has been predicted and is presented in Table 5-4.

Table 5-4 Cumulative Operational Noise

Receiver	Predicted Noise Level ($L_{Aeq,15min}$)	Criteria ($L_{Aeq,15min}$)			Exceedance?
		Day	Evening	Night	
R1	24	46	44	38	No
R2	29	46	44	38	No
R3	30	46	44	38	No
RC1	32	46	44	38	No
RC2	41	46	44	38	Yes (3dBA)

Table 5-4 indicates that cumulative noise levels would likely exceed the night time criterion at future residential receptors in RC2. Since it is not proposed for the retail and fast food outlets to trade in the night time period, the combined impact of car-park and mechanical plant noise is considered unlikely.

If night time trading is proposed in the future, it is considered most likely that noise criteria could be met through careful selection and installation of mechanical plant items, and management of car-park activities.

6 CONCLUSION

It is proposed to develop food and drink premises and neighbourhood shops on land describes as Lots 85 and 87 in DP 1167633, Hanrahan Place, Orange.

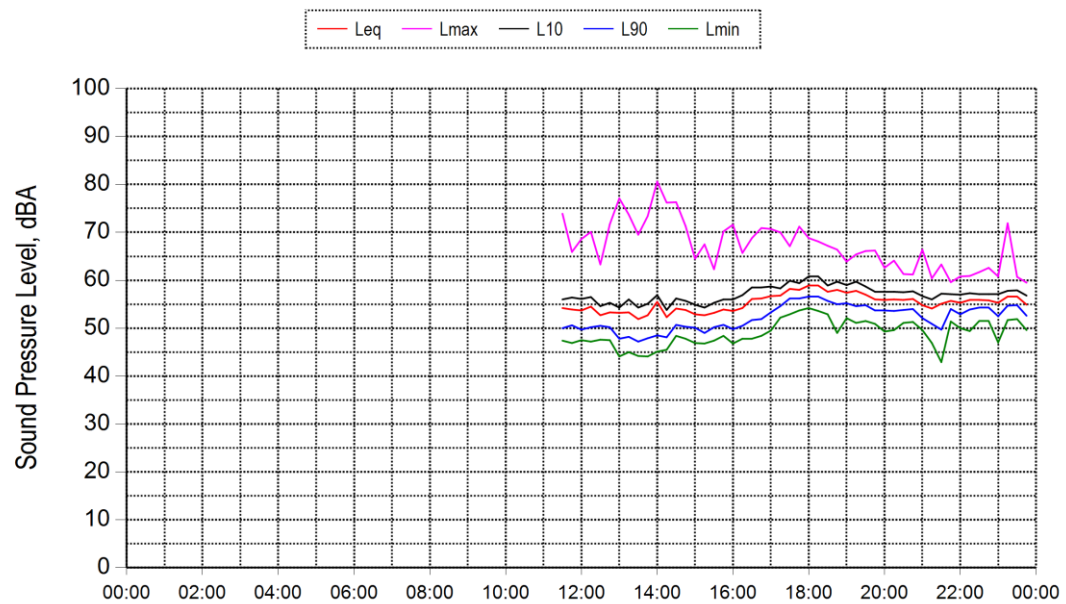
Wilkinson Murray Pty Ltd (WMPL) has been commissioned to conduct a noise impact assessment for the proposed development.

Potential noise impacts have been assessed in accordance with relevant NSW Government guidelines and policies, and the proposed development is predicted to comply with all relevant noise criteria.

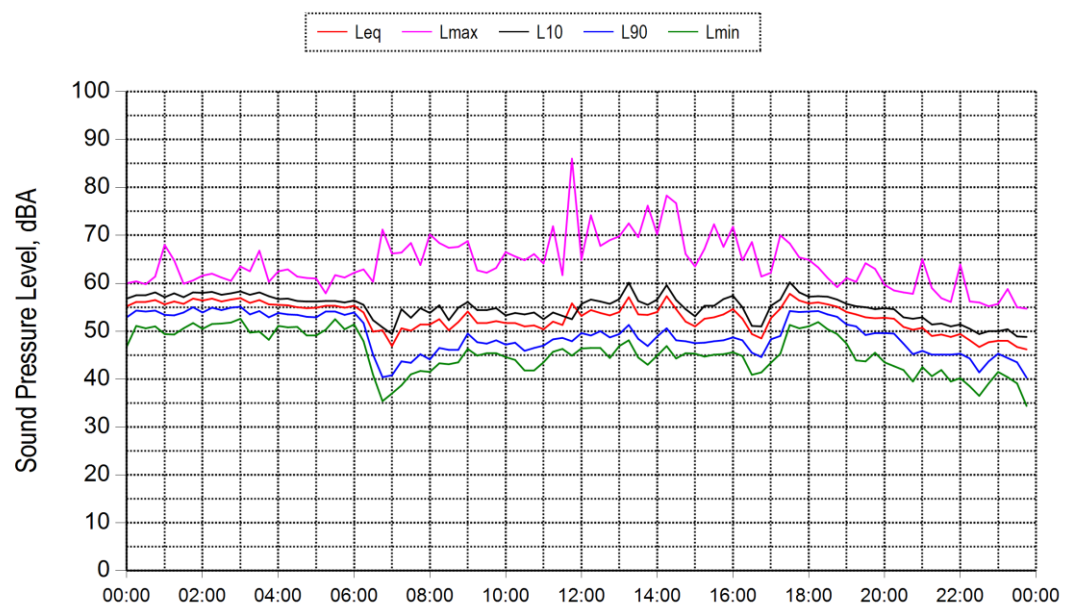
APPENDIX A

NOISE MEASUREMENT RESULTS

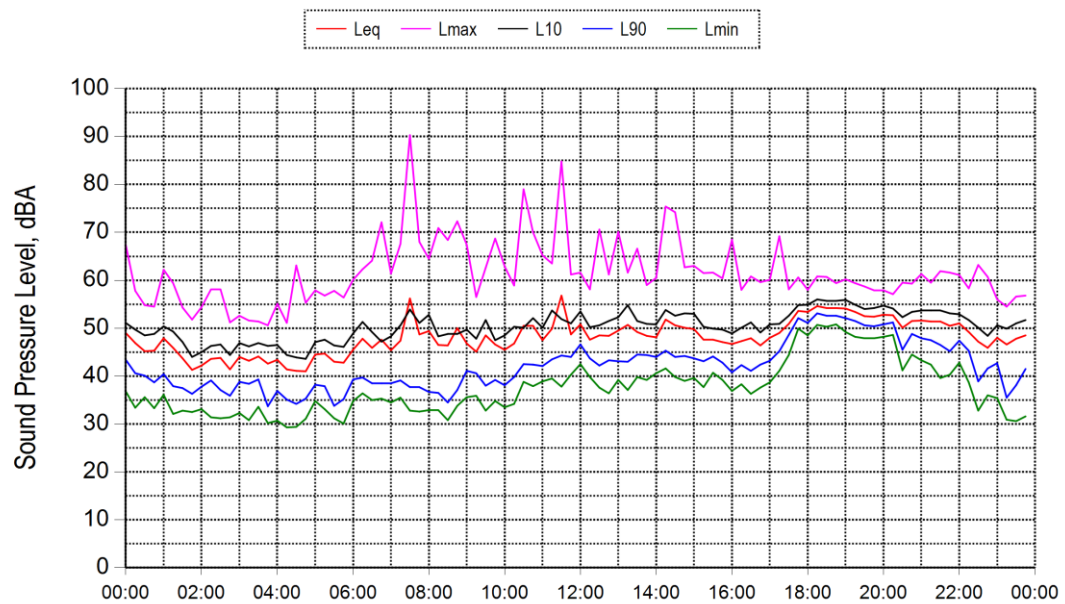
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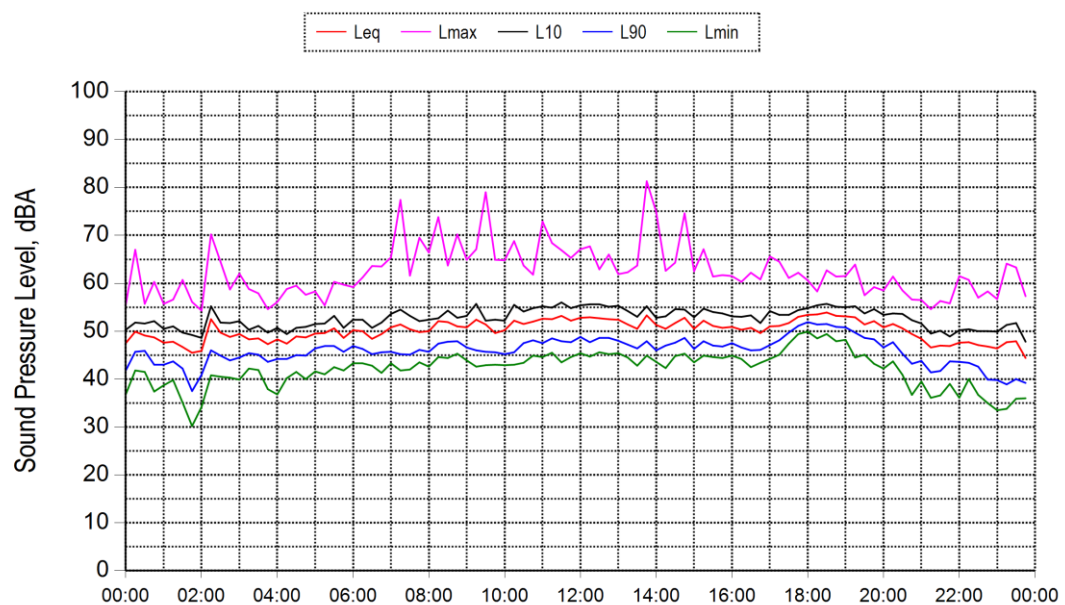
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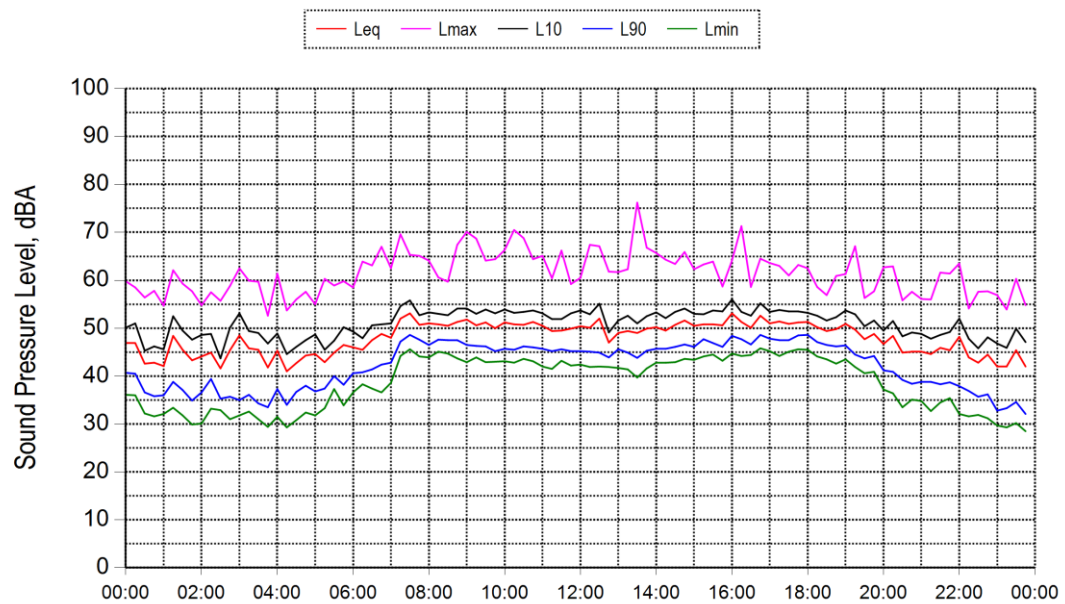
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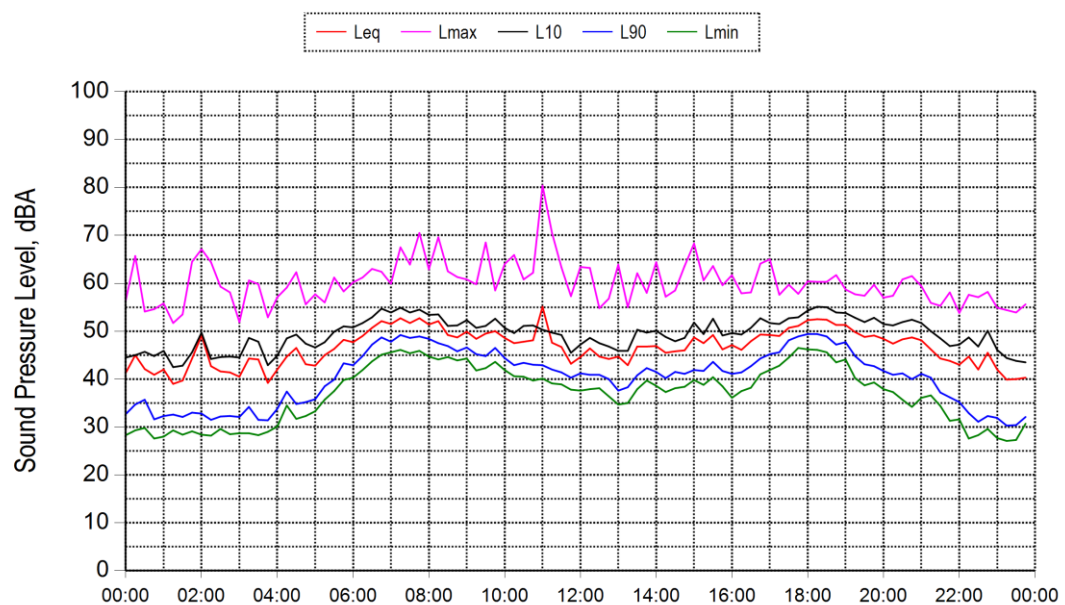
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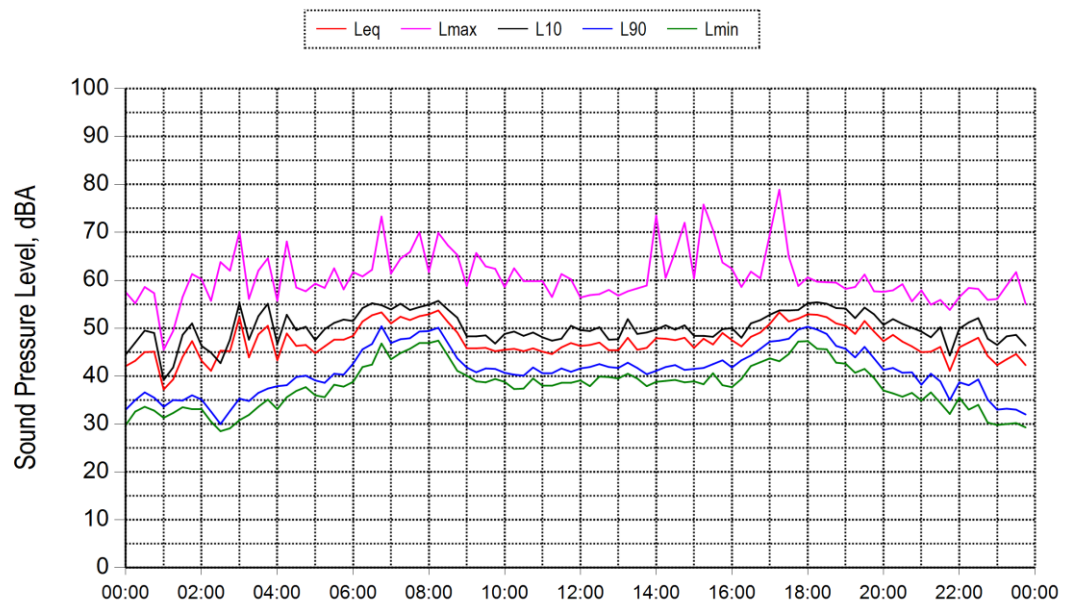
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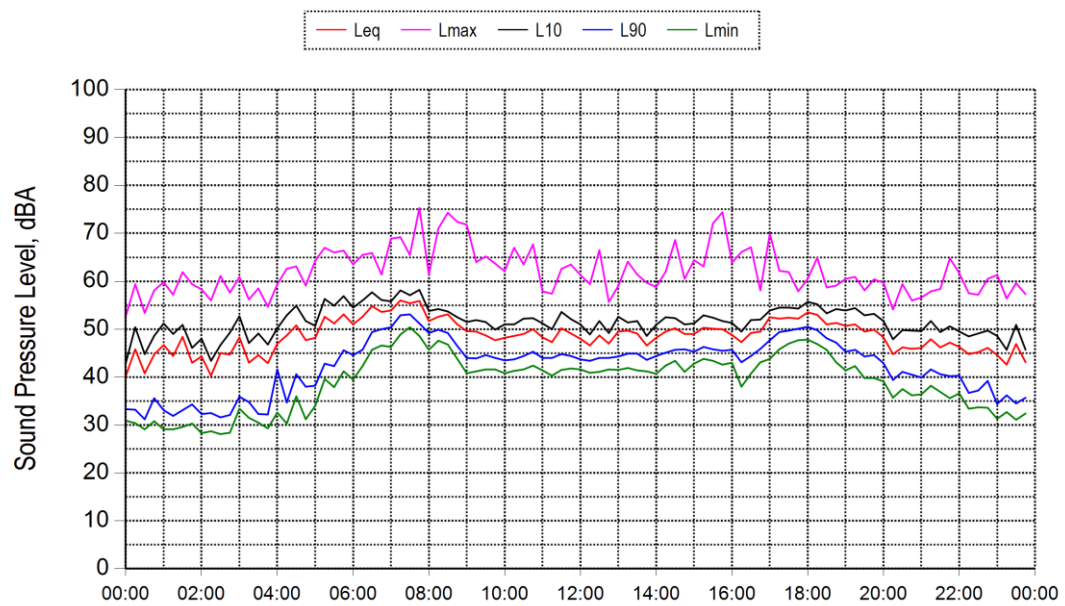
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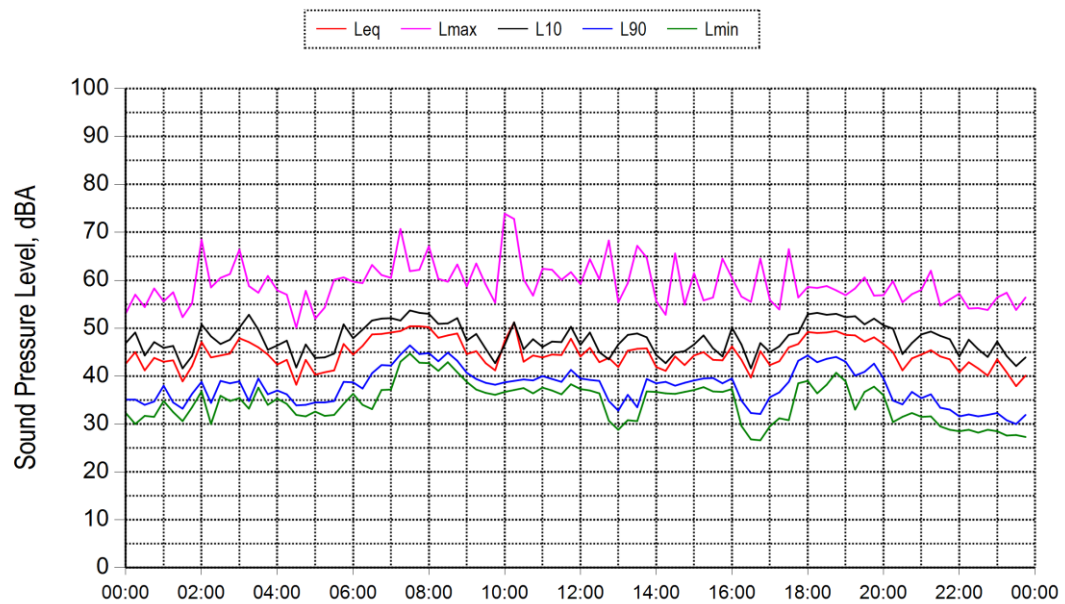
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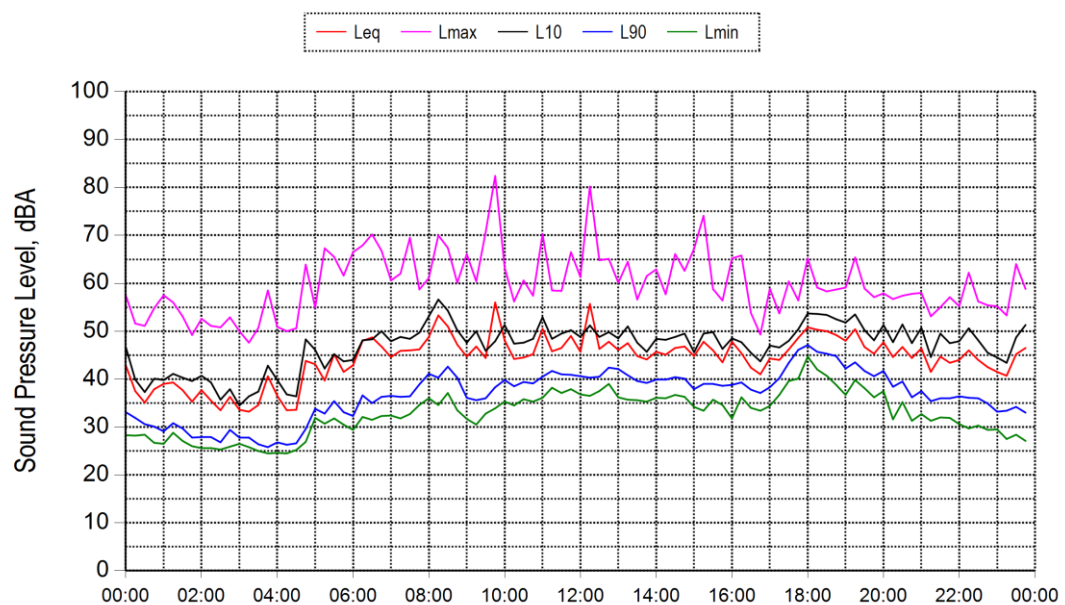
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Saturday 27 July 2013



Sunday 28 July 2013



Monday 29 July 2013

