Noise and Dust Review Report

Wilkinson Murray

Attachment I

JBA | 13070

ACOUSTICS AND AIR

CENTRAL PRECINCT - HAUL ROAD

DA NOISE AND DUST REVIEW

REPORT NO. 14145
VERSION A

JUNE 2014

PREPARED FOR

CARDNO
LEVEL 9 - THE FORUM, 203 PACIFIC HIGHWAY
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DOCUMENT CONTROL

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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.

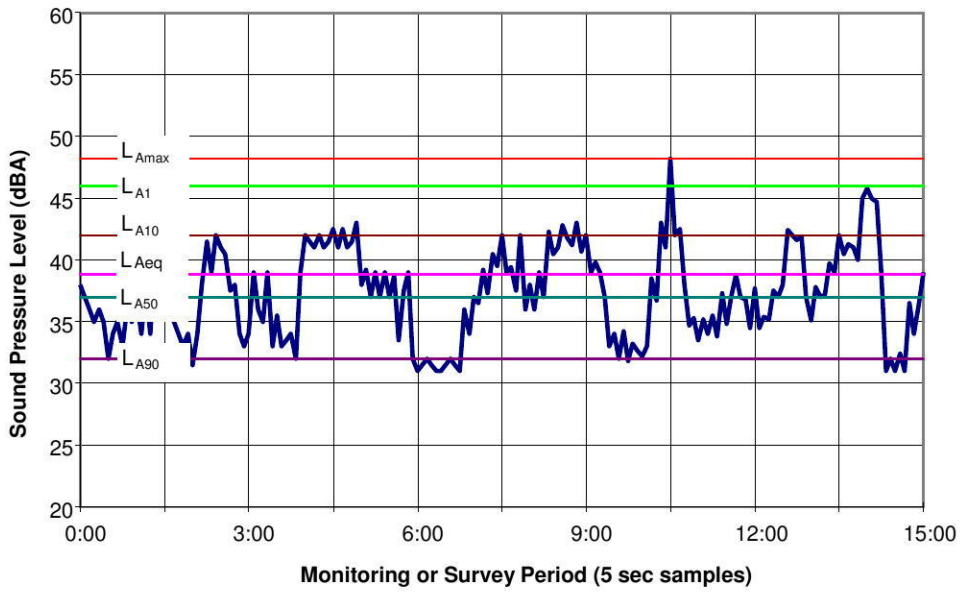
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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 10^{th} percentile (lowest 10^{th} 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

This construction noise, vibration and dust review has been prepared by Wilkinson Murray Pty Limited in relation to the Central Precinct Haul Road.

Lend Lease is proposing to deliver a new residential estate in the central precinct and the Haul Road is required to link the site and the existing road networks via the Dunheved Industrial Estate. This report reviews potential noise and dust impacts associated with the construction of the Haul Road.

It is noted that the Haul Road is sufficiently remote from any receivers (at least 1000 metres) to ensure that vibration will be negligible. Therefore the issue of construction vibration has not been considered further in this review.

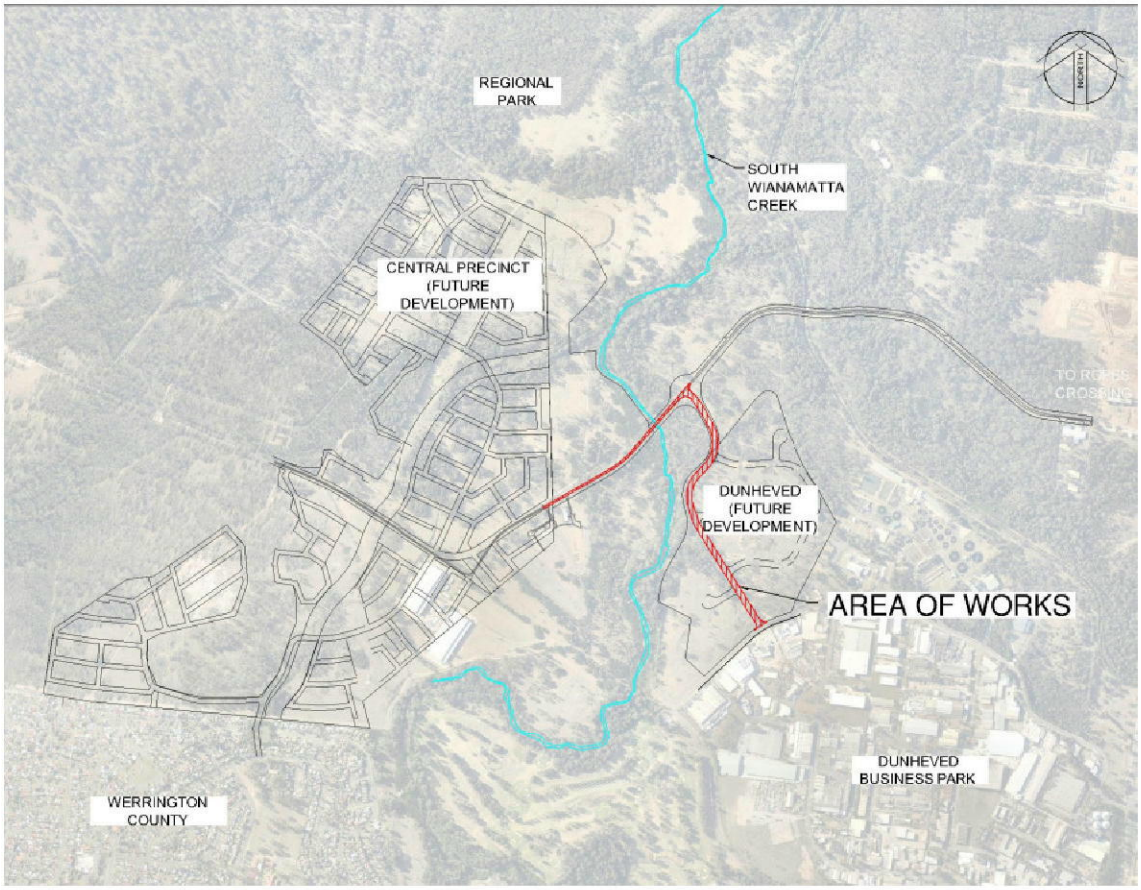
Assessment of noise and dust impacts associated with main Central Precinct construction works will be the subject of a separate assessment which will be submited to the Department of Planning.

2 SITE AND WORKS DESCRIPTION

Cardno has been engaged by Lend Lease Communities on behalf of the Maryland Development Company to provide Civil Engineering services to support the development of the Central Precinct.

The Central Precinct is located within the Penrith City Council (Council) Local Government Area (LGA) and covers an approximate area of 135 hectares. The Central Precinct is located within the ADI Site, St Marys and is bound by Regional Park to the north and west, South Creek to the east and existing urban development to the south. A site locality plan is included in Figure 1.1.

Figure 1.1 Central Precinct – Site Locality Plan



Under existing conditions, the Central Precinct is subject to inundation from rising water levels in South Creek during local and regional rainfall events. To provide finished floor levels within the Central Precinct above the 1% Annual Exceedance Probability (AEP) approximately two million cubic metres of fill needs to be imported, placed and compacted.

Vehicular access to the Central Precinct is currently afforded via a private road network that:

- Traverses the regional park between eastern boundary of the Central Precinct and Ropes Crossing Boulevard, Ropes Crossing; and

- Traverses the regional park between the western boundary of the Central Precinct and Lakeside Parade, Jordan Springs.

In order to facilitate the delivery of the required fill volume and to mitigate the potential impacts on residents at Ropes Crossing and Jordan Springs it is proposed to construct a haul road linking the Central Precinct to the existing public road network within the Dunheved Industrial Estate.

The proposed haul road would connect to the existing road network at Links Road, traverse the Dunheved Precinct and then join the existing private road that currently joins the Central Precinct to Ropes Crossing Boulevard. The proposed haul road route is shown in Figure 1

The proposed haul road route starts and ceases within the Penrith City Council LGA. However, it does traverse a small portion of the Blacktown City Council LGA.

2.1 Contruction Works

The construction of the Haul Road will utilise standard road construction techniques. The following construction plant is expected to be used in the construction of the haul road:

- Rigid Heavy Vehicles and Truck and Dog semi-trailers for importing fill material;
- Excavators and bulldozers for the management of imported fill material;
- Scrapers for the removal of topsoil and organic layers;
- Graders for the preparation of fill surfaces;
- Smooth and peg drummed rollers for compaction of placed fill; and
- Asphalt paving plant.

Approval for 24/7 construction operation is proposed by Lend Lease. Construction is scheduled to commence in the final quarter of the 2014 (i.e., October / November) and should extend for a period of 3-4 months.

3 NOISE REVIEW

A review of likely construction noise levels has been conducted based on the following:

- Identification of surrounding residential receivers;
- Measurement of ambient noise levels;
- Determination of construction noise management levels;
- Prediction of likely construction noise levels at residences; and
- Recommendations for noise management.

The following sections present this information.

3.1 Residential Receivers

The nearest residential receivers to the proposed road works are presented on Table 3.1

Table 3.1 Nearest Residences to Roadworks

Receivers	Distance to Site - m	Area Description
R1 – Llandilo Residences	1500	Isolated rural residence to the North of the site.
R2 – Werrington County Residences	1000	Suburban Residential Receivers

3.2 Background Noise Levels

Long term ambient noise measurements were conducted at residences in Llandilo and Werrington County using ARL EL215 noise logger between Thursday 8th and Monday 19th May 2014. The data was processed in accordance with EPA procedures to determine the Rating Background Levels (RBLs) for the day, evening and night periods. Table 3.2 present the RBLs for these sites.

Table 3.2 Measured Rating Background Noise Levels

Location	Rating Background Level (RBL) - dBA		
	Day (7am – 6 pm)	Evening (6pm to 10 pm)	Night (10 pm to 7 am)
R1 – 321 Ninth Ave Llandilo	34	36	30
R2 – 15 Warburton Street Werrington County	37	36	30

3.3 Construction Noise Management Levels

The EPA released the "*Interim Construction Noise Guideline*" *(CNG)* in July 2009. The guideline provides noise goals that assist in assessing the impact of construction noise.

For residences, the basic daytime construction noise goal is that the noise should not exceed the noise affected RBL by more than 10dBA. This is for construction during standard hours: Monday to Friday 7.00am to 6.00pm, and Saturday 8.00am to 1.00pm. Outside the standard hours, the criterion would be RBL + 5dBA.

Table 3.3 Construction Noise Goals at Residences using Quantitative Assessment

Time of Day	Management Level $L_{Aeq,(15min)}$ *	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10dBA	• The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{ea,(15min)}$ 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 of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dBA	• 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 level of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours	Noise affected RBL + 5 dB	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 noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2.

In addition, the following construction noise management levels $L_{Aeq,15\ min}$ are recommended for other receivers and areas as follows:

- Industrial premises: external $L_{Aeq,15\ min}$ 75 dBA;

Based on the above, Table 3.4 presents the applicable site specific noise management levels for construction activities.

Table 3.4 Site Specific Construction Noise Management Levels

Location		Construction Noise Management Level, L_{Aeq} (dBA)			Maximum Construction Noise Level, L_{Aeq} (dBA)
		Day	Evening	Night	
R1 – Llandilo Residences	- Weekdays	44	41	35	75
	- Weekends	39	41	35	
R2 – Werrington County Residence	- Weekdays	47	41	35	75
	- Weekends	42	41	35	
Industrial Premises		75 dBA			

3.4 Estimated Noise Levels at Residences

Site related noise emissions were modeled with the "CadnaA" acoustic noise prediction software using ISO 9613 noise prediction algorithm. Factors that are addressed in the noise modeling are:

- equipment sound level emissions and location;
- receiver locations;
- ground topography
- noise attenuation due to geometric spreading;
- ground absorption; and
- Atmospheric absorption.

The construction operations are assessed are for road construction works and surfacing activities based on typical equipment noise levels as detailed in Table 3.5.

Table 3.5 Typical Construction Plant Sound Power Levels (SWL)

Plant	L_{Aeq} SWL (dBA)
Excavator	107
Dump Trucks	112
Scraper	119
Smooth Drum Roller	107
Graders	109
Asphalt Paver	109
Water Truck	110

Based on the above, resultant noise levels at receivers have been predicted as shown in Table 3.6 and 3.7.

Table 3.6 Predicted L_{Aeq} Construction Noise Levels at Residences due to Road Construction – dBA

Receiver	Resultant	Night Noise Management Level	Exceedance
R1 – Llandilo Residences	34	35	0
R2 – Werrington County Residences	40	35	5

Table 3.7 Predicted L_{Aeq} Construction Noise Levels at Residences due to Road Paving – dBA

Receiver	Resultant	Night Noise Management Level	Exceedance
R1 – Llandilo Residences	25	35	0
R2 – Werrington County Residences	30	35	0

3.5 Discussion of Results

A review of the predicted construction noise levels indicates the following:

- **Llandilo Residences**

  Predicted construction noise levels at the rural residences in Llandilo residences will

comply with noise management levels for the entire 24 day period. This is to be expected given the relatively large distance between the works site and these residences.

- **Werrington County Residences**

Predicted construction noise levels at the suburban residences in Werrington County residences will comply with noise management levels for the day and evening period. At night an exceedance of up to 5 dBA is predicted at these residences.

It is noted that exceedances of noise management levels of between 5 – 10 dBA are not uncommon. Therefore the impact at residences to the north and south of the site are likely to be manageable by adopting standard noise management principles.

3.6 Recommended Mitigation Measures

As construction noise will be audible, the following noise mitigation measures are considered best practice and are recommended to be adopted on site.

- Inform affected residents/owners of the works program and contact details for the site representative.
- Diesel powered machines such as trucks, bobcats and excavators should be switched off if not required for more than a few minutes, rather than left idling unnecessarily.
- Machines used on site should be maintained in good condition, particularly considering the exhaust system on diesel powered machines, to minimise noise emissions. Excessively loud machines should be repaired, modified or removed from the site. Sound pressure level measurements should be conducted on all plant prior to works beginning on-site.
- A representative from the construction contractor should be available to respond to questions and complaints from the community in a professional, considerate and timely manner.
- Reversing alarms should be controlled to the minimum sound level consistent with safety by replacing, shielding or relocating the alarm unit on noisy machines.
- A representative should be nominated by Lend Lease to monitor, manage and respond to complaints.

The above recommendations should be included in the site Environmental Management Plan (EMP).

4 DUST MANAGEMENT

Based on the proposed roadwork's and distance to residences and industrial receivers dust generated by construction is not expected to be an issue from the proposed works unless strong winds blow dust to these receivers during major wind events. In this case care should be taken to manage wind-blown dust at the site during earthworks activities.

Dust can be generated through a range of means and activities:

- Wind action - Exposed soil surfaces will generate dust during winds;
- Agitation and movement - Excavation, mixing and placement of soil will generate dust; and
- Vehicle Movements - Vehicles' wheels on exposed soil surfaces (such as unsealed roadways) will generate dust.

Appropriate management of dust is required to ensure that it is minimised and/or prevented. Dust management will include the following:

- Minimising exposed/excavation areas;
- Wetting down; and
- Dust monitoring.

5 CONCLUSION

A review of potential noise, vibration and dust impacts associated with the Central Precinct haul road has been conducted. The following findings have been made in relation to the proposed 24 hour operation:

Noise

Construction noise levels are likely to result in no or small exceedances of night time noise management level at residences to the north and south of the proposed construction site in Werrington County and Llandilo. Therefore the level of adverse impact associated with these works is likely to be low.

Vibration

All receivers are sufficiently remote from the proposed construction site to ensure that vibration from construction works will be imperceptible.

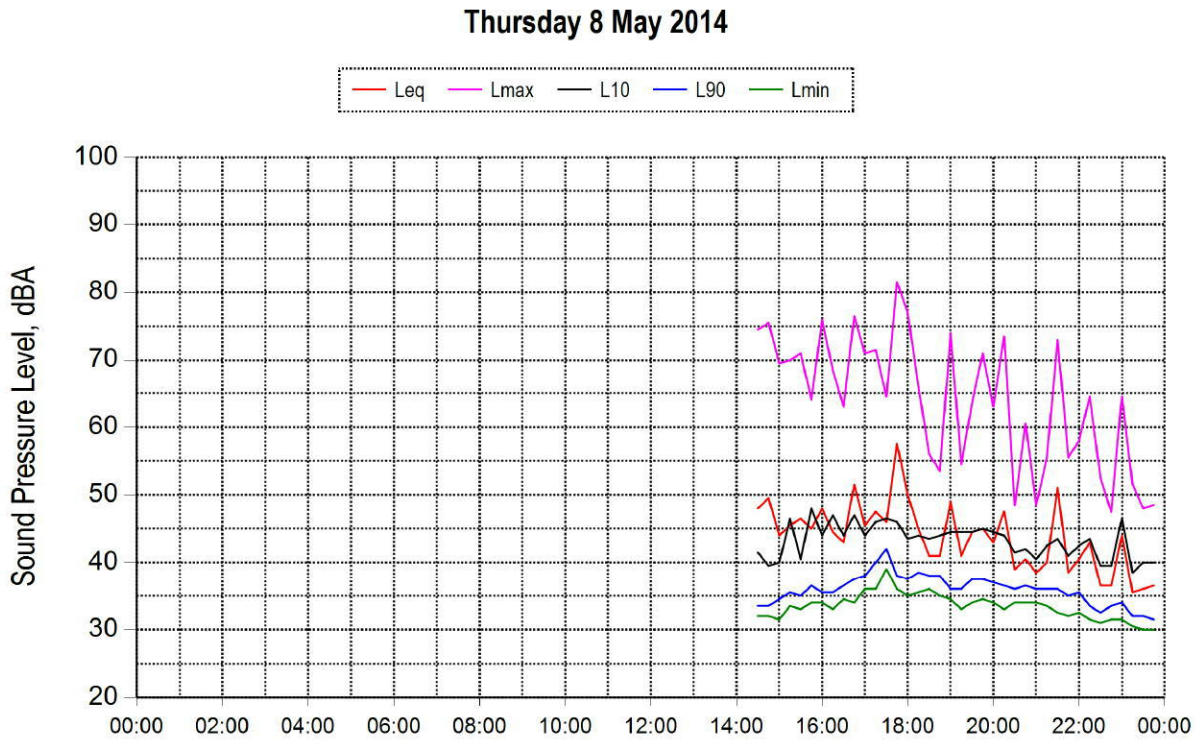
Dust

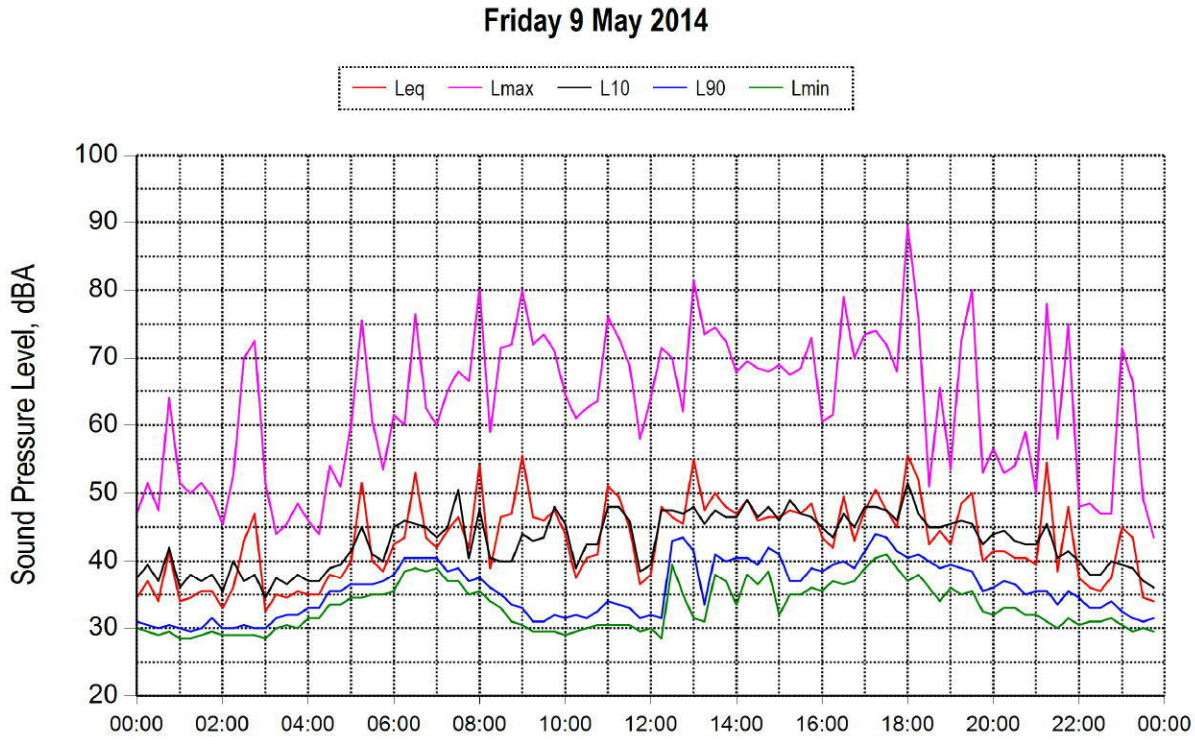
The potential for adverse dust impact at receivers is low. During strong wind events management of dust is recommended.

APPENDIX A

NOISE MEASUREMENT RESULTS

Location R2 – 321 Ninth Avenue Llandilo





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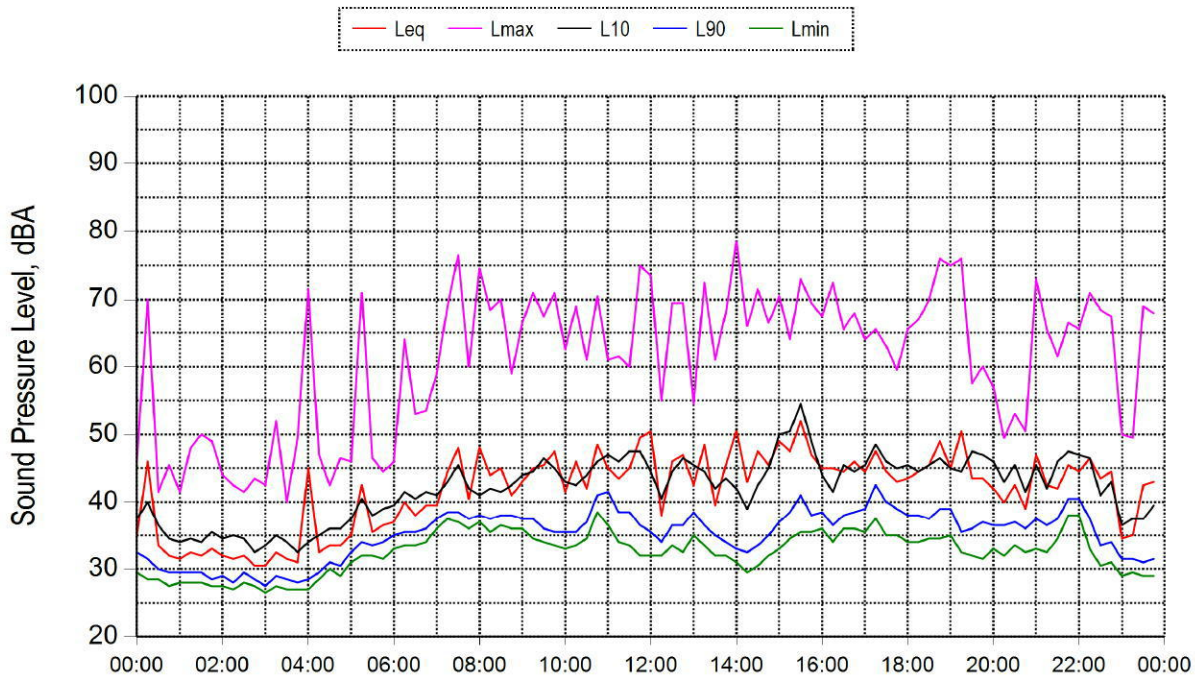

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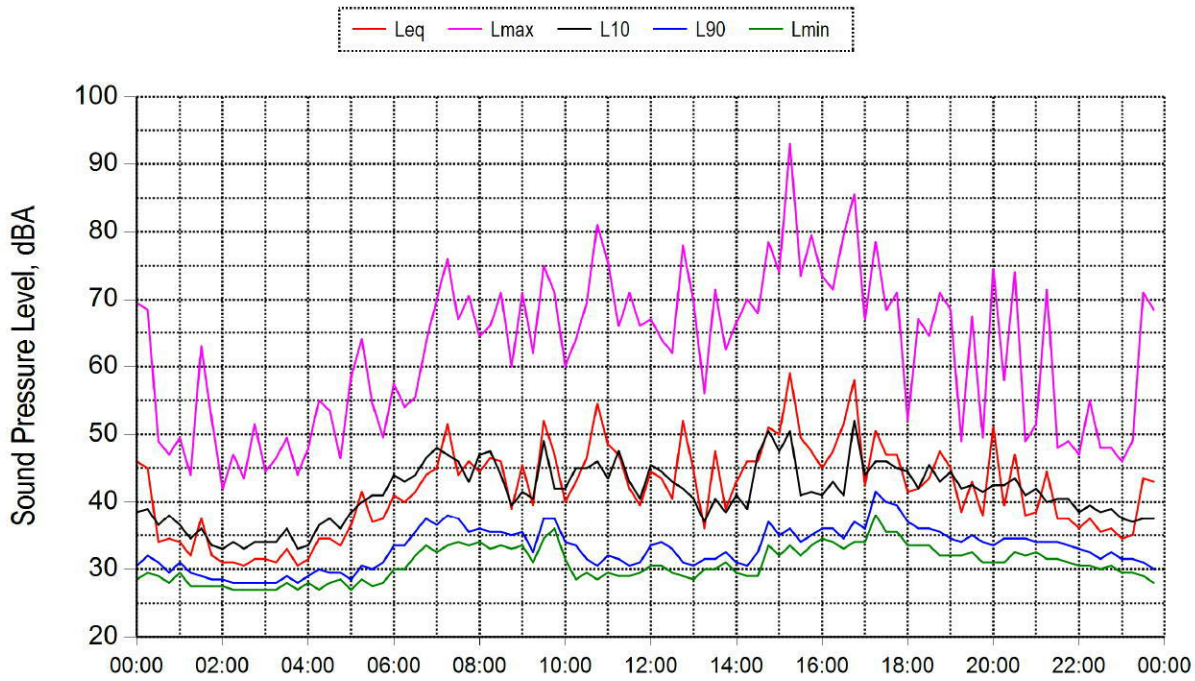

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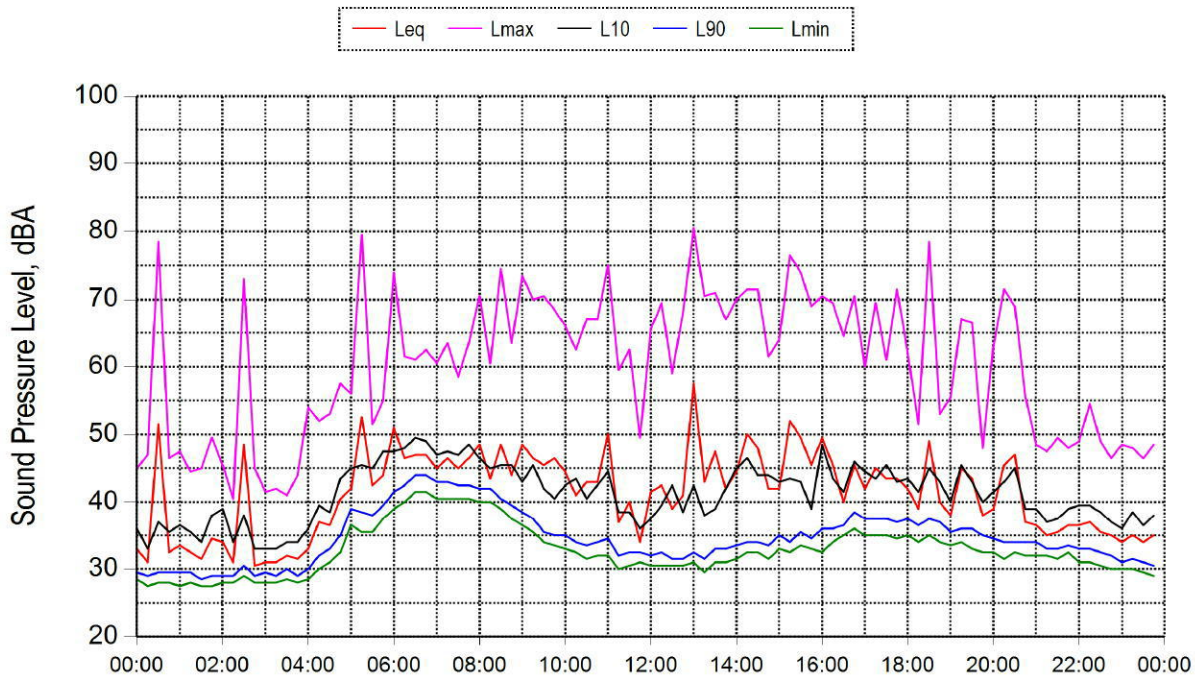

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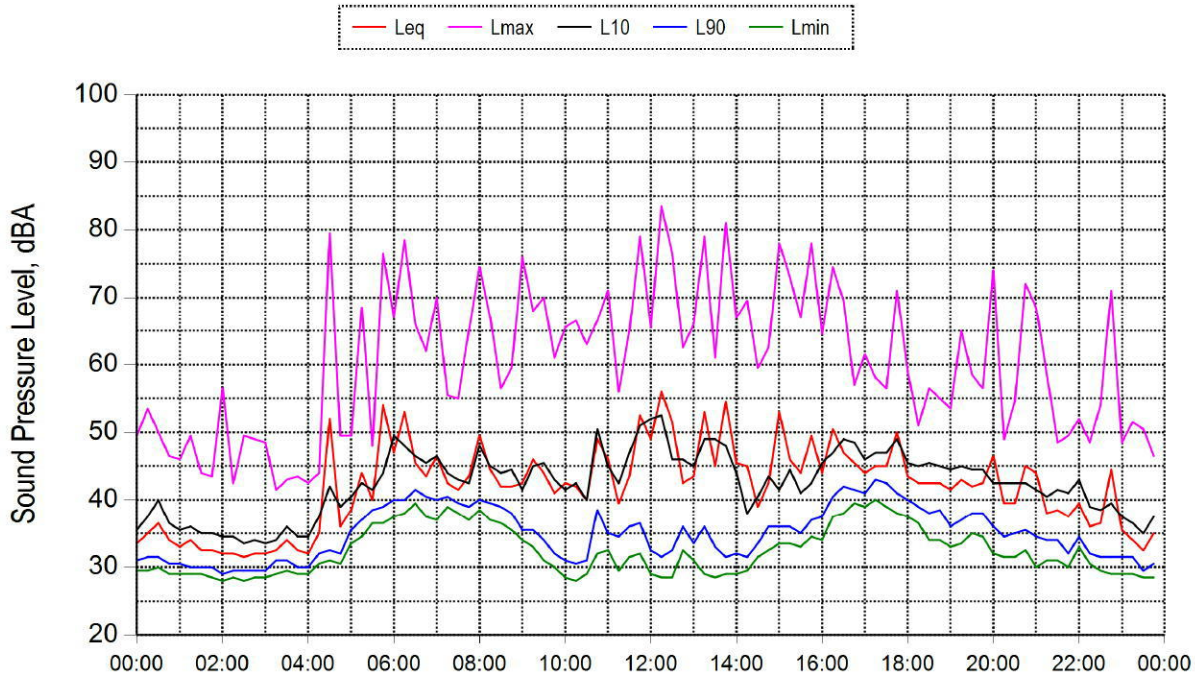

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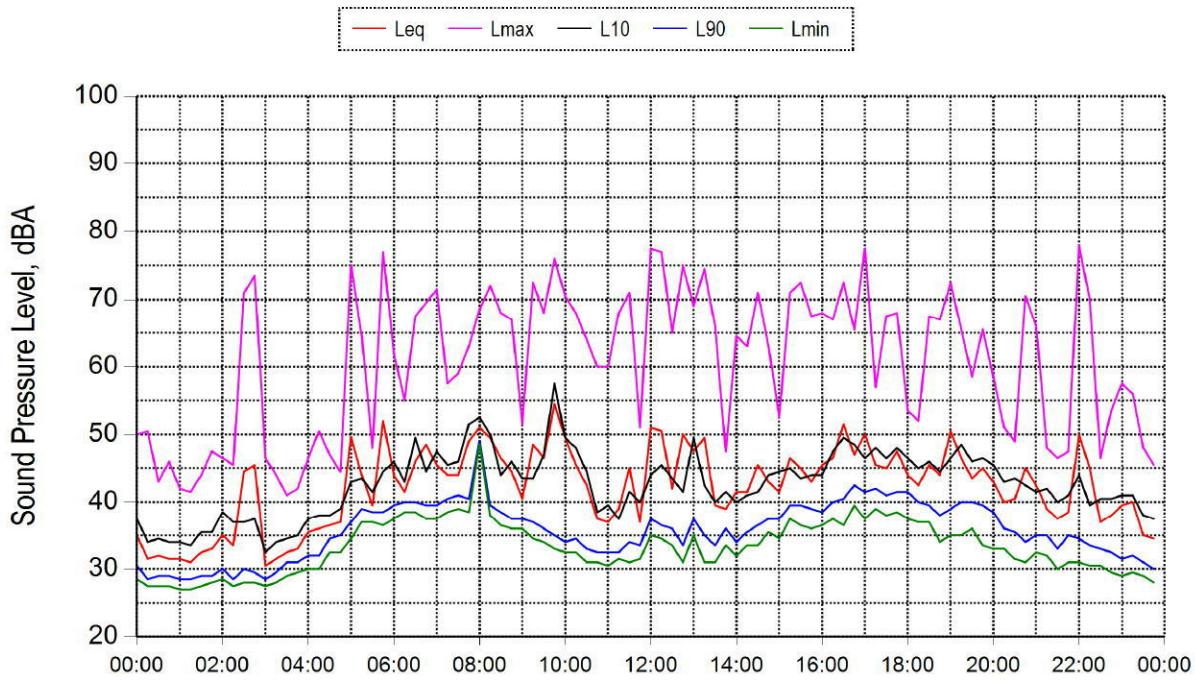

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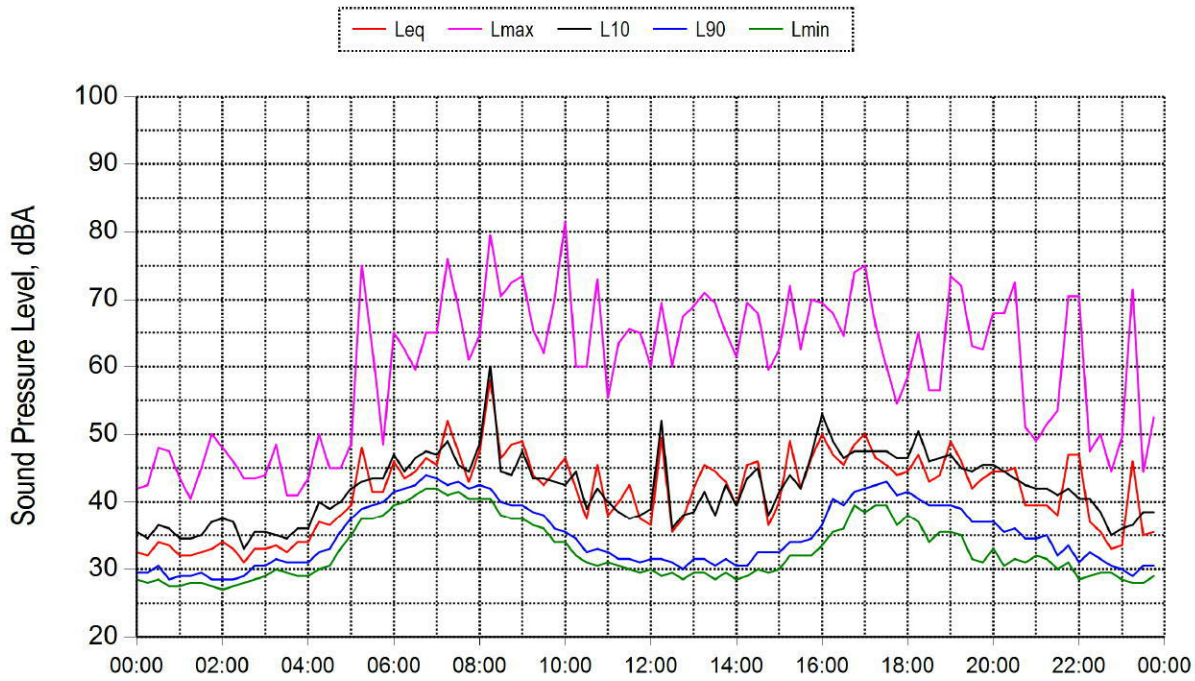

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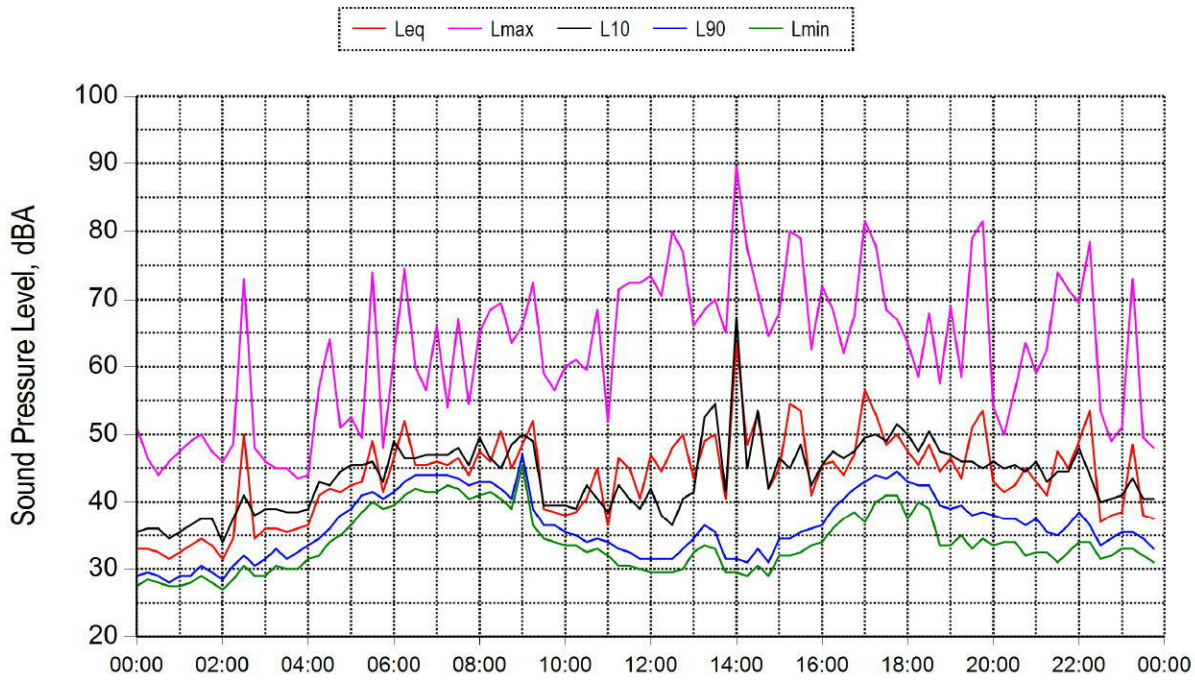

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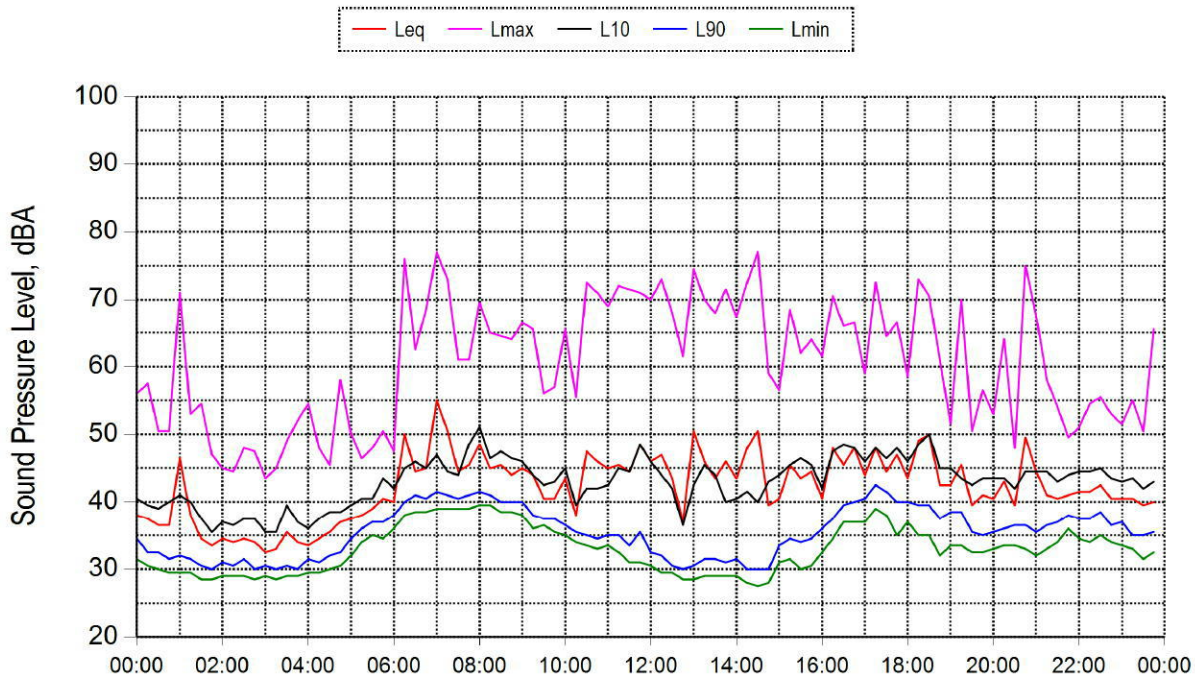

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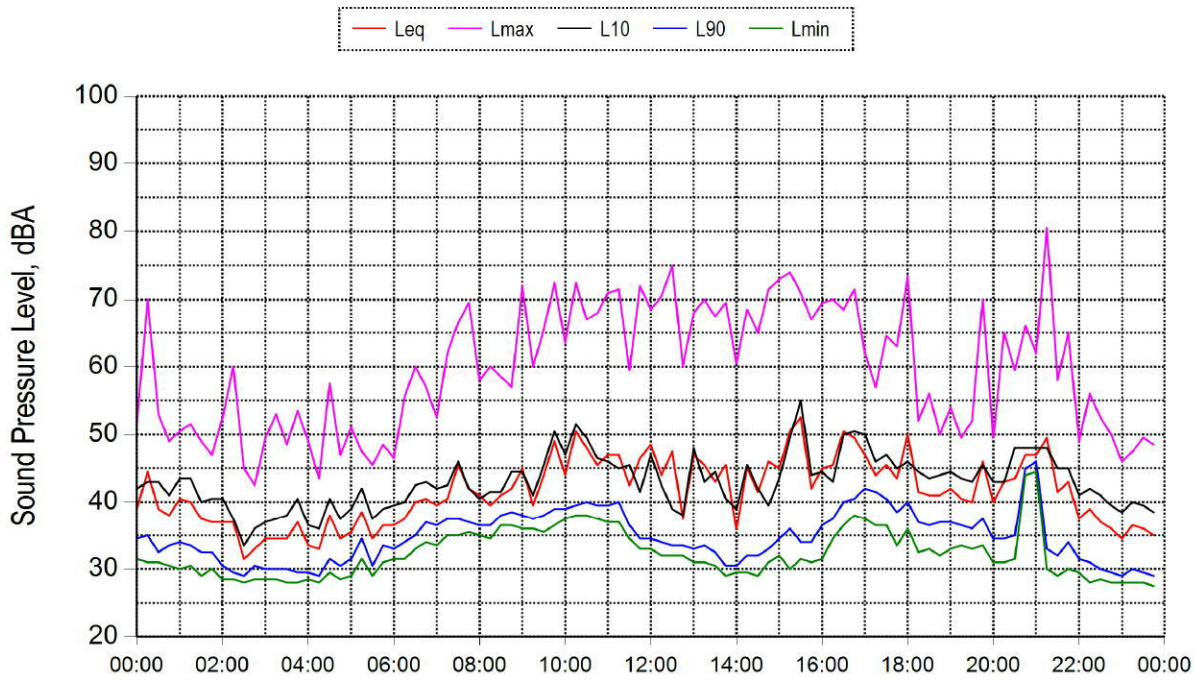

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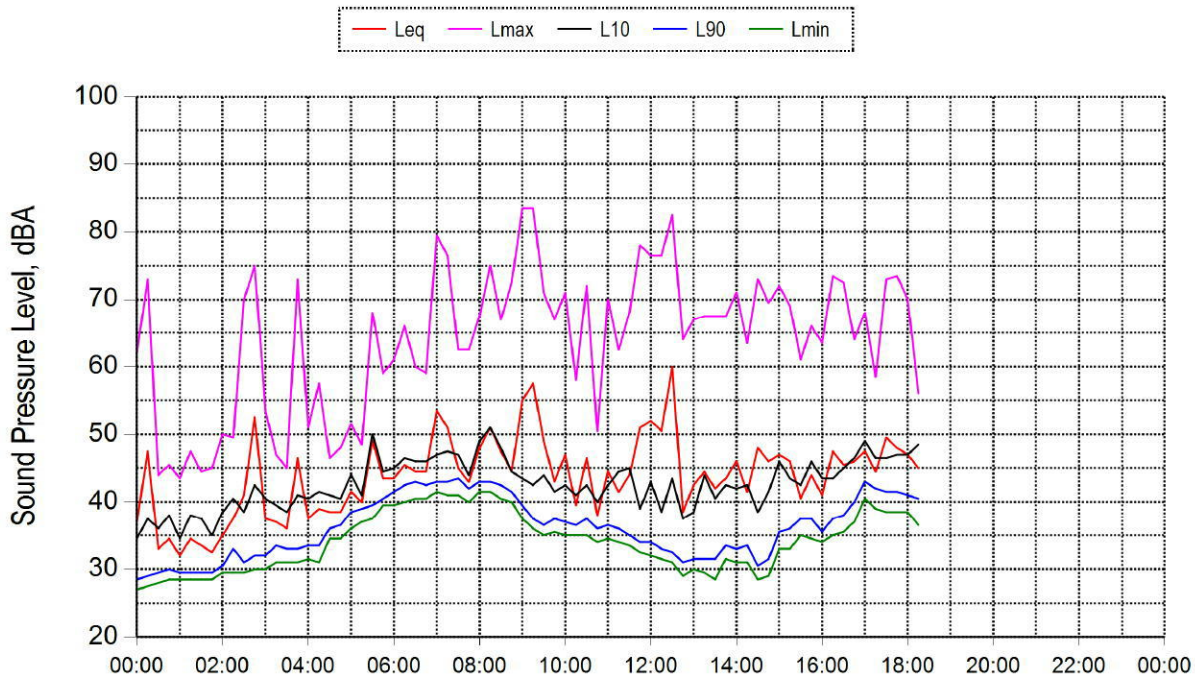
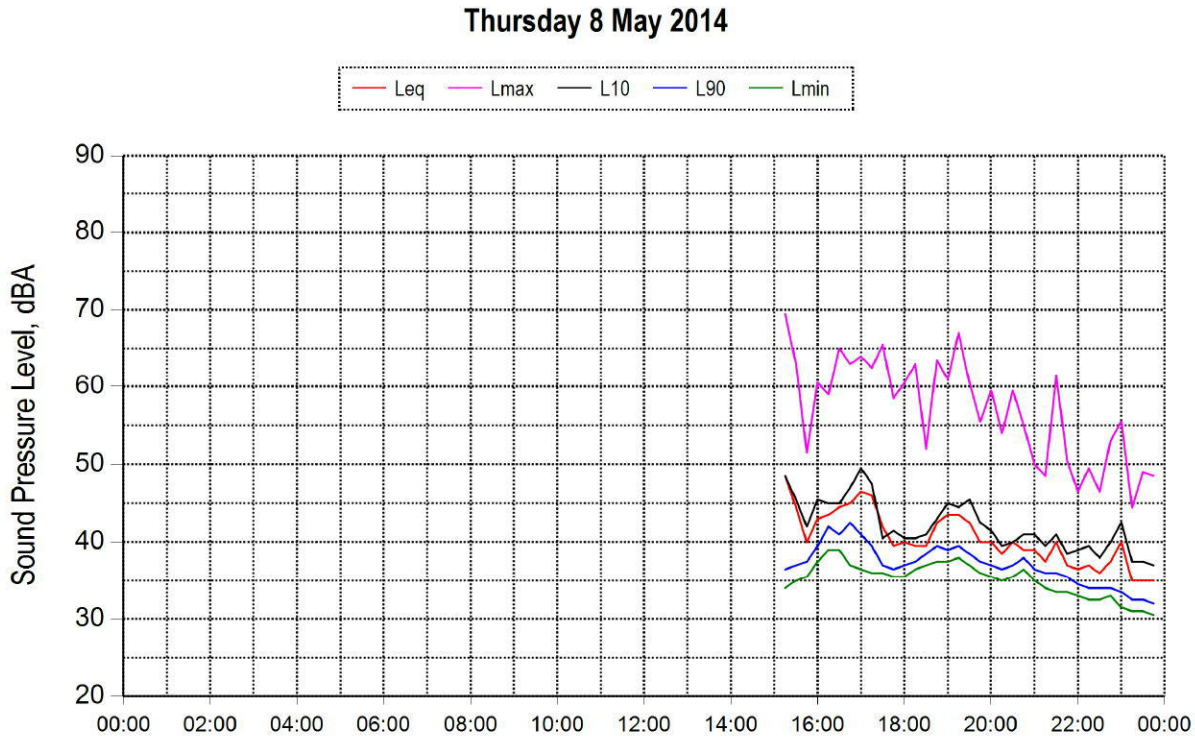
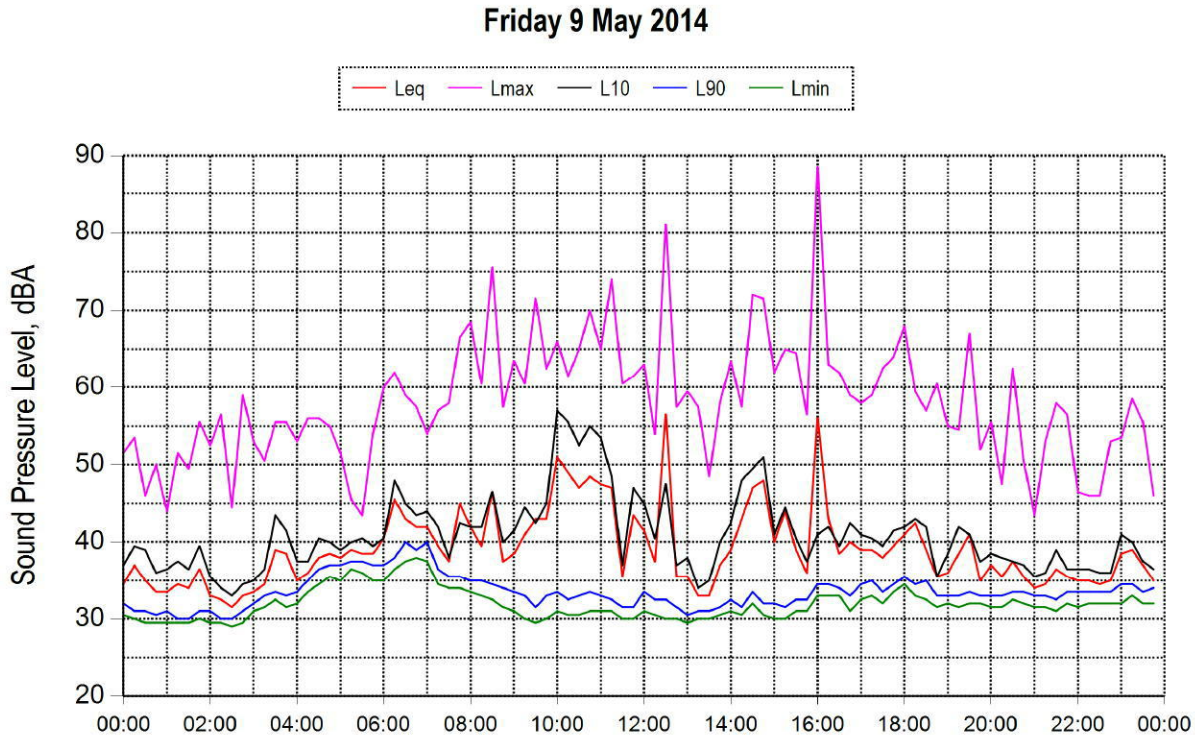


Location R3 – 15 Warburton Crescent Werrington County





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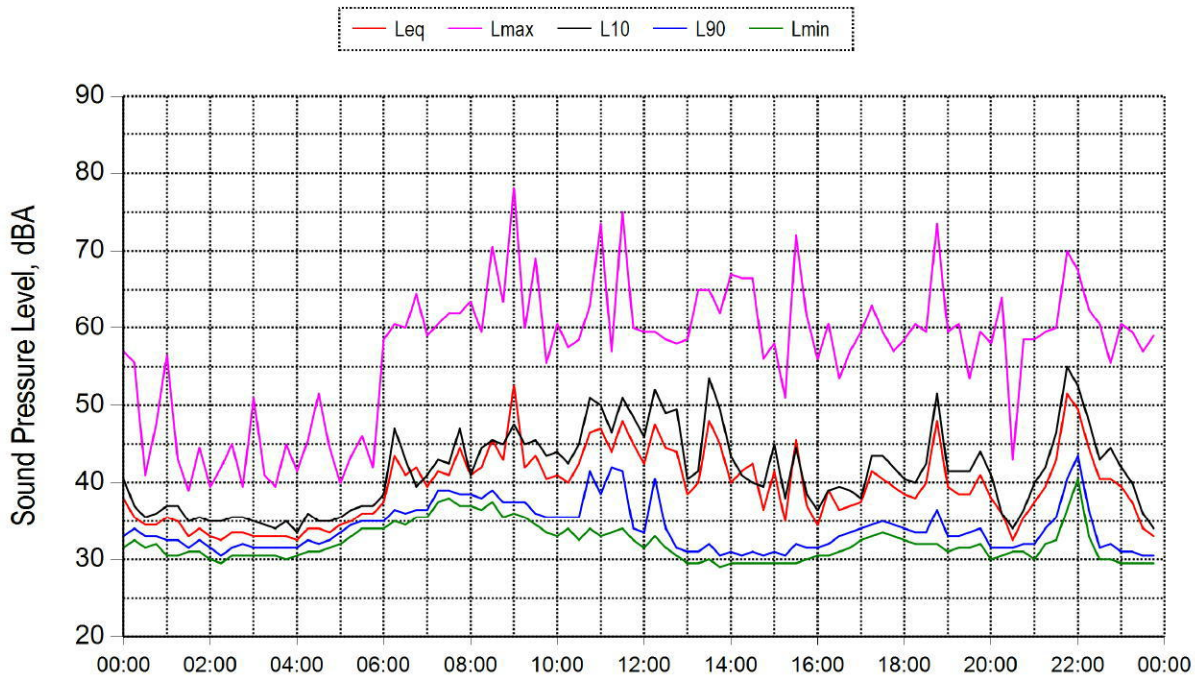

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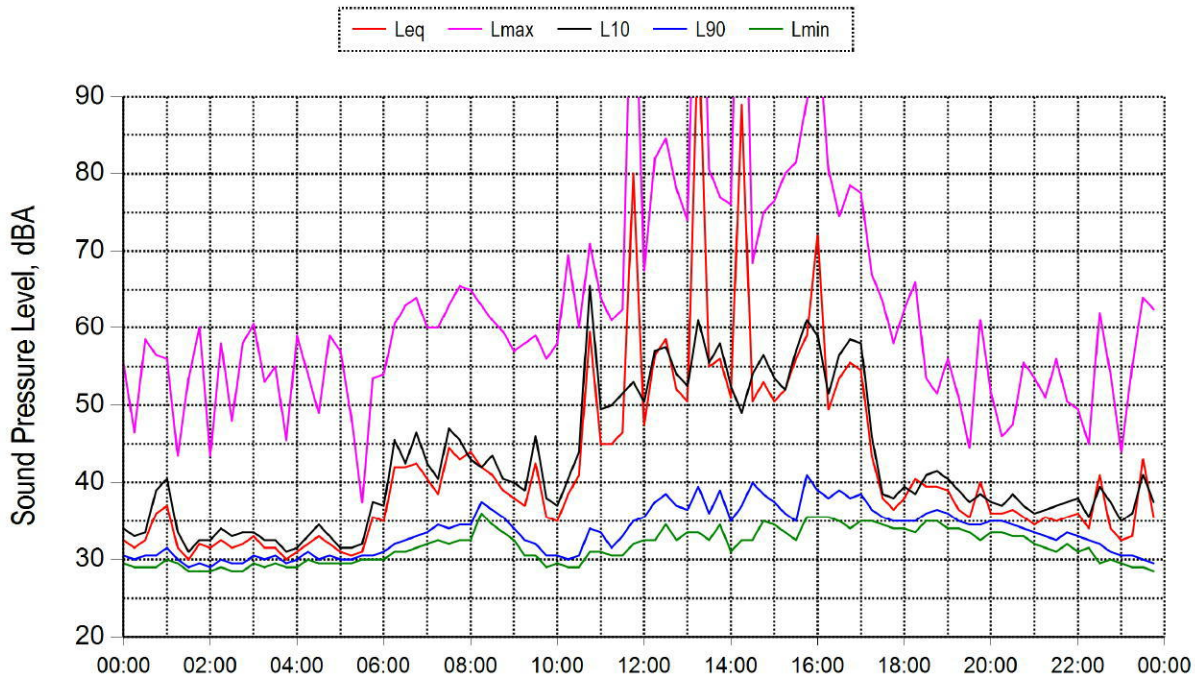

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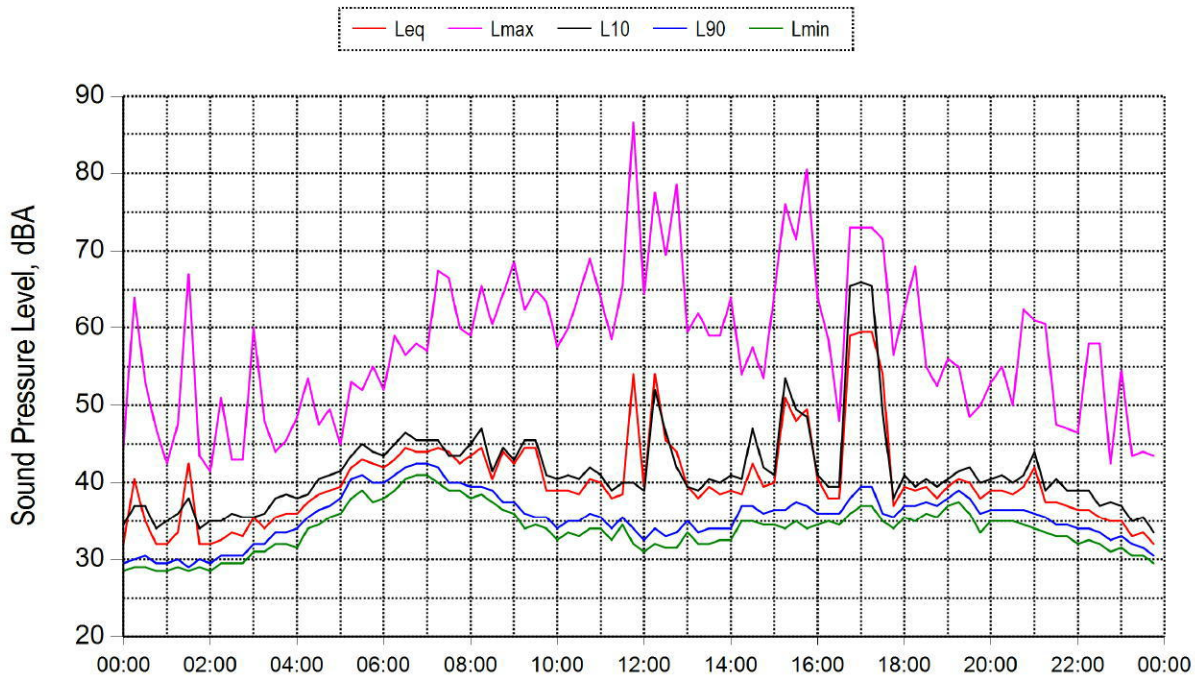

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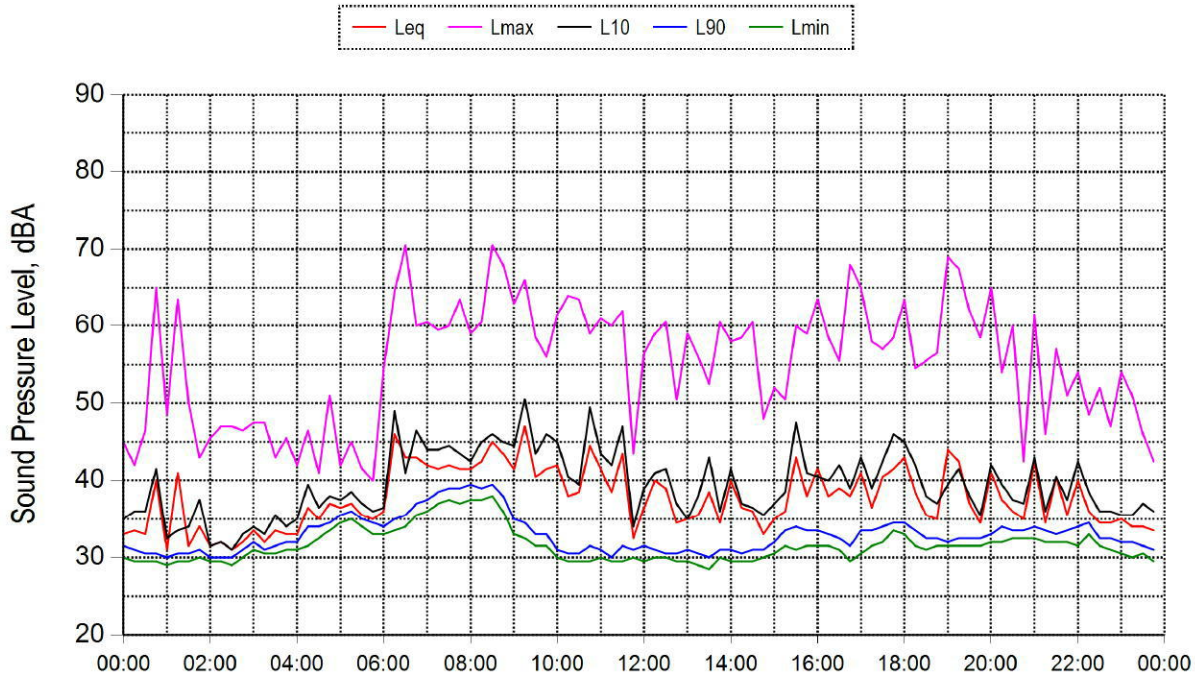

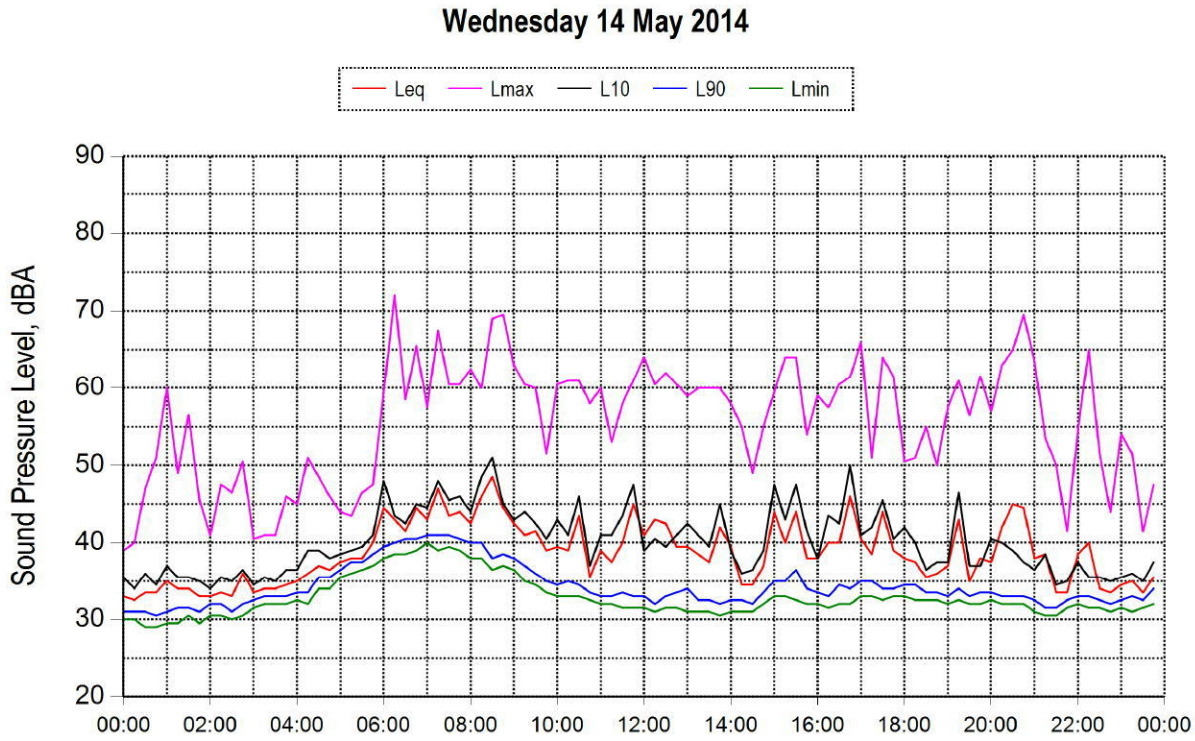

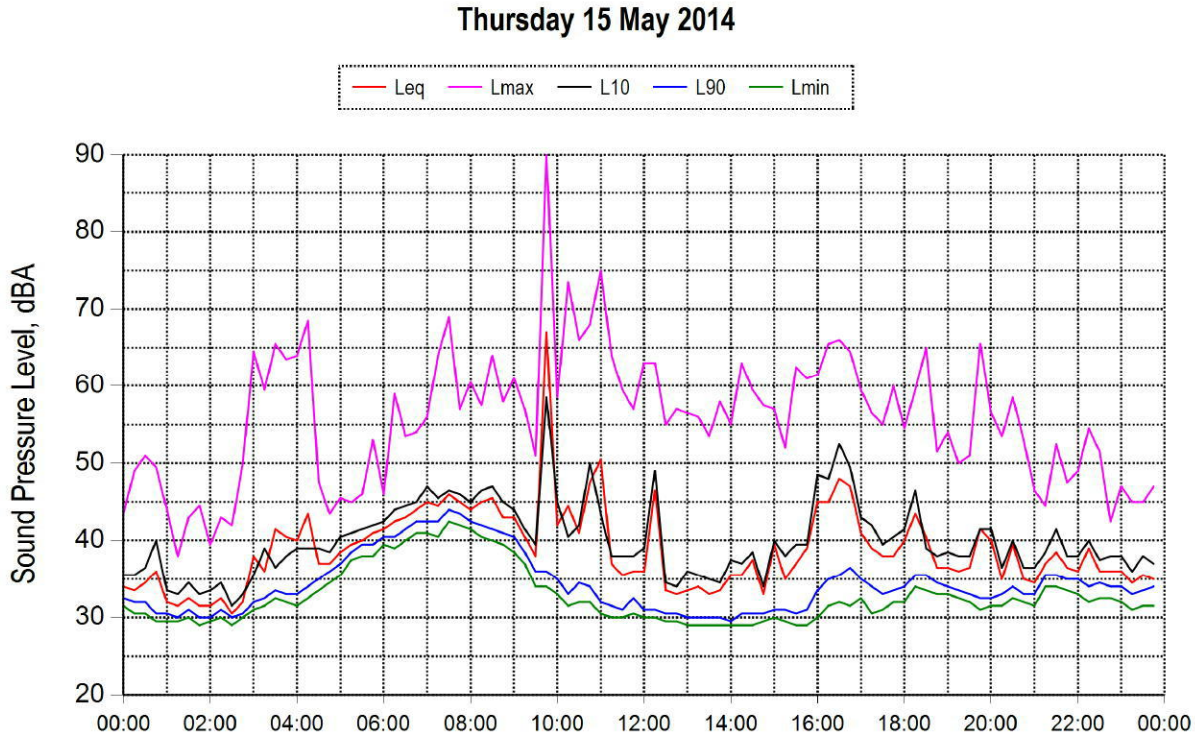

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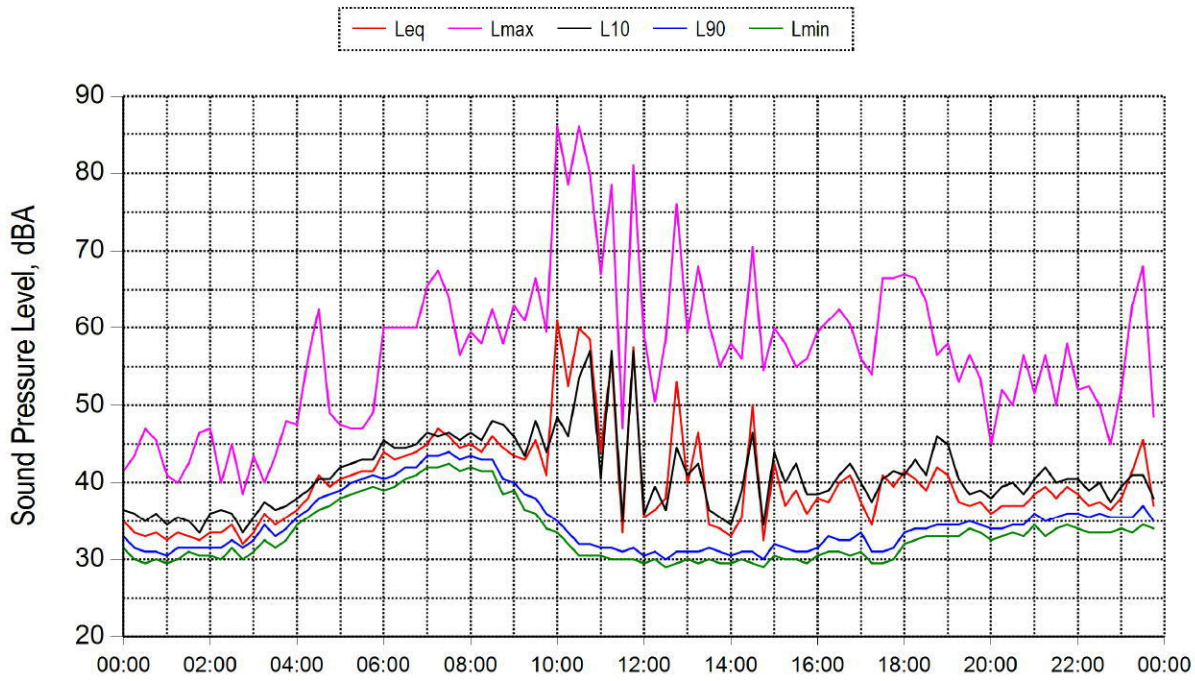

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