

Orora Pty Ltd

B9 Paper Mill – EPL Compliance May 2018 Quarterly noise monitoring report



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B9 Paper Mill - EPL Compliance

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Glossary

Acoustic and vibration related terms:

- **Acoustic Spectrum:** A representation of a sound sample (usually short term) of the amount of energy or sound level per frequency.
- **Ambient Noise:** Ambient noise encompasses all sound present in a given environment, being usually a composite of sounds from many sources near and far.
- **dB(A):** A unit of sound measurement which has frequency characteristics weighted so that it approximates the response of the human ear to sound waves
- **Heavy Vehicle:** A truck, transport or other vehicle with a gross vehicle weight above a specified level (for example: over 8 tonnes)
- **L_{A90}:** Is the noise level that is exceeded 90 per cent of the measurement time. This parameter is commonly referred to as the background noise level
- **L_{Aeq}:** Noise level that represents the energy average noise from the source during a specified time period, and is the equivalent continuous sound pressure level for a given period
- **L_{Aeq(15hr)}:** The Leq noise level for the period from 7 am to 10 pm.
- **L_{Aeq(9hr)}:** The Leq noise level for the period from 10 pm to 7 am.
- **NCA:** Noise Catchment Area. Grouping dwellings or receivers together in terms of similar noise environment.
- **Noise barrier:** Generally a wall or an earth mound that obstructs or restricts the passage of sounds waves from a noise source
- **Noise Logger:** A data logging (data and audio in some cases) which records noise. Usually used for unattended noise monitoring of background or ambient noise.
- **NML:** Noise Management Level as detailed in the NSW Interim Construction Noise Guideline. The NML is the noise goal for construction activities.
- **Octave Bands:** Sounds that contain energy over a wide range of frequencies are divided into sections called bands. A common standard division is in 10 octave bands identified by their center frequencies 31.5, 63, 250, 500, 1000, 2000, and 4000 Hz
- **RBL:** Rating Background Level is the overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used for determining the appropriate construction noise criteria.
- **RNP:** Road Noise Policy (OEH, 2011)
- **Sound Level Meter:** An instrument consisting of a microphone, amplifier and data analysis package for quantifying and measuring noise.
- **Sound Power Level (L_w):** Sound power level or acoustic power level is a logarithmic measure of the sound power in comparison to a specified reference level.
- **Sound Pressure Level (SPL or L_p):** The level of noise, usually expressed in dB(A), as measured by a standard sound level meter.

1. Introduction

1.1 Background

ORORA Packaging operates the B9 Paper Mill at its Botany site in Sydney, NSW. The Paper Mill is subject to operational noise conditions set out in the Ministers Conditions of Approval (MCoA) (including subsequent modifications) and the Environment Protection Licence (EPL) No. 1594.

As part of the EPL, there is a requirement to undertake quarterly monitoring at receivers surrounding the site to show compliance with set noise limits. This report covers the April 2018 – June 2018 quarter. At the time of preparing this report, the B9 paper machine has been in use for over 5 years and is currently operating at typical production capacity. Traffic currently accesses the site via Botany Road with product trucks and delivery vehicles exiting the site via McCauley Road as per the site traffic plan.

Modifications to the site layout include the demolition of the remains of the old B5 building, and construction of a new waste water treatment plant that is currently being commissioned. A large warehousing development on the boundary of the site at the corner of McCauley Street and Australia Avenue was completed in 2016. This development has added a significant proportion of acoustic shielding for receivers directly north of the site, reducing noise sources in the south including Orora, Sydney Ports, and traffic on Botany Road.

Demolition of the B7 paper machine building is complete and a temporary noise wall that covers the extent of the B7 building has been constructed on the Orora boundary. This noise barrier provides shielding from the Orora site for residents in Murrabin, Partanna and Moorina Avenues.

1.2 Objective

This report addresses operational licence conditions relating to measurements of the quarterly monitoring of the noise environment around the Orora site, ie Condition M6.1 and M6.2 of EPL 1594. These require:

- M6.1 The licensee must undertake noise monitoring at least once every three months to check compliance with the noise limits specified in Condition L4.1.
- M6.2 All monitoring required by this licence must be undertaken in accordance with Australian Standard 2659.1 – 1998: Guide to the use of sound measuring equipment – Portable sound level meters, or any revisions of that standard which may be made by Australian Standards Authority, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.

1.3 Operational noise limits

Operational noise limits for the new Orora Paper Mill are detailed in condition L4.1 of EPL 1594 and Condition 10 of the MCoA. These have been replicated in **Table 1**.

Table 1 Operational noise limits

ID	Location	Day	Evening	Night	Night
		L _{Aeq,15min} , dB(A)	L _{Aeq,15min} , dB(A)	L _{Aeq,15min} , dB(A)	L _{Amax} , dB(A)
R1	Corner of McCauley Street and Australia Avenue	46	45	43	55
R2	Australia Avenue	45	45	43	55
R3	Murrabin Avenue	46	45	43	55
R4	Partanna Avenue	42	41	41	55
R5	Corner of Partanna Avenue and Moorina Avenue	42	42	39	55
R6	Moorina Avenue	43	43	39	55

2. Existing environment

Typically, the noise environment around the Orora B9 paper Mill does not change over the short term. The influences are fairly consistent and constant in nature. The following details are general comments to describe these influences and their impact.

The site is located within a predominantly industrial area with residential properties located to the north and east of the site, as illustrated in Figure . The local noise environment beyond the Orora boundary varies throughout the day depending on the contribution of sources including trucks on Botany Road, aircraft, port noise, local business activities on McCauley Road, and local traffic movements.

The prevailing meteorological conditions include strong drainage flows for wind direction and also temperature inversions during the winter months influencing the propagation of noise. Weather conditions are also apparent as seasonal variations which are increasingly apparent in the long-term monitoring data for the local area.

2.1 Monitoring limitations

Total measured noise levels at monitoring locations are only partly due to Orora site operations. The local noise environment has been a feature of the area for many years. Direct monitoring of Orora noise emissions over this time has demonstrated that specific contribution from Orora cannot be provided with any certainty due to the contribution of other audible noise sources adjacent to the site.

2.2 Receiver locations

The EPL specifies six locations for quarterly monitoring. These are illustrated in Figure 2-1 and described further in Table 2.

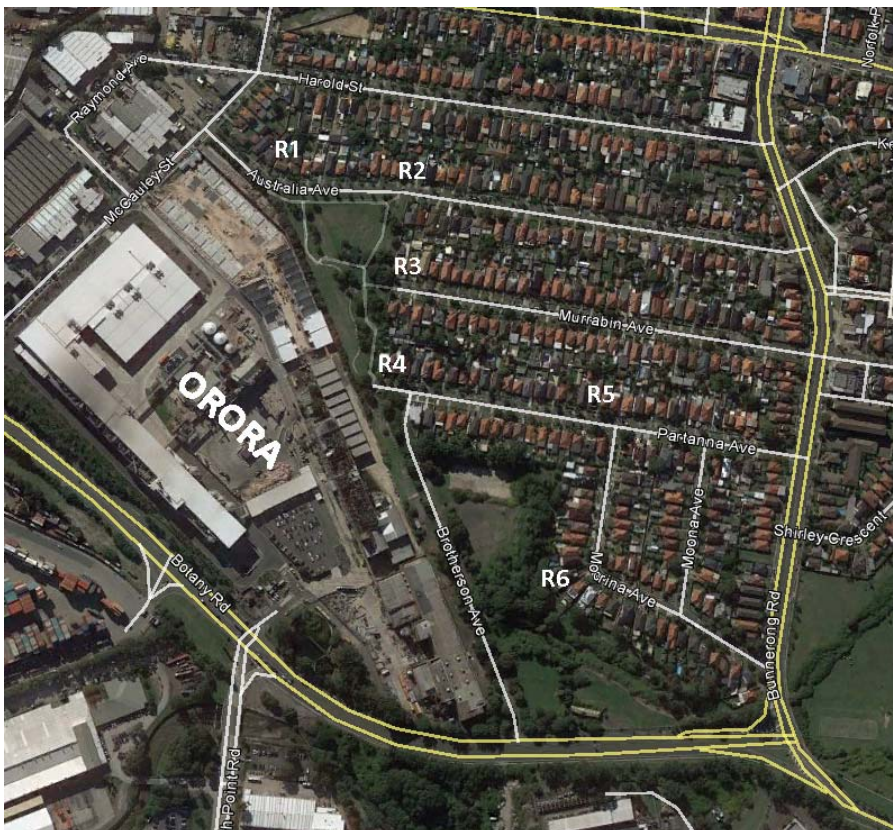


Figure 2-1 Site location and compliance monitoring locations (Source: Google Maps 2016)

Table 2 Description of monitoring locations

Monitoring location	Description
R1	This location has a large degree of acoustic shielding from local noise sources due to the recent development of a warehousing facility on the corner of McCauley Avenue and Australia Avenue. The noise environment at this location is heavily influenced by traffic on McCauley Street, Perry Street and Beauchamp Road. Local industrial noise from Raymond Avenue is also audible during the day and night time. Some construction work was in progress at the property during the monitoring period.
R2	This receiver is located opposite the bottom apex of the Purcell Park on Australia Avenue. At this location the residents have a clear line of sight to the paper mill. Noise walls have less effectiveness for the residences due to the large separation distances. Noise from port activities also has less shielding from the Orora site. Background noise levels are heavily dominated by road traffic noise from all sources.
R3	The receivers at Partanna Avenue are physically closest to the Orora site but have the benefit of significant shielding of operational activities from the B7 paper machine building and the No. 7 reel store. Road traffic noise contributes to background noise for this receiver. Some construction work was in progress at the property during the monitoring period.
R4	Furthest location from the Orora site, a higher degree of influence from Botany Road, Bunnerong Road and the port. Noise from the Orora site is generally inaudible at this location although significant noise from the Orora site has been observed here during adverse meteorological conditions. Some construction activity was noted at the adjacent property during the monitoring period.
R5	In this location receivers are well shielded from operational noise from the Orora site due to the presence of the redundant No. 7 and No. 8 paper machine buildings. Noise levels at this location are heavily influenced by local bird colonies, port noise, traffic on Botany road and traffic on Bunnerong Road.
R6	In this location receivers are well shielded from operational noise from the Orora site due to the presence of the redundant No. 7 and No. 8 paper machine buildings. Noise levels at this location are heavily influenced by local bird colonies, port noise, traffic on Botany road and traffic on Bunnerong Road.

3. Operational noise monitoring

3.1 Method

Operational noise monitoring for the May survey period was completed between 11 May and 18 May 2018, using automatic noise loggers deployed at six representative locations.

Monitoring was performed using Acoustic Research Laboratories brand Ngara Type 1 noise loggers, set to A-weighting, fast-response, and recording noise levels continuously over consecutive 24-hour periods at each location. This survey period coincided with typical continuous operations of B9 paper mill.

Weather conditions during the survey period were obtained from the Automatic Weather Station (AWS) maintained by the Bureau of Meteorology at Sydney Airport. Weather conditions for the monitoring period have been plotted showing daily trends in wind direction and speed which are presented in Figure 3-1.

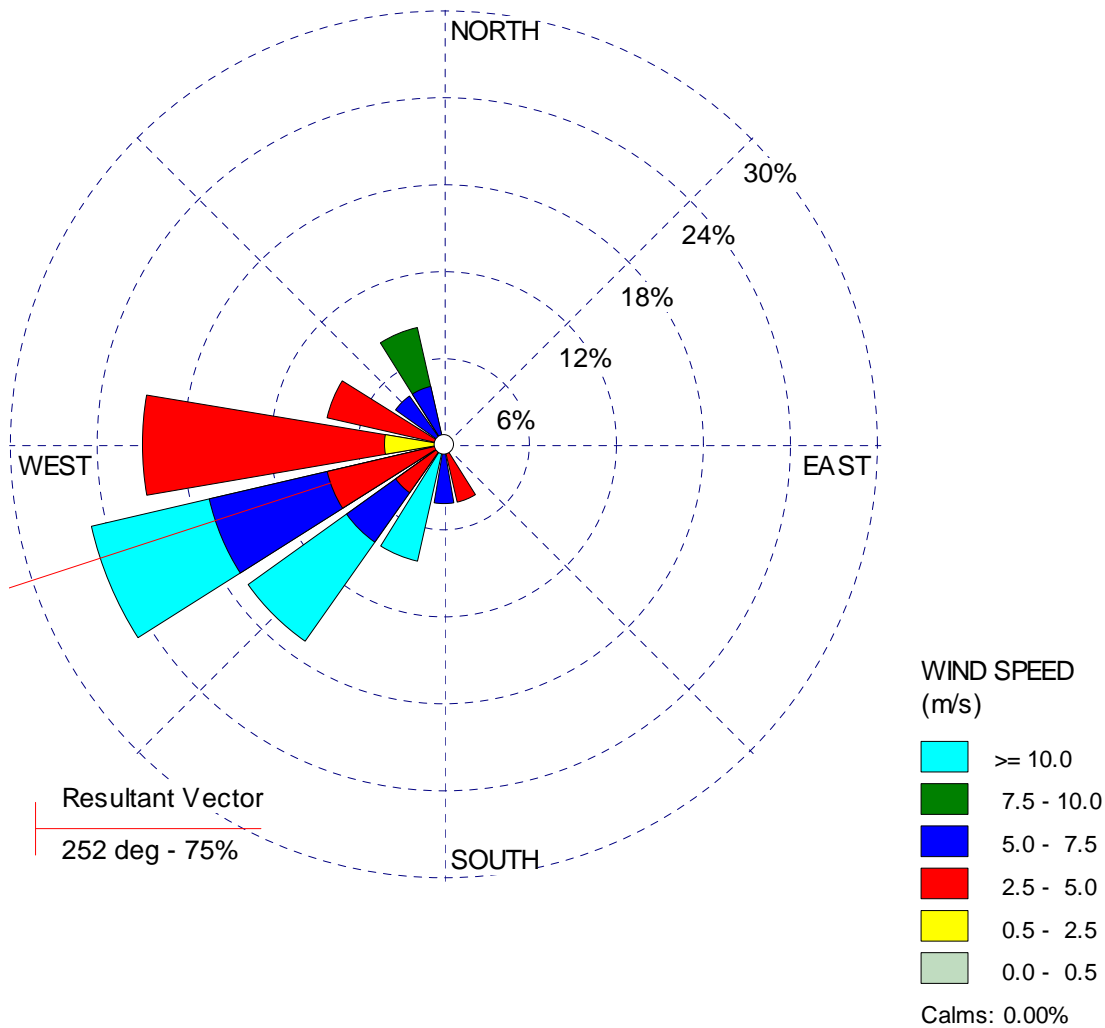


Figure 3-1 Wind speed and direction during monitoring period (11 May – 18 May 2018, source BoM 2018)

The plotted data indicates that the wind direction during the monitoring period was dominated by winds from the west and west south west directions. Winds from this direction are expected to enhance noise levels from the Orora site as well as Botany Road and Port Botany Terminal.

Approximately 40% of the total measurements were observed between 0 to 5 m/s with wind speeds above 5 m/s present for about 50% of the monitoring time. The high wind speeds and the general westerly direction will have the tendency to increase overall noise levels at receiver locations in this direction.

3.2 Monitoring results

During the May 2018 quarterly noise survey, the paper mill was in full production and there were no unusual activities occurring within the site. The measured L_{Aeq} noise levels taken across several days are affected by a multitude of noise sources such as road traffic, loud short-term noise such as birds, aircraft, and local heavy vehicle movements.

The Orora site itself has a noise profile consistent with plant and equipment that operate under steady state conditions and therefore has little variability in noise emissions. This type of noise environment is most appropriately described using the L_{A90} statistical parameter, which has been presented in the results summary to be considered in conjunction with the L_{Aeq} noise level when assessing compliance of the Orora site.

The results of monitoring survey for May 2018 have been graphed and are shown in Appendix A. The parameters of L_{Aeq} and L_{A90} presented in Table 3 are used to provide information for comparison against the project criteria and the background noise environment.

These periods were assessed to provide information of the Orora B9 Paper Mill noise contributions using the night time median L_{A90} noise levels as a benchmark. The results of the analysis indicate that background noise levels during operations were lower at the majority of receiver locations when compared to the periods of inactivity of the shut-down (see Figures 3-4 and 3-5).

Successive monitoring surveys have demonstrated that direct measurement of Orora's contribution to the noise environment is not possible. The measured L_{Aeq} noise levels during both the operational and shut down periods remain above the EPL criteria and therefore 'mask' noise from the site.

The most recent round of compliance measurements has been added to the historical data collected during compliance monitoring, providing about six years worth of seasonal data. This data includes measurements of the noise environment both with the Orora site both operational and shut down for maintenance. Table 3 presents the assessment background noise levels and the rating background noise levels from the May 2018 survey as well as the L_{Aeq} , 15 minute for each assessment period.

3.3 Comparison with previous monitoring surveys

An indicator of the contribution of Orora operational noise to existing noise levels may be made using background noise levels measured during both shutdown and operational conditions. During the night time-period, fewer extraneous noise influences are present providing lower overall noise levels in the area. Under these conditions constant noise sources such as Orora operations are more likely to be apparent in the background noise levels measured during this time noting that the emission levels from the site remain relatively constant throughout the day, evening, and night time.

The data in Figure 3-2 and Figure 3-3 provides a chronological progression of the measured noise levels during shutdown and normal operations summarised for monitoring from 2012 to present. The measured data for the most recent monitoring for May 2018 indicates that L_{A90} noise levels were well above the L_{Aeq} , 15 minute criteria at the majority of monitoring sites.

Historical background noise levels from Figure 3-2 and Figure 3-3 are not directly related to the L_{Aeq} criteria from the EPL; however, they provide an indication of the increase in background environmental noise levels corresponding to the regular noise surveys undertaken for the Orora site.

Table 3 Summary of noise monitoring

Time and date*	Profile of Noise Environment - Noise Monitoring Location											
	R1		R2		R3		R4		R5		R6	
Day 7:00:00 AM to 6:00:00 PM Date	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period
Friday 11 May2018	47.6	66.4	50.0	65.5	49.1	63.8	49.7	66.8	48.9	73.6	46.0	72.4
Saturday 12 May2018	47.4	53.7	49.6	54.8	48.7	54.3	50.6	56.2	46.6	55.2	46.9	53.8
Sunday 13 May2018	50.6	56.6	51.6	56.7	50.4	55.7	53.5	58.1	48.0	55.7	49.7	58.1
Monday 14 May2018	50.9	56.2	52.2	56.1	50.8	54.3	53.4	57.3	46.3	51.9	50.2	54.7
Tuesday 15 May2018	44.0	51.9	45.6	53.5	45.4	51.3	46.9	53.2	38.9	49.8	42.9	51.0
Wednesday 16 May2018	47.7	53.4	48.5	54.7	48.1	52.5	50.1	55.3	41.2	51.1	47.4	52.2
Thursday 17 May2018	41.0	51.9	39.4	52.0	41.0	50.7	42.3	52.5	38.0	51.5	40.0	50.9
Friday 18 May2018	42.7	54.3	46.6	56.4	44.9	53.7	46.4	55.6	38.8	51.7	43.3	51.1
Median	47.5	54.0	49.1	55.4	48.4	54.0	49.9	55.9	43.8	51.8	46.4	53.0
Evening 6:00:00 PM to 10:00:00 PM Date	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period
Friday 11 May2018	45.3	53.1	47.7	53.8	47.4	52.0	47.0	52.4	47.6	54.0	44.4	50.1
Saturday 12 May2018	48.1	53.0	50.0	53.1	48.8	52.0	51.3	54.1	46.9	52.7	46.8	51.1
Sunday 13 May2018	52.3	57.5	52.0	55.9	51.1	57.4	54.3	58.6	47.7	56.6	51.9	60.2
Monday 14 May2018	45.4	51.1	49.6	53.3	47.8	50.8	49.8	53.4	43.6	48.4	44.2	49.4
Tuesday 15 May2018	45.5	51.2	47.2	51.4	46.5	49.4	47.9	52.1	39.4	44.1	43.4	49.2
Wednesday 16 May2018	41.6	50.8	43.8	50.8	43.9	48.8	44.8	51.1	35.3	44.7	40.8	48.8
Thursday 17 May2018	43.1	49.9	40.6	48.9	43.8	47.8	41.8	46.3	41.5	48.3	41.3	47.1
Friday 18 May2018												
Median	45.4	51.2	47.7	53.1	47.4	50.8	47.9	52.4	43.6	48.4	44.2	49.4

ORORA – B9 COMPLIANCE NOISE MONITORING

Time and date*	Profile of Noise Environment - Noise Monitoring Location											
	R1		R2		R3		R4		R5		R6	
Night 10:00:00 PM to 7:00:00 AM Date	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period	L90 (10th Percentile)	Leq - over period
Friday 11 May2018	42.4	49.7	46.1	51.5	46.1	51.1	46.2	51.7	45.3	51.4	42.1	51.5
Saturday 12 May2018	46.5	53.5	48.7	53.7	47.1	52.5	50.5	55.6	44.6	54.3	45.0	54.3
Sunday 13 May2018	50.4	55.0	52.0	55.1	50.1	53.5	52.7	55.9	46.3	51.6	46.8	53.6
Monday 14 May2018	44.4	48.5	49.5	52.7	47.7	50.2	48.8	52.2	43.1	46.8	42.2	46.4
Tuesday 15 May2018	41.9	49.7	47.0	51.2	45.7	49.9	46.1	51.6	40.7	46.0	38.6	48.4
Wednesday 16 May2018	40.7	46.7	45.3	50.4	44.6	48.3	44.3	49.7	38.1	45.8	37.4	43.1
Thursday 17 May2018	43.1	48.7	48.1	52.9	47.0	50.4	47.0	51.9	43.0	48.0	41.1	46.7
Friday 18 May2018												
Median	43.1	49.7	48.1	52.7	47.0	50.4	47.0	51.9	43.1	48.0	42.1	48.4

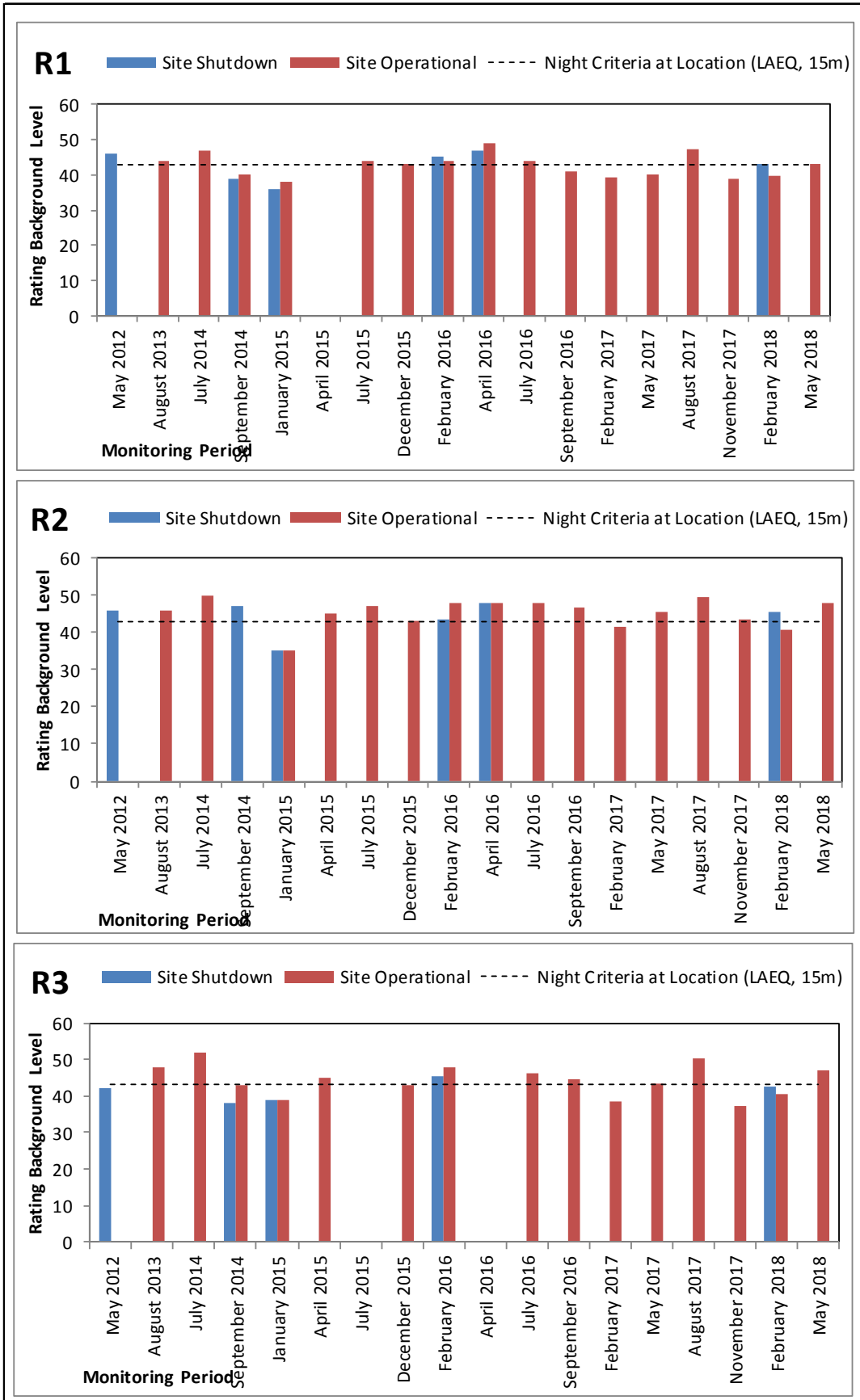


Figure 3-2: Comparison of background noise levels at R1 – R3

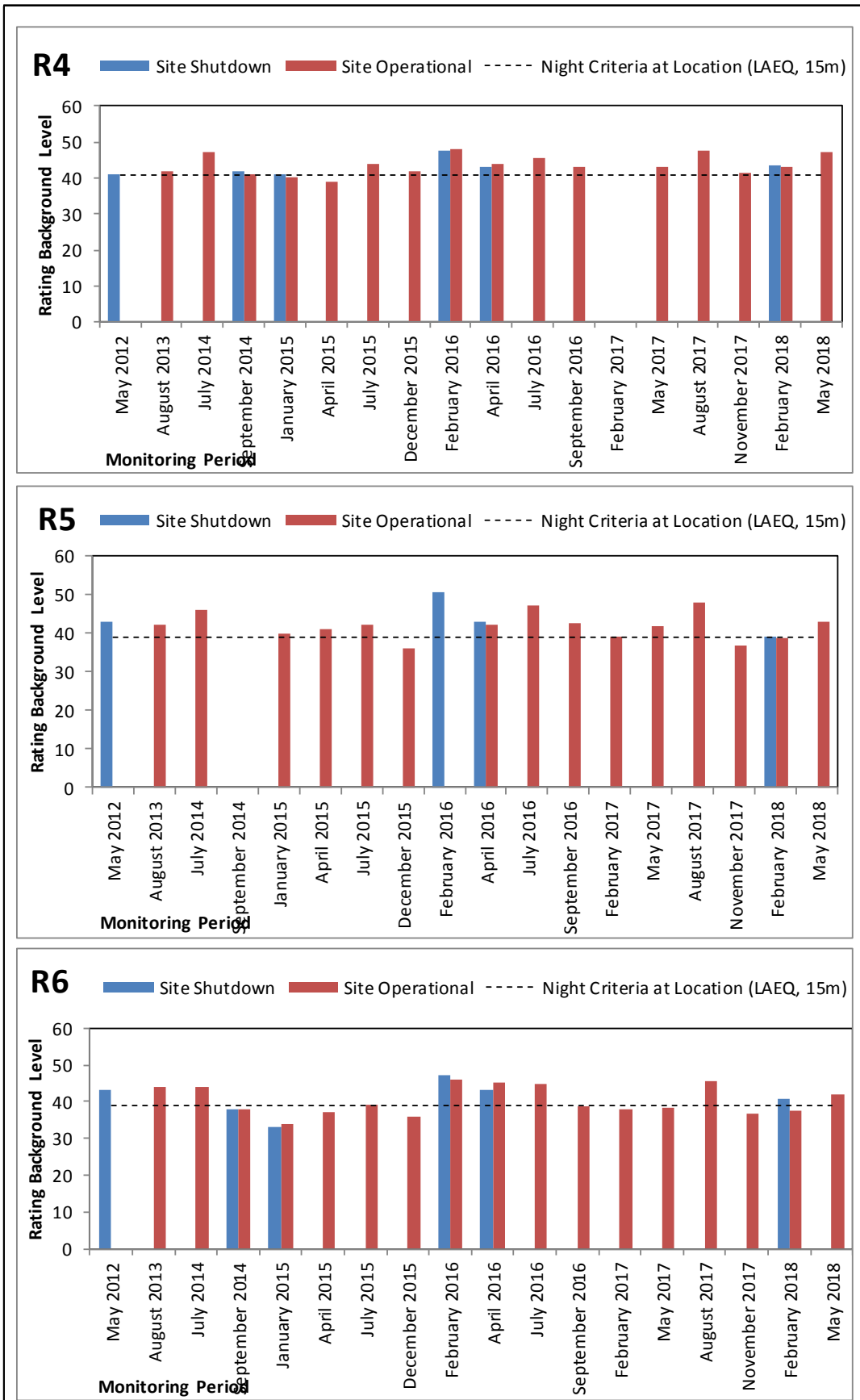


Figure 3-3: Comparison of background noise levels at R4 – R6

4. Summary

Orora B9 Paper Mill operations in its current form have been a part of the local noise environment for several years since the decommissioning of the B7 and B8 paper mills. Regular monitoring surveys have been used to collect data at residences in key locations around the paper mill to determine the contribution on ambient noise levels.

In general, the L_{Aeq} measured noise levels will exceed the EPL criteria for day, evening, and night time whether the paper mill is operational or shut down indicating that the site does not have a significant influence on the local noise environment.

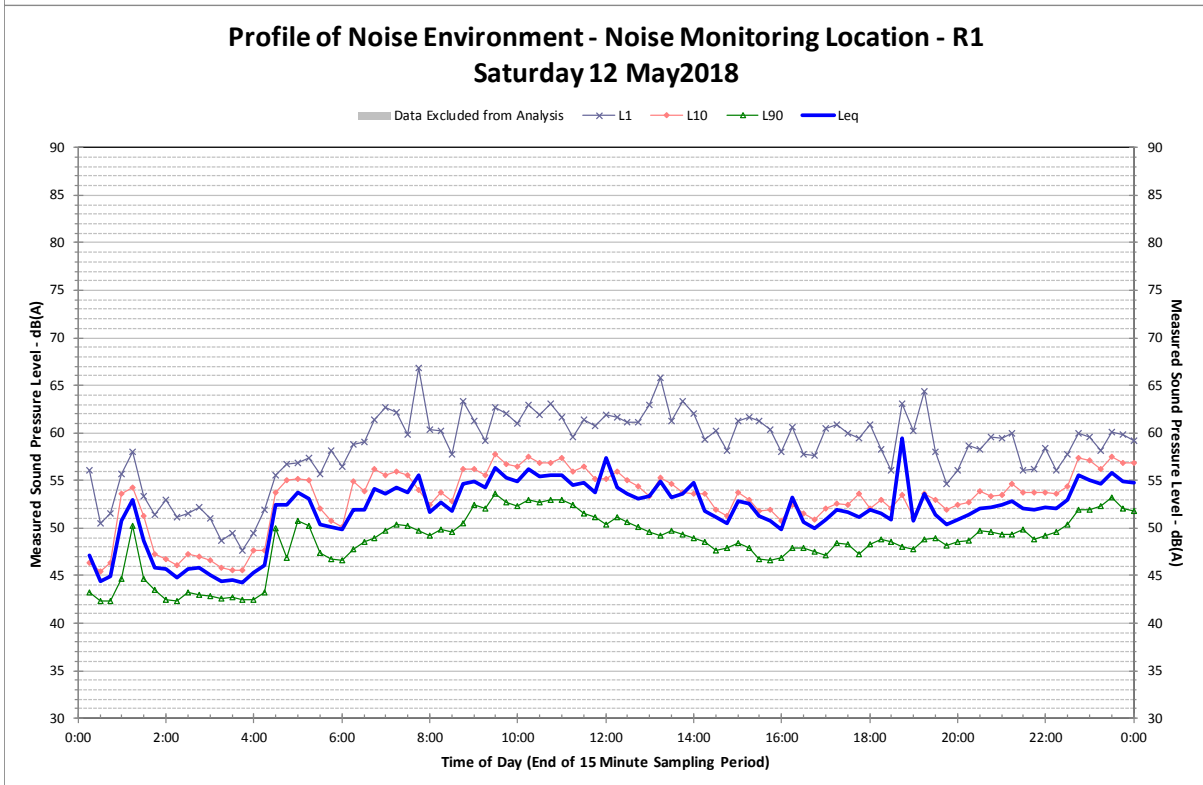
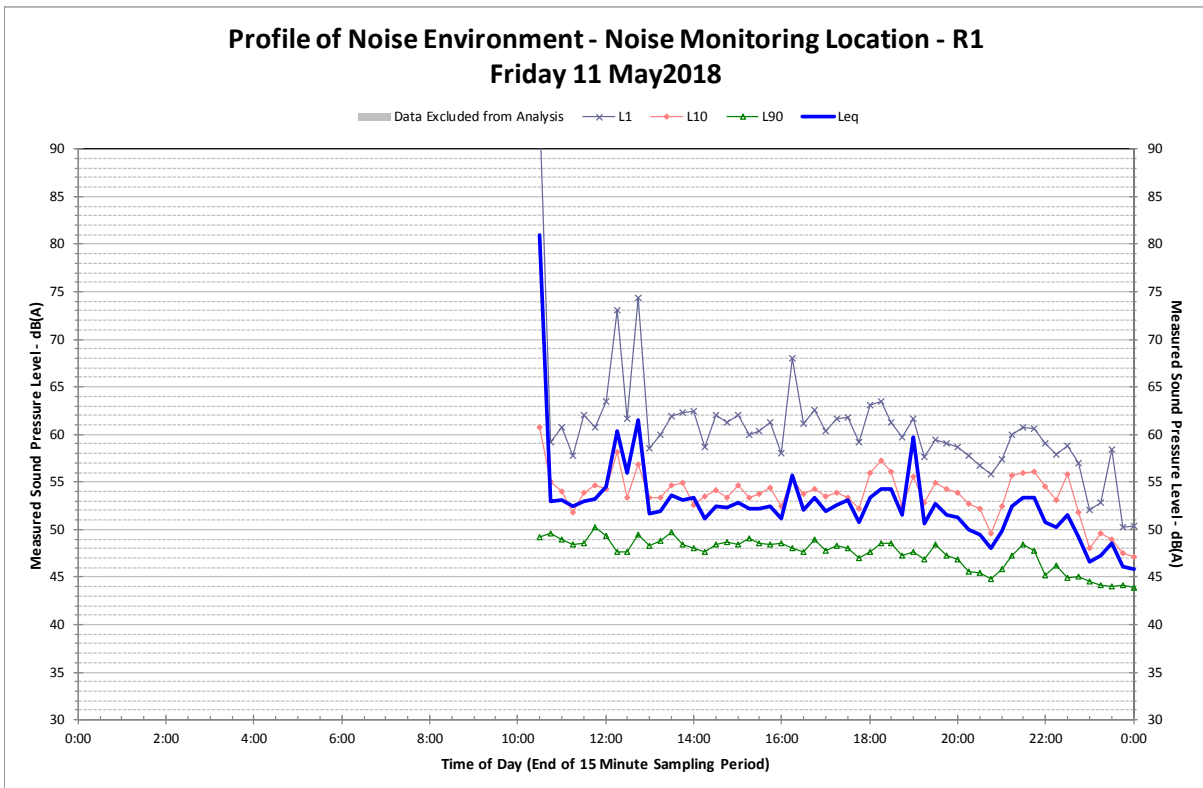
Recent results for the May 2018 monitoring period when the Orora site was operational, indicate that an exceedance of the EPL criteria is apparent at all the representative receiver locations. These exceedances of the L_{Aeq} criteria are not directly attributable to the operations of the B9 paper mill.

The L_{A90} results of this latest monitoring survey are higher than the EPL criteria but follow the seasonal trends of higher levels during the winter months. The higher measured noise levels are likely to be due to the influence of wind speed and direction which will equally increase the noise levels from all local noise sources, including the paper mill.

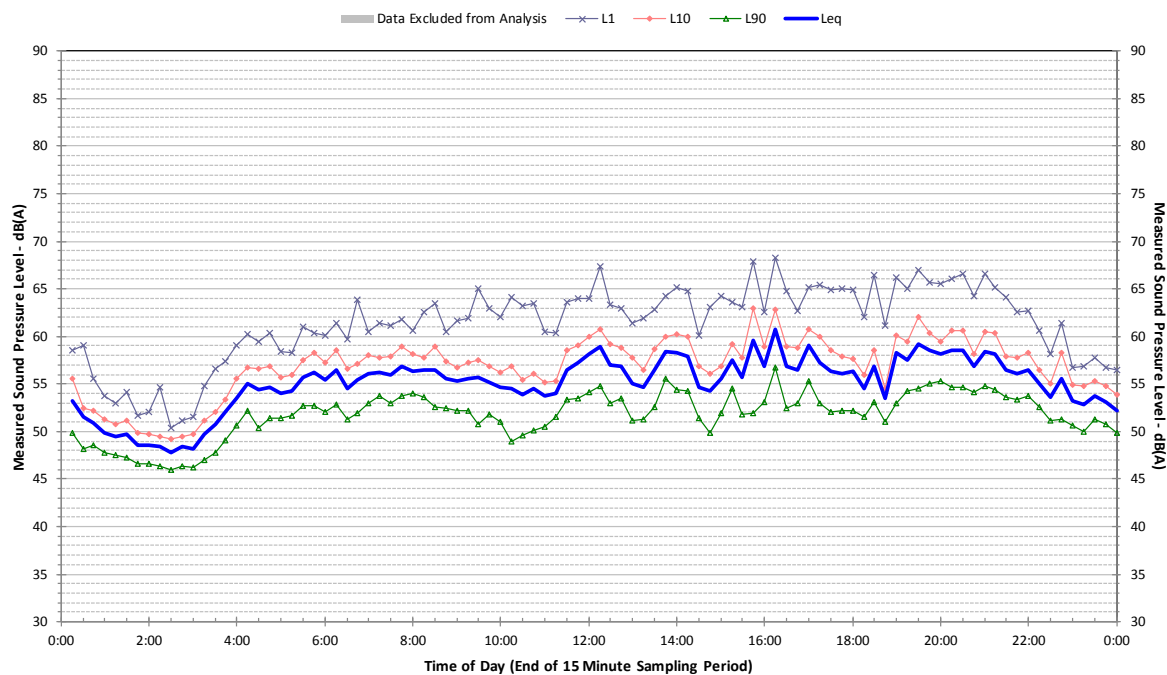
From the May 2018 quarterly monitoring the following conclusions may be drawn:

- The most recent noise monitoring results indicate that the measured L_{A90} noise levels are higher than the L_{Aeq} criteria, but are similar to corresponding seasonal measurement periods.
- Winds typically came from westerly directions which tend to enhance noise from the Orora site as well as other sources such as Botany road, for receivers to the east of the site. These enhancing effects tend to increase measured noise levels at receiver locations, which is reflected in monitoring noise levels higher than the L_{Aeq} criteria.
- The ambient noise environment in the local area is a product of the combined influence of all noise sources within the Port Botany area including the Orora site when operational.
- Changes to the site including the completion of the demolition of the B7 Paper Machine building. This work does not noticeably affect the measured noise levels in the vicinity of the Orora site when compared on an historical basis.

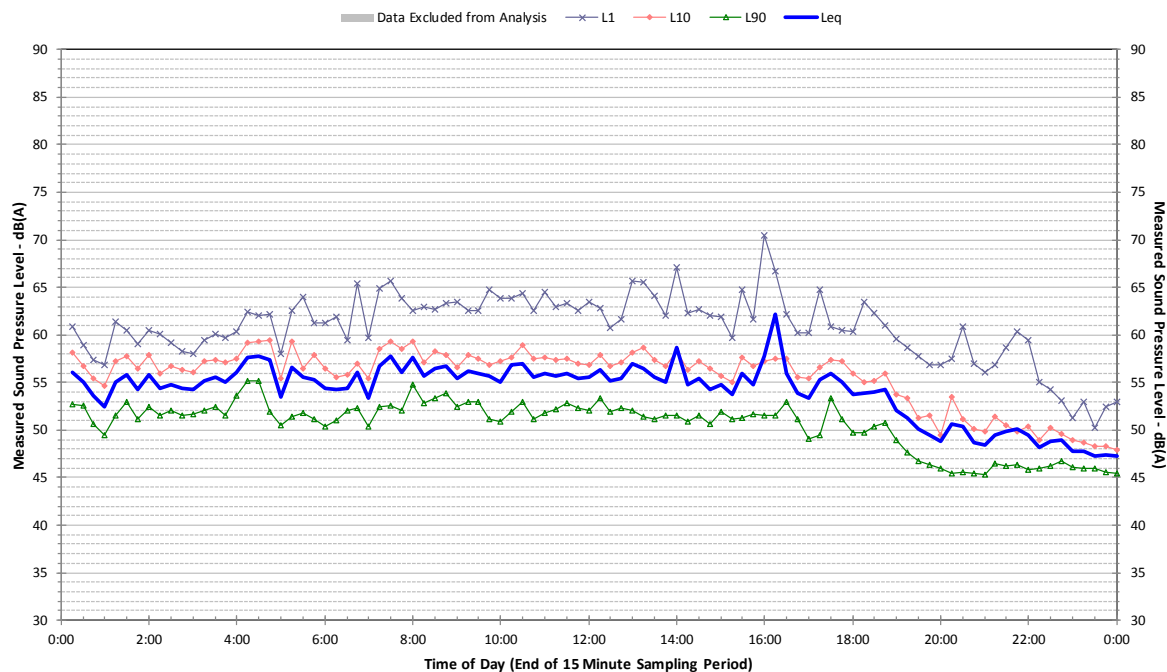
Appendix A. Noise logger graphs



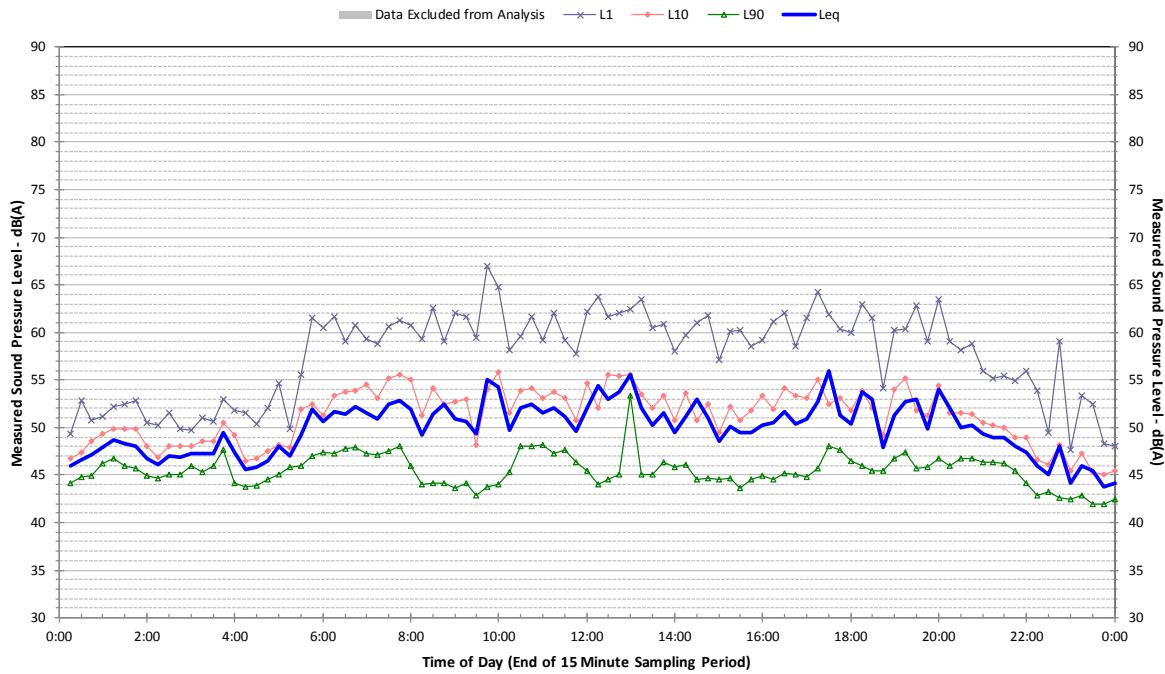
Profile of Noise Environment - Noise Monitoring Location - R1 Sunday 13 May 2018



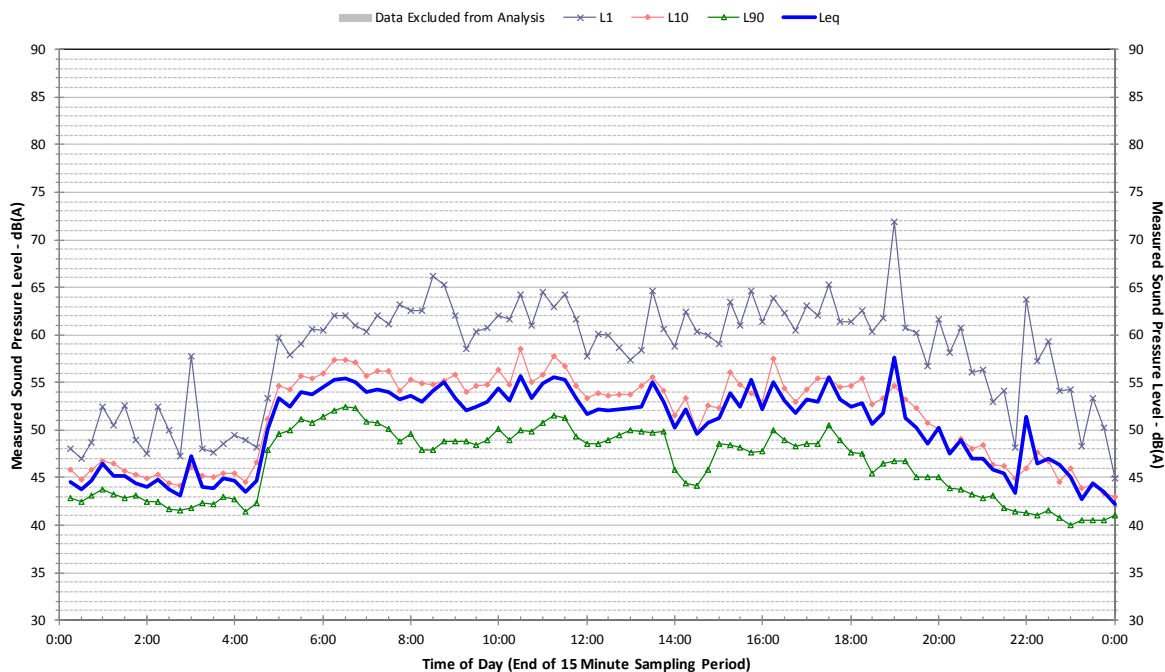
Profile of Noise Environment - Noise Monitoring Location - R1 Monday 14 May 2018



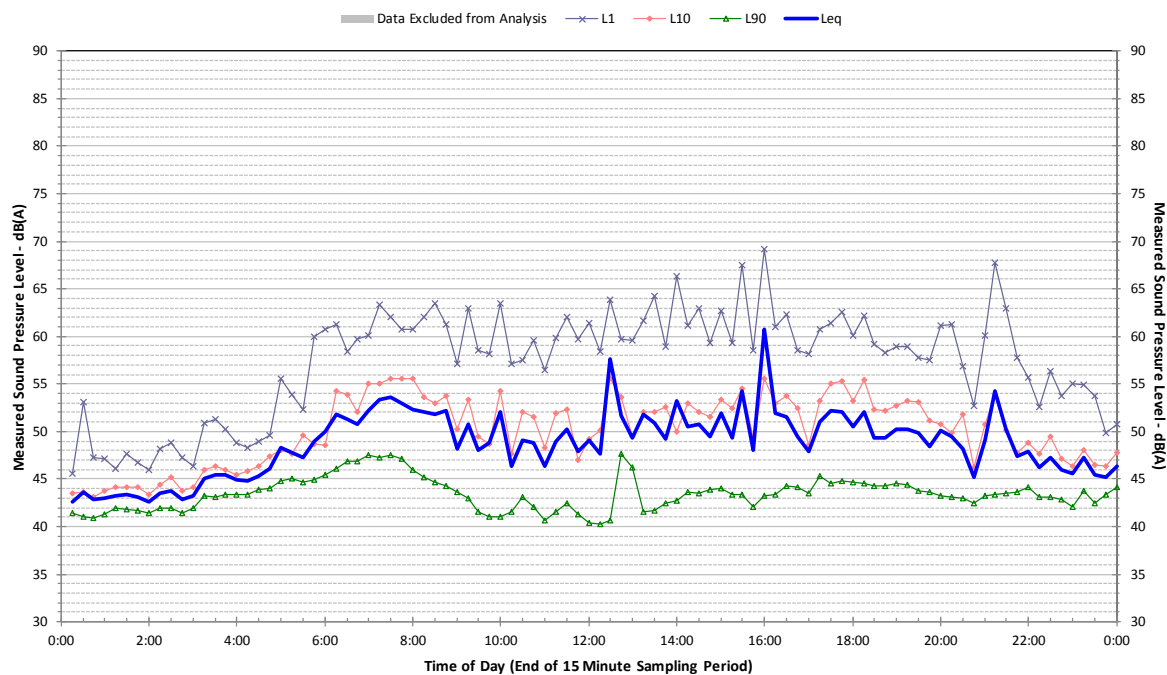
Profile of Noise Environment - Noise Monitoring Location - R1 Tuesday 15 May 2018



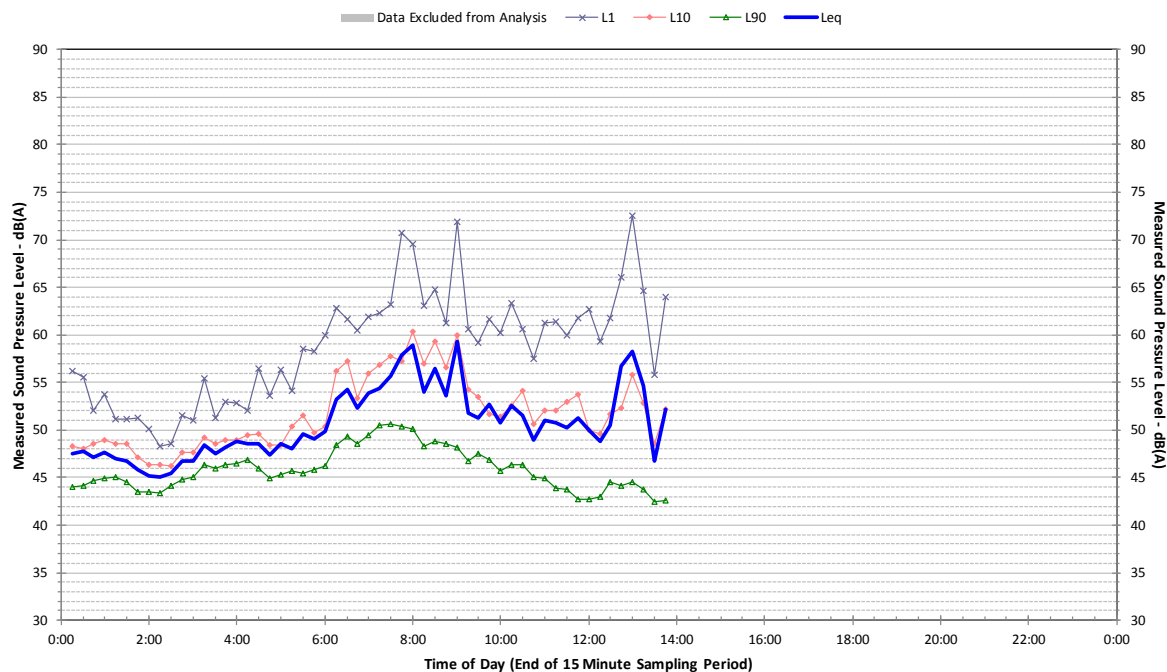
Profile of Noise Environment - Noise Monitoring Location - R1 Wednesday 16 May 2018



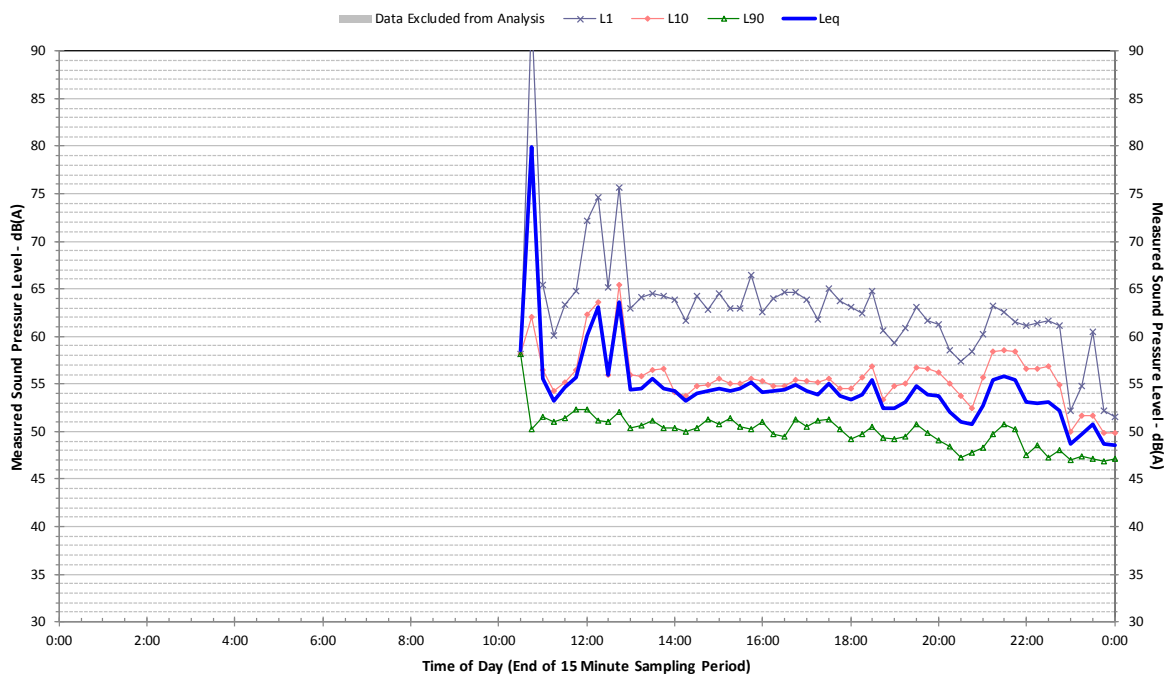
Profile of Noise Environment - Noise Monitoring Location - R1 Thursday 17 May 2018



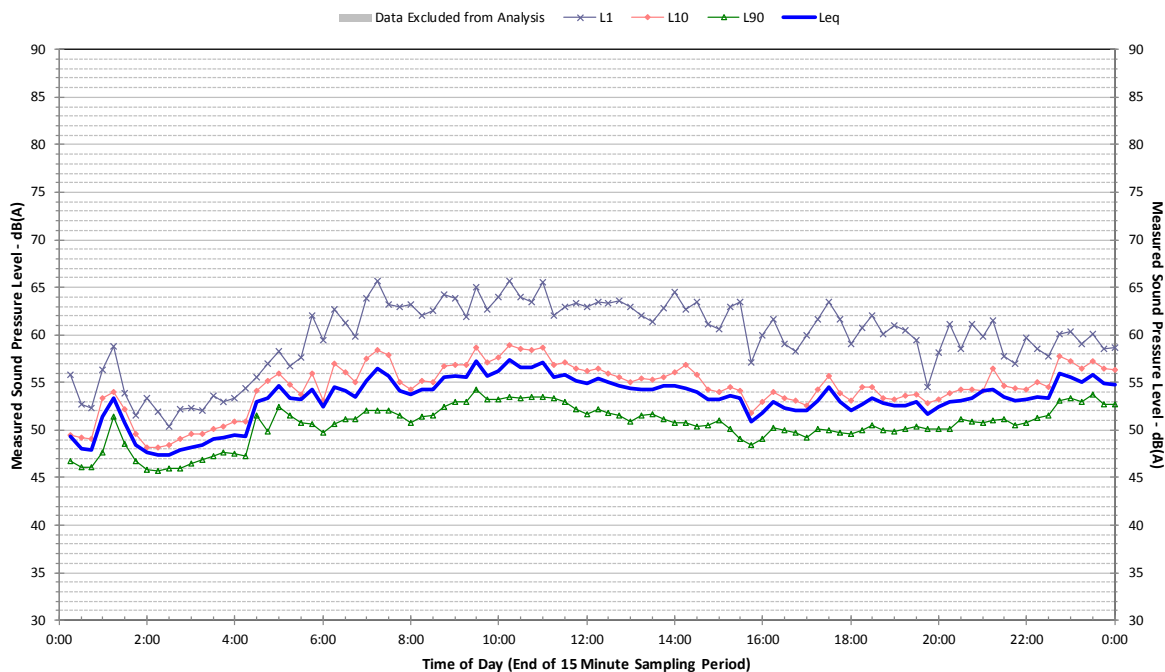
Profile of Noise Environment - Noise Monitoring Location - R1 Friday 18 May 2018



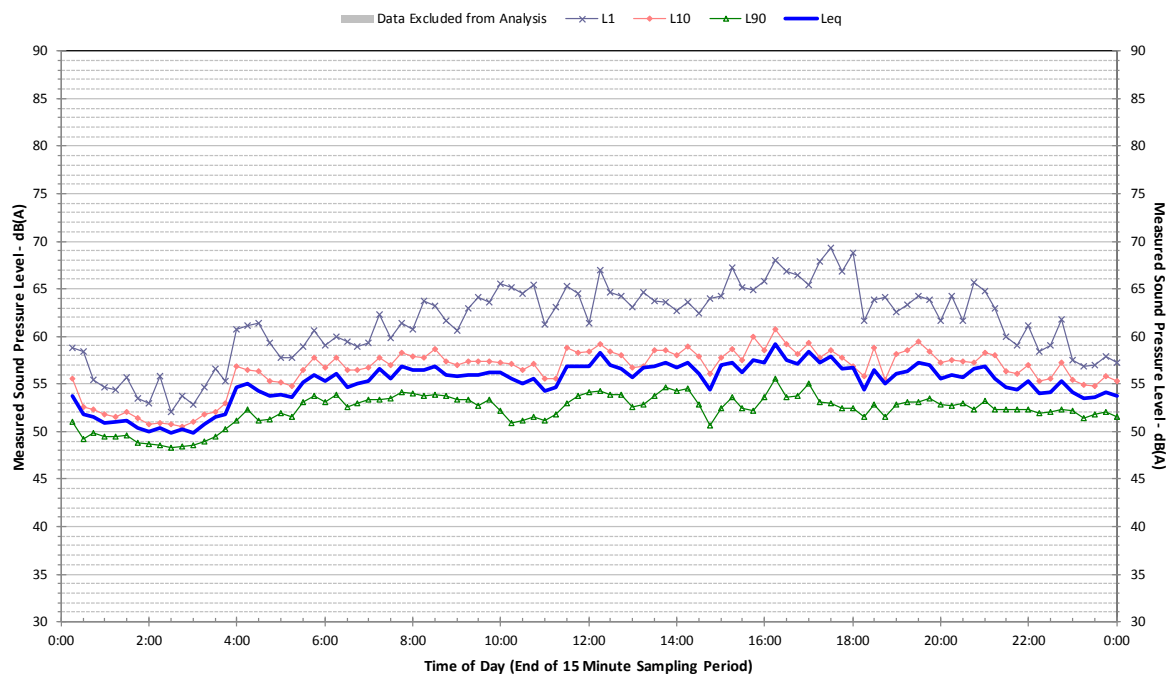
**Profile of Noise Environment - Noise Monitoring Location - R2
Friday 11 May 2018**



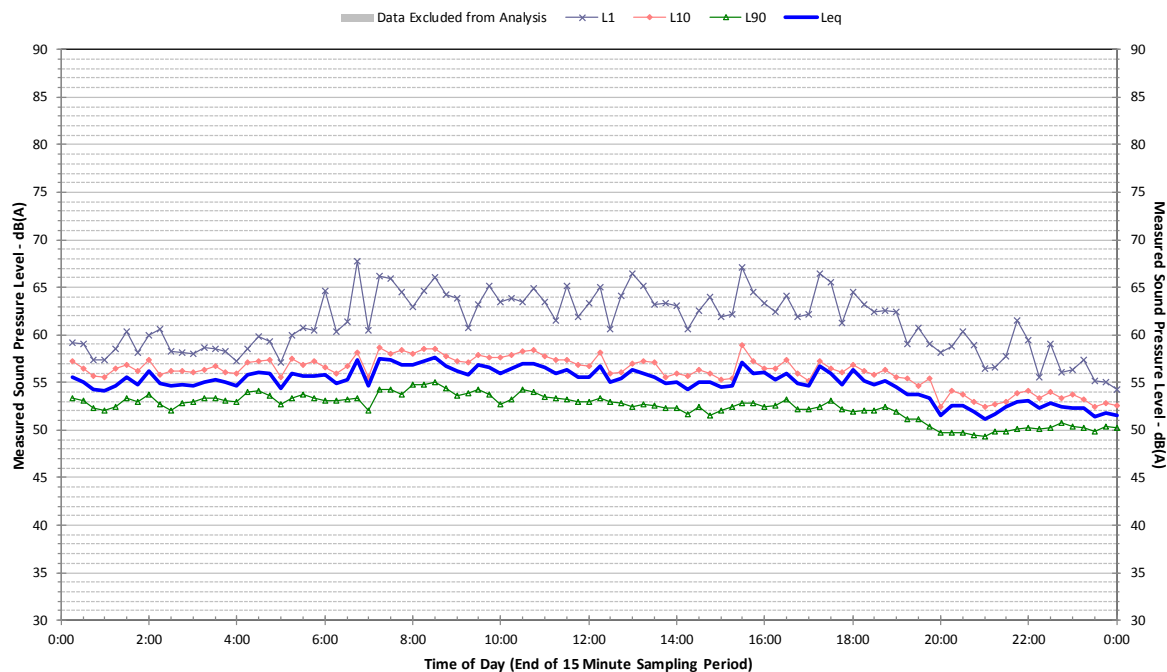
**Profile of Noise Environment - Noise Monitoring Location - R2
Saturday 12 May 2018**



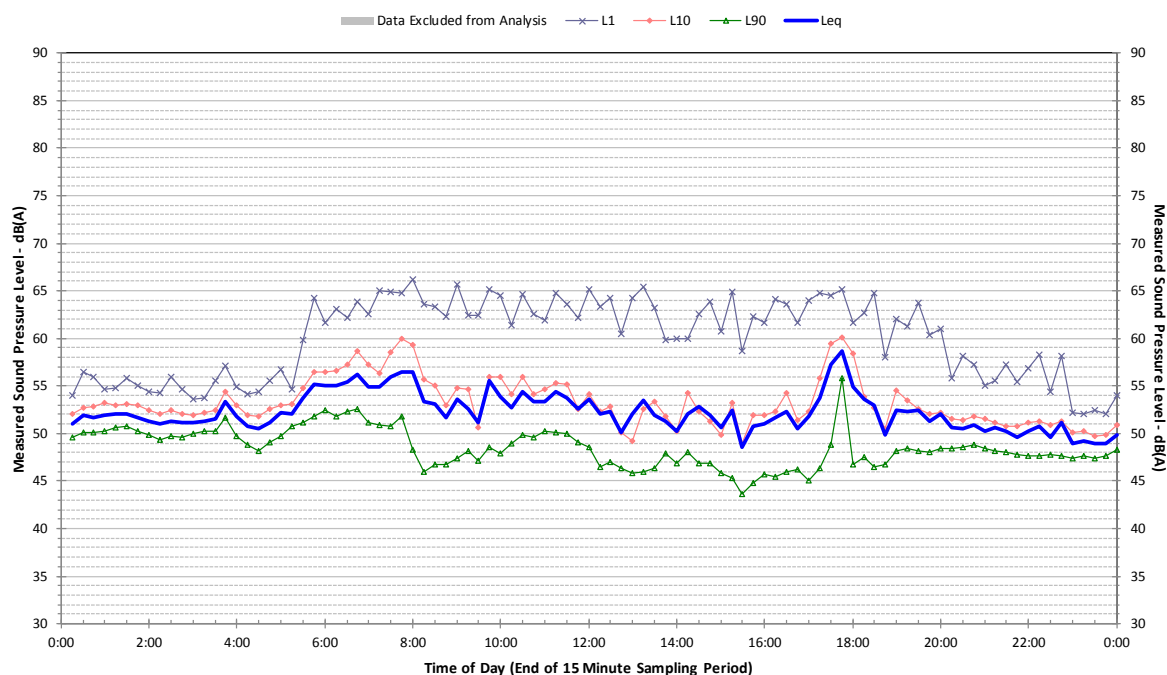
Profile of Noise Environment - Noise Monitoring Location - R2 Sunday 13 May 2018



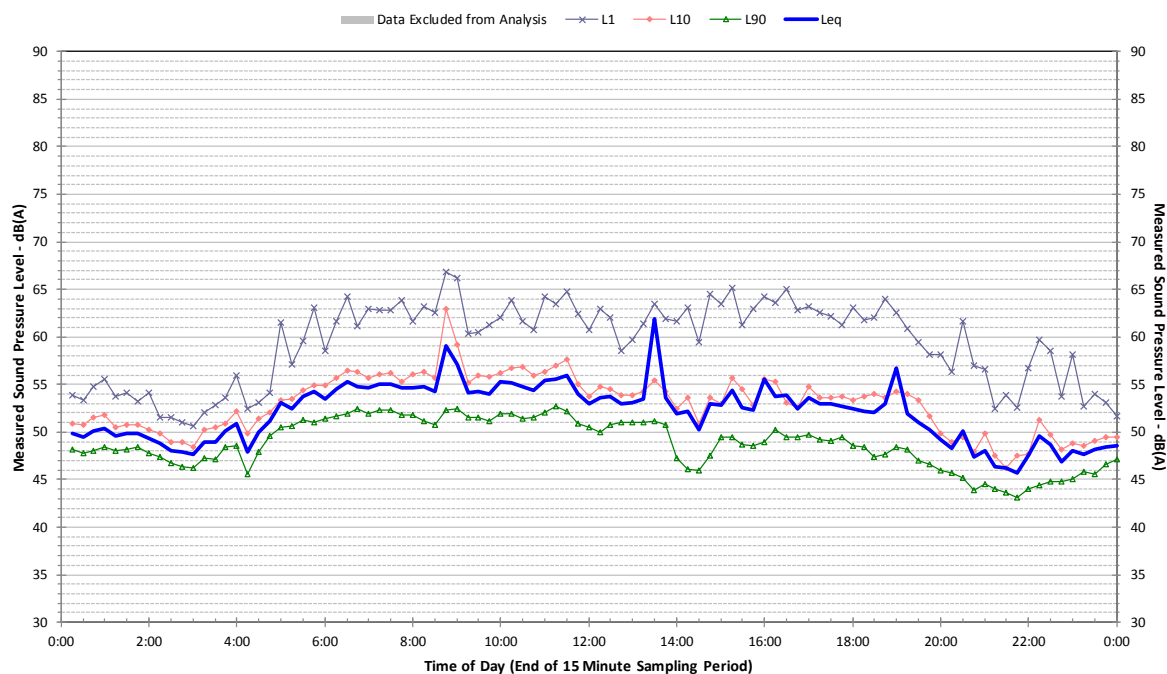
Profile of Noise Environment - Noise Monitoring Location - R2 Monday 14 May 2018



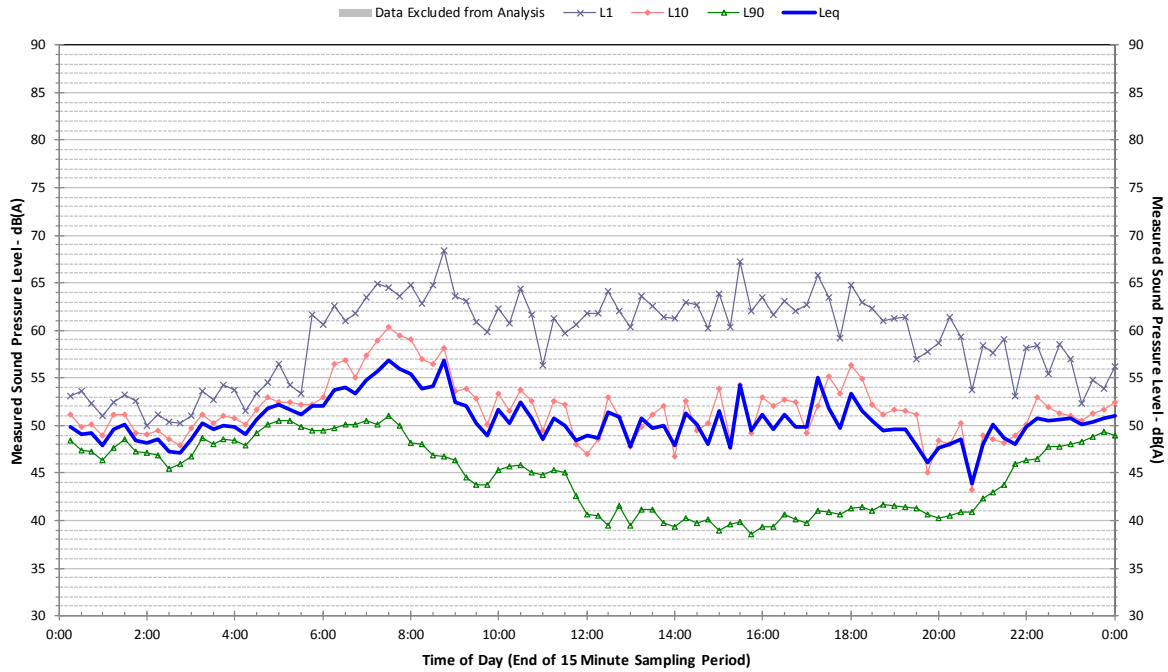
Profile of Noise Environment - Noise Monitoring Location - R2 Tuesday 15 May 2018



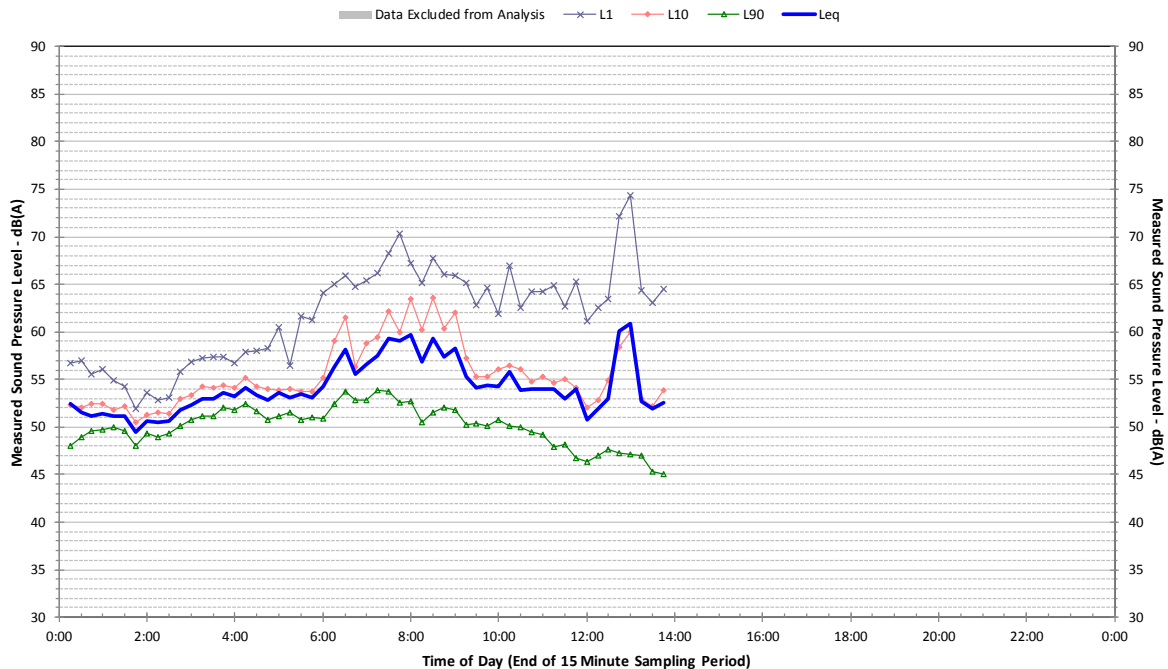
Profile of Noise Environment - Noise Monitoring Location - R2 Wednesday 16 May 2018



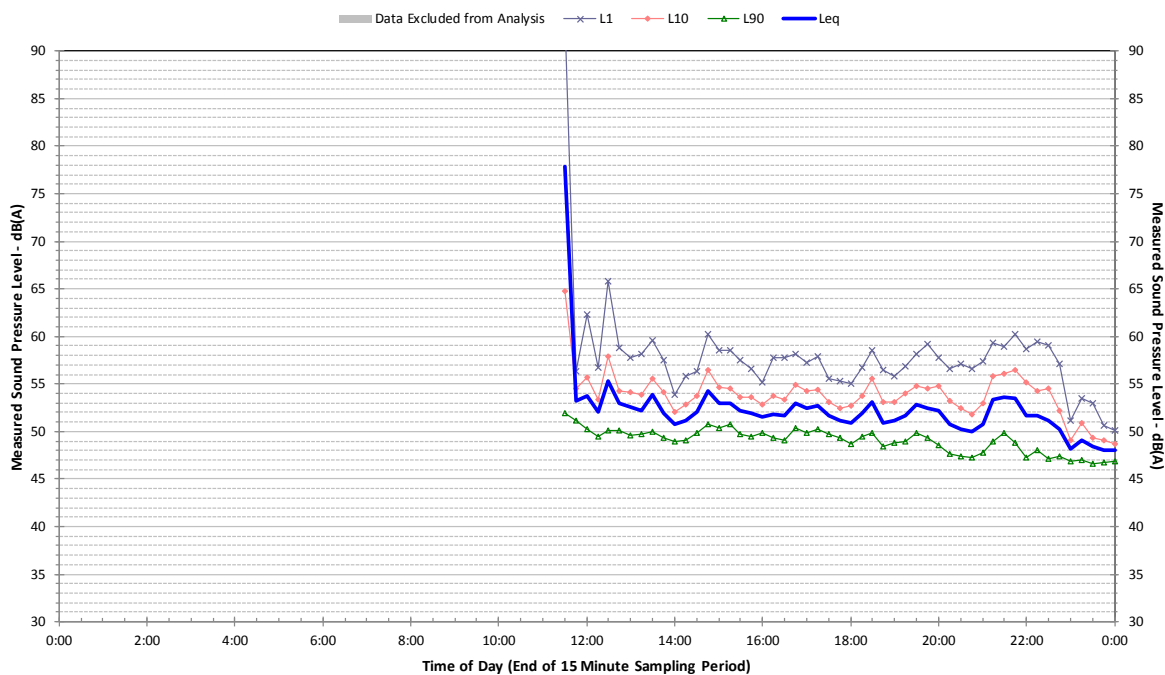
Profile of Noise Environment - Noise Monitoring Location - R2 Thursday 17 May 2018



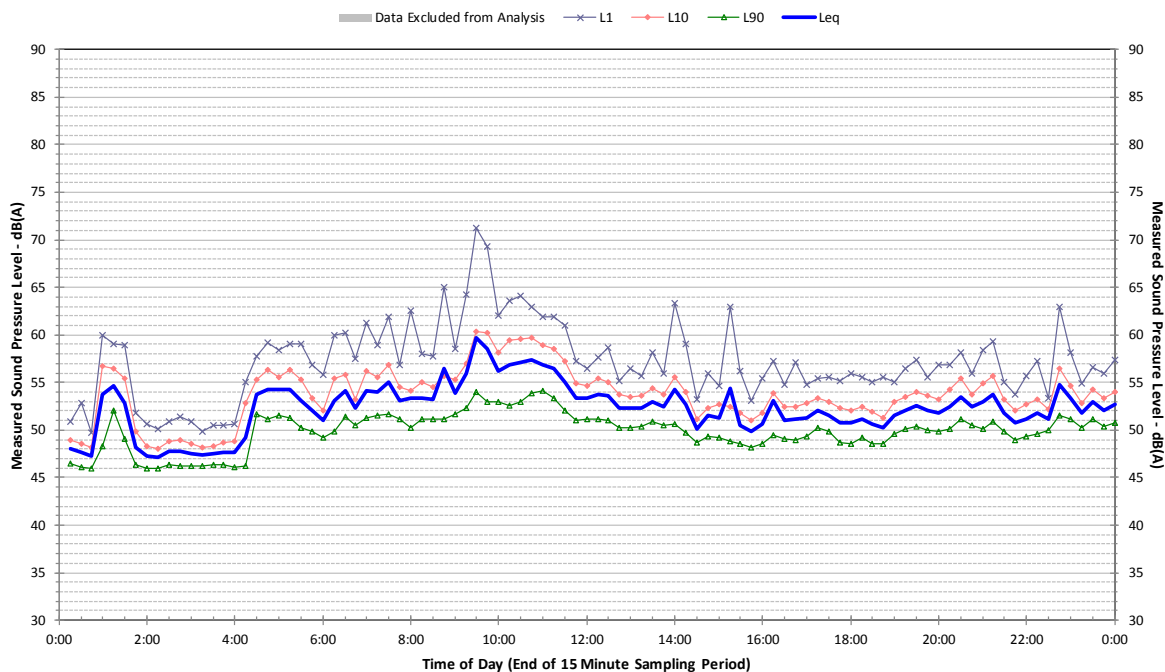
Profile of Noise Environment - Noise Monitoring Location - R2 Friday 18 May 2018



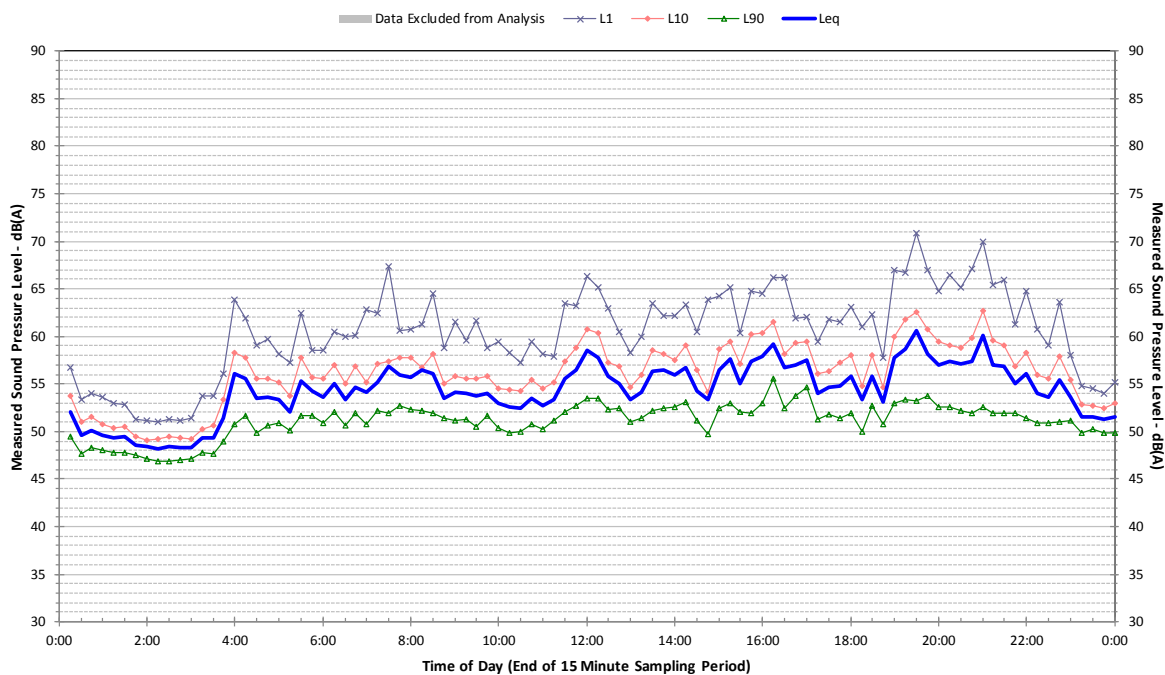
**Profile of Noise Environment - Noise Monitoring Location - R3
Friday 11 May 2018**



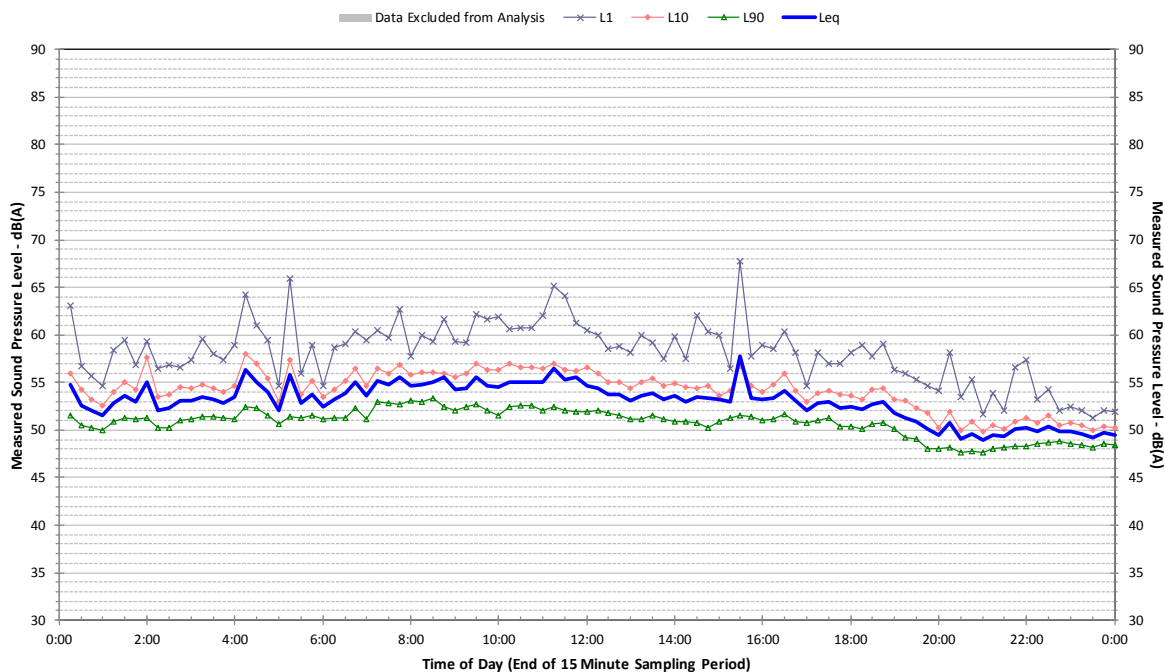
**Profile of Noise Environment - Noise Monitoring Location - R3
Saturday 12 May 2018**



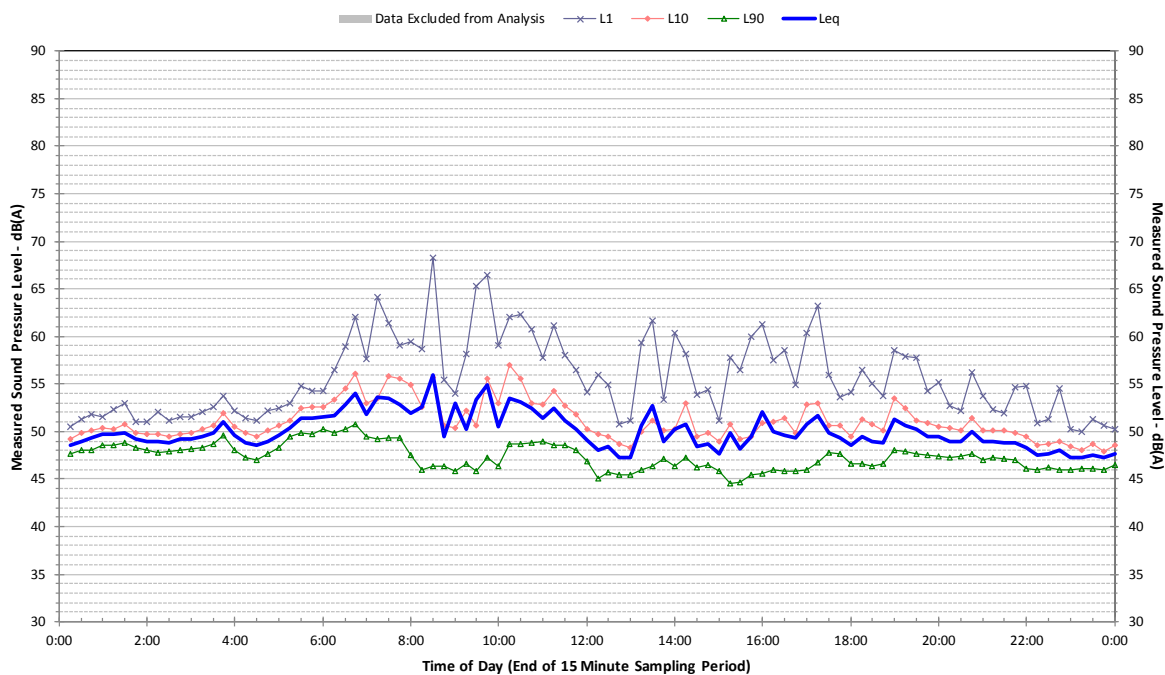
**Profile of Noise Environment - Noise Monitoring Location - R3
Sunday 13 May 2018**



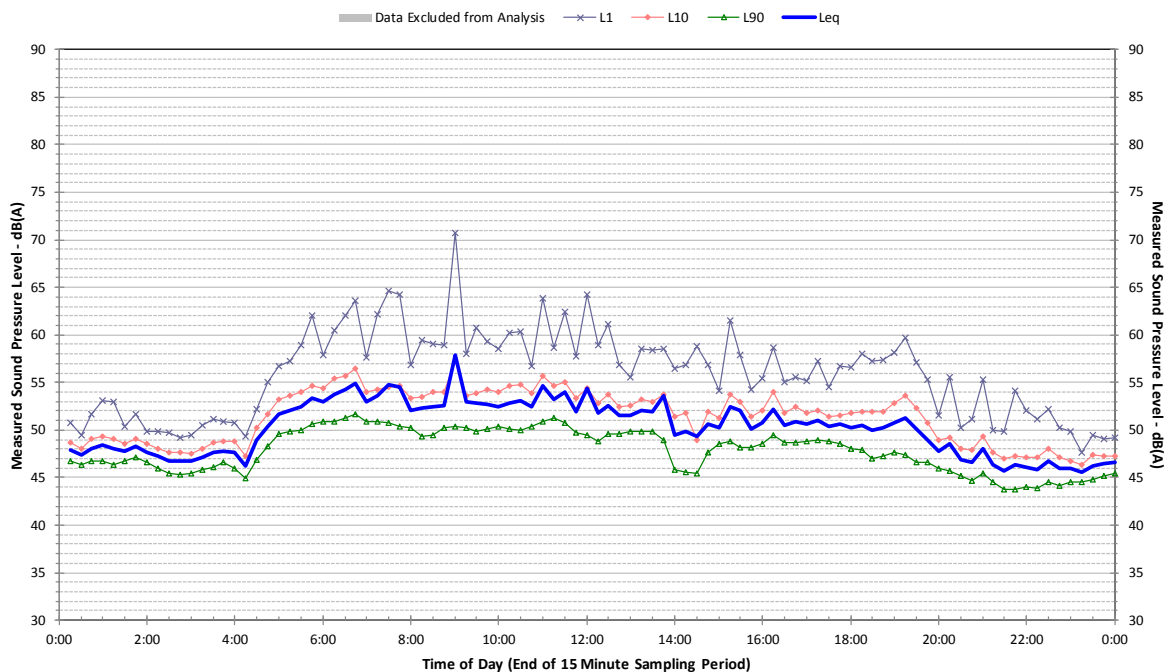
**Profile of Noise Environment - Noise Monitoring Location - R3
Monday 14 May 2018**



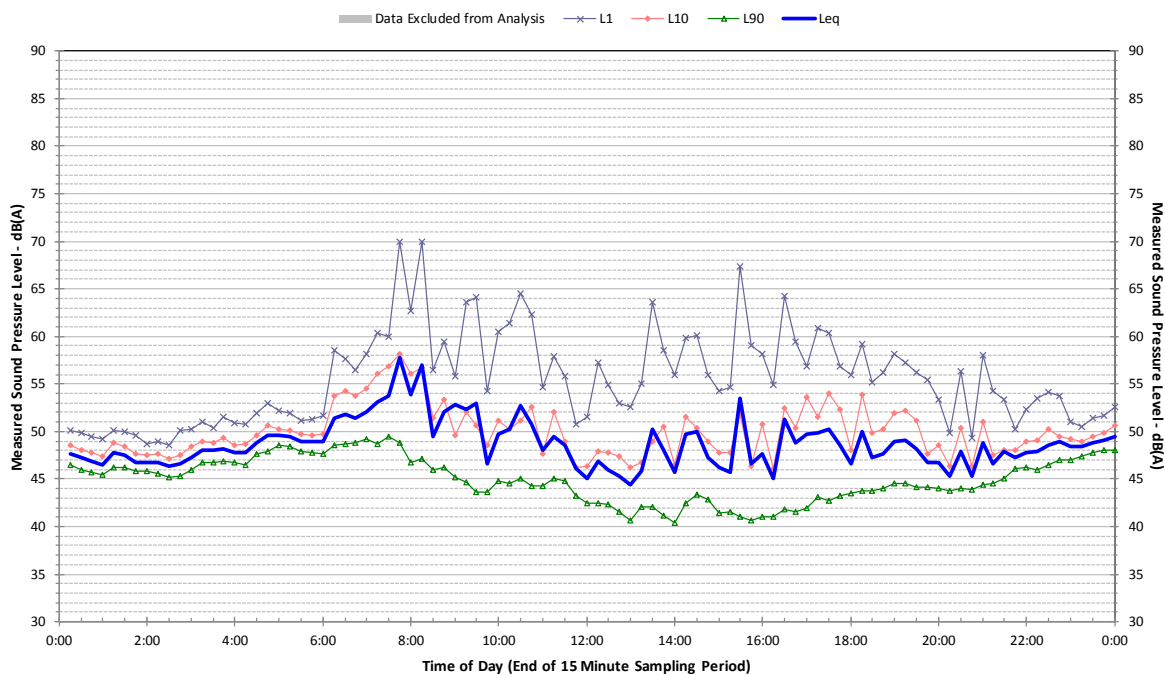
Profile of Noise Environment - Noise Monitoring Location - R3 Tuesday 15 May 2018



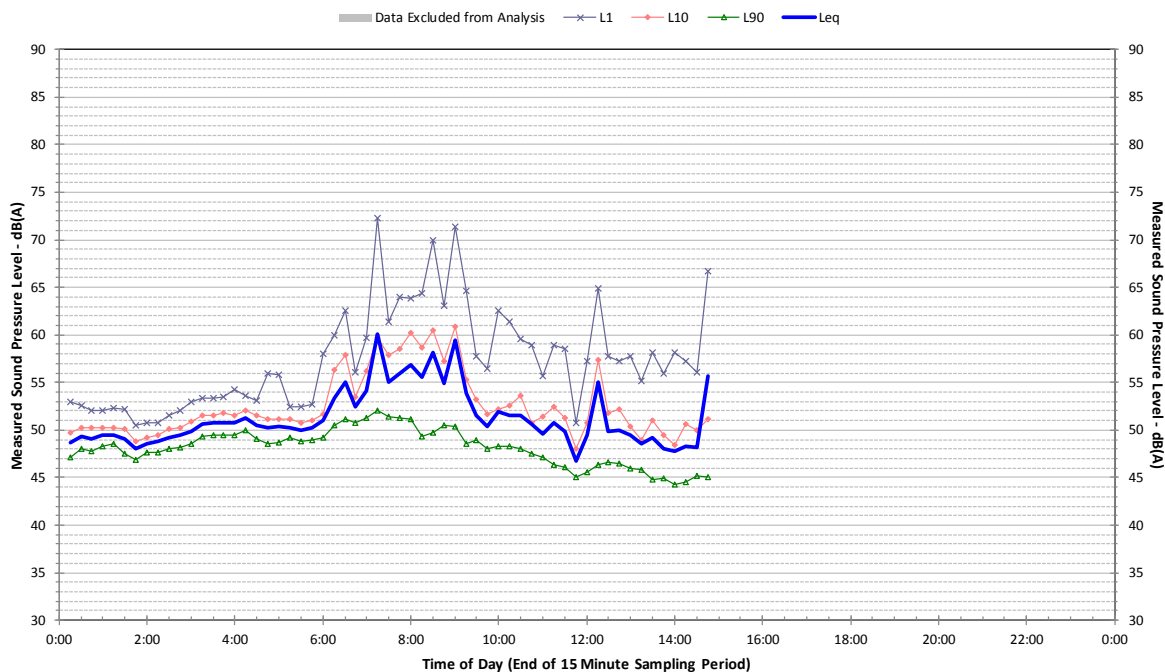
Profile of Noise Environment - Noise Monitoring Location - R3 Wednesday 16 May 2018



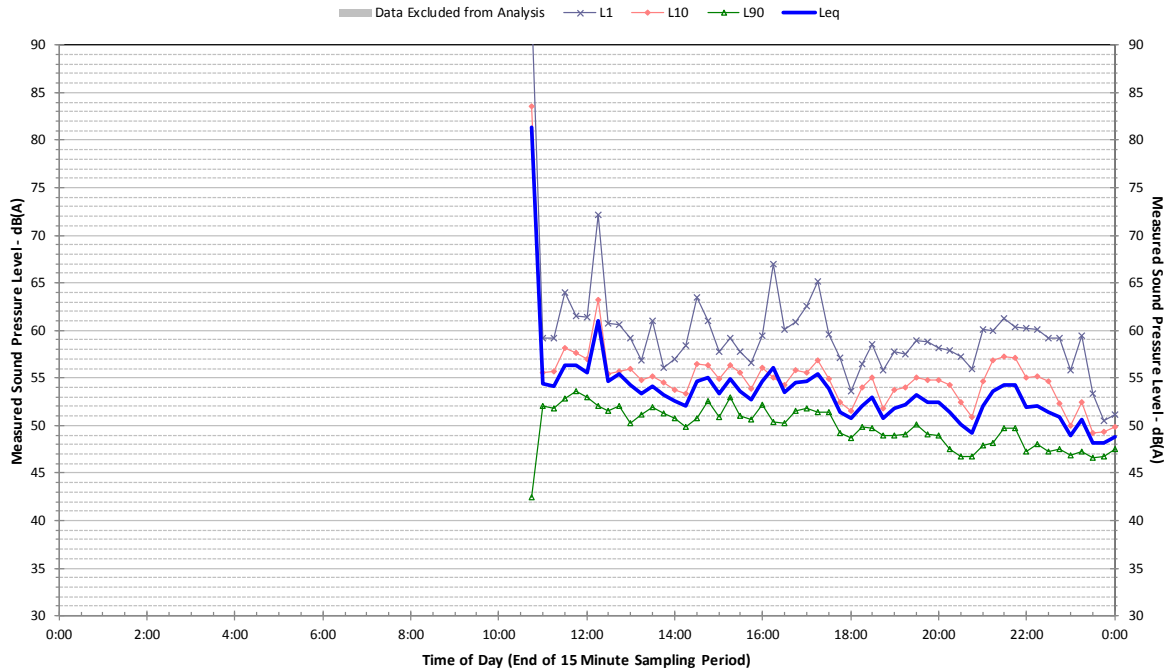
**Profile of Noise Environment - Noise Monitoring Location - R3
Thursday 17 May 2018**



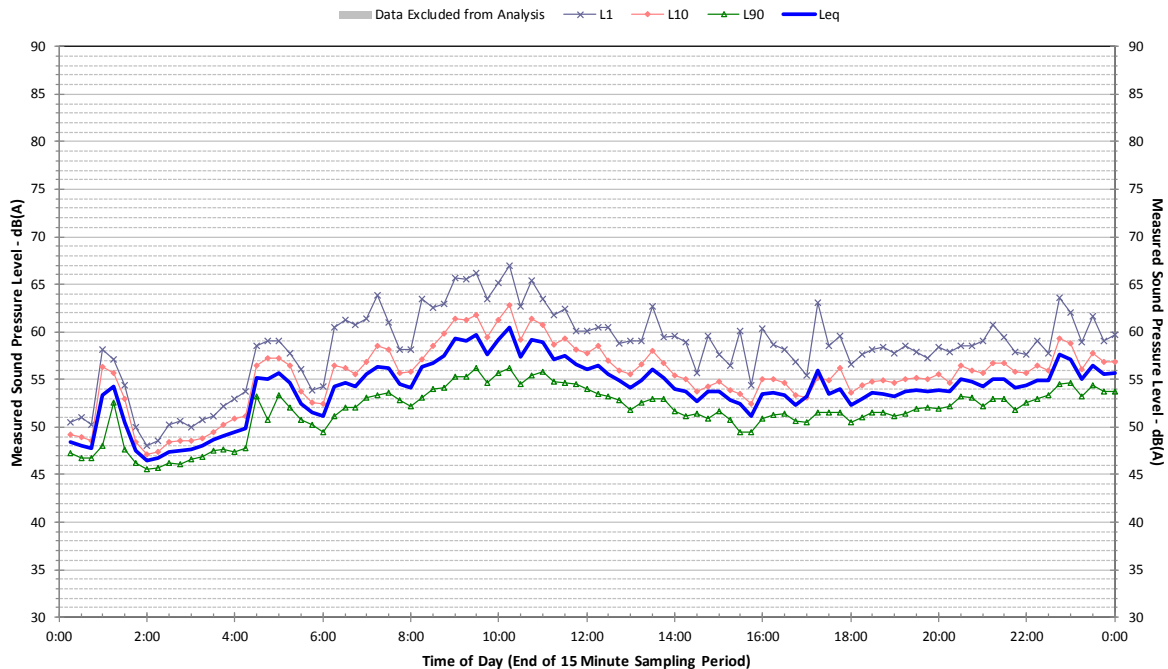
**Profile of Noise Environment - Noise Monitoring Location - R3
Friday 18 May 2018**



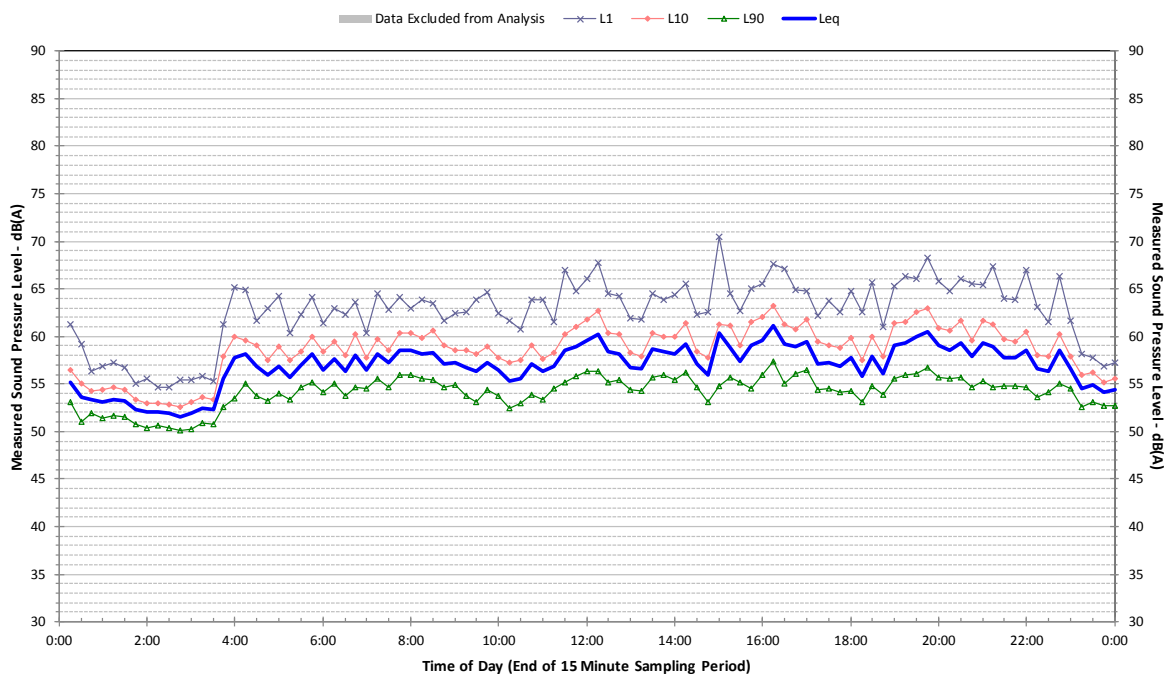
Profile of Noise Environment - Noise Monitoring Location - R4 Friday 11 May 2018



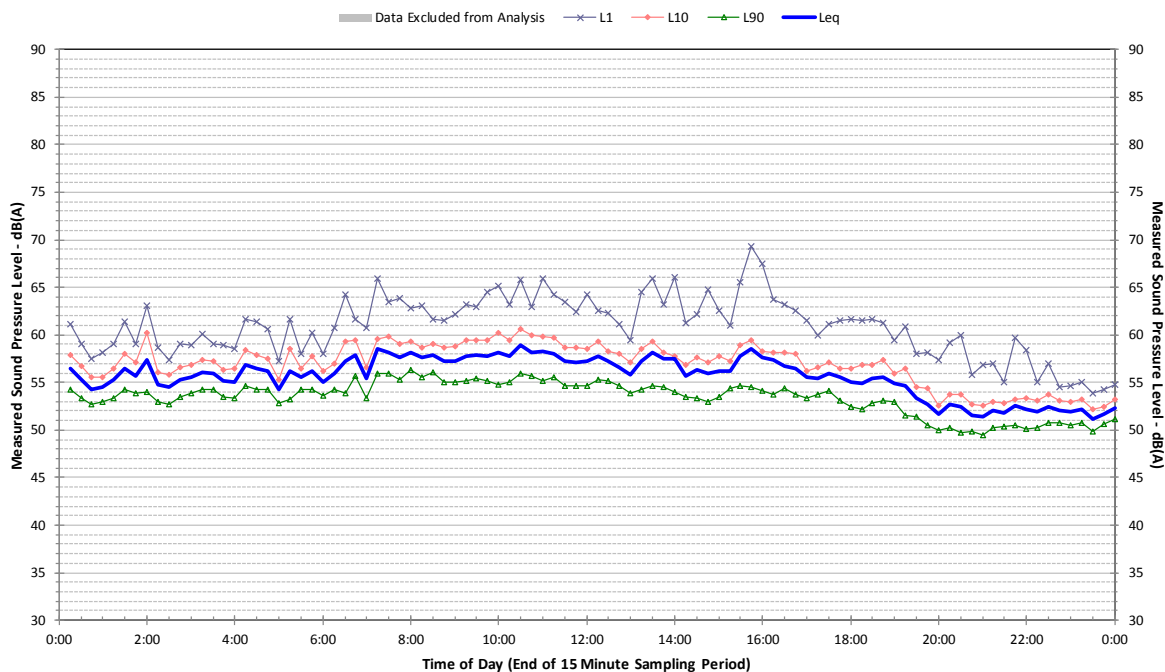
Profile of Noise Environment - Noise Monitoring Location - R4 Saturday 12 May 2018



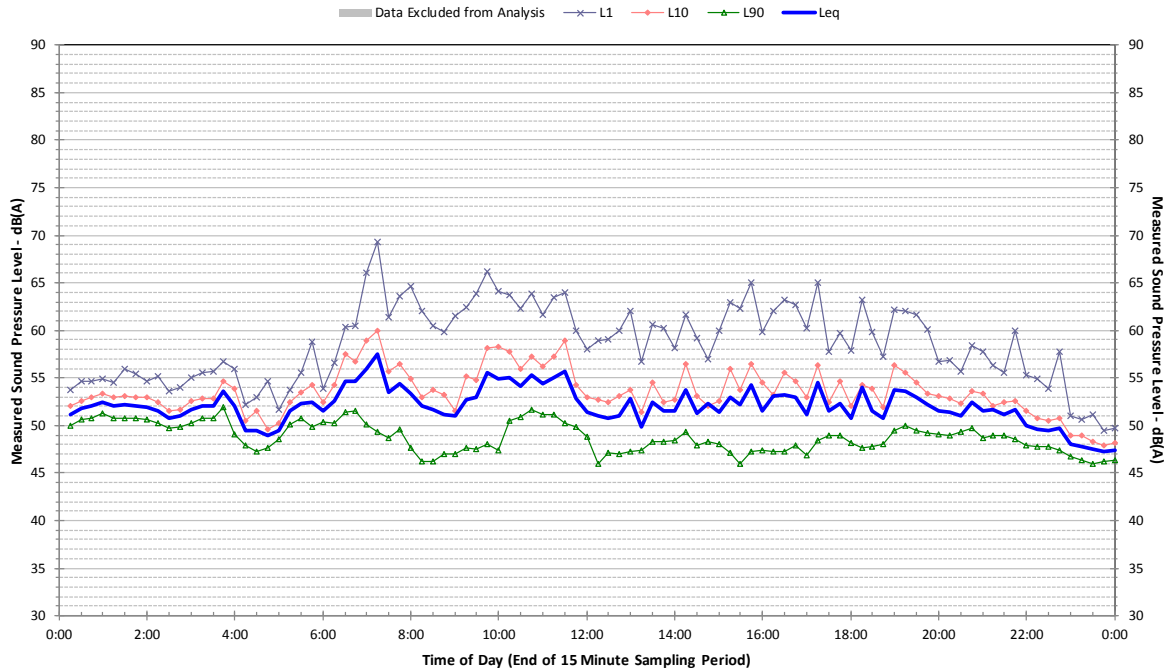
Profile of Noise Environment - Noise Monitoring Location - R4 Sunday 13 May 2018



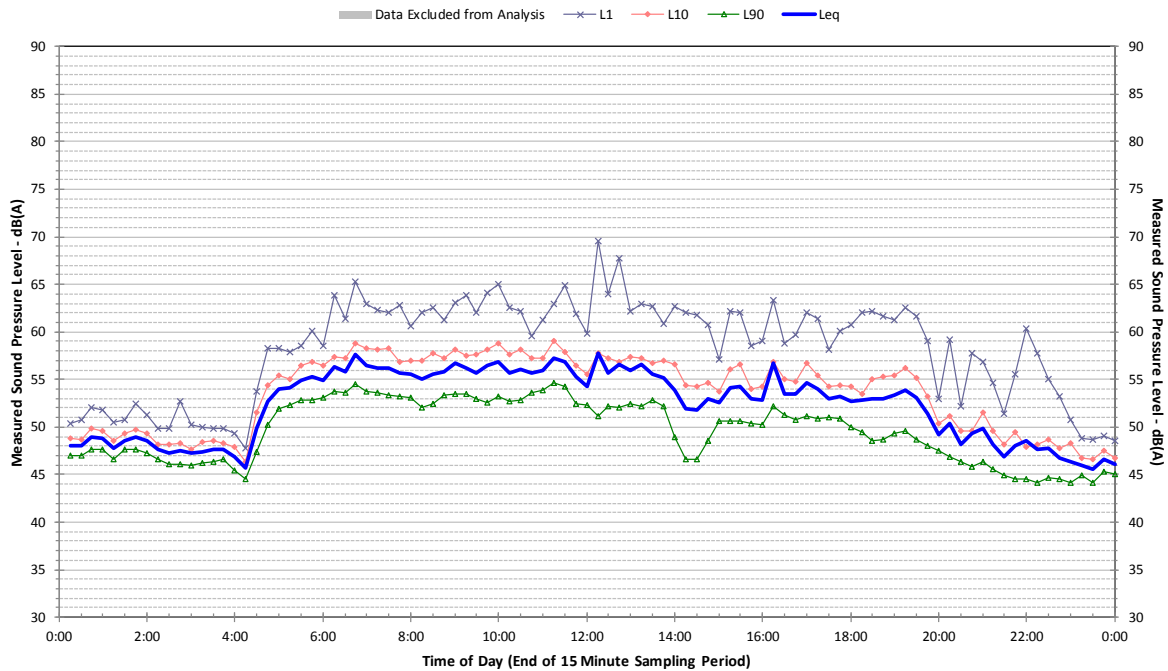
Profile of Noise Environment - Noise Monitoring Location - R4 Monday 14 May 2018



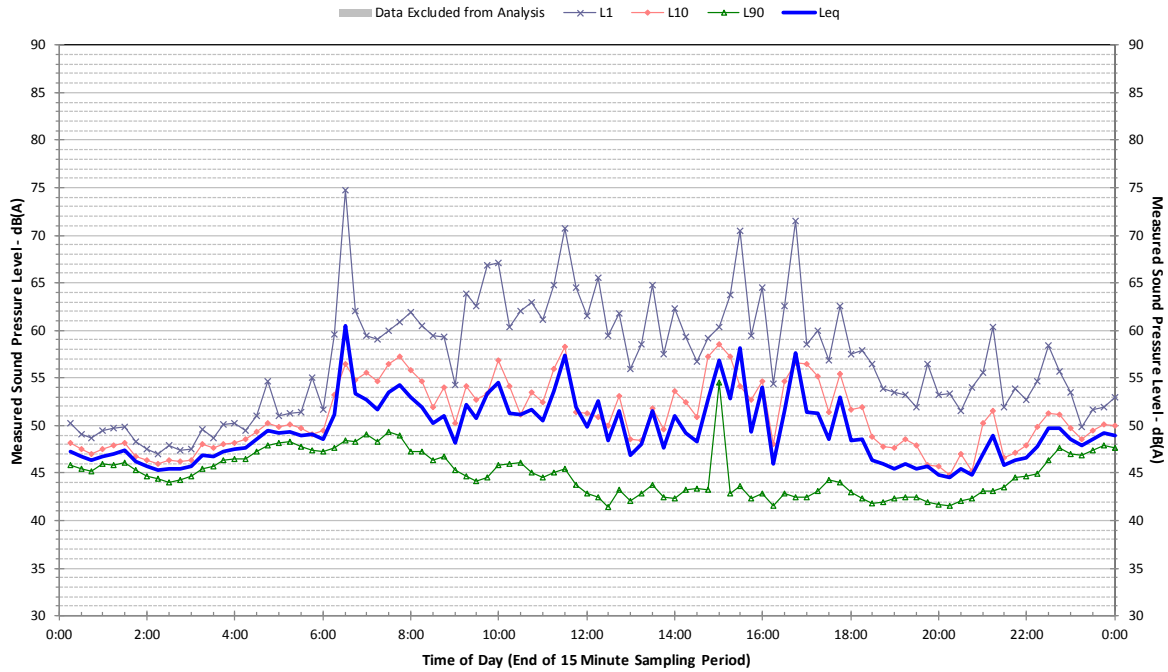
Profile of Noise Environment - Noise Monitoring Location - R4 Tuesday 15 May 2018



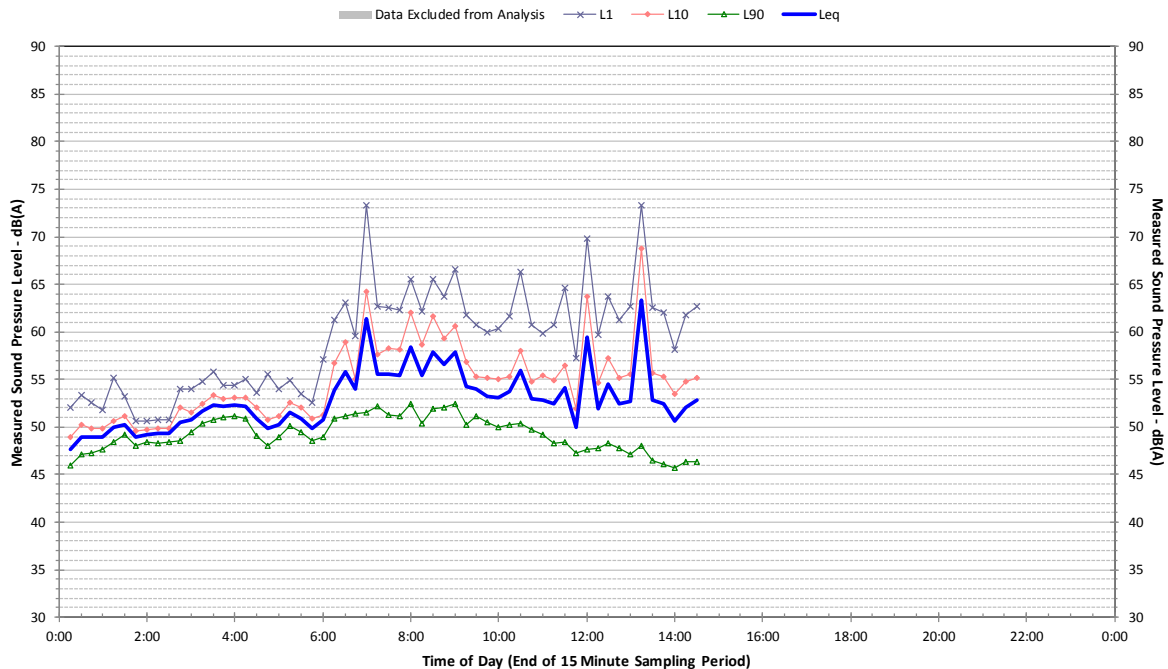
Profile of Noise Environment - Noise Monitoring Location - R4 Wednesday 16 May 2018



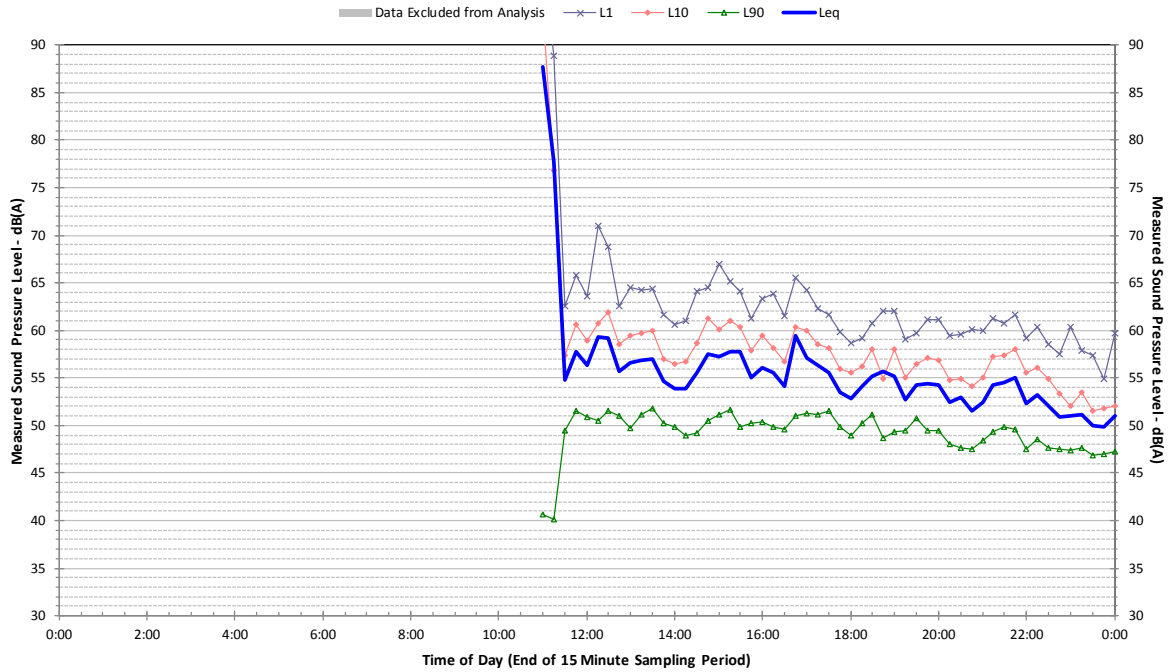
Profile of Noise Environment - Noise Monitoring Location - R4 Thursday 17 May 2018



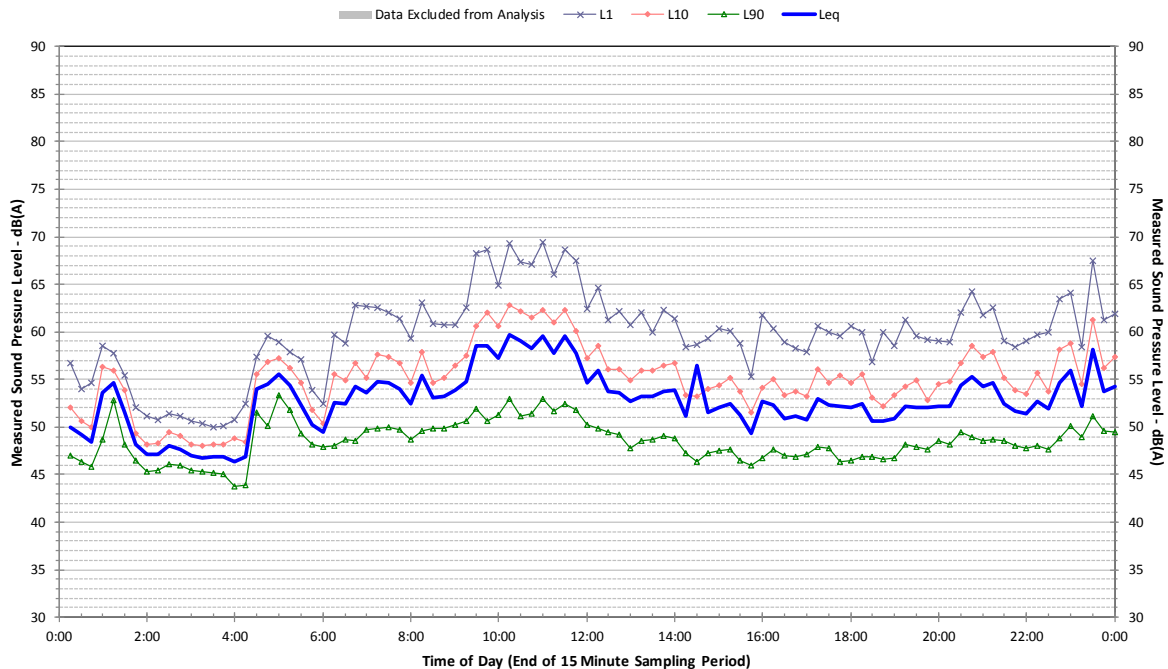
Profile of Noise Environment - Noise Monitoring Location - R4 Friday 18 May 2018



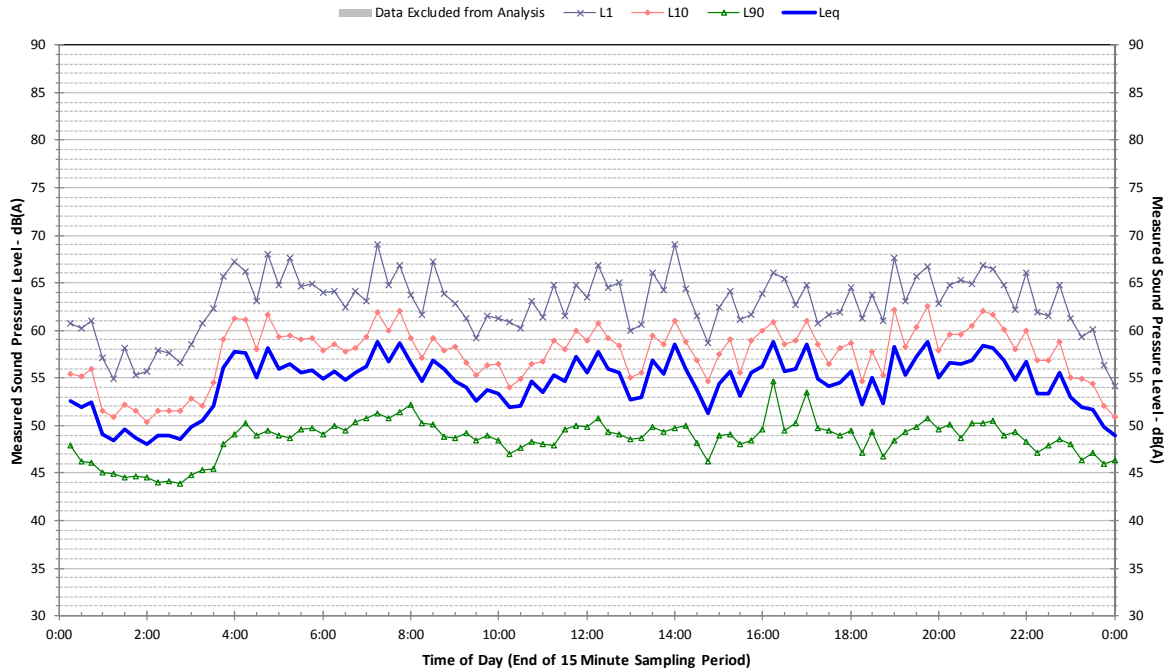
Profile of Noise Environment - Noise Monitoring Location - R5 Friday 11 May 2018



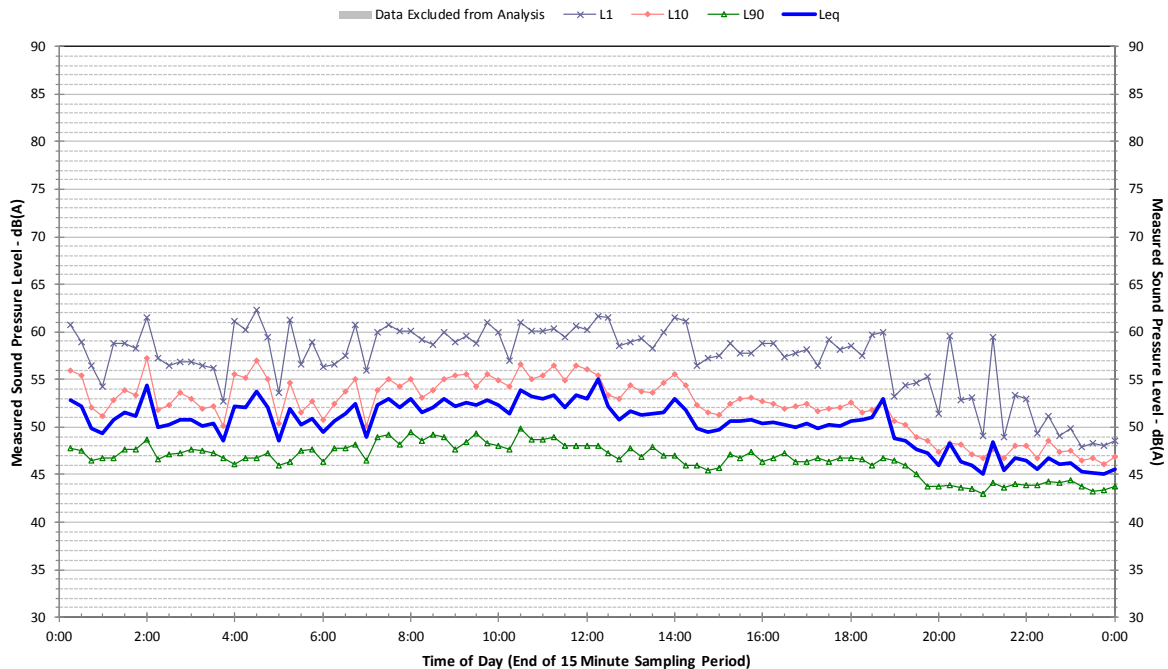
Profile of Noise Environment - Noise Monitoring Location - R5 Saturday 12 May 2018



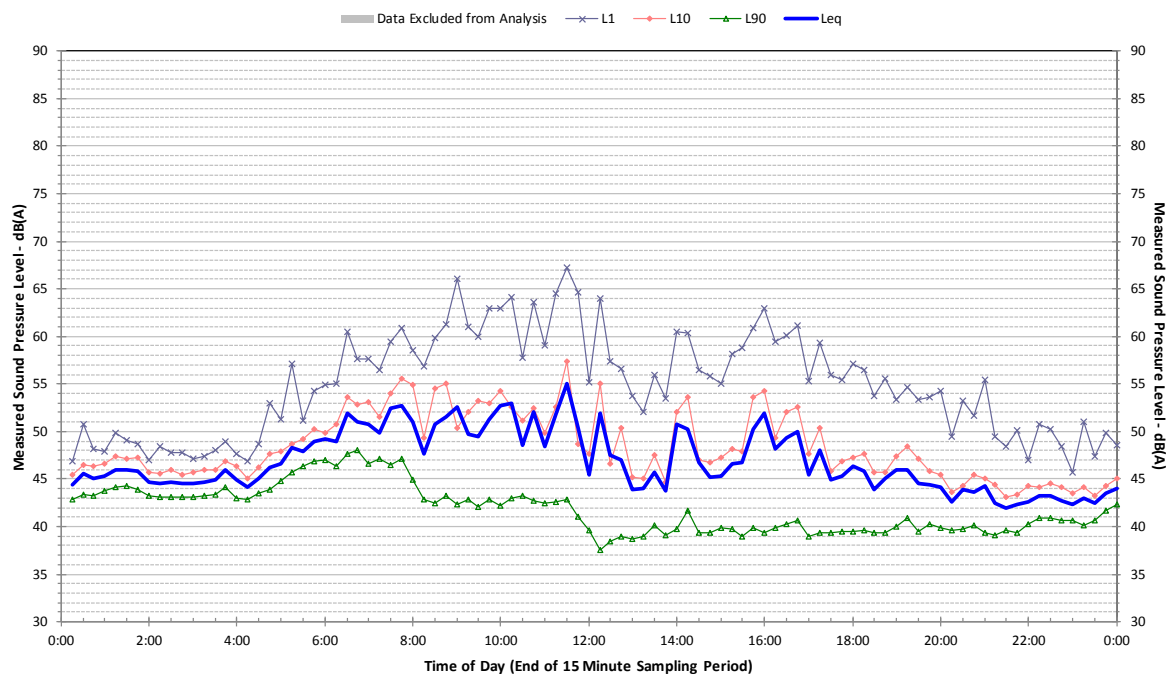
Profile of Noise Environment - Noise Monitoring Location - R5 Sunday 13 May 2018



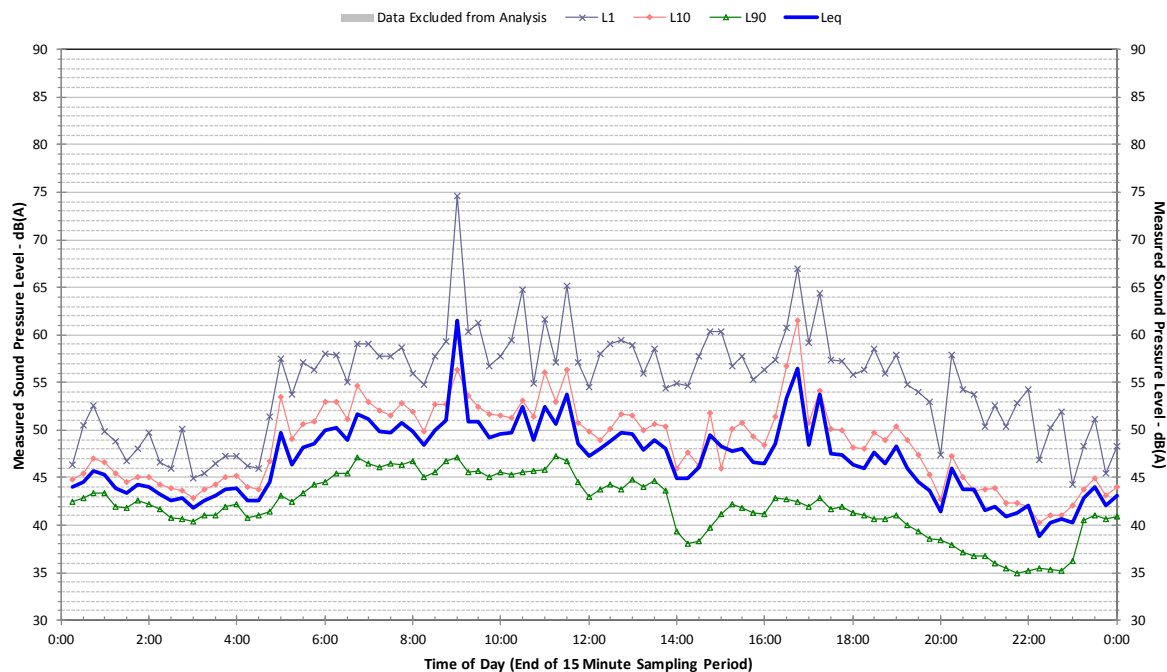
Profile of Noise Environment - Noise Monitoring Location - R5 Monday 14 May 2018



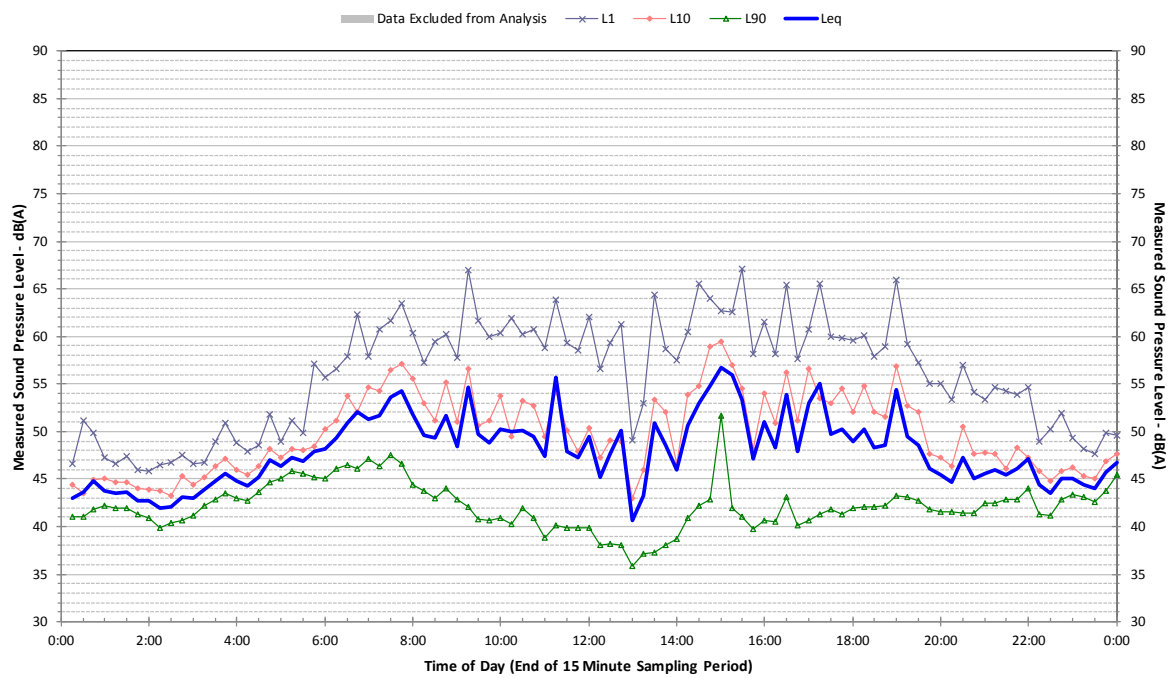
**Profile of Noise Environment - Noise Monitoring Location - R5
Tuesday 15 May 2018**



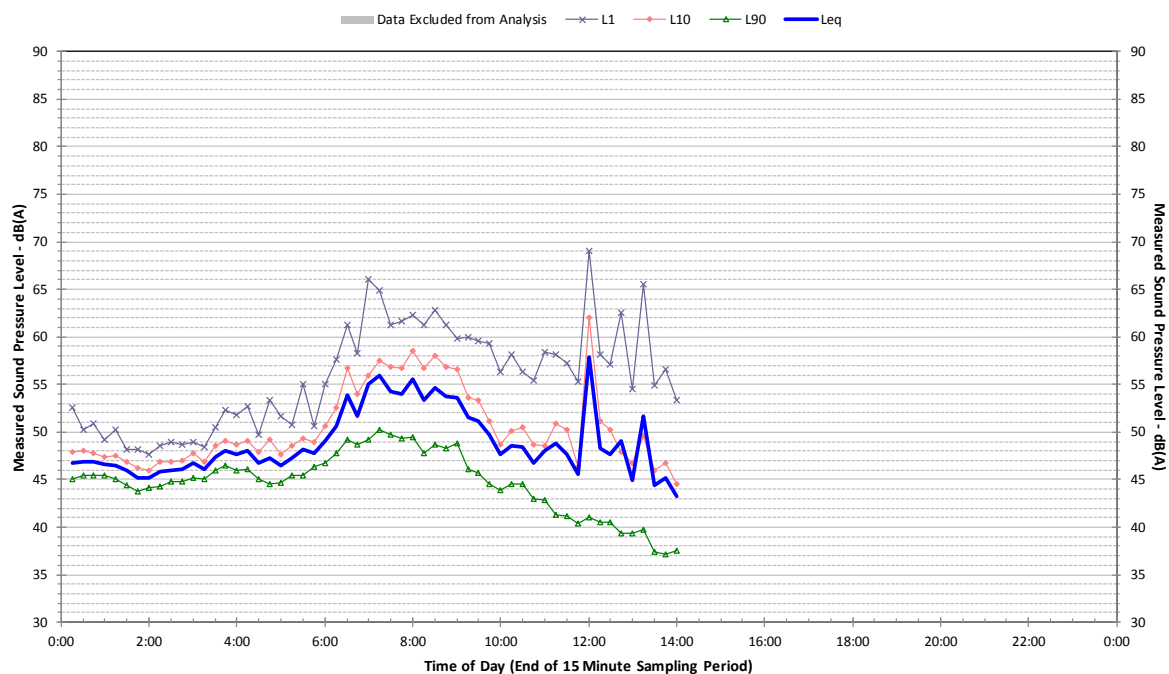
**Profile of Noise Environment - Noise Monitoring Location - R5
Wednesday 16 May 2018**



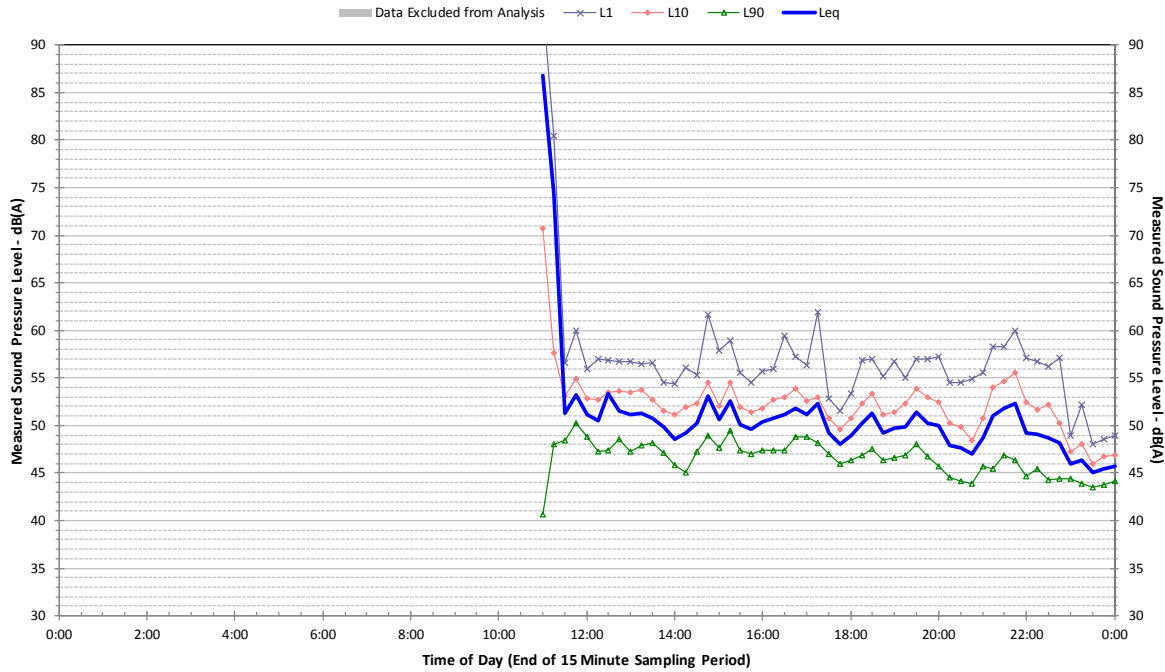
Profile of Noise Environment - Noise Monitoring Location - R5 Thursday 17 May 2018



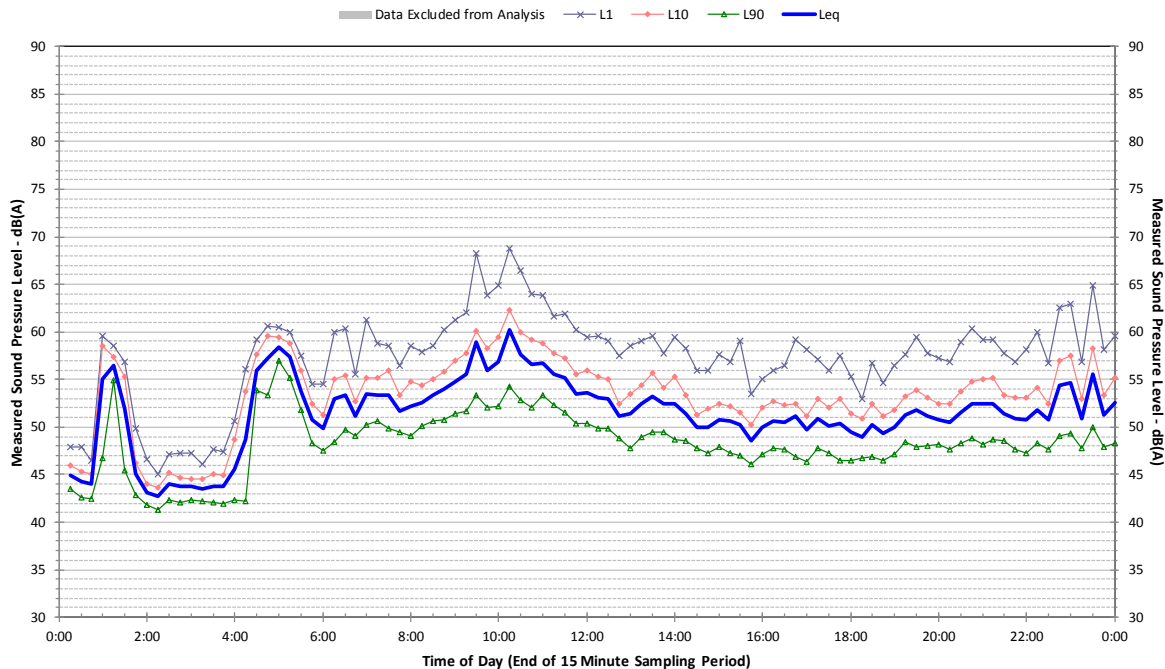
Profile of Noise Environment - Noise Monitoring Location - R5 Friday 18 May 2018



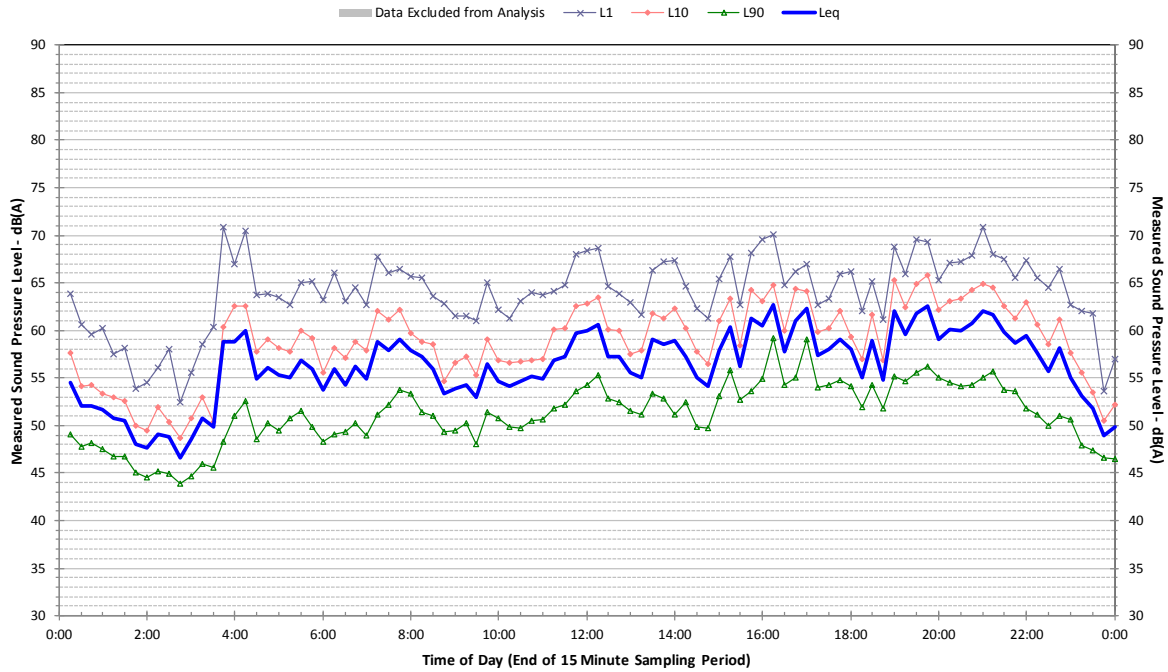
Profile of Noise Environment - Noise Monitoring Location - R6 Friday 11 May 2018



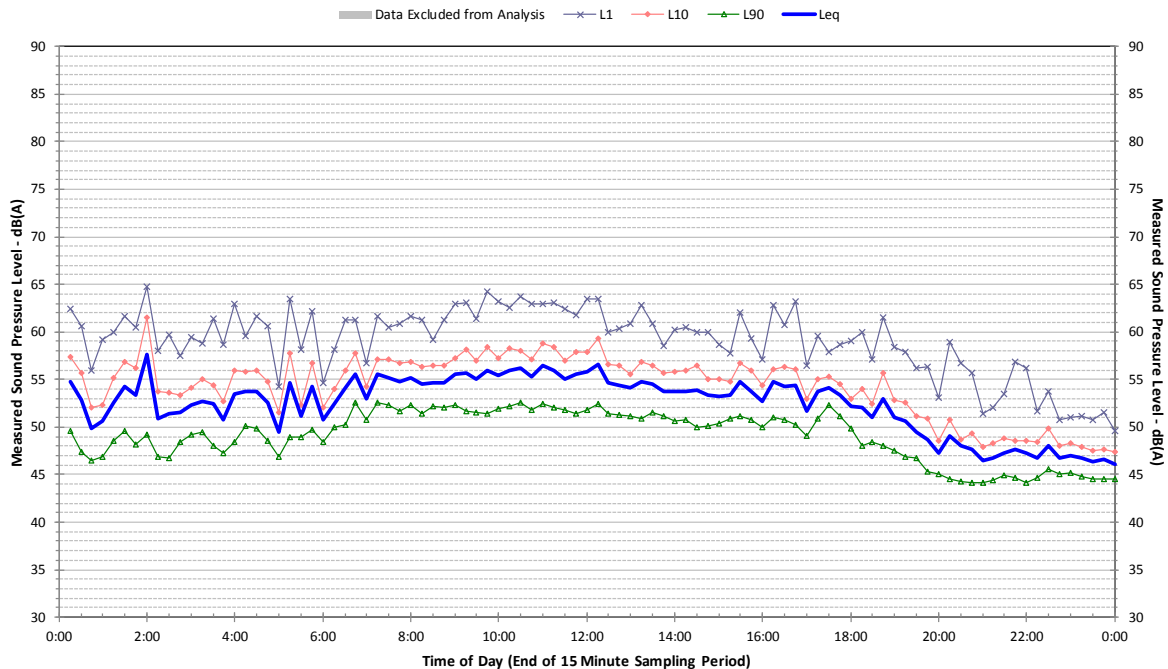
Profile of Noise Environment - Noise Monitoring Location - R6 Saturday 12 May 2018



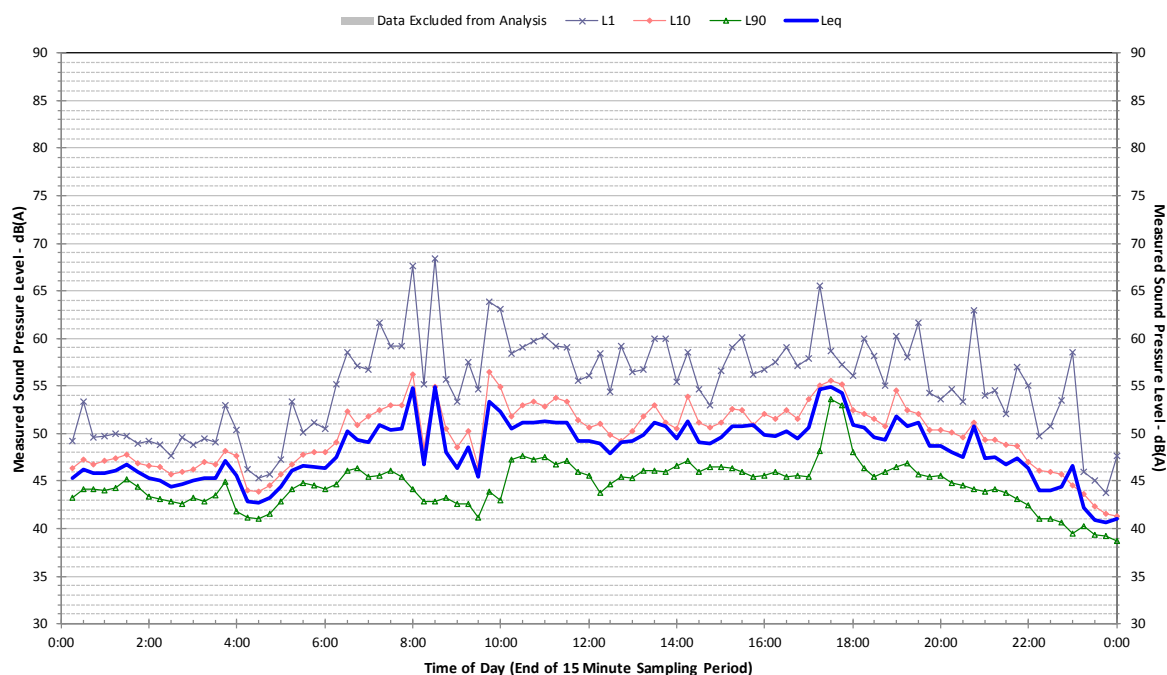
Profile of Noise Environment - Noise Monitoring Location - R6 Sunday 13 May 2018



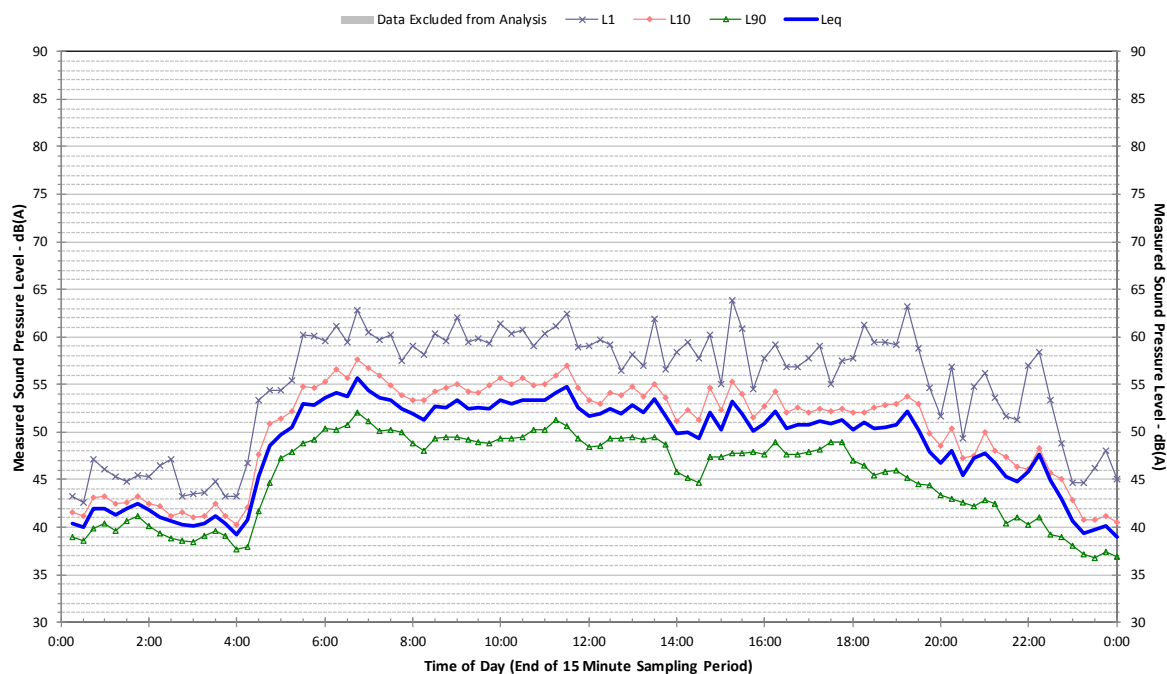
Profile of Noise Environment - Noise Monitoring Location - R6 Monday 14 May 2018



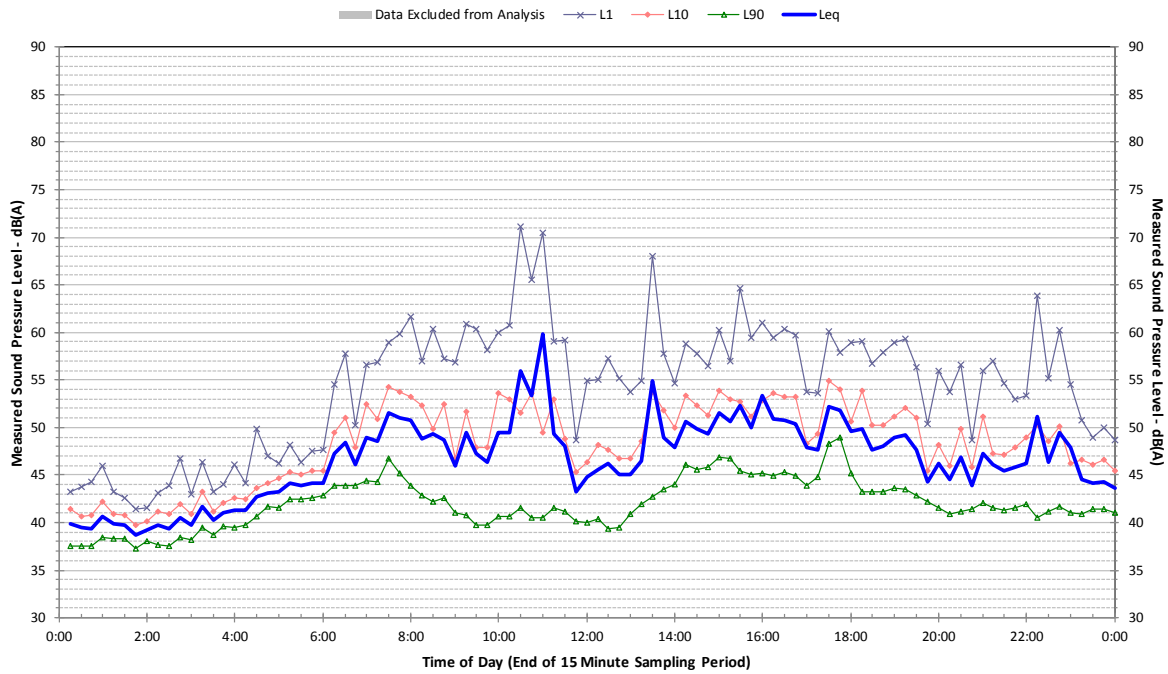
Profile of Noise Environment - Noise Monitoring Location - R6 Tuesday 15 May 2018



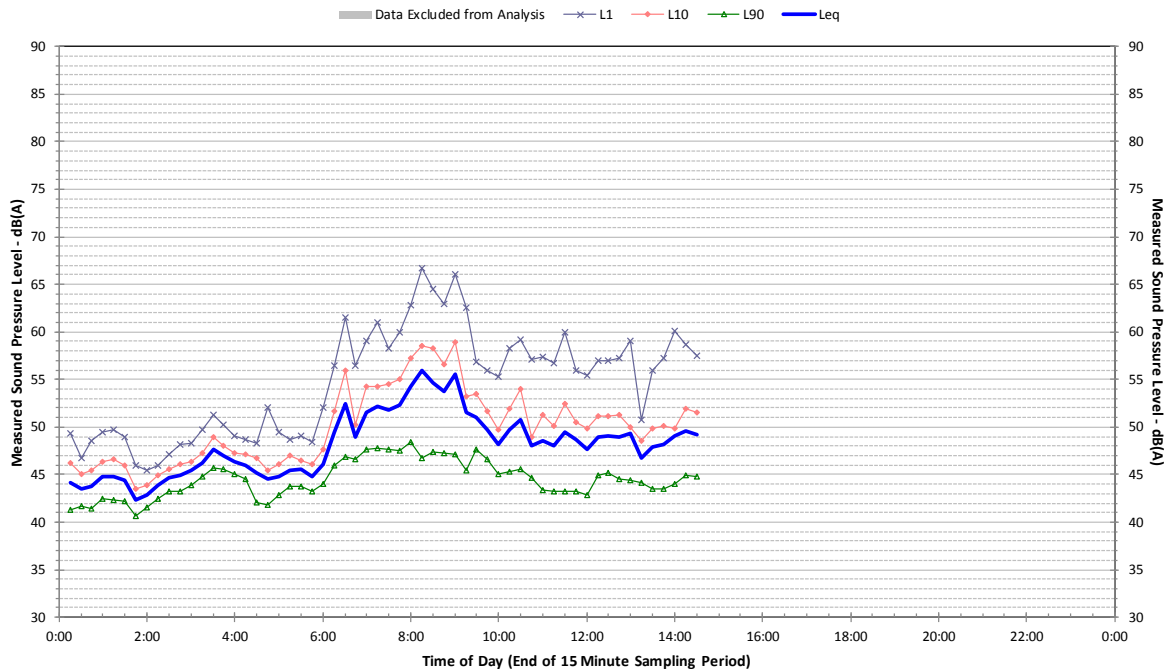
Profile of Noise Environment - Noise Monitoring Location - R6 Wednesday 16 May 2018



Profile of Noise Environment - Noise Monitoring Location - R6 Thursday 17 May 2018



Profile of Noise Environment - Noise Monitoring Location - R6 Friday 18 May 2018



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