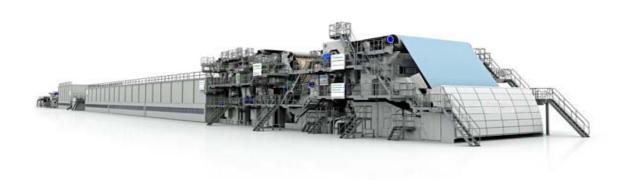
Orora Pty Ltd

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



28 March 2018

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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_{Aeg(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** (Lw): 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 Lp): 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 January 2018 – March 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 has begun and was underway during the February noise monitoring survey. The facade of the building has been demolished place and a temporary noise wall constructed of shipping containers is currently providing a noise barrier for residents in Murrabin, Partanna and Moorina Avenues.

Figure 1-1 Figure shows the scale and location of the noise wall relative to residents in Partanna Avenue.



Figure 1-1 Location and scale of temporary noise wall – B7 demolition

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 L _{Aeq,15min} , dB(A)	Evening L _{Aeq,15min} , dB(A)	Night L _{Aeq,15min} , dB(A)	Night 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 McCauly 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 February monitoring period was completed between 23 February and 5 March 2018, using automatic noise loggers deployed at six representative locations.

This survey covered a period of about 4 days where the B9 paper mill was undergoing a shut down and therefore was non-operational. During this time it is possible to measure ambient noise levels in the vicinity of the paper mill and compare the measured levels to those prior to and following the shut down period.

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.

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 speed which are presented in Figure 3-1.

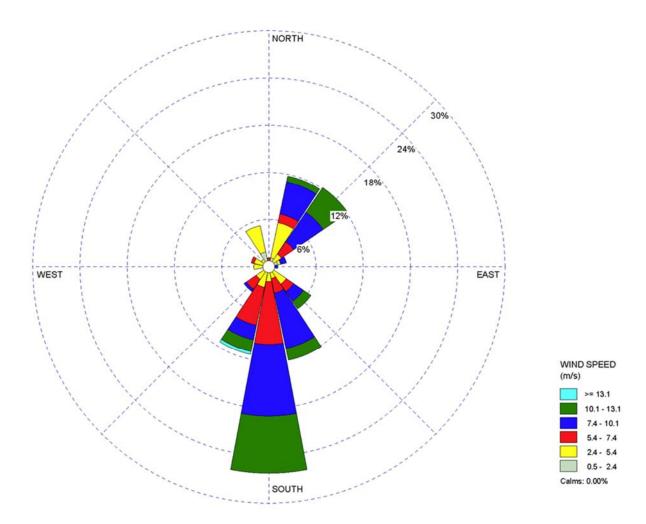


Figure 3-1 Wind speed and direction during monitoring period (23 February – 5 March 2018, source BoM 2018)

The plotted data indicates that the wind direction during the monitoring period was dominated by winds from the south with only minor variance. About 33% of the total measurements were observed between 0 to 5.5 m/s. Wind speeds above 5.5 m/s were present for about 67% of the monitoring time.

Wind from the southerly directions are expected to direct noise from Port Botany, Botany Road and the Orora site in the direction of receivers north of the site. The prevailing southerly winds during this time would tend to enhance the influence from all sources equally.

3.2 Monitoring results

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 at more or less a steady state 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 February 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.

During the February 2018 quarterly noise survey, a site wide shut down was captured in the monitoring data. The general details of the timing for maintenance activities are as follows:

• Production stopped: 11:50pm, 25 February 2018

• Steam out of dryers: 12:30am, 26 February 2018

Pulping started: 12:18pm, 2 March 2018

Production start-up complete (making paper): 9:30pm, 2 March 2018

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).

Although not clear, the increased noise levels during the shutdown period may have been the result of meteorological influences or night time activities from industrial sources other than Orora. This round of monitoring provides additional evidence that Orora's contribution to background noise levels is not significant and that there is no appreciable change to the noise environment occurs as a result of its operations.

While it has been 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. Monitoring results also indicate that the measured background noise levels during operations were below the EPL noise criteria.

The most recent round of compliance measurements has been added to the historical data collected during compliance monitoring. This data includes measurements of the noise environment both with the Orora site operational and without. Table 3 presents the assessment background noise levels and the rating background noise levels from the February 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 noise data measured during shutdown and normal operations summarised for monitoring from 2012 to present. These results demonstrate the degree of variability in the noise environment at these locations as well as any trends due to seasonal and local influences. The measured data for the most recent monitoring for February 2018 indicates that L_{A90} noise levels were well below the L_{Aeq} , 15 minute criteria at all sites and typically low by historical standards.

The 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 for the Orora site.

Table 3 Summary of noise monitoring

The second date #	Profile of Noise Environment - Noise Monitoring Location											
Time and date*	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 23 February 2018	44.6	62.4	41.7	72.9	43.8	77.1	44.3	69.4	45.2	67.9	47.7	63.7
Saturday 24 February 2018	41.7	52.1	40.9	50.0	42.2	63.2	43.1	54.1	41.9	55.5	41.9	55.6
Sunday 25 February 2018	48.8	56.8	50.4	55.9	47.8	53.7	49.1	55.7	41.9	53.2	44.9	54.7
Monday 26 February 2018	48.9	56.6	49.2	56.2	46.6	53.7	51.6	60.4	45.4	55.6	49.6	55.3
Tuesday 27 February 2018	41.6	52.9	41.5	53.9	40.3	51.3	43.9	56.9	40.3	52.0	43.0	52.0
Wednesday 28 February 2018	41.9	52.1	40.7	51.2	41.7	49.8	42.6	51.4	42.3	54.2	42.8	52.2
Thursday 1 March 2018	46.0	53.5	45.8	55.6	43.5	50.9	48.0	54.5	42.4	52.6	47.5	52.7
Friday 2 March 2018	44.4	54.4	46.2	70.5	42.7	50.1	46.1	55.6	40.9	52.7	45.6	53.8
Saturday 3 March 2018	39.7	50.2	39.6	66.7	40.0	49.5	42.0	63.5	38.0	53.5	40.7	52.9
Sunday 4 March 2018	47.0	54.9	48.6	56.0	46.4	52.2	49.3	55.6	43.3	53.3	46.4	55.8
Median	44.6	53.9	45.8	55.9	43.5	51.3	45.2	55.6	41.9	53.3	45.6	54.7
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 23 February 2018	44.2	51.3	43.0	50.4	43.6	50.4	44.0	51.2	44.7	56.4	46.6	53.8
Saturday 24 February 2018	42.9	49.7	41.2	47.5	42.8	48.7	43.0	53.8	44.3	54.1	45.1	59.9
Sunday 25 February 2018	48.8	56.3	46.9	54.7	47.7	55.0	48.5	55.7	47.9	55.9	52.1	58.4
Monday 26 February 2018	45.9	52.9	47.0	53.9	44.8	49.2	48.5	53.3	41.5	51.9	45.7	54.6
Tuesday 27 February 2018	41.0	49.8	36.1	53.9	35.2	46.9	39.4	51.0	35.8	53.3	41.0	56.3
Wednesday 28 February 2018	43.5	50.6	41.7	52.6	43.4	49.6	41.4	60.2	44.8	52.0	45.0	53.9
Thursday 1 March 2018	44.5	52.2	45.1	54.3	42.5	49.0	45.6	57.3	41.5	48.4	44.1	53.0
Friday 2 March 2018	40.7	54.4	40.4	49.4	35.9	44.8	40.7	57.2	37.8	50.0	40.3	51.9
Saturday 3 March 2018	41.0	49.0	41.9	52.3	39.9	46.5	40.4	58.1	41.8	51.1	41.8	51.7
Sunday 4 March 2018	46.5	51.5	48.5	52.1	45.9	49.4	48.2	52.2	42.9	53.2	43.6	50.6

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ORORA – B9 COMPLIANCE NOISE MONITORING

	Profile of Noise Environment - Noise Monitoring Location											
Time and date*	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 23 February 2018	37.5	45.6	38.0	45.8	39.1	44.7	41.7	46.3	36.6	45.2	36.1	46.3
Saturday 24 February 2018	41.1	47.3	42.8	49.6	41.7	47.0	44.1	48.4	38.7	45.9	38.8	44.3
Sunday 25 February 2018	45.8	53.8	45.1	51.5	44.8	51.2	46.3	52.3	43.2	53.6	47.8	55.8
Monday 26 February 2018	43.0	49.0	45.4	50.8	42.7	47.8	45.9	50.4	38.4	46.5	41.6	47.2
Tuesday 27 February 2018	39.8	45.9	39.4	47.0	38.8	45.5	39.7	44.2	34.9	44.6	37.6	43.5
Wednesday 28 February 2018	43.1	51.2	46.1	52.3	44.6	50.3	41.6	52.1	43.8	50.4	41.7	52.1
Thursday 1 March 2018	43.4	48.8	45.6	49.5	42.6	46.0	45.3	49.4	39.8	44.1	40.0	45.9
Friday 2 March 2018	38.0	44.0	39.0	45.7	36.5	42.1	39.6	43.3	37.9	43.0	35.1	42.0
Saturday 3 March 2018	38.3	44.8	38.8	46.8	39.3	43.0	40.3	44.0	39.1	44.3	36.5	42.5
Sunday 4 March 2018	42.4	47.4	45.4	49.7	42.6	46.1	46.8	49.8	38.8	43.8	39.1	45.5
Median	41.8	47.3	43.9	49.5	42.1	46.1	42.9	48.9	38.8	44.9	38.9	45.7

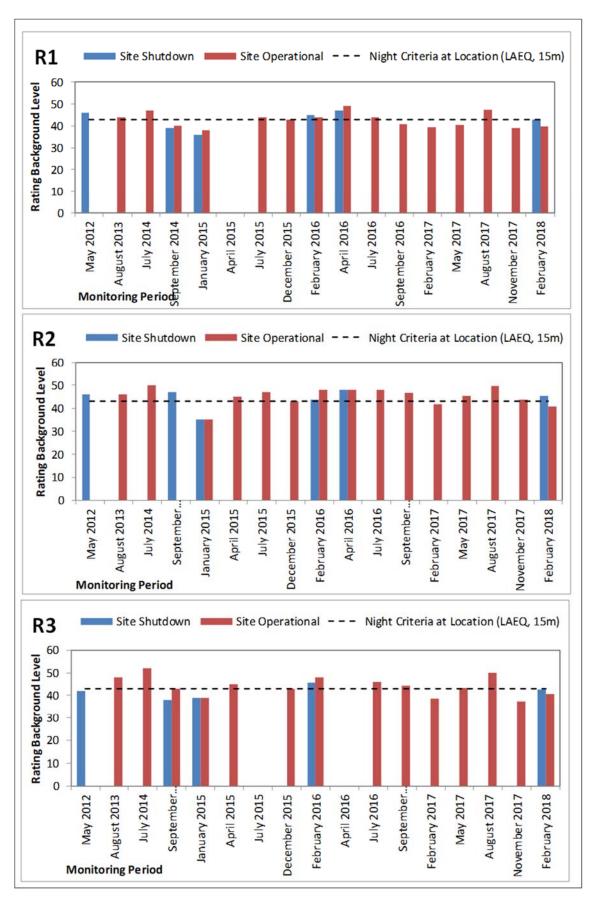


Figure 3-2: Comparison of background noise levels at R1 - R3

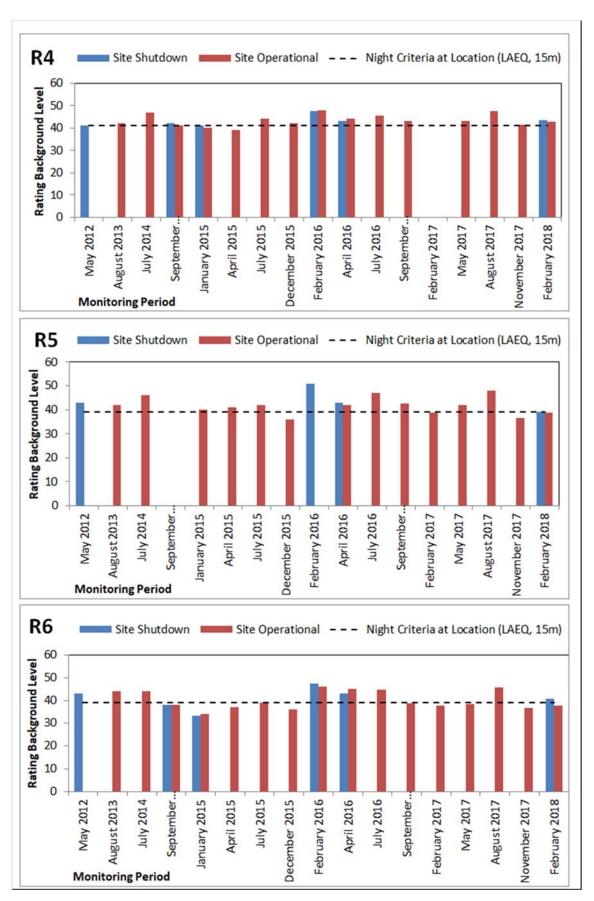


Figure 3-3: Comparison of background noise levels at R4 - R6

4. Summary

Historically, the Orora B9 Paper Mill quarterly monitoring surveys indicate L_{Aeq} measured noise levels that exceed the EPL criteria for day, evening, and night time whether the site is operational or shut down.

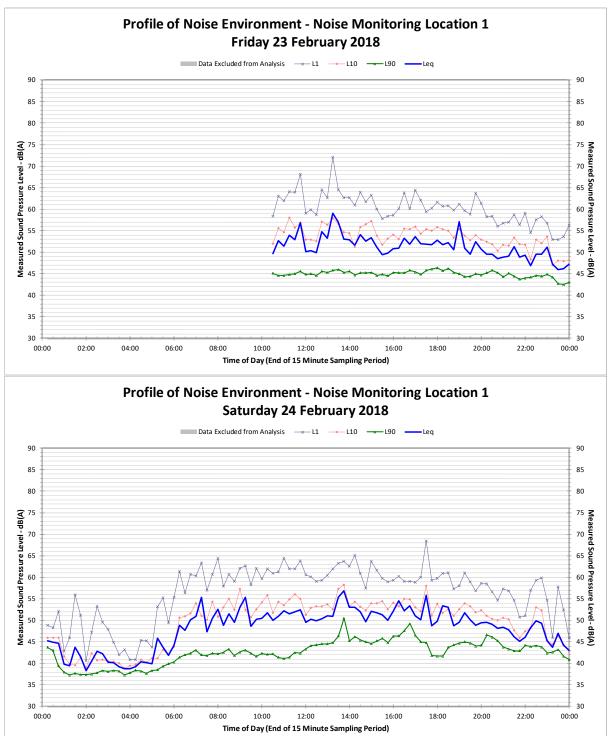
Recent results for the February 2018 monitoring period when the Orora site is both shut down and operational, indicate that an exceedance of the EPL criteria is apparent at all the representative receiver locations. These exceedances of the L_{Aeq} criteria are not directly attributable to the operations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

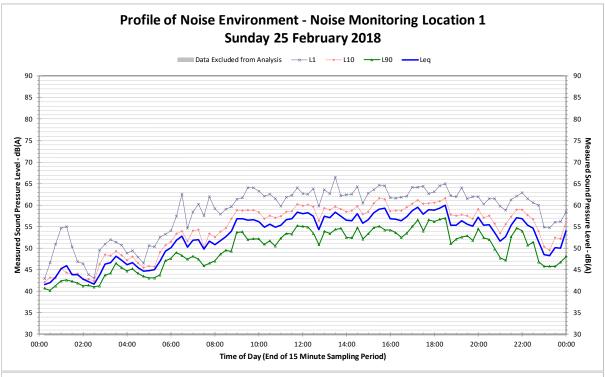
The results of this latest monitoring survey indicate that the contribution of the Orora site to the local noise environment does not have a significant influence on overall levels.

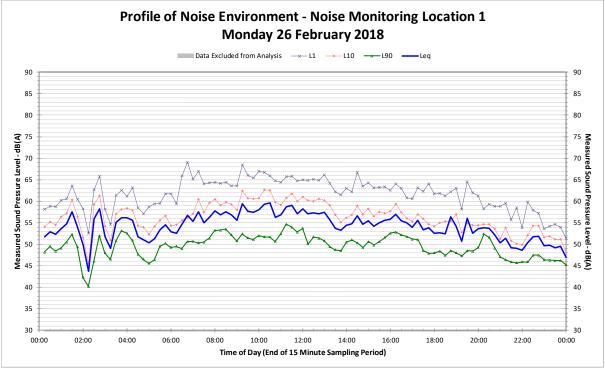
From the February 2018 quarterly monitoring the following conclusions may be drawn:

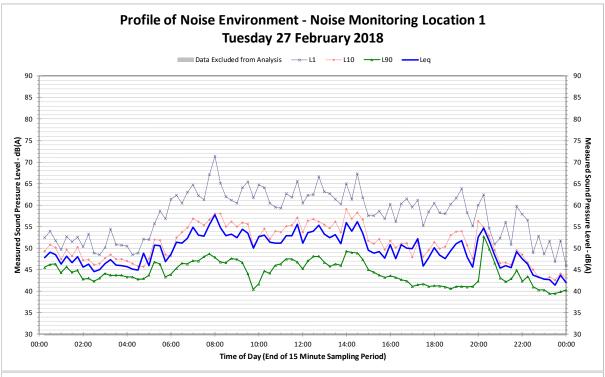
- The most recent noise monitoring results indicate that the measured L_{A90} noise levels are generally lower when the site was shut down for maintenance activities.
- Winds typically came from the southerly directions which tend to enhance noise from the Orora site as well as other sources such as Botany road and Port Botany, for receivers to the north. These enhancing effects may have been present during the Orora shut-down period.
- 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 demolition of the B7 Paper Machine building have not noticeably affected the measured noise levels in the vicinity of the Orora site when compared on an historical basis.

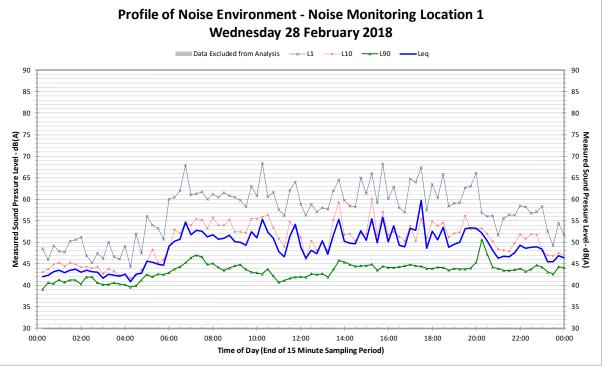
Appendix A. Noise logger graphs

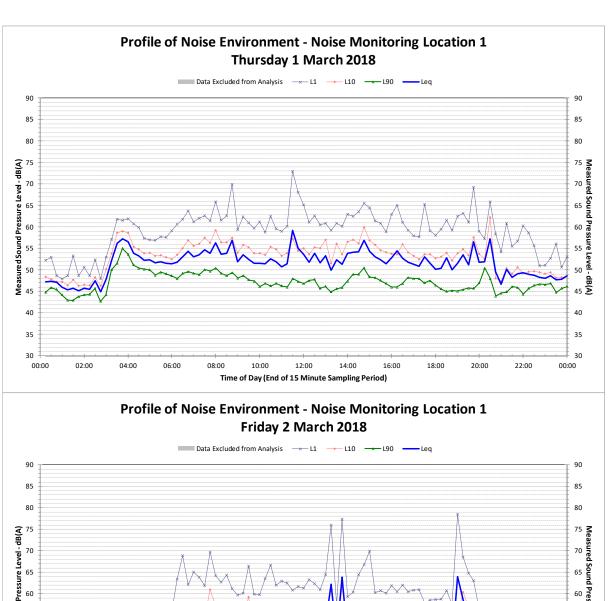


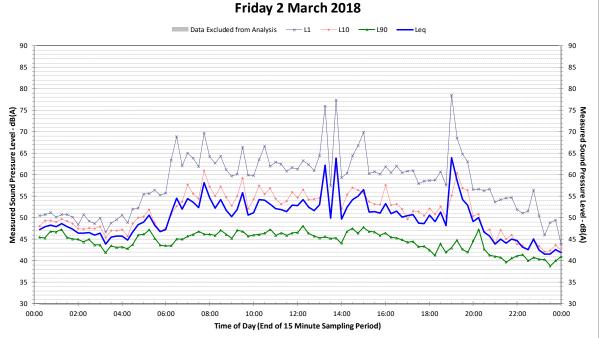


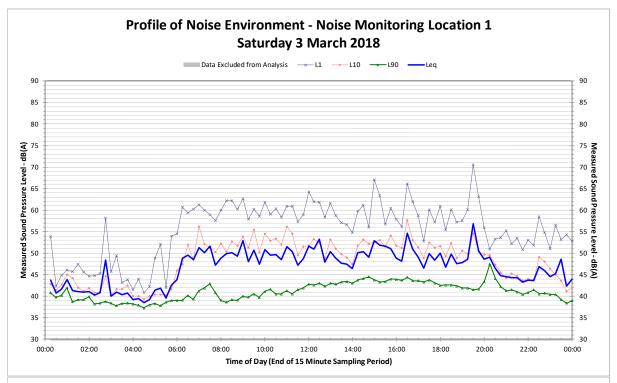


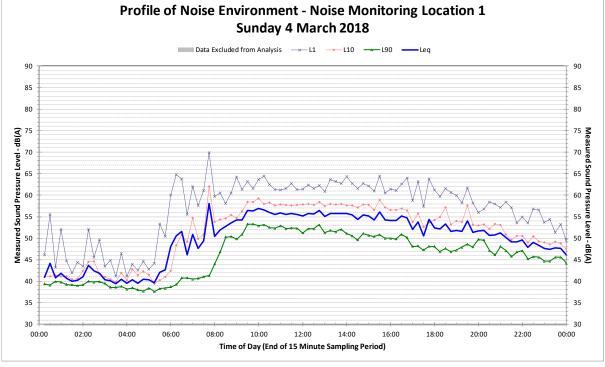


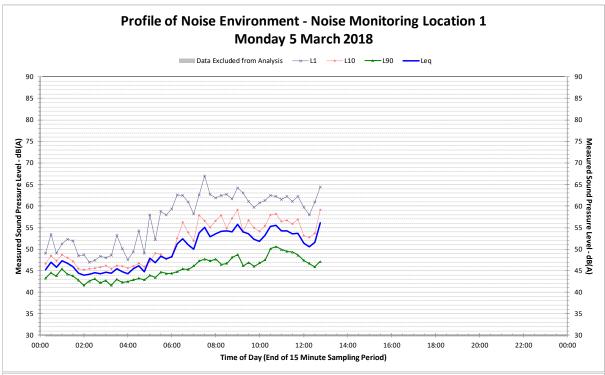


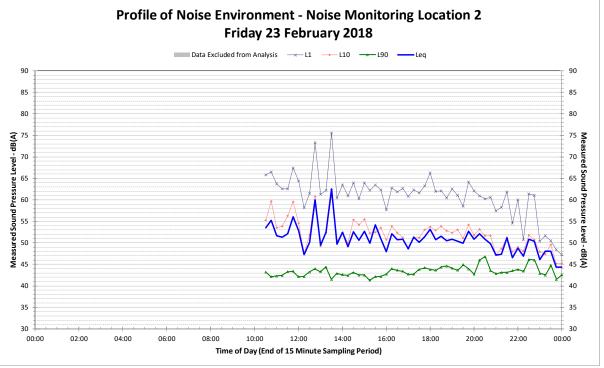










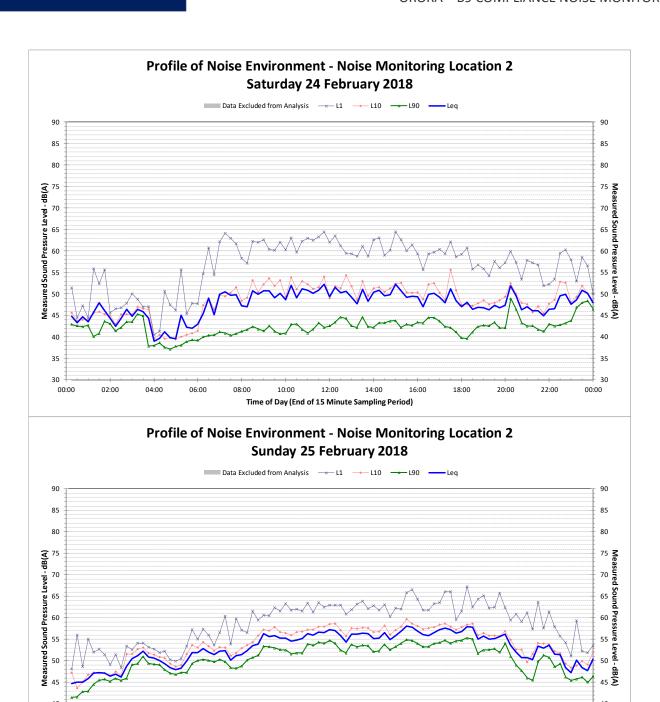


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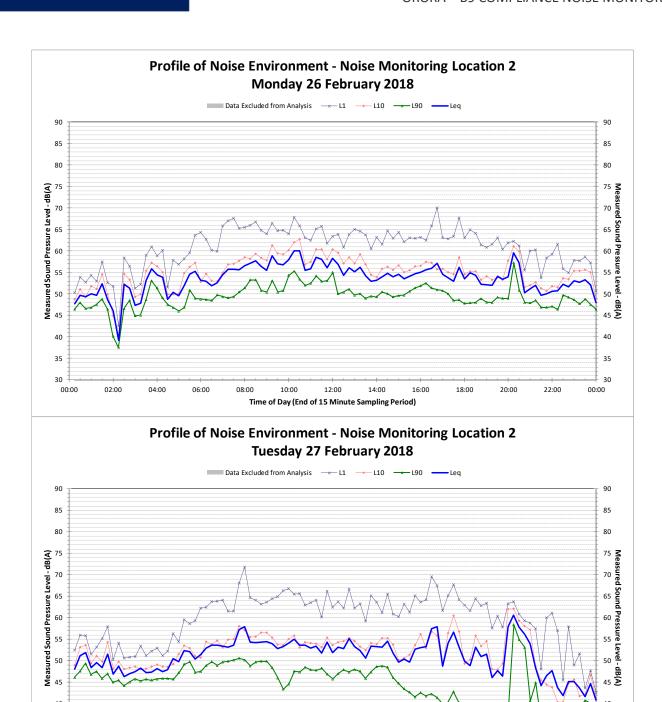
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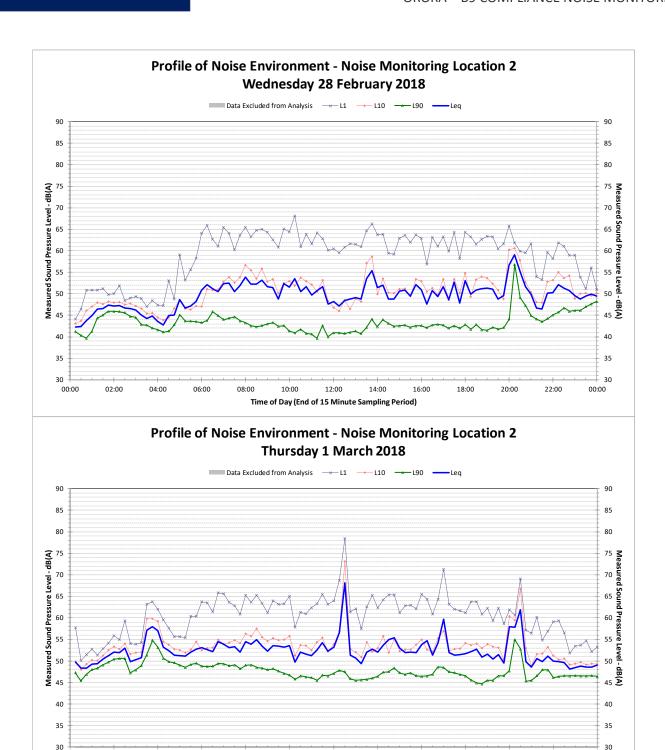
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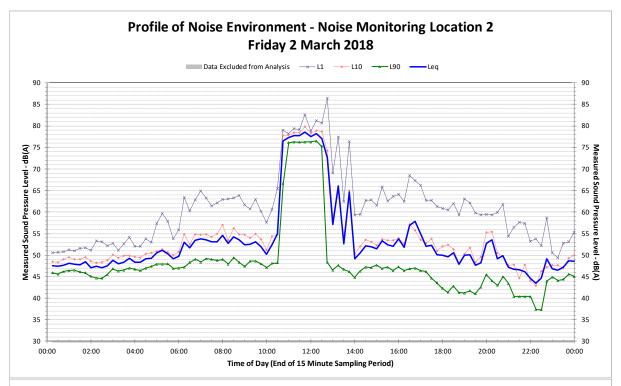


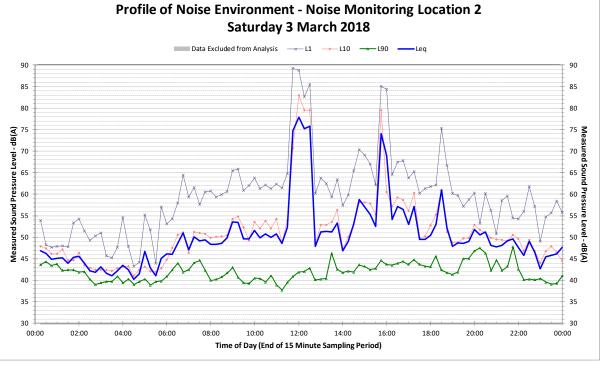
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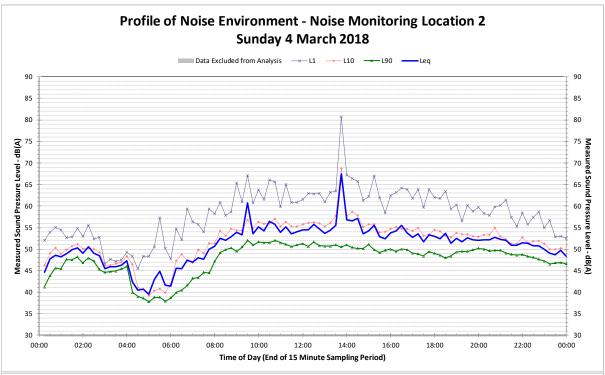
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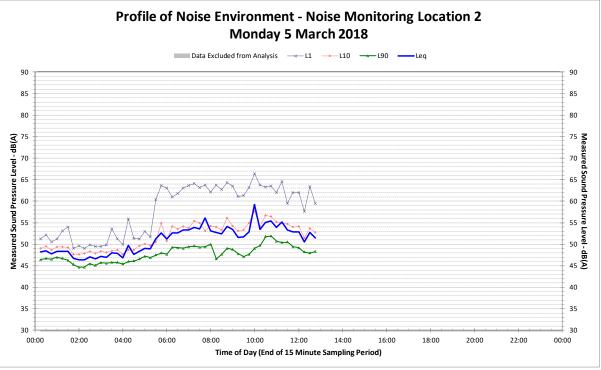
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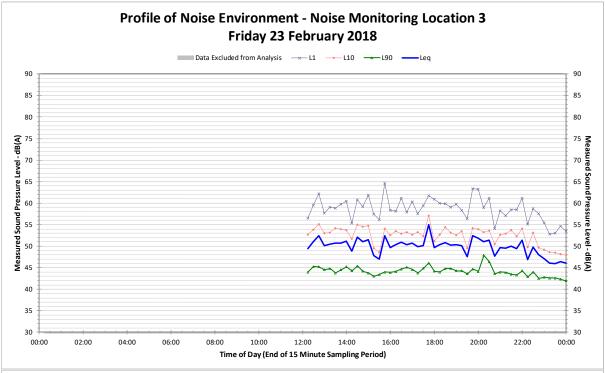
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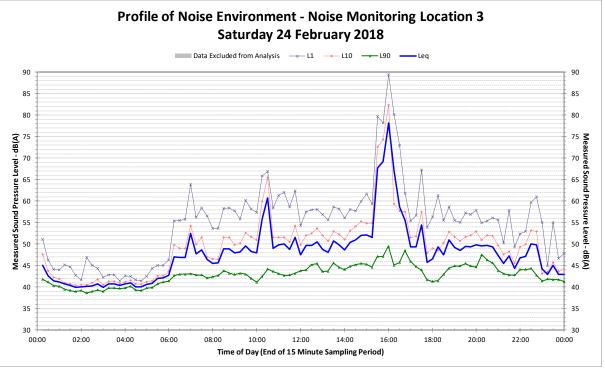


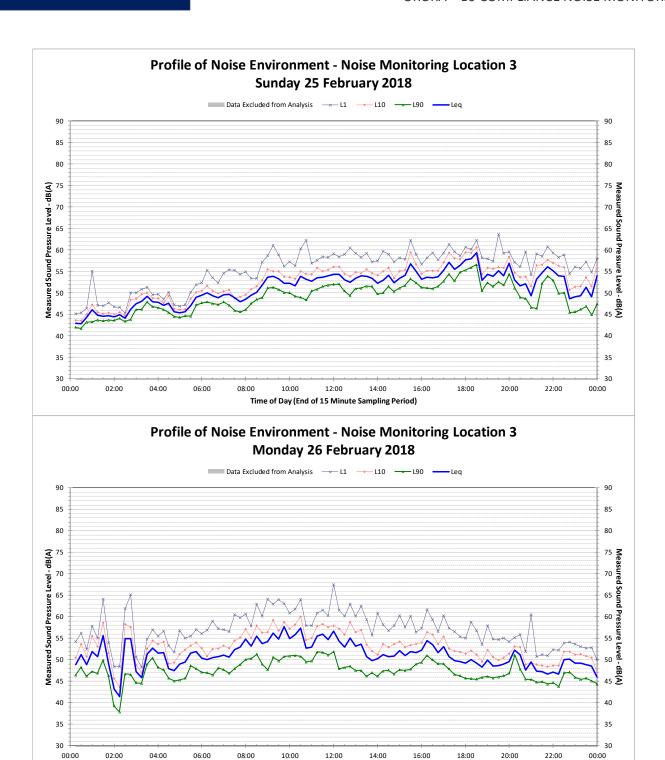




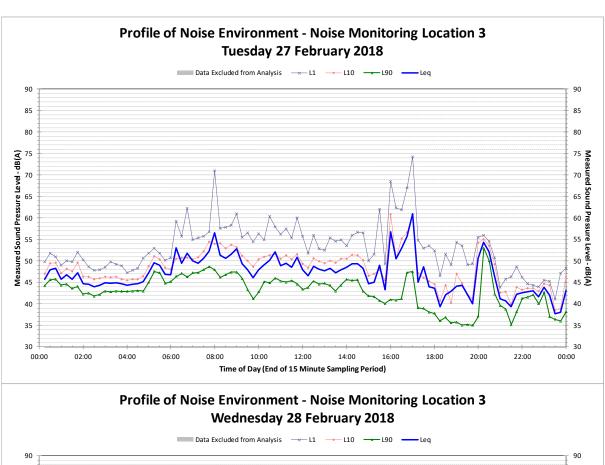


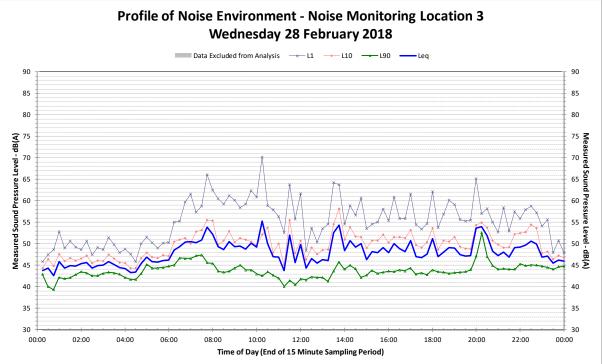


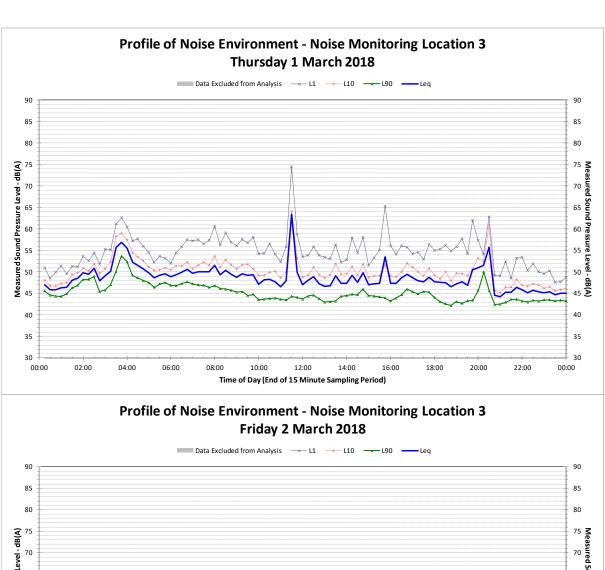


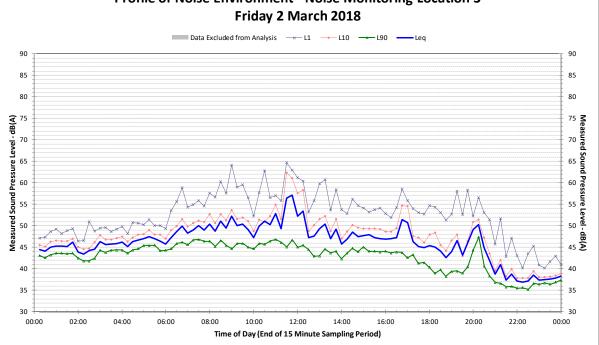


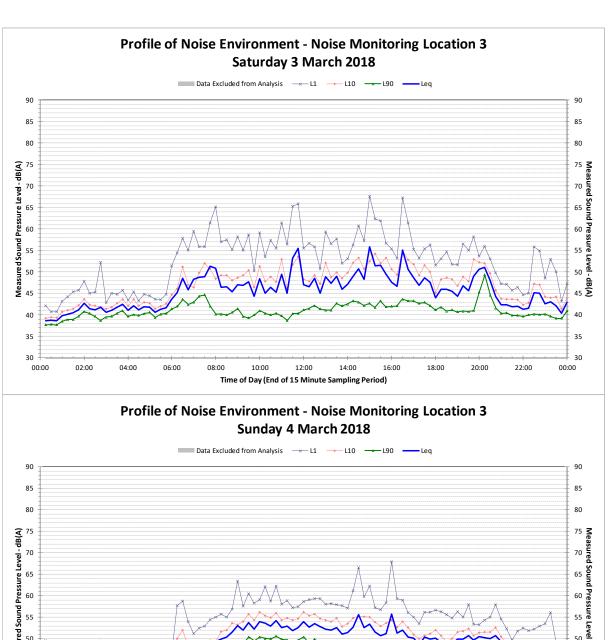
Time of Day (End of 15 Minute Sampling Period)

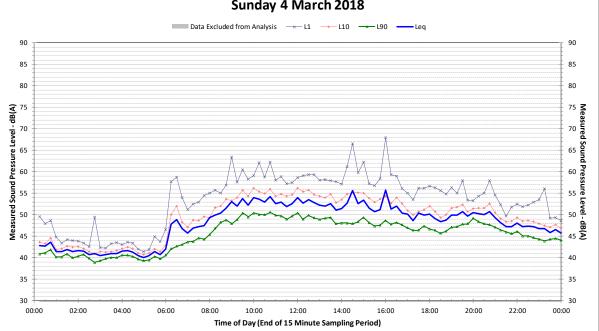


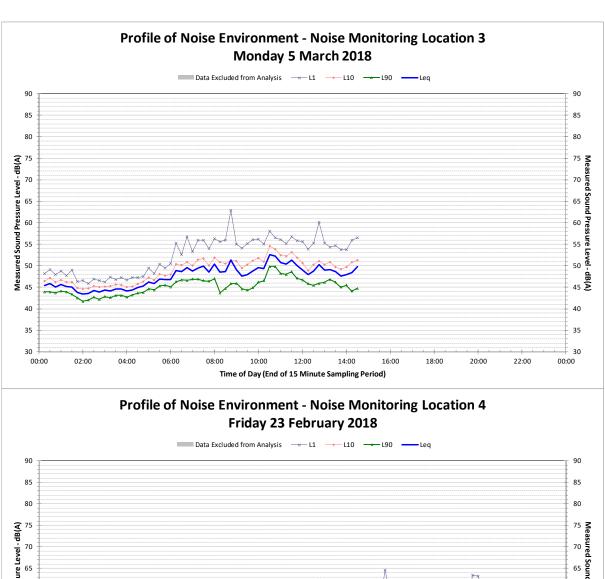


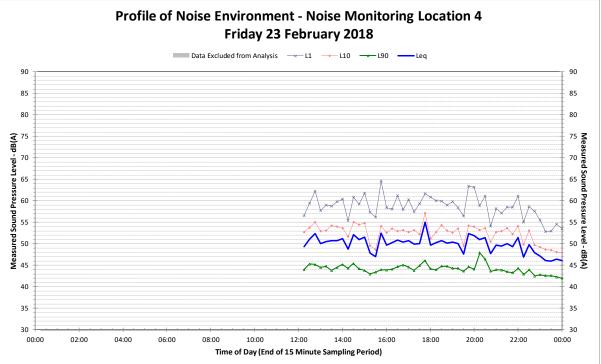


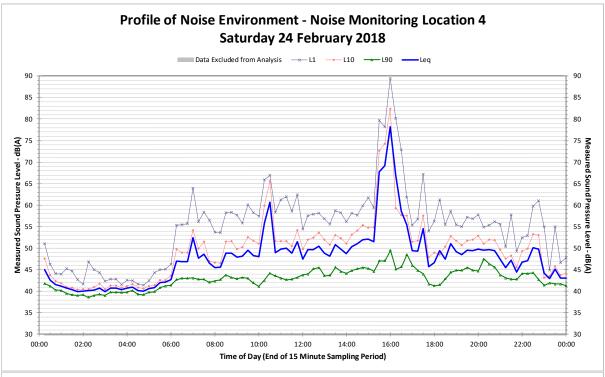


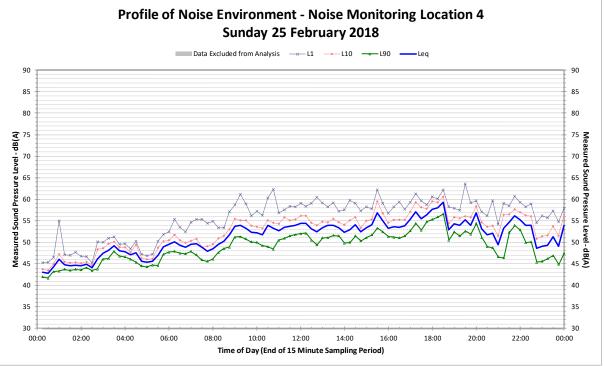


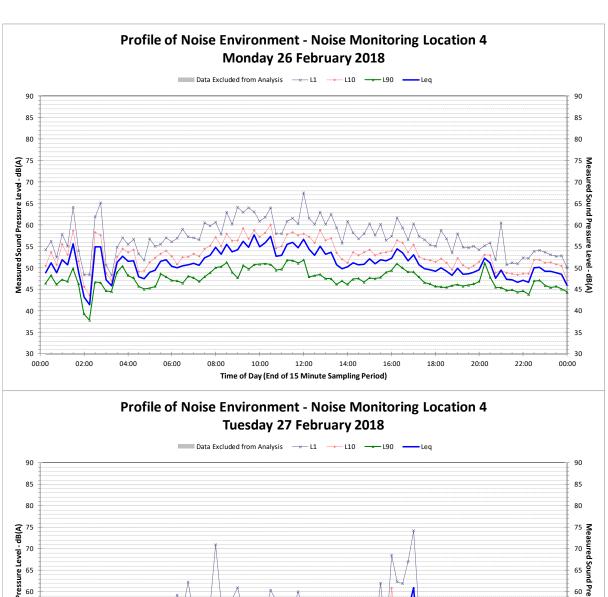


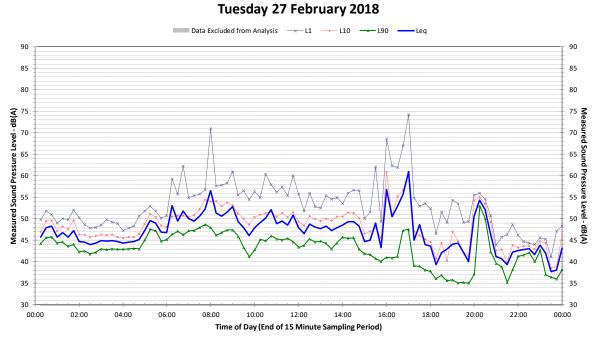












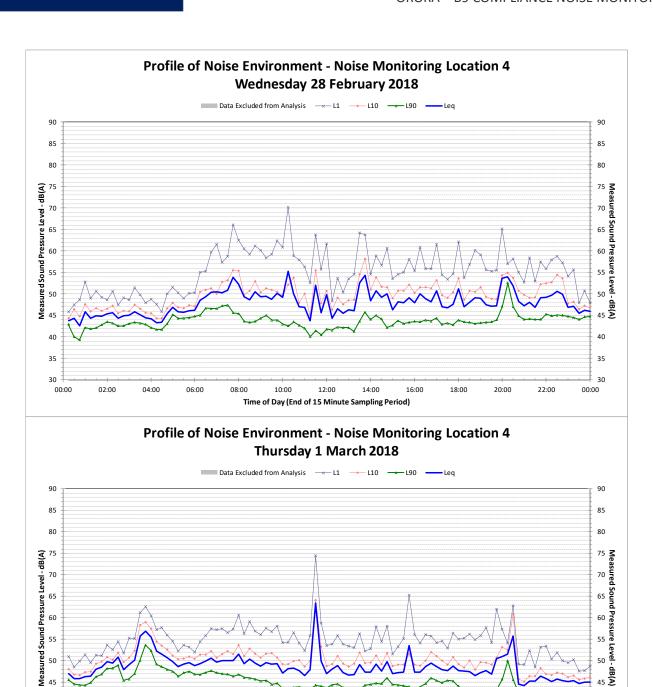
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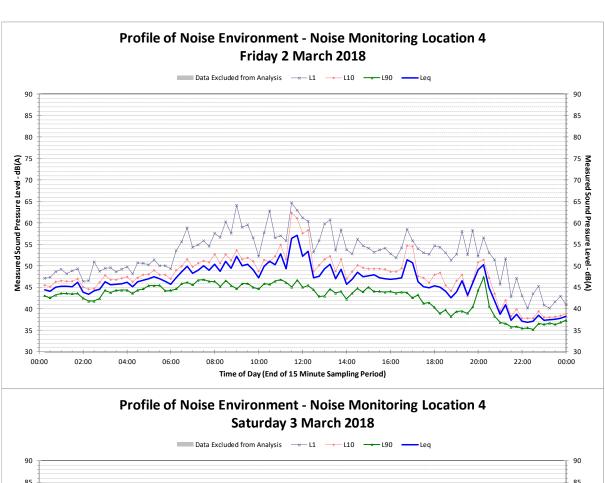
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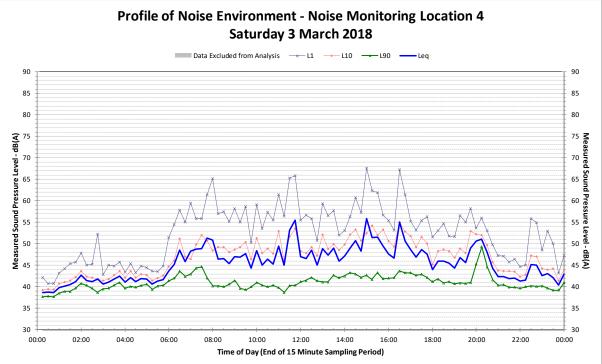
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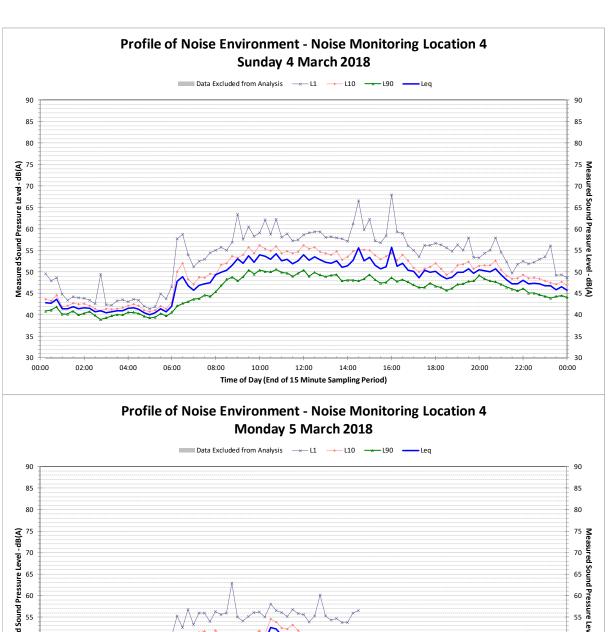
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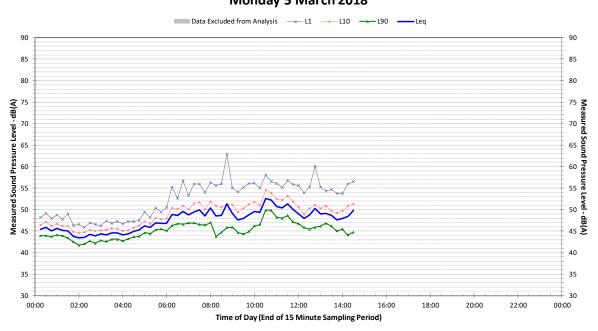
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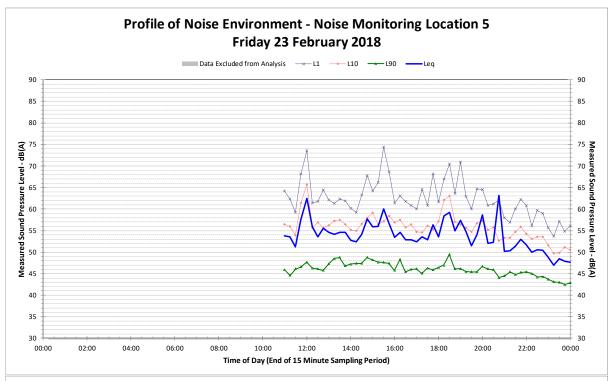
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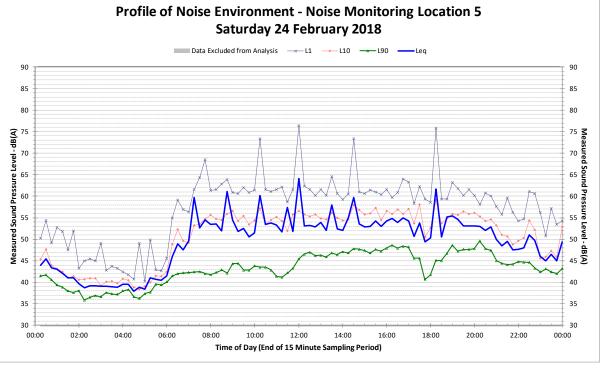


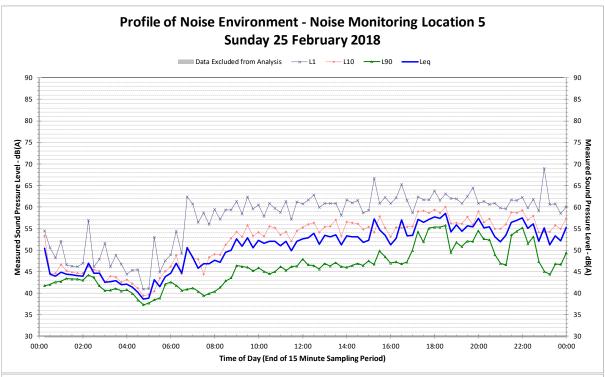


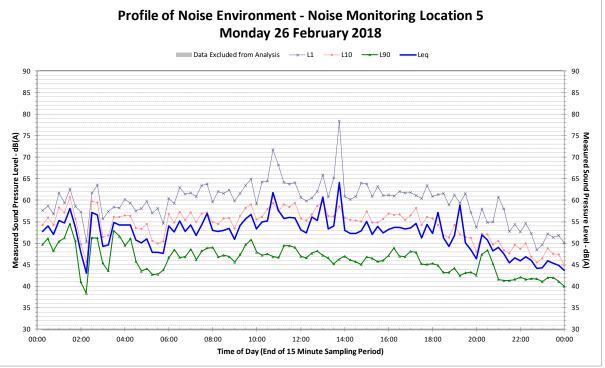


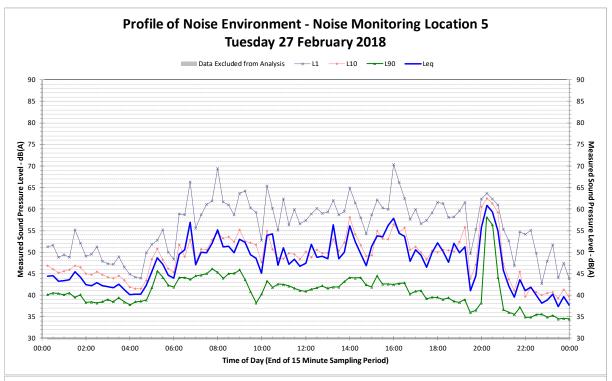


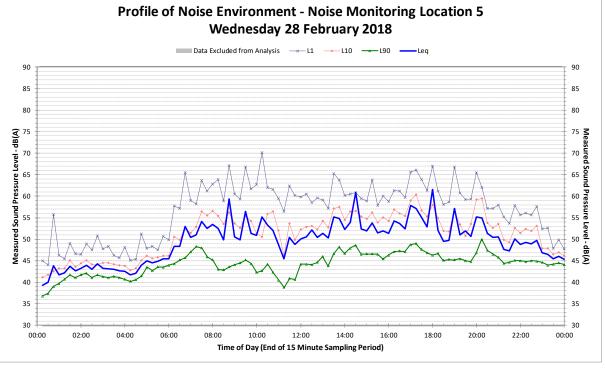


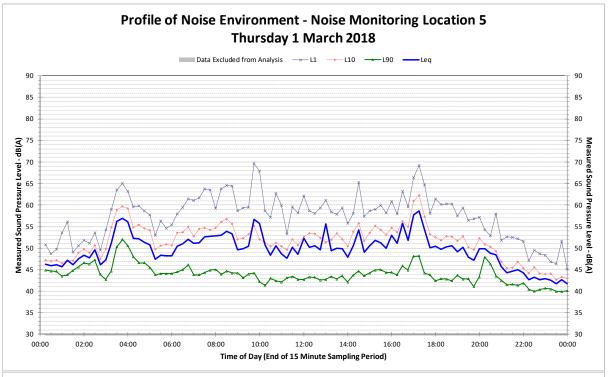


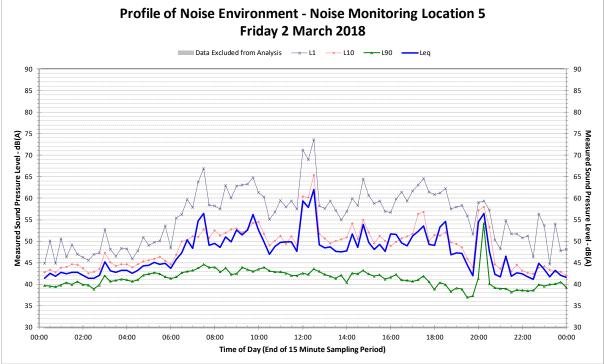


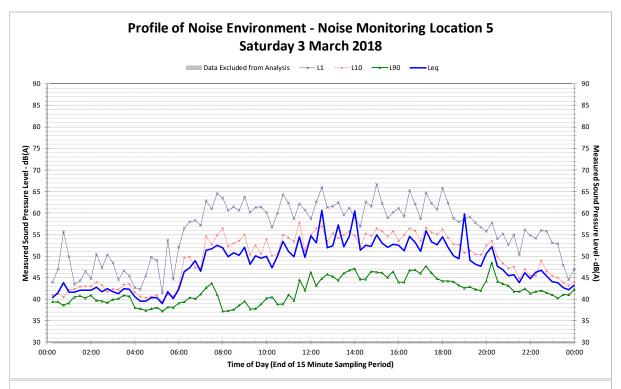


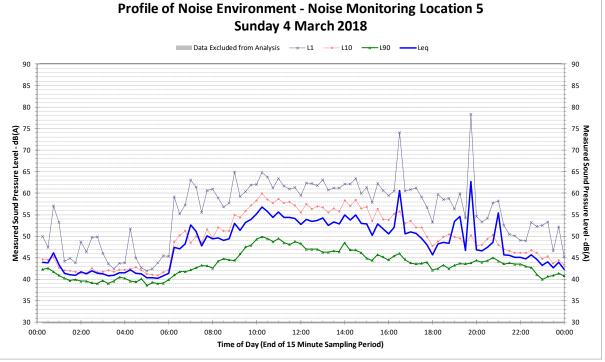


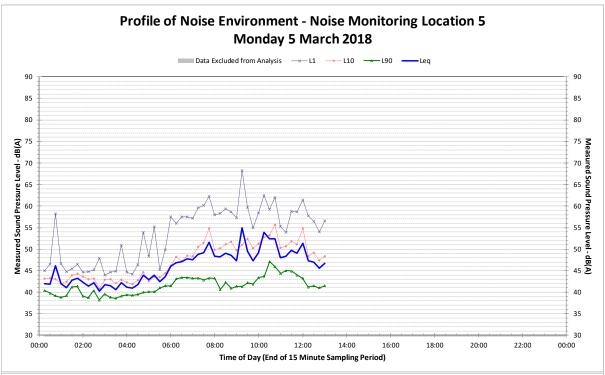


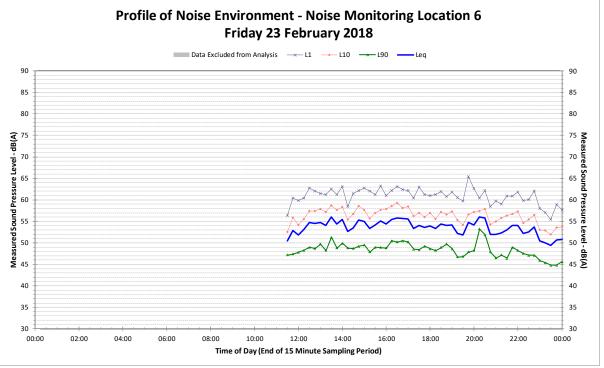






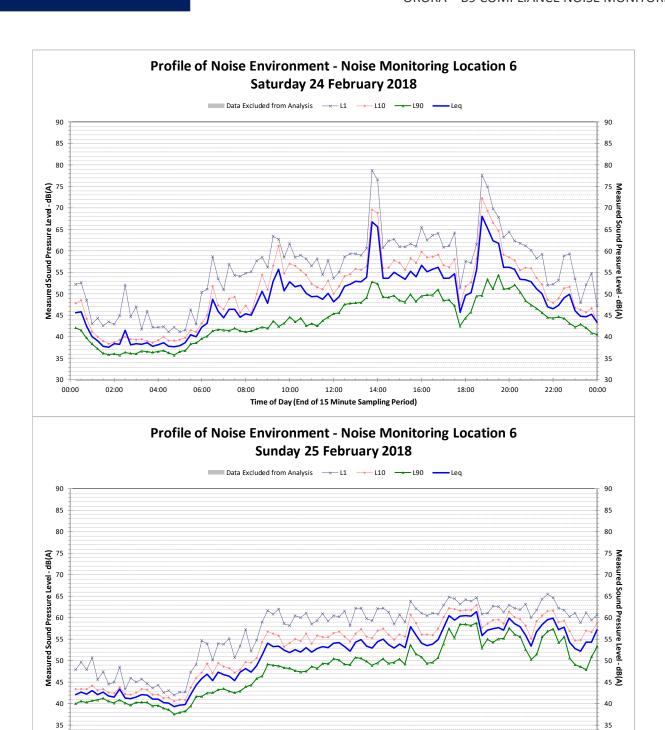






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22:00



12:00

Time of Day (End of 15 Minute Sampling Period)

10:00

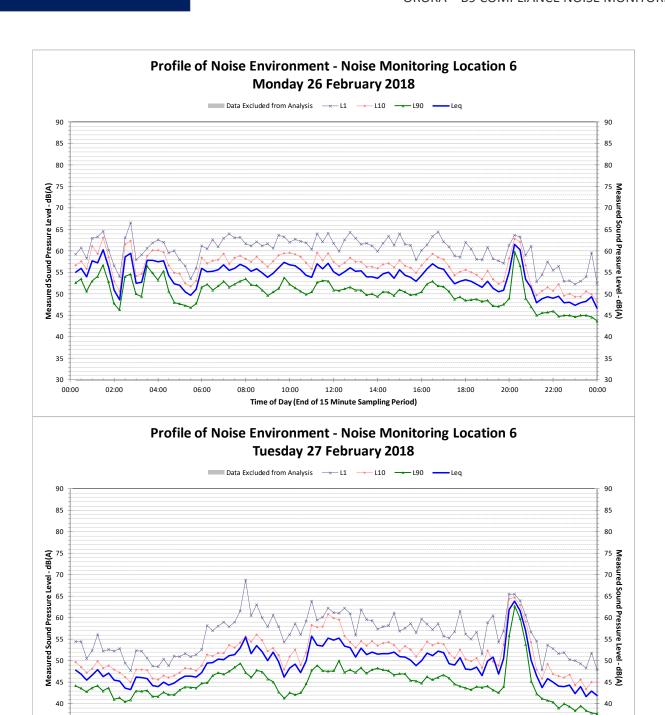
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12:00

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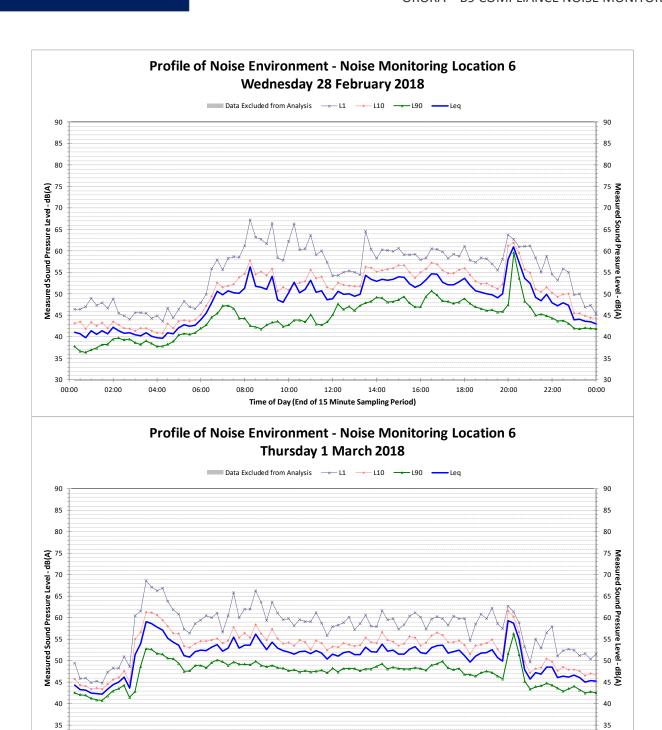
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02:00

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12:00

Time of Day (End of 15 Minute Sampling Period)

10:00

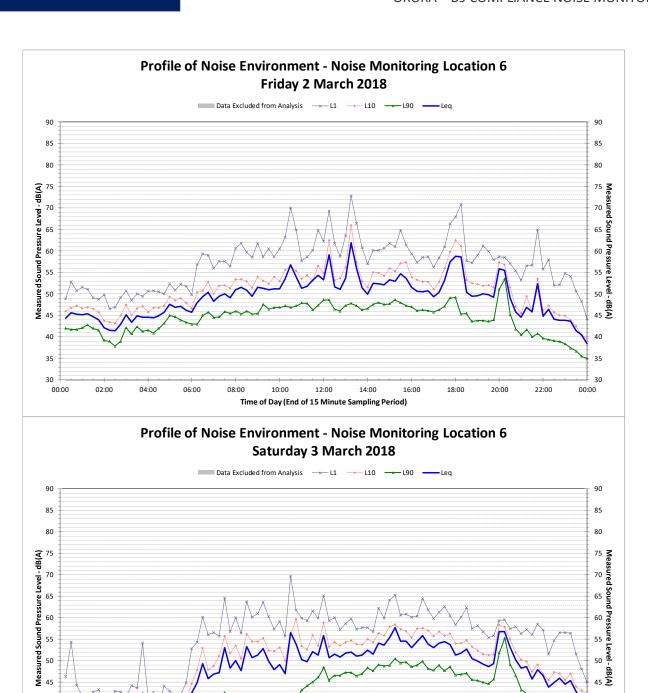
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12:00

Time of Day (End of 15 Minute Sampling Period)

10:00

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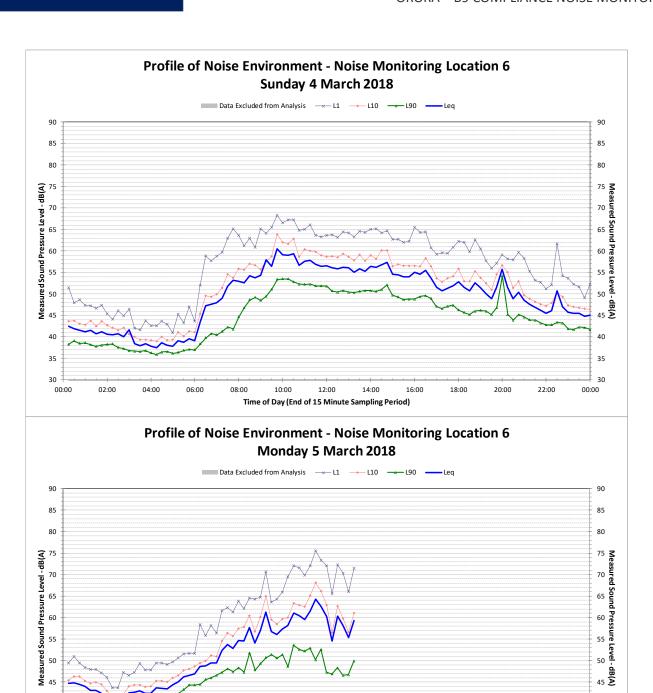
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Time of Day (End of 15 Minute Sampling Period)

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hutchison weller

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