Final Environmental Noise Report

Listen Out 2018
Centennial Park, Brazilian Field
28th & 29th September 2018

Prepared for
The Centennial Parklands & Moore Park Trust
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A. Introduction

The P.A. People were engaged by The Centannial Parklands & Moore Park Trust to provide Environmental Noise Management and Monitoring Services for Listen Out 2018.

This document is the final report outlining the process and procedures employed by our Company to assist the venue and the event organiser to manage the environmental impact of this event on the surrounding residential areas of Centennial Park. The document is intended to fulfil the requirements of the sound monitoring report as required by The Centannial Parklands & Moore Park Trust to comply with Centennial Park EPA Notice details - Clause 17 (a) through (h) of the Trusts Prevention Notice No 1002139, file No SR125 dated 26-Feb-2001. And Variations of Prevention Notice No 1521549 File No EF13/8821 dated 18-Feb-2015

To proactively prevent perimeter sound pressure levels exceeding the levels set by the regulator, The PA People provided SPL*net* - a networked, real time sound pressure level monitoring system.

Sound pressure levels from five (5) fixed SPL data collectors located at key perimeter locations along with three (3) fixed SPL monitors at the stage FOH audio mix positions were centrally monitored in real time. During the event two (2) additional mobile sound pressure level monitoring engineers supplemented the SPL*net* system. These mobile monitors were used to patrol the perimeter, verify SPL*net* measurements and to conduct location specific measurements in response to any received complaints.

This report comprises:

- An introduction
- Compliance with the Prevention Notice
- Event Details
- Environmental Noise management approach
- Monitoring Details
- Results
- Appendices

The P.A. People prepared the report for this event, under the guidance of Chris Dodds M.A.A.S (Managing Director).

The report also draws extensively on our experience in other similar venues and our understanding of event operational requirements, coupled with our strong understanding of environmental noise issues as they relate to outdoor venues and live entertainment.

Please do not hesitate to contact us should you require clarification of any part of this report.

B. Compliance with the Prevention Notice

Listen Out 2018 complied with the noise monitoring conditions of the Trusts Prevention Notice No 1002139, file number SR125, dated 26 February 2001. And Variations of Prevention Notice No 1521549 File No EF13/8821 dated 18-Feb-2015

The location of perimeter noise loggers is based on historical data of resident complaint locations. In addition, guidelines on the position of stages and the type and direction of sound amplification are designed to minimise noise spill to residential areas, and noise loggers are generally positioned at the most sensitive perimeter areas. This provides consistency in approach to noise management and is reviewed for continuous improvement. An independent review of sound management for events on BGCP land provided further investigation of the most sensitive perimeter areas, and provided recommendations that have been implemented for the 2018/19 season onwards to concentrate noise loggers on sensitive areas that provide data that corresponds to the event levels.

The above procedures are implemented for each event in consultation between the Centennial Parklands and Moore Park Trust representatives, The P.A. People, and the event organiser. The Centennial Parklands and Moore Park Trust representatives and The P.A. People complement this further with the review of each event Noise Management Plan, providing feedback and recommendations to further mitigate noise impact.

B.1 Exceedances

The PA People have collected a substantial amount of data pertaining to the noise levels at the perimeter during this event.

B.1.1 Rehearsals and Sound Tests

Zero (0) exceedance of the 65dB(A) limit was identified at the perimeter monitoring locations
Zero (0) exceedance of the 80dB(C) limit was identified at the perimeter monitoring locations

There were consistently high levels of extraneous traffic noise during the sound test period.
No exceedance of the noise limits attributable to the amplified noise were measured during the sound test period on September 28th, 2018.

B.1.2 Main Event

Zero (0) exceedance of the 65dB(A) limit was identified at the perimeter monitoring locations.
Zero (0) exceedance of the 80dB(C) limit was identified at the perimeter monitoring locations.

There were no noise level exceedances during the event attributable to the sound reinforcement systems that were not negated by condition 14(c) of the “Variation of Prevention Notice” and condition 15 of “Prevention Notice”.

In response to condition 17(f) of the Prevention Notice a list of all limit breeches as measured on the perimeter of the Centennial Parklands while the event sound system was in use is shown below.

Time	Location	Levels	Duration	Exemption
1332	Lang Rd	71.0dBa / 89.0dBC	12 seconds	Condition 15
1542	Lang Rd	68.1dBA / 88.4dBC	8 seconds	Condition 14(c)
1606	York Rd	78.1dBA / 92.0dBC	37 seconds	Condition 15
1624	Lang Rd	72dBA / 87.9dBC	16 seconds	Condition 14(c)
1945	Lang Rd	70.7dBA / 87.9dBC	13 seconds	Condition 15
2005-2011	Lang Rd	74.9dBA / 92.5	67 seconds	Condition 14(c)
2013	Lang Rd	68.6dBA / 89.4dBC	12 seconds	Condition 14(c)
2103	York Rd	74.4dBA / 90.2dBC	19 seconds	Condition 15

Observations from mobile monitoring engineers note that dBA ambient noise peaks were generally the result of ambient traffic noise in the area.
On each occasion a limit breech was noted to have occurred the sound system operators were informed, and requests made to reduce levels. In addition to the requests for level decreases, frequency information was also provided so spectrum adjustments could be made.

B.2 Complaints

As confirmed by The Centennial Parklands and Moore Park Trust, there were seventeen (17) sound-related complainants to the telephone hotline during the sound test day and the event day of Listen Out 2018.
Details of the complaints and the actions taken in response to the complaints are available on the complaints log for this event. This information is supplied as a separate document by the Centennial Parklands and Moore Park Trust.

B.3 Hours of Operation

Listen Out 2018 took place within the nominated hours as detailed for this event. All performers were off stage by 2200. The sound systems were turned off at 2201.

C. Event Details

C.1 Dates and Times

Listen Out 2018 was a multi stage music concert held at The Brazilian Field, Centennial Park, Sydney from 1.00pm – 10.01pm on Saturday 29th September 2018. Sound system tests were held on both Friday the 28th September 2018 from 4pm–5.45pm and Saturday 29th September 2018, from 12am - 1pm

The Trust reports that 34,272 people attended this event.

The Trust confirms that music concluded at 22:01pm.

The event, rehearsals and sound tests were all held within the licensed hours nominated and contained in the venue licence and the event plan.

C.2 Schedule of Acts

A complete schedule of acts can be seen below. In general, all acts conformed to this schedule.

Atari Stage	**909 Stage**	**3rd Base Stage**
1300-1330 Kiri Puru	1315-1345 Triple One	1345-1445 Moonbase
1340-1410 Haiku Hands	1400-1430 Col3trane	1445-1545 Flexmami
1420-1500 Poloshirt	1440-1510 Glades	1545-1630 Imbi The Girl
1510-1550 Lil Skies	1520-1550 Kllo	1630-1700 Milan Ring
1600-1645 Noname	1600-1645 Petit Biscuit	1700-1745 Marlie
1655-1755 Brockhampton	1650-1745 Enschway	1745-1830 Ariane
1800-1845 Skepta	1745-1845 Fisher	1830-1915 Purple Sneakers
1920-2020 A$AP Rocky	1845-1945 Camelphat	1915-2015 Godlands
2045-2200 Skrillex	1945-2045 Snakehips	2015-2115 Made In Paris
	2100-2145 Confidence Man	

C.3 Weather Conditions

During the times when noise monitoring was carried out for this event information pertaining to weather conditions around the event site were obtained from the Sydney Airport Weather Station, as it appears on the Bureau of Meteorology website.

On the afternoon of Friday, 28th September it was noted by the SPL*net* engineer on site that the weather was warm and conditions mild.
Temperatures ranged between 22°C to 24.5°C, humidity was moderate, 36-46%, and the winds were predominantly from the north-east at speeds between 15 and 24km/h. Later in the afternoon the wind speed decreased and changed to a more westerly direction at speeds between 13 & 20km/h.

On Saturday 29th September, the temperatures were lower than the previous day, ranging from 14.7°C to 19.6°C. Winds were predominantly from the west south-west and the south. Wind speeds were between 26-46km/h with wind gusts up to 57km/h.
Humidity ranged from 26%-71% early in the day but was generally between 50-60%.

D. Environmental Noise Management Approach

D.1 Mitigation before the Event

Fuzzy, the event organisers for Listen Out 2018 are a well-established organisation with a good history of managing its noise emissions on event sites.

Audio system design has historically been carried out by the sound system contractors with the dual goal of reducing emissions, whilst maintaining acceptable performance for the artist's requirements. On this occasion we are satisfied that the systems provided for event was of an appropriate professional standard and level of performance.

The P.A. People reviewed the site layout and sound management plans provided by the organiser prior to the event and these documents accompanied by direction from The Centennial Parklands and Moore Park Trust forms the basis for the noise monitoring for Listen Out 2018.

D.2 Mitigation during the Event

The SPL*net* system was used to continuously monitor and log nose levels at the event site.

The SPL*net* engineer at event control was able to use this data, in combination with the subjective analysis of the information received from the mobile monitoring engineers, to identify the source of sound pressure level exceedances at the event perimeter. Any perimeter exceedances detected by SPL*net* or the mobile monitoring engineers caused by external factors were identified. Any potential exceedances caused by Listen Out sound reinforcement systems were identified and immediately actioned by event control.

The SPL*net* engineer set dynamic SPL thresholds and exceedance indicators for the FOH positions. These thresholds were based on the effect the sound reinforcement systems had on perimeter SPL conditions. Therefore, the sound engineer was able to proactively adjust the sound pressure level produced by the stage based on its' effect on perimeter conditions at any given time.

D.3 Mitigation after the Event

The Trust, the P.A. People and the organisers of Listen Out 2018 regard the management of environmental noise for this event to be appropriate and in compliance with the venue License and the EPA Prevention Notice. It is proposed that this level of sound management and monitoring is implemented for future events of this nature in Centennial Park.

E. Monitoring Details

E.1 Details of Measurement System

To monitor perimeter sound pressure levels for Listen Out, The PA People provided a networked, real time sound pressure level monitoring system based on SPL*net*.

Key features of this system include:

- The centralised logging of SPL data includes information as to when stages are notified of exceedances or, to the best of our knowledge, impending exceedances, to ensure immediate action from the stages otherwise penalties are implemented from the sound bond.
- When notified of a complaint, sound control can immediately identify readings at the perimeter so there is an immediate measurement in the vicinity at the time of the complaint before the roving sound monitor arrives at the complaint location. This allows more accurate and immediate response to the complainant, and if there is an exceedance this can be immediately rectified centrally while the mobile sound monitor is being dispatched to the residence.
- The communication lines between identifying an exceedance and notifying the offending stage are more streamlined.
- All logging meters work in all weather conditions. Most logging meters currently employed for event monitoring in Australia are affected by wet weather or cannot be used at all.

As noted previously, the SPL*net* system is focused on proactively preventing perimeter sound pressure level exceedance.

Sound pressure levels for the Listen Out 2018 event were centrally monitored and recorded from fixed SPL meters located at five (5) key perimeter locations, and centrally monitored from Three (3) FOH mixing positions in real time. During the event two (2) additional mobile sound pressure level monitoring engineers supplemented the SPL*net* system. The mobile monitoring engineers were used to patrol the perimeter and verify the SPL*net* measurements and to conduct location specific measurements in response to any received complaints.

The SPL*net* system was used to continuously monitor and log noise levels at the perimeter of the event site. The SPL*net* system continuously recorded data from each of the five (5) SPL*net* perimeter monitors for the duration of the event.

The SPL*net* engineer at event control was able to use this data, in combination with the subjective analysis of the mobile monitoring engineers, to identify the source of sound pressure level exceedances at the event perimeter. Any perimeter exceedances detected by the SPL*net* system or the mobile monitoring engineers caused by external factors (i.e. not due to sound emanating from the event) were identified. Similarly, exceedances caused by the event sound reinforcement system could be identified and immediately actioned by event control.

Fast dB(A) and dB(C) SPL measurements for all SPL*net* meters were simultaneously monitored by the engineer at event control.

Fast dB(A) and dB(C) SPL results for the stages were also monitored at the FOH mixing position by the sound engineers. Dynamic SPL thresholds and exceedance indicators were set for the FOH positions by event control. These thresholds were based on the effect of the stage sound system on perimeter SPL conditions. Therefore, the sound engineer was able to proactively adjust the sound system outputs to maintain predetermined sound pressure levels based on their effect on perimeter conditions at any given time.

E.2 Site Plan and Measurement Locations

The P.A. People reviewed The Centannial Parklands & Moore Park Trust prevention notice and noise management plan. This information assisted us in formulating the event monitoring strategy that was implemented for this event.

E.2.1 Perimeter Monitoring

As per the requirements outlined in The Centannial Parklands & Moore Park Trust prevention notice for this category of event. Five (5) perimeter locations were used for the installation of fixed sound pressure level monitoring instruments. At these locations the instrument was attached to a light pole at a height of approximately three (3) metres.

The instrument cabinet comprises the following items:

- SPL*net* M100 analyser complete with third octave analysis software
- SPL*net* M121 Type 1 measurement microphone fitted in a weatherproof enclosure
- Battery, 4G X mobile broadband modem

The five (5) fixed locations were near the following locations as directed by the Trust.

- 12 Martin Road, Moore Park
- 30 Lang Road, Centennial Park
- 60 Oxford St, Paddington
- 85 Darley Road, Centennial Park
- 60 York Road, Queens Park

To proactively manage levels at the perimeter of the event site, the engineer uses the fixed location data collection units. If the engineer detects any exceedance of the limits set out in the prevention notice a roving monitor is dispatched to the location to conduct location specific measurements and determine if the exceedance is a result of the amplified sound from the event.

These measurements are conducted using a class one portable analyser at a height between 1.2m-1.6m above the ground, this meter when practical would be placed within 1m of the boundary of the nearest affected premises in relation to the fixed monitoring location.

E.2.2 Stage Monitoring

Three (3) systems were also located within the event boundary, at the FOH mixing locations. At these locations an instrument was attached to the supporting structure of the platform.

The instrument cabinet comprises the following items:

- SPL*net* M100 analyser complete with third octave analysis software
- SPL*net* M121 Type 1 measurement microphone fitted in a weatherproof enclosure

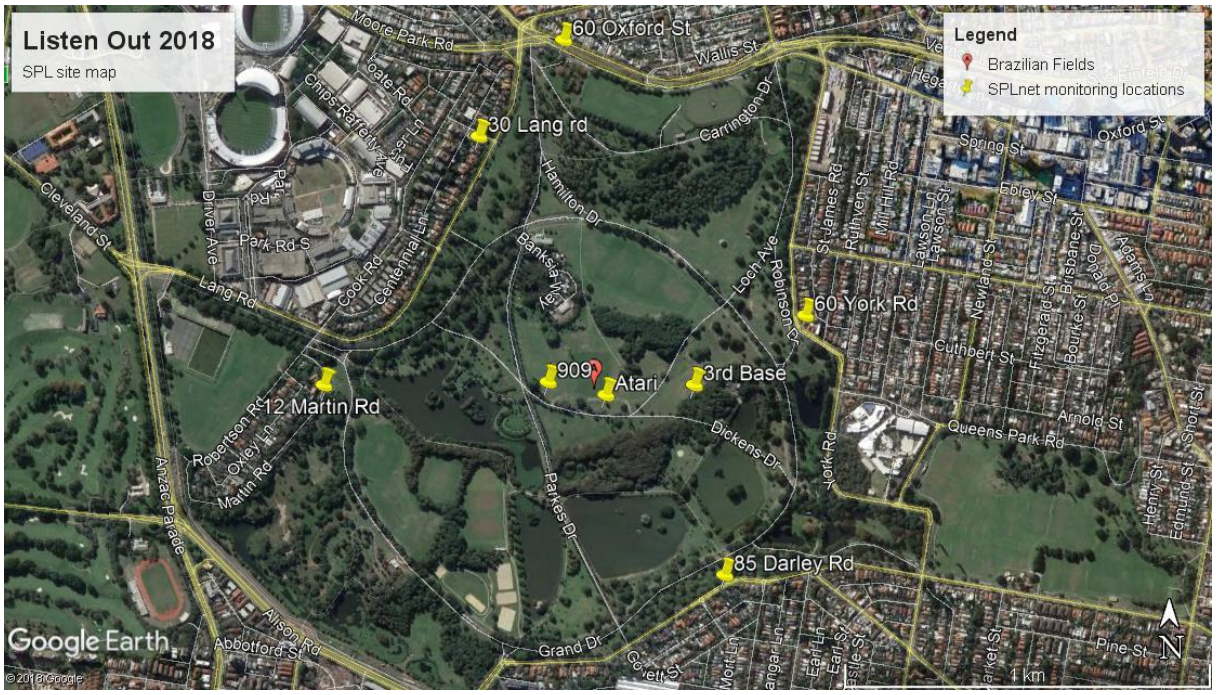
E.2.3 Mobile Monitor

Two mobile monitoring personnel were also available to patrol the perimeter, corroborate the SPL*net* measurements and to conduct location specific measurements in response to any received complaints or exceedances noted by the engineer.

The remote monitoring engineers were provided with a Type1 sound analyser complete with calibrator.

E.2.4 Site Plan

Below is a plan showing the relative position of the monitoring locations used for this event. It also shows the event site location.



E.2.5 Calibration

Each instrument was calibrated using Bruel and Kjaer 4230 calibrator prior to and after use.

No significant variations were noted between pre and post use measurements.

E.3 Use of Third Octave information

A feature of the SPL*net* system is the capability for third octave analysis at all measurement locations, again in real time.

This capability is significant in that it allows the audio operators of each system to tailor the response of their system to maximise the perceived level of their system by adjusting spectral content of the music, rather than relying on level only.

This also reduces the annoyance factor of the noise by reducing dominant frequencies and smoothing the resultant frequency response.

E.4 Complaints Management

The Centannial Parklands & Moore Park Trust has adopted a comprehensive sound management program, which includes a detailed complaints management procedure.

The focus of The P.A. People and The Centannial Parklands & Moore Park Trust for this event was to proactively minimise complaints by monitoring perimeter sound pressure levels continuously in real time. In addition to continuous static perimeter monitoring two (2) mobile monitoring engineer were available to attend complainant locations personally.

F. Results

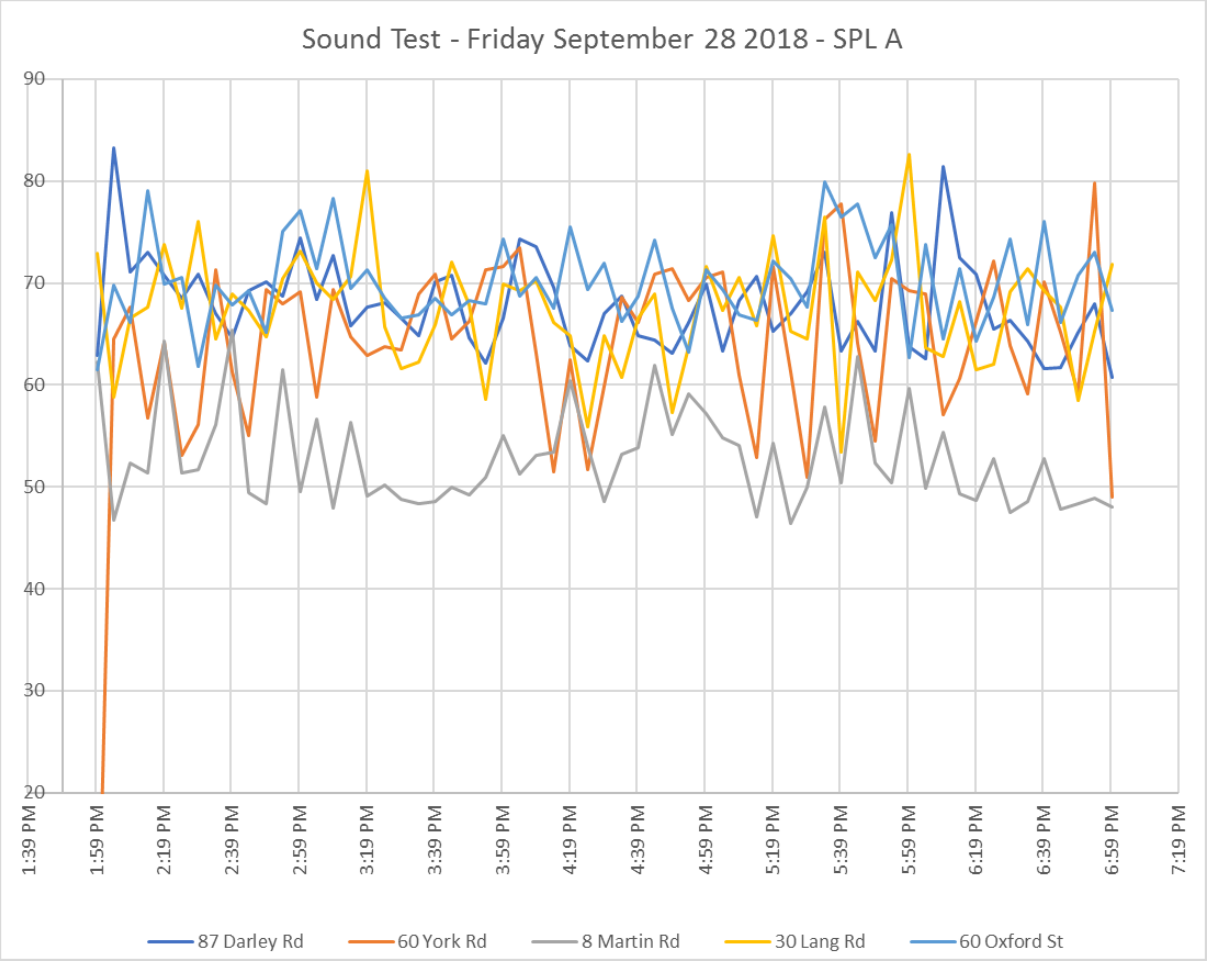
F.1 Perimeter Results

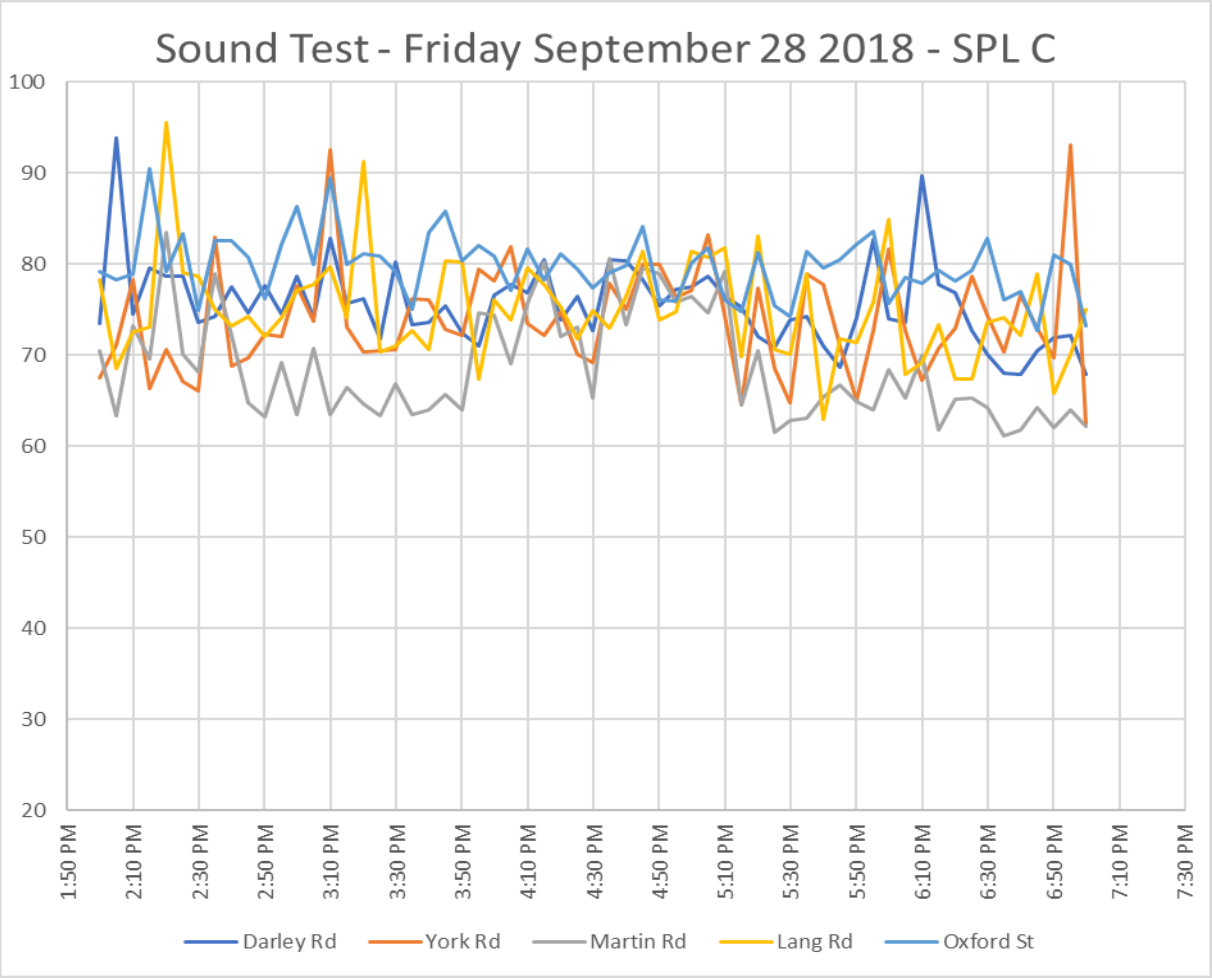
The SPL*net* system employed for this event provided a significant amount of data.

One would expect that continuous monitoring of all perimeter sensors might reveal a significant increase in the number of exceedances identified. This has not proven to be the case, due mostly to the proactive approach of using this same information to adjust the exceedance thresholds provided to each stage.

Below are four (4) graphs outlining the levels at each perimeter location over the duration of the event, please note that these graphs are of limited use in and of themselves as they record absolute levels due to all environmental factors, not only levels that are associated with the sound generated by the Listen Out 2018 stages.

Each plot represents samples taken at 5-minute intervals of a total some 3600 points per hour at each measurement location.

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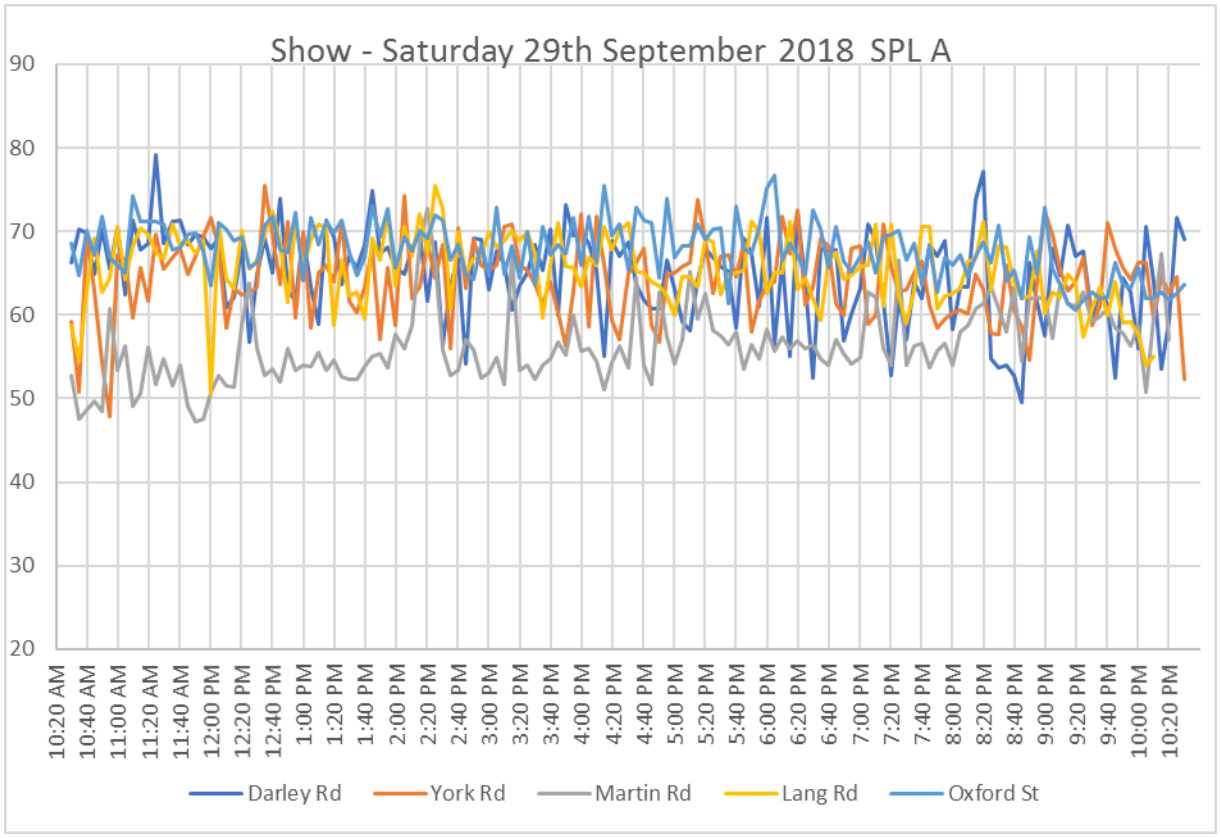
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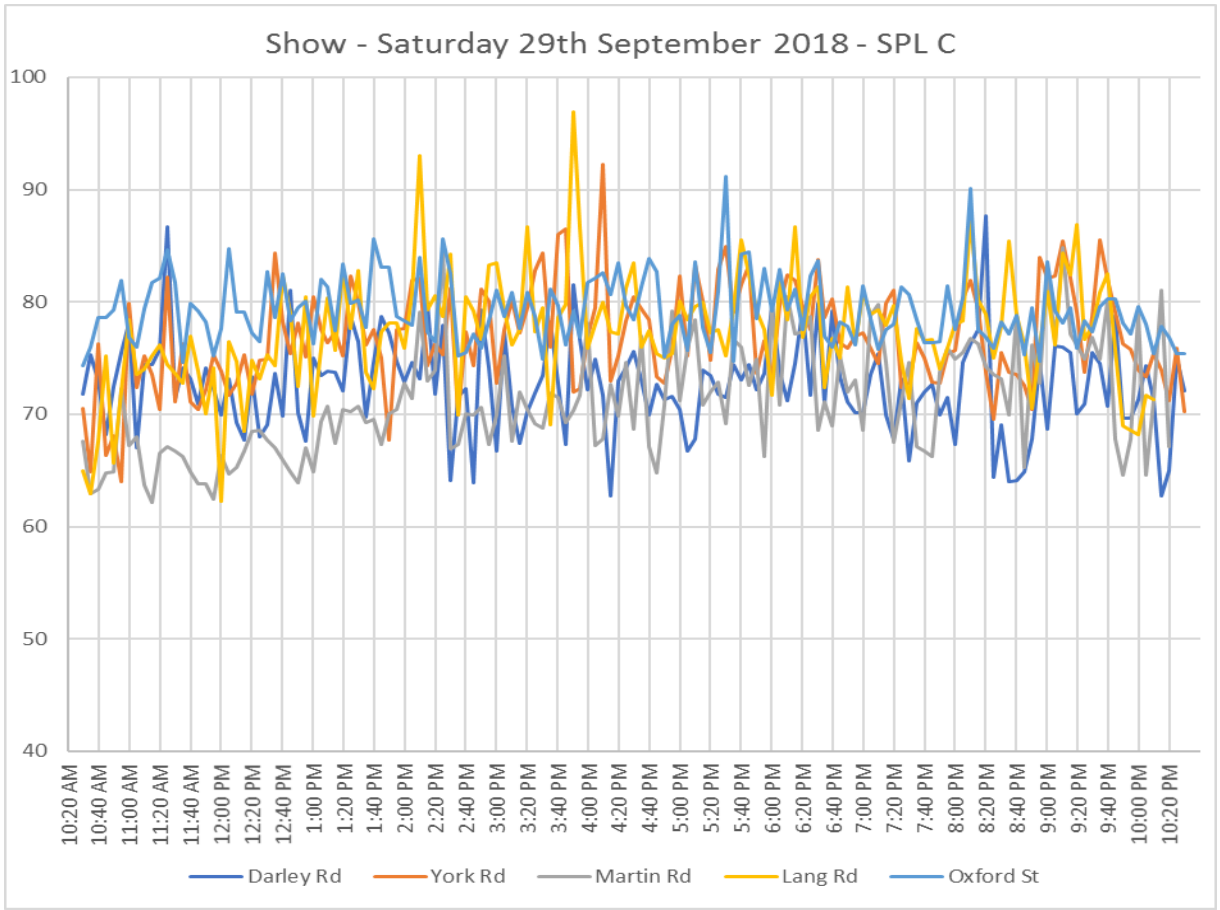
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F.2 Management Process for Exceedances

With the SPL*net* system SPL levels at all perimeter points were centrally monitored in real time from event control. The system is designed so that upon the detection of a perimeter exceedance deemed to be the result of the Listen Out 2018 reinforcement systems, event control would immediately contact the front of house sound control position and the event organiser to request a level decrease.

In general, communications between event control and the production management and the three (3) stages was prompt and effective in preventing and correcting any perimeter exceedances.

The dynamic sound pressure level thresholds set for the stage were effective in preventing perimeter exceedances.

G. Summary

Overall, we believe that the implementation of the SPL*net* system as part of the environmental noise management plan for Listen Out 2018 has improved the quality of noise management for the event and ensured overall compliance with the EPA Prevention Notice.