



Final Environmental Noise Report

Avicii 2014
Centennial Parklands, Sydney
25th January 2014

Prepared for
Centennial Parklands
Centennial Park and Moore Park Trust

by
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A. Introduction

The P.A. People were engaged by Centennial Park and Moore Park Trust (The Trust) to provide Environmental Noise Management and Monitoring Services for Avicii 2014.

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 the Centennial Parklands precinct. The document is intended to fulfil the requirements of the sound monitoring report as required by The Trust to comply with Clause 17 (a) through (h) of the Centennial Parklands EPA license No 1002139 dated 26 Feb 2001.

In order to proactively prevent perimeter sound pressure levels exceeding the levels set by the regulator, The PA People provided *SPLnet* - a networked, real time sound pressure level monitoring system

Sound pressure levels at five fixed SPL meters located at key perimeter locations along with one fixed monitor at the FOH mix position were centrally monitored in real time. During the event one additional mobile sound pressure level monitor personnel supplemented the *SPLnet* system. This mobile monitor was used to patrol the perimeter, verify the *SPLnet* measurements and to conduct location specific measurements in response to any received complaints.

This report comprises:

- An introduction
- 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. Event Details

B.1 Dates and Times

Avicii 2014 was a single stage music concert held in the Brazilian Fields precinct of Centennial Park Sydney from 5pm – 10pm on Saturday 25th January 2014, with rehearsal / sound checks held on the afternoon of Friday 24th January 2014 and on the event day Saturday 25th January 2014.

The Trust reports that 15,489 people attended the event this year. The event was licenced for a capacity crowd of 30,000 patrons.

The Trust confirms that music concluded at 10:00pm.

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

B.2 Schedule of Acts

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

7:55pm – 10:00pm	AVICII
6:30pm – 7:40pm	Will Sparks
5:45pm – 6:30pm	New World Sound
5:00pm – 5:45pm	Throttle

B.3 Weather Conditions

It was noted that on the event day the winds were from the south/southwest with a strength >30kph.

C. Environmental Noise Management Approach

C.1 Mitigation before the Event

Future Music the event organisers for Avicii 2014 are a well-established organisation with a good history of managing its noise emissions on its 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 also reviewed the site layout plan prior to the event.

Finally, The P.A. People reviewed data and other information from previous events held in Centennial Parklands over previous years. This information assisted us in formulating the event monitoring strategy that was implemented for this event.

The Trust's Noise Management Plan forms the basis for sound monitoring for Avicii 2014.

Details of the Noise Management Plan be accessed at:

http://www.centennialparklands.com.au/about_us/centennial_park_and_moore_park_trust/noise_management_plan

A summary of the measures are as follows:

C.1.1 Community Consultation:

To get a broad understanding of noise impacts from Centennial Parklands events, a broad community consultation took place to identify key areas of effective communication with residents. This comprised firstly of 120 residents within a 2km radius of the Parklands who were surveyed by telephone about noise. This radius captured the area from which complaints had been received by the Trust in relation to events in the past. Following on from these interviews, a group of residents who lived adjacent to the Parklands were randomly selected and invited to attend several focus groups to discuss noise management. Finally in-depth interviews were conducted with people who had lodged complaints with the Trust.

This consultation identified the need for a range of communication options between the Trust and local residents.

This includes:

- Resident meetings
- Email and postal register
- Information on the Trust website including online publication of sound reports
- Event newsletters with information on upcoming events in addition to specific event-related letter drops.

We are advised by The Trust that recommendations in the Noise Management Plan and the Noise Management Plan Review were implemented for Avicii 2014. An event specific letter drop was also made to 16,000 surrounding residents. As per all major music festivals at the Parklands, The Trust

provided a hotline for residents to register complaints and comments, operating throughout all sound checks, rehearsals and during the event.

C.1.2 Sound Bond:

As part of the Noise Management Plan implementation, a sound bond was imposed on the event client to commit the client to respond immediately to Trust directives to alter sound emissions (through the Trust's contracted sound monitors working in residential areas during the festival), or risk forfeiture of the sound bond.

For Avicii the event client was responsive to directives, pro-active in controlling sound levels and the Trust did not require forfeit of the bond.

C.1.3 Pre-event planning:

As part of pre-event planning, the following was carried out for the event:

- Early provision of site plans to the Trust's acoustic consultants for feedback on noise impact and implementation of recommendations received by the consultants. This included study of the site layout, and positioning and direction of stages. Details include:
- Facing stages away from direct lines to residential areas.
 - Particularly directing sound sub frequency energy to dense tree area between the Brazilian Fields and the Parade Grounds.
- Sound briefings prior to the event with the event organiser, representatives of The Trust and the Sound System Contractor establishing clear understanding of how requests for noise reduction will be communicated and actioned, and a clear action plan should any stage fail to comply with instructions received for noise reduction.
- Notification to residents as outlined in community consultation above, including provision of a hotline for residents to register complaints and comments, operating throughout all sound checks, rehearsals and during the event.
- Scheduling of sound checks the day before the event covering a one hour period in the afternoon, when residents are more likely to be away from home. This removed exposure to residents and decreased the continuous exposure time to noise on event day.
- Scheduling of event to finish at 10.00pm, instead of the 10.30pm finish time permitted under EPA guidelines.

C.2 Mitigation during the Event

The *SPLnet* system was used to continuously monitor and log environmental conditions at the event site. The *SPLnet* system continuously recorded audio from each of the five perimeter *SPLnet* monitors for the duration of the event.

The engineer at event control was able to use this data, in combination with the subjective analysis of the mobile monitor, to identify the source of any sound pressure level exceedances at the event perimeter. Any perimeter exceedances detected by the *SPLnet* or mobile monitor caused by external factors were identified. Any potential exceedances caused by Avicii sound reinforcement systems were identified and immediately actioned by sound control.

Event control set dynamic SPL thresholds and exceedance indicators for the stage/FOH position. These thresholds were based on the stage's effect 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.

In general, sound engineers responded to request for adjustment in a timely manner, and exceedances outside the exemptions offered by Clause 15 of the license were contained.

C.3 Mitigation after the Event

Overall, The Trust, The P.A. People and the organisers of Avicii 2014 regard the management of environmental noise for this event to be appropriate and generally in compliance with the venue License and the EPA Prevention Notice.

D. Monitoring Details

D.1 Details of Measurement System

To monitor perimeter sound pressure levels for Avicii 2014, The PA People provided a networked, real time sound pressure level monitoring system based on *SPLnet*.

Key features of this system include:

- The centralised logging of SPL data also includes information as to when stages are notified of exceedances or 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 residence. 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 is 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 *SPLnet* system is focused on proactively preventing perimeter sound pressure level exceedance.

Sound pressure levels for the Avicii 2014 event were centrally monitored and recorded from fixed SPL meters located at the main stage and at five key perimeter positions in real time. During the event one additional mobile sound pressure level monitor supplemented the *SPLNet* system. The mobile monitor was used to patrol the perimeter and verify the *SPLNet* measurements and to conduct location specific measurements in response to any received complaints.

The *SPLnet* system was used to continuously monitor and log environmental conditions at the event site. The *SPLnet* system continuously recorded data from each of the five perimeter *SPLnet* monitors for the duration of the event.

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

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

Fast dB(A) and dB(C) SPL results for the stage were also monitored at the FOH mixing position by the sound engineer. Dynamic SPL thresholds and exceedance indicators were set for the stage/FOH position by event control. These thresholds were based on the stage's effect 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.2 Site Plan and Measurement Locations

The P.A. People reviewed data and other information from previous events held in Centennial Parklands over previous years. This information assisted us in formulating the event monitoring strategy that was implemented for this event.

D.2.1 Perimeter Monitoring

Five perimeter locations were selected for the installation of fixed sound pressure level monitoring instruments. At each location an instrument was attached to a roadside pole at a height of three metres.

Each instrument cabinet comprised the following items:

- SPLnet M100 analyser complete with third octave analysis software
- SPLnet M121 Type 1 measurement microphone fitted in a weatherproof enclosure
- Battery, solar panel, audio monitoring unit, 3G mobile broadband modem

These five fixed locations were in the vicinity of:

- Lang Road
- Martin Road
- Cook Road
- Darley Road
- York Road

D.2.2 Stage Monitoring

One system was also located within the event boundary, at the Front of House mixing location for the stage. At this location an instrument was attached to the supporting structure of the platform.

The instrument comprised the following items:

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

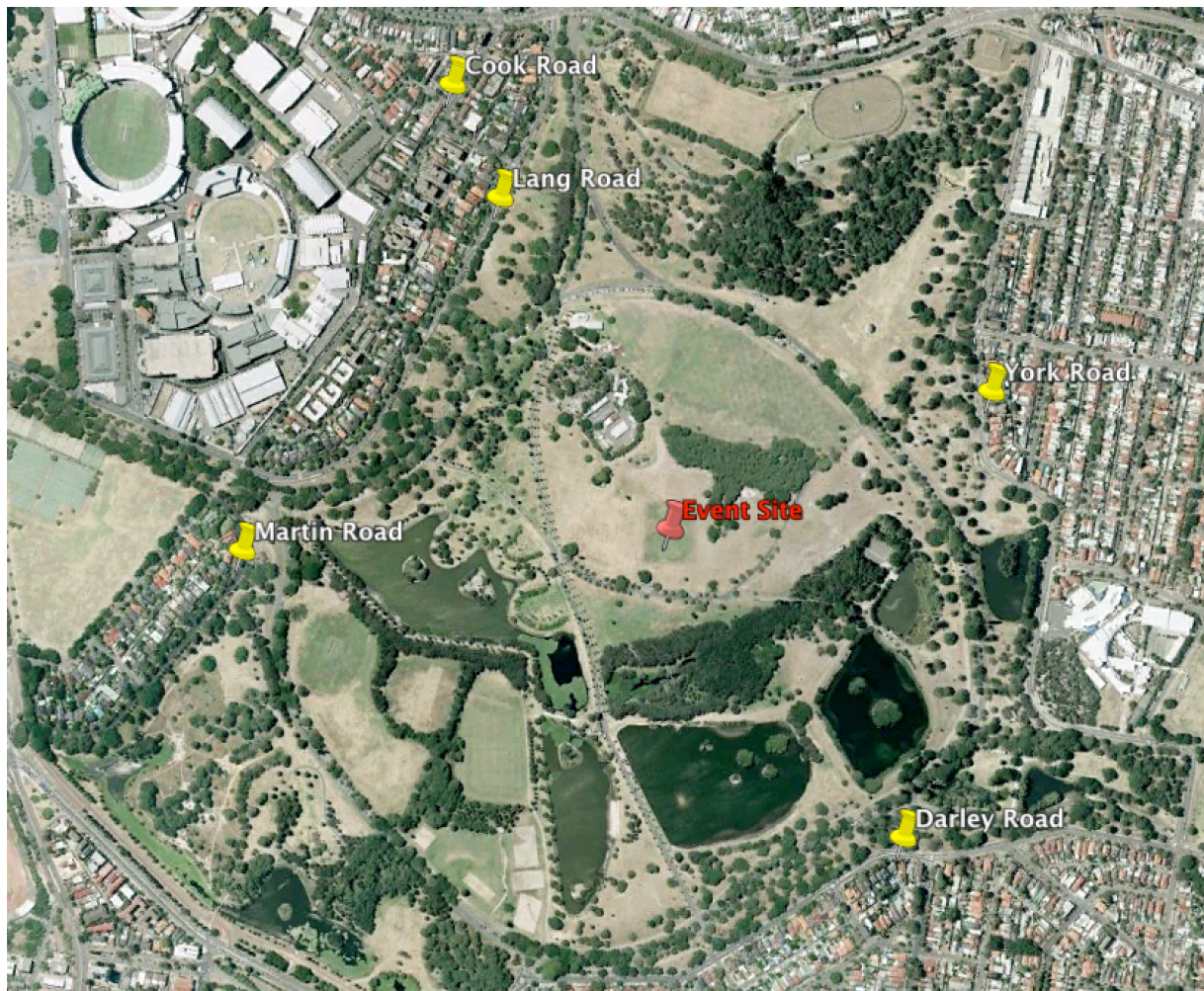
D.2.3 Mobile Monitor

One mobile monitoring person was also available to patrol the perimeter, corroborate the SPLnet measurements and to conduct location specific measurements in response to any received complaints.

This monitoring person was provided with a Type1 sound analyser complete with calibrator.

D.2.4 Site Plan

Below is a site plan showing relative positions of the five major monitoring locations used for this event.



D.2.5 Calibration

All instruments used for the monitoring of sound pressure levels for this event carry current calibration certificates.

Each instrument was field calibrated using either Bruel and Kjaer 4230 calibrator or a BWSA Type 660 calibrator prior to and after use.

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

D.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.

D.4 Complaints Management

The Centennial Park and Moore Park Trust have adopted a comprehensive sound management program, which includes a detailed complaints management procedure.

The focus of The P.A. People and The Trust for this event has been to proactively minimise complaints by monitoring perimeter sound pressure levels continuously in real time. In addition to continuous perimeter monitoring one mobile monitor personnel was available to attend to complainants locations personally.

E. Results

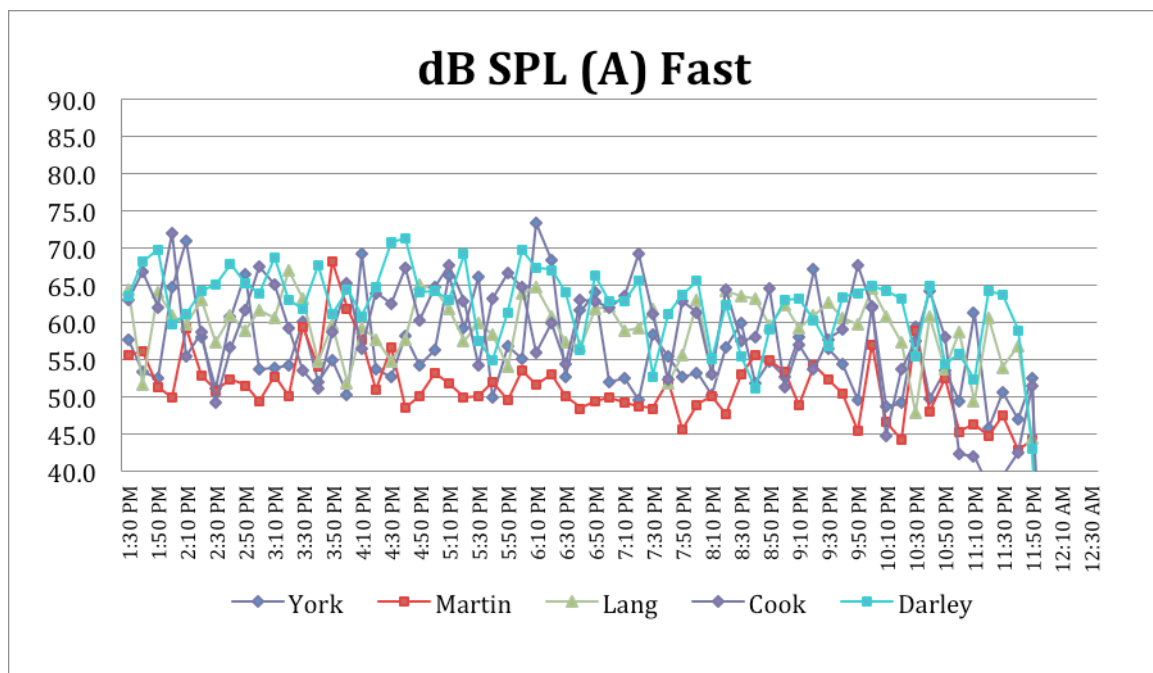
E.1 Perimeter Results

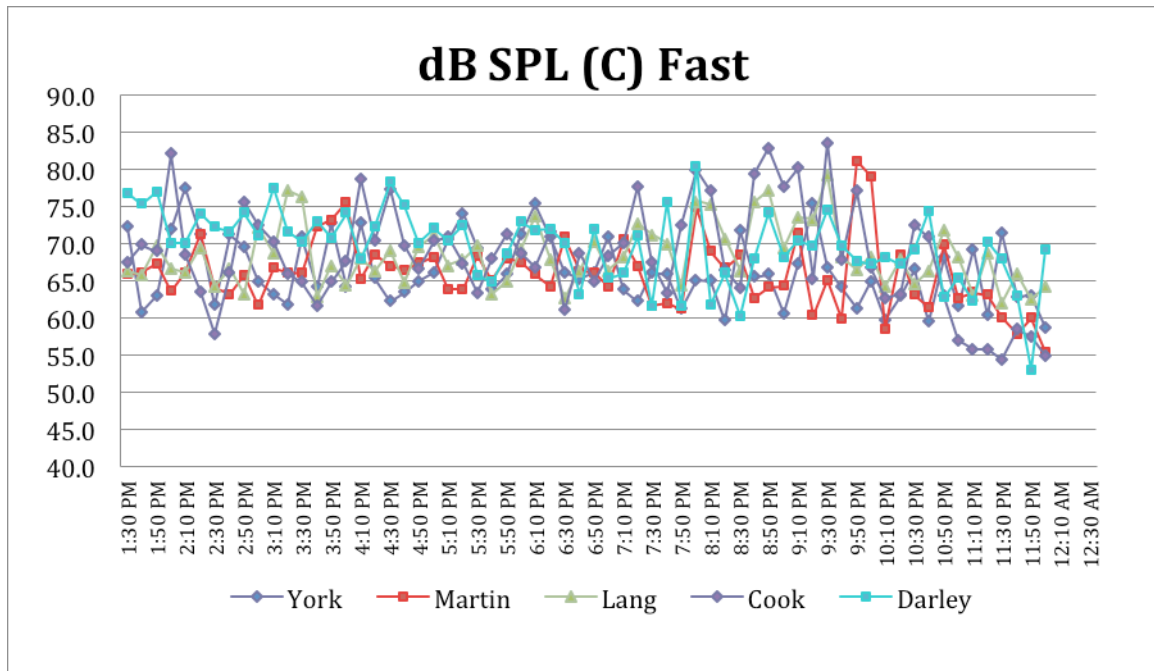
The SPL_{net} system employed for this event provides a significant amount of data particularly compared to the data collected from previous events.

In particular 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 two graphs outlining the levels at each of the five perimeter locations over the duration of the event day. 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 Avicii stage. In particular the A weighed plot shows significant interference from local traffic.

Each plot represents samples taken at 10 minute intervals of a total some 12,500 data points per measurement per location.





E.2 Exceedances

As noted previously we have collected a substantial amount of data pertaining to the noise levels at the perimeter of Centennial Park during this event.

E.2.1 Rehearsals and Sound Tests

There was no exceedances noted during sound tests.

E.2.2 Main Event (not exempted by Clause 15)

There was no exceedances noted during the main event.

E.3 Complaints

As confirmed by the Trust, there were Twenty-One (21) sound-related complaints to the telephone hotline during the day of Avicii 2014.

The mobile monitors responded to all telephone complaints on the event day.

Real time and spot measurement investigation of these complaints revealed zero (0) exceedances due to Avicii audio.

E.4 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 as a result of the Avicii sound reinforcement systems, Event Control would immediately contact the front of house sound control position to request a level decrease.

In general communications between event control and the main stage was prompt and effective in preventing and correcting perimeter exceedances.

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

F. Summary

Overall we believe that the implementation of the *SPLnet* system as part of the environmental noise management plan for Avicii 2014 has improved the quality of noise management for the event and ensured overall compliance with the EPA Prevention Notice.