7 Conclusion

Based on the assessments detailed above, it is concluded that the development will not have any significant additional operational noise impacts on the nearby noise sensitive receivers or the environment around the development site. Event noise emissions are predicted to be no worse than existing levels. Some disturbances due to construction noise are anticipated and mitigation measures have been recommended. No significant construction vibration impacts are anticipated.

The assessment has covered the following issues and concluded:

7.1 Construction noise

Noise generated from the various stages of stadium construction have been predicted at surrounding noise sensitive receivers. This has been informed by guidance from the project Construction Consultant.

The most significant noise impacts are predicted during stadium construction works, where the use of equipment such as the excavator, impact drills, angle grinders and electric saws are predicted to generate noise impacts above construction NMLs.

Some residential receivers along Moore Park Road may be 'highly affected' during some periods of works, experiencing noise levels in excess of $L_{eq(15min)}$ 75dBA during some works, however, these periods are likely to be limited in duration and frequency. Noise impacts may also affect occupants in the University of Technology Sydney Rugby Australia and NRL building, and scheduling of works and consultation is recommended.

The likelihood of adverse vibration impacts as a result of proposed construction works is low. Nonetheless, mitigation should be considered where vibration intensive works are required closer than 'safe working distances' to sensitive receivers, presented in Table 14, and adherence to the methodology statement, "SFS Response to Submissions (SSD9249) Attachment 8 – Methodology Statement – Working Near Busby's Bore" [9], is recommended to minimise the risk of structural damage in accordance with DIN 4150-3 [8].

Detailed recommendations are given for the control of construction noise for the periods where exceedances are predicted of relevant Noise Management Levels. The construction contractor is required to prepare a detailed Construction Noise and Vibration Management Sub Plan which reviews the modelled construction details and noise and vibration impacts presented in Section 3.

7.2 Operational noise excluding events

Operation noise criteria have been established for noise emissions excluding events, which include:

- External mechanical plant and equipment;
- Staff carpark activities; and
- Loading bay operations & waste and recycling collection.

Mitigation measures have been recommended where required and resulting noise from these operations have been assessed are predicted to comply with established noise criteria. No significant adverse acoustic impacts are anticipated.

7.3 Event noise

While the proposed SFS will retain a capacity of 45,000, the change in shape from the current 'saddle' to a 'bowl', which has higher tiered seating stands to the north and south, will reduce environmental noise emission to the surrounding environment. This is also anticipated to retain sound within the bowl, enhancing the overall acoustic atmosphere within the Stadium.

A noise management framework is proposed for the SFSR, which will establish a more technically robust method of assessing noise egress from the SFSR than the existing noise management regime and provide a mechanism to respond to incidents rapidly, and potentially in a pre-emptive manner. Revised noise limits have been established in consultation with the EPA and DPE and discussion on the appropriateness of established limits has been provided. Proposed noise limits are based on L_{eq5min} noise levels for both concert noise and PA noise during sporting events.

Noise emissions from sporting and concert events have been predicted at nearby residential receivers. The following event scenarios have been modelled:

- Sporting events
  - Noise from in-house PA system
- Concert events:
  - Noise from a typical concert speaker stack configuration; located north facing south; and
  - Noise a non-typical concert speaker stack configuration; located centre facing outwards and located south facing north.

Noise levels at surrounding residences have been predicted, with the following conservative assumptions:

- No roof has been included in the model;
- Line arrays are comprised of multiple point-sources, which is anticipated to under-predicted the directionality of a realistic line array speaker stack;
- Modelled noise levels are based on the ISO 9613-2 algorithm which assumes a source to receiver wind.

Results show predicted noise emissions during concert events comply with noise limits when in typical speaker configuration and comply with noise limits during sporting events. It is noted that noise emissions from sporting events are generally lower than ambient noise levels from road traffic.

Overall, event noise emissions are expected to be no worse than current event noise emissions. No significant cumulative effect from sporting events at the SCG are expected.

Noise mitigation measures have been recommended and are included in a draft NMP to be implemented for concert and sporting events. The draft NMP has been prepared in consultation with the EPA and DPE, and is presented in Appendix G. This draft NMP

outlines the proposed structure and preliminary content for the working NMP for the SFSR, which shall be prepared in consultation with Consent Authorities, relevant stakeholders and a suitably qualified acoustic consultant.

8 References

[1] NSW Environment Protection Authority, "NSW Noise Policy for Industry," NSW Environment Protection Authority , Sydney, 2017.

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[3] Department of Environment and Conservation (NSW), "Assessing Vibration: A technical guideline," Department of Environment and Conservation (NSW), Sydney, 2006.

[4] Department of Planning NSW, "Development Near Rail Corridors and Busy Roads – Interim Guideline," Department of Planning NSW, Sydney, 2008.

[5] Arup, "2018-06-05 - AC01-v5_SFSR_Noise and Vibration Impact Assessment," Arup, Sydney, 2018.

[6] British Standards, "BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting," British Standards, 2008.

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[13] NSW Environmental Protection Authority, "NSW Road Noise Policy," NSW Environmental Protection Authority, Sydney, 2012.

[14] Arup, "Transport Assessment for Stage 2," Arup, Sydney, 2019.

[15] Environment Protection Authority, "Notice of Preventative Action 1003904," Environment Protection Authority, Sydney, 2017.

[16] Environmental Resources Management Australia, "Sydney Cricket Ground and Allianz Stadium - Noise Management Plan," Environmental Resources Management Australia, Sydney, 2017.

[17] V. H. Miedema HM, "Noise annoyance from stationary sources: relationships with exposure metric day-evening-night level (DENL) and their confidence intervals.," *J Acoust Soc Am,* 2004.

[18] British Standards, "BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration," British Standards, 1993.

[19] NSW Environment Protection Authority, "Noise Guideline for Local Government," NSW Environment Protection Authority, Sydney, 2013.

[20] New South Wales Government, “Protection of the Environment Operations Act 1997 No 156,” New South Wales Government, Sydney, 1997.

[21] New South Wales Government, “Protection of the Environment Operations (Noise Control) Regulation 2008,” New South Wales Government, Sydney, 2008.

[22] Environment Protection Authority, “Envrionmental Criteria for Road Traffic Noise,” Environment Protection Authority, Sydney, 1999.

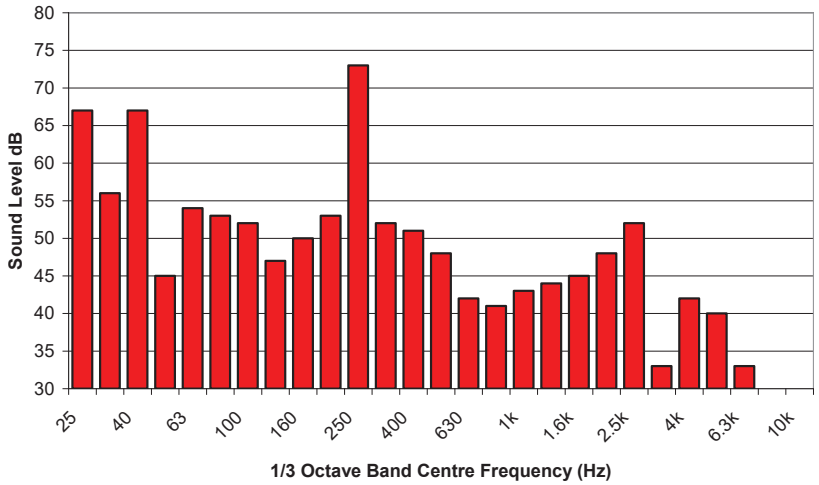
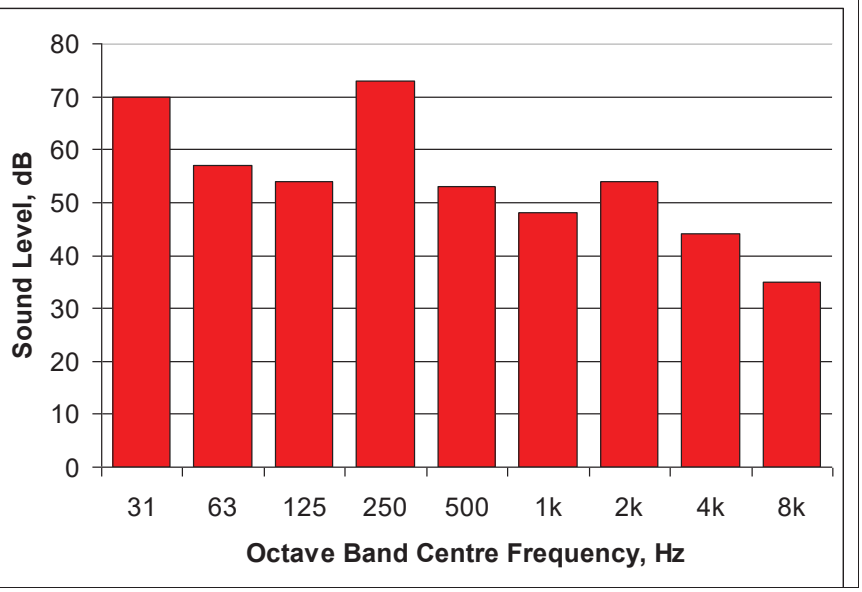
[23] Arup, “AC06 v2 SFSR Alernative noise management framework,” Arup, Sydney, 2019.

Appendix A

Acoustic Glossary

Term	Definition
Ambient Noise Level	The ambient noise level is the overall noise level measured at a location from multiple noise sources. When assessing noise from a particular development, the ambient noise level is defined as the remaining noise level in the absence of the specific noise source being investigated. For example, if a fan located on a city building is being investigated, the ambient noise level is the noise level from all other sources without the fan running. This would include sources such as traffic, birds, people talking and other nearby fans on other buildings.
Background Noise Level	The background noise level is the noise level that is generally present at a location at all or most times. Although the background noise may change over the course of a day, over shorter time periods (e.g. 15 minutes) the background noise is almost-constant. Examples of background noise sources include steady traffic (e.g. motorways or arterial roads), constant mechanical or electrical plant and some natural noise sources such as wind, foliage, water and insects. **Assessment Background Level (ABL)** A single-number figure used to characterise the background noise levels from a single day of a noise survey. ABL is derived from the measured noise levels for the day, evening or night time period of a single day of background measurements. The ABL is calculated to be the tenth percentile of the background LA90 noise levels – i.e. the measured background noise is above the ABL 90% of the time. **Rating Background Level (RBL / min $L_{A90,1hour}$)** A single-number figure used to characterise the background noise levels from a complete noise survey. The RBL for a day, evening or night time period for the overall survey is calculated from the individual Assessment Background Levels (ABL) for each day of the measurement period, and is numerically equal to the median (middle value) of the ABL values for the days in the noise survey. This parameter is denoted RBL in NSW, and min $L_{A90,1hour}$ in QLD.
Decibel	The decibel scale is a logarithmic scale which is used to measure sound and vibration levels. Human hearing is not linear and involves hearing over a large range of sound pressure levels, which would be unwieldy if presented on a linear scale. Therefore, a logarithmic scale, the decibel (dB) scale, is used to describe sound levels. An increase of approximately 10 dB corresponds to a subjective doubling of the loudness of a noise. The minimum increase or decrease in noise level that can be noticed is typically 2 to 3 dB.
dBA	dBA denotes a single-number sound pressure level that includes a frequency weighting (“A-weighting”) to reflect the subjective loudness of the sound level. The frequency of a sound affects its perceived loudness. Human hearing is less sensitive at low and very high frequencies, and so the A-weighting is used to account for this effect. An A-weighted decibel level is written as dBA.

<table>
<tr><th>Term</th><th>Definition</th></tr>
<tr><td></td><td>Some typical dBA levels are shown below.
<table>
<tr><th>Sound Pressure Level dBA</th><th>Example</th></tr>
<tr><td>130</td><td>Human threshold of pain</td></tr>
<tr><td>120</td><td>Jet aircraft take-off at 100 m</td></tr>
<tr><td>110</td><td>Chain saw at 1 m</td></tr>
<tr><td>100</td><td>Inside nightclub</td></tr>
<tr><td>90</td><td>Heavy trucks at 5 m</td></tr>
<tr><td>80</td><td>Kerbside of busy street</td></tr>
<tr><td>70</td><td>Loud stereo in living room</td></tr>
<tr><td>60</td><td>Office or restaurant with people present</td></tr>
<tr><td>50</td><td>Domestic fan heater at 1m</td></tr>
<tr><td>40</td><td>Living room (without TV, stereo, etc.)</td></tr>
<tr><td>30</td><td>Background noise in a theatre</td></tr>
<tr><td>20</td><td>Remote rural area on still night</td></tr>
<tr><td>10</td><td>Acoustic laboratory test chamber</td></tr>
<tr><td>0</td><td>Threshold of hearing</td></tr>
</table></td></tr>
<tr><td>L_1</td><td>The L_1 statistical level is often used to represent the maximum level of a sound level that varies with time.
Mathematically, the L_1 level is the sound level exceeded for 1% of the measurement duration. As an example, 87 dB $L_{A1,15min}$ is a sound level of 87 dBA or higher for 1% of the 15 minute measurement period.</td></tr>
<tr><td>L_{10}</td><td>The L_{10} statistical level is often used as the “average maximum” level of a sound level that varies with time.
Mathematically, the L_{10} level is the sound level exceeded for 10% of the measurement duration. L_{10} is often used for road traffic noise assessment. As an example, 63 dB $L_{A10,18hr}$ is a sound level of 63 dBA or higher for 10% of the 18 hour measurement period.</td></tr>
<tr><td>L_{90}</td><td>The L_{90} statistical level is often used as the “average minimum” or “background” level of a sound level that varies with time.
Mathematically, L_{90} is the sound level exceeded for 90% of the measurement duration. As an example, 45 dB $L_{A90,15min}$ is a sound level of 45 dBA or higher for 90% of the 15 minute measurement period.</td></tr>
<tr><td>L_{eq}</td><td>The ‘equivalent continuous sound level’, Leq, is used to describe the level of a time-varying sound or vibration measurement.
Leq is often used as the “average” level for a measurement where the level is fluctuating over time. Mathematically, it is the energy-average level over a period of time (i.e. the constant sound level that contains the same sound energy as the measured level). When the dBA weighting is applied, the level is denoted dB LAeq. Often the measurement duration is quoted, thus LAeq,15 min represents the dBA weighted energy-average level of a 15 minute measurement.</td></tr>
</table>

Term	Definition
L_{max}	The Lmax statistical level can be used to describe the "absolute maximum" level of a sound or vibration level that varies with time. Mathematically, Lmax is the highest value recorded during the measurement period. As an example, 94 dB LAmax is a highest value of 94 dBA during the measurement period. Since Lmax is often caused by an instantaneous event, Lmax levels often vary significantly between measurements.
Frequency	Frequency is the number of cycles per second of a sound or vibration wave. In musical terms, frequency is described as "pitch". Sounds towards the lower end of the human hearing frequency range are perceived as "bass" or "low-pitched" and sounds with a higher frequency are perceived as "treble" or "high pitched".  

Term	Definition
Peak Particle Velocity (PPV)	Peak Particle Velocity (PPV) is the highest velocity of a particle (such as part of a building structure) as it vibrates. Most sound level meters measure *root mean squared* (RMS) values; it is common to approximate the PPV based on an RMS measurement. PPV is commonly used as a vibration criterion, and is often interpreted as a PPV based on the L_{max} or $L_{max,spec}$ index.
Sound Power and Sound Pressure	The sound power level (L_w) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level (L_p) varies as a function of distance from a source. However, the sound power level is an intrinsic characteristic of a source (analogous to its mass), which is not affected by the environment within which the source is located.
Vibration	Waves in a solid material are called “vibration”, as opposed to similar waves in air, which are called “sound” or “noise”. If vibration levels are high enough, they can be felt; usually vibration levels must be much higher to cause structural damage. A vibrating structure (eg a wall) can cause airborne noise to be radiated, even if the vibration itself is too low to be felt. Structureborne vibration limits are sometimes set to control the noise level in a space. Vibration levels can be described using measurements of displacement, velocity and acceleration. Velocity and acceleration are commonly used for structureborne noise and human comfort. Vibration is described using either metric units (such as mm, mm/s and mm/s^2) or else using a decibel scale.

Appendix B

Measurement Methodology and Results

B1 Noise monitoring equipment

Unattended and attended monitoring was carried out using the following equipment:

Monitoring	Measurement location	Equipment/model	Serial No.	SLM Type
Unattended long-term	Meas. 1	Ngara (ARL)	878 07b	Class 1
	Meas. 2	Ngara (ARL)	878 000	Class 1
	Meas. 4	Ngara (ARL)	878 0E6	Class 1
	Meas. 5	Ngara (ARL)	878 042	Class 1
	Meas. 6	Ngara (ARL)	878 0EA	Class 1
	Meas. 7	Ngara (ARL)	878 0D1	Class 1

Notes: All meters comply with AS IEC 61672.1 2004 “Electroacoustics - Sound Level Meters” and designated either Class 1 as per table, and are suitable for field use.

The equipment was calibrated prior and subsequent to the measurement period using a Bruel & Kjaer Class 4231 calibrator. No significant drift in calibration was observed.

B2 Long-term unattended noise measurement results

Long-term noise monitoring was carried out from Wednesday, 21 February 2018 to Monday, 5 March 2018 by Arup. Monitoring was conducted in accordance with Appendix B1 of the NPI [1]. The NPI separates the 24-hour day into three different time periods – day, evening and night, as detailed below in Table 50.

Table 50: Standard NPI time periods

Period	Day of Week	Time period
Day	Monday-Saturday Sunday, Public Holidays	7:00 am-6:00 pm 8:00 am-6:00 pm
Evening	Monday-Sunday	6:00 pm -10:00 pm
Night	Monday-Saturday Sunday, Public Holidays	10:00 pm -7:00 am Operating times of the stadium are limited to 11:00 pm, therefore RBLs have been calculated based on this period, see Section 5.3.2.3. 10:00 pm -8:00 am

The long-term noise monitoring methodology and noise level-vs-time graphs of the data are included in Appendix C.

Table 51 presents the overall single RBLs and representative ambient L_{eq} noise levels for each assessment period, determined in accordance with the NPI.

Table 51: Long-term noise monitoring results

ID	NCA	Location	Time period	RBLs[1], dBL_{A90}	Ambient $dBL_{Aeq(period)}$
Meas. 1	NCA 1	587 South Dowling Street	Day	58	69

ID	NCA	Location	Time period	RBLs[1], dBL_{A90}	Ambient $dBL_{Aeq(period)}$
			Evening	56	68
			Night[1]	55	67
Meas. 2	NCA 2	24 Moore Park Road	Day	56	67
			Evening	52	65
			Night[1]	51	62
Meas. 3	NCA 3	256 Moore Park Road	Day	52	68
			Evening	49	66
			Night[1]	49	64
Meas. 4	NCA 4	43 Stewart Street	Day	43	57
			Evening	41	55
			Night[1]	41	46
Meas. 5	NCA 5	11 Furber Road	Day	39	60
			Evening	36	56
			Night[1]	35	43
Meas. 6	NCA 6	17 Robertson Road	Day	47	57
			Evening	47	57
			Night[1]	45	49
Meas. 7	-	Sydney Boys High School	Day	60	72
			Evening	56	70
			Night[1]	56	67

1 - Night-time RBLs have been calculated based on the operational time of the SFS from 10:00pm to 11:00pm.

Measurement samples affected by extraneous noise, wind (greater than 5m/s) or rain were excluded from the recorded data in accordance with the procedures outlined in Appendix B of the NPI [1].

Data was provided by the Bureau of Meteorology (BOM) collection station at Sydney Observatory Hill. Wind speed data was adjusted to account for the difference in measurement height and surrounding environment between the BOM weather station (measured 10 m above ground) and the microphone location based on Table C.1 of ISO 4354:2009 '*Wind actions on structures'*.

B2.1 Short-term attended noise measurement results

Short-term operator attended noise measurements were conducted on Monday, 5 March 2017 by Arup at each logger location. Noise measurements were conducted over a 15-minute period. Weather conditions were warm, still and clear during measurements.

It should be noted no industrial noise contribution was noted at any of the measurement locations.

Table 52 presents the measured L_{90} and L_{eq} noise levels for at each measurement locations, determined in accordance with the NPI.

Table 52: Short-term noise monitoring results

ID	Location	Date / Time	dBL$_{Aeq}$	dBL$_{A90}$	dBL$_{Amax}$	Description of noise environment
Meas. 1	587 South Dowling Road	5/03/18 11:55AM	68	60	79	Traffic noise dominant Heavy vehicles passing intermittently Drilling / jack hammer from road construction works across South Dowling Street very regular (approx 50 m away) Construction generators and vehicles constant in background as well
Meas. 2	24 Moore Park Road	5/03/18 1:09 PM	65	56	82	Traffic noise dominant with significant heavy traffic Bird noise noted
Meas. 3	256 Moore Park Rd	5/03/18 1:33 PM	67	51	85	Traffic noise dominant with significant heavy traffic
Meas. 4	43 Stewart street	5/03/18 1:59 PM	46	39	66	Local traffic only, intermittent Occasional noise from residences and passing foot traffic
Meas. 5	11 Furber Street	5/03/18 2:55 PM	46	38	77	Local traffic only, intermittent Some occasional construction noise - drilling, jack hammer and sawing in background
Meas. 6	17 Robertson Road	5/03/18 3:21 PM	50	43	72	Local traffic only, intermittent Occasional noise from residences and passing foot traffic Bird noise noted
Meas. 7	Sydney Boys School	5/03/18 12:31 PM	70	57	83	Traffic noise dominant on Anzac Parade, including many buses. Construction noise in open area next door to school on northern side of fence - drilling and jack hammer

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587 South Dowling St (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		56	45		67	65
Thursday-22-February-2018	57	56	44	68	67	65
Friday-23-February-2018	58	57	46	68	68	66
Saturday-24-February-2018	57	56		67	67	
Sunday-25-February-2018						
Monday-26-February-2018	60	56	47	70	69	67
Tuesday-27-February-2018	58	57	49	68	70	66
Wednesday-28-February-2018	57	57	50	69	68	66
Thursday-01-March-2018	58	57	49	69	68	67
Friday-02-March-2018	57	56		70	68	
Saturday-03-March-2018						
Representative Weekday[5]	**58**	**56**	**47**	**69**	**68**	**66**
Representative Weekend[5]	**57**	**56**	**#NUM!**	**67**	**67**	**#DIV/0!**
Representative Week[5]	**58**	**56**	**47**	**69**	**68**	**66**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	67	65	69	69
Thursday-22-February-2018	68	65	68	69
Friday-23-February-2018	68	66	68	69
Saturday-24-February-2018	67	68	68	70
Sunday-25-February-2018	70	70	74	72
Monday-26-February-2018	70	67	71	72
Tuesday-27-February-2018	69	66	70	69

Wednesday-28-February-2018	68	66	70	69
Thursday-01-March-2018	69	67	72	70
Friday-02-March-2018	70	66	0	68
Saturday-03-March-2018				
Representative Weekday[3]	**69**	**66**	**69**	**70**
Representative Weekend[3]	**69**	**69**	**72**	**71**
Representative Week[3]	**69**	**67**	**70**	**70**

Notes:

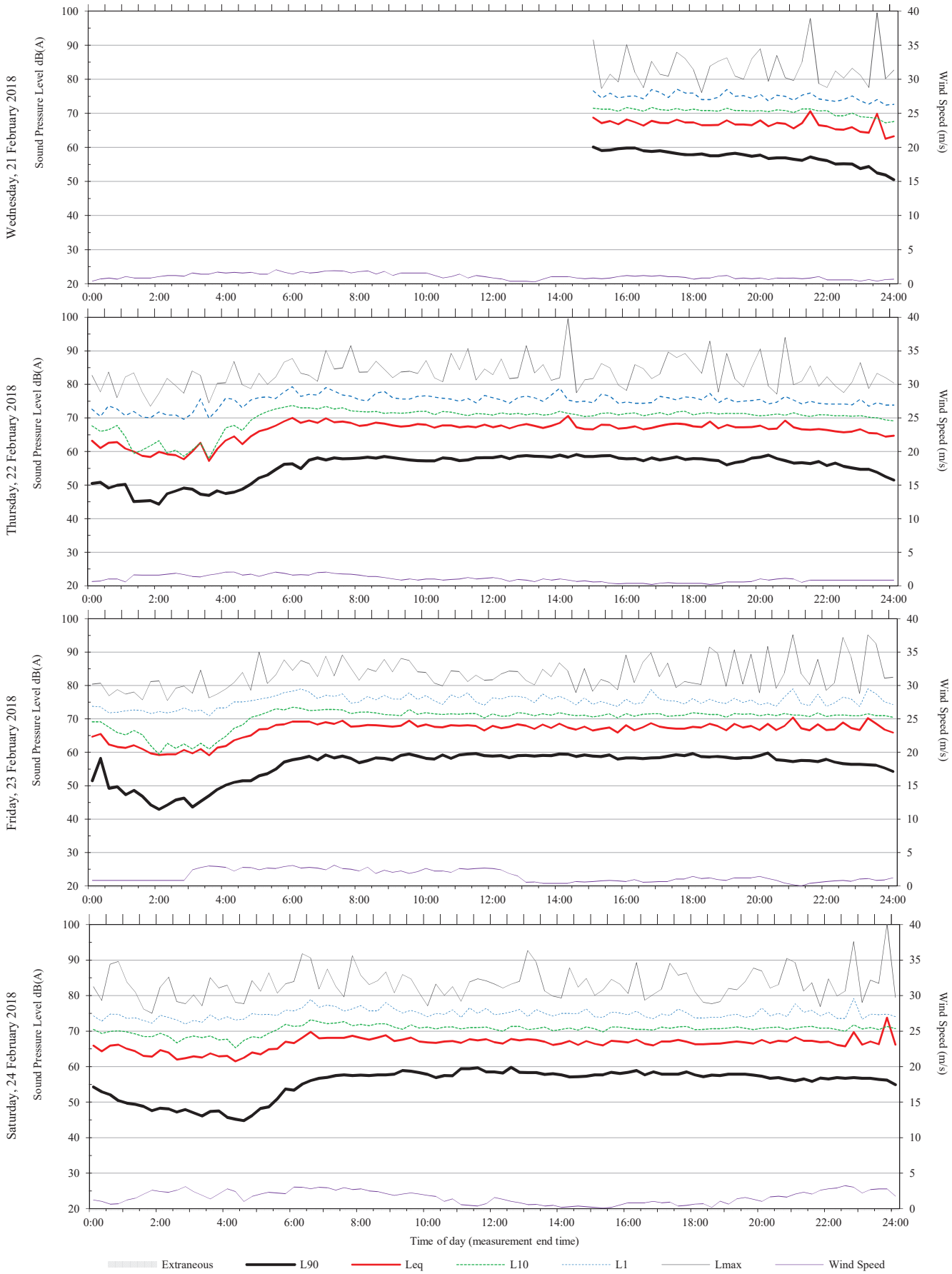
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

Unattended monitoring: 587 South Dowling St (Free Field)

ARUP



Unattended monitoring: 587 South Dowling St (Free Field)

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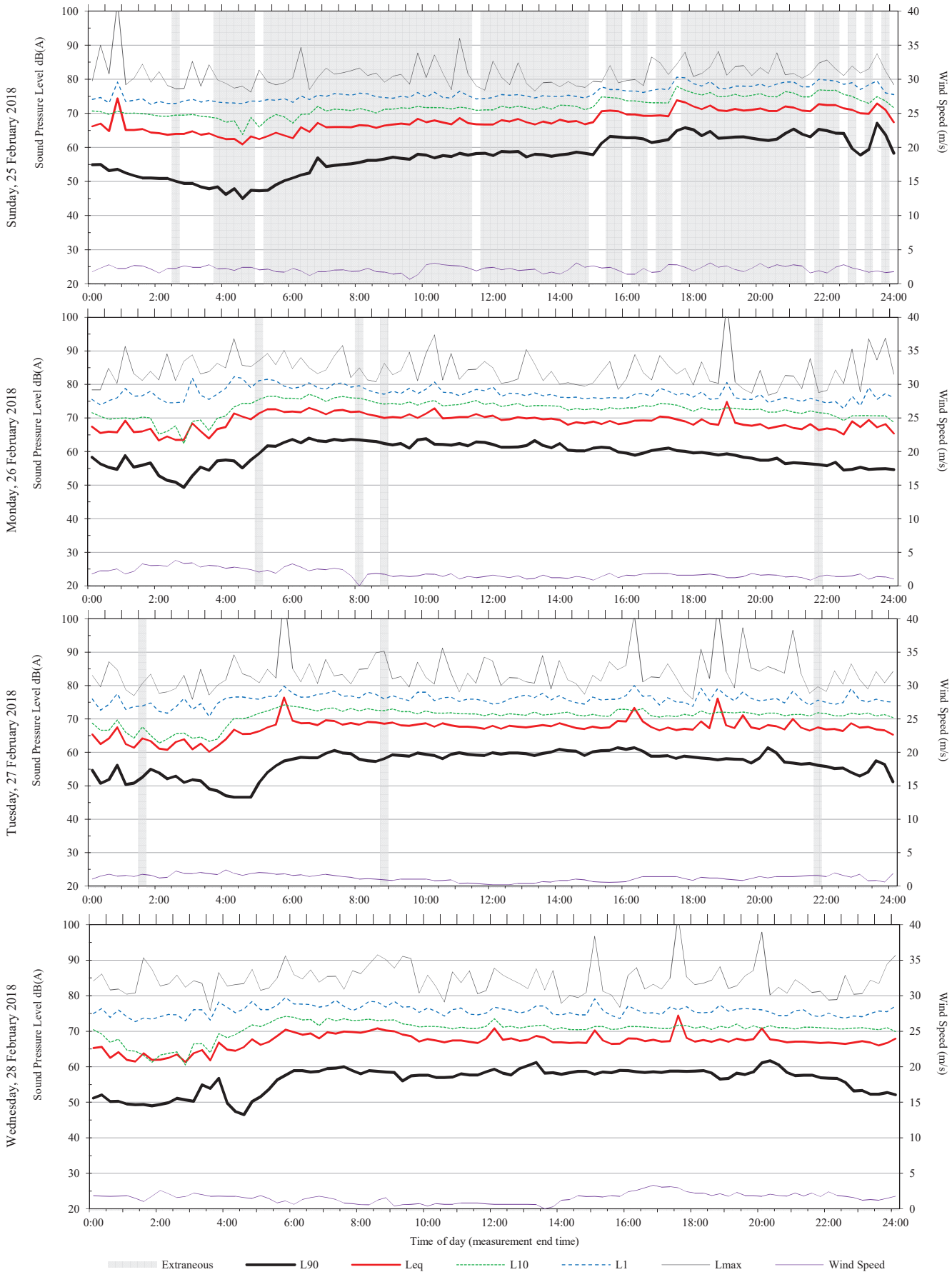

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24 Moore Park Road, Paddington (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		52	38		64	61
Thursday-22-February-2018	56	51	39	66	65	61
Friday-23-February-2018	57	52	39	66	64	60
Saturday-24-February-2018	54	52		66	64	
Sunday-25-February-2018						
Monday-26-February-2018	58	52	42	69	67	61
Tuesday-27-February-2018	56			66		
Wednesday-28-February-2018						
Thursday-01-March-2018		54	44		65	63
Friday-02-March-2018	57	51	42	67	64	61
Saturday-03-March-2018	55			66		
Sunday-04-March-2018	56	51	42	66	63	60
Monday-05-March-2018						
Representative Weekday[5]	**57**	**52**	**41**	**67**	**65**	**61**
Representative Weekend[5]	**55**	**52**	**42**	**66**	**63**	**60**
Representative Week[5]	**56**	**52**	**42**	**67**	**65**	**61**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	65	61	66	66
Thursday-22-February-2018	66	61	67	67
Friday-23-February-2018	66	60	67	64

Saturday-24-February-2018	65	62	66	64
Sunday-25-February-2018	69	65	72	69
Monday-26-February-2018	68	61	70	66
Tuesday-27-February-2018	66		67	
Wednesday-28-February-2018				
Thursday-01-March-2018	66	63	66	67
Friday-02-March-2018	66	61	0	65
Saturday-03-March-2018	66	62	67	65
Sunday-04-March-2018	65	60	66	66
Monday-05-March-2018	66		67	
Representative Weekday[3]	**66**	**61**	**67**	**66**
Representative Weekend[3]	**67**	**62**	**69**	**66**
Representative Week[3]	**66**	**62**	**68**	**66**

Notes:

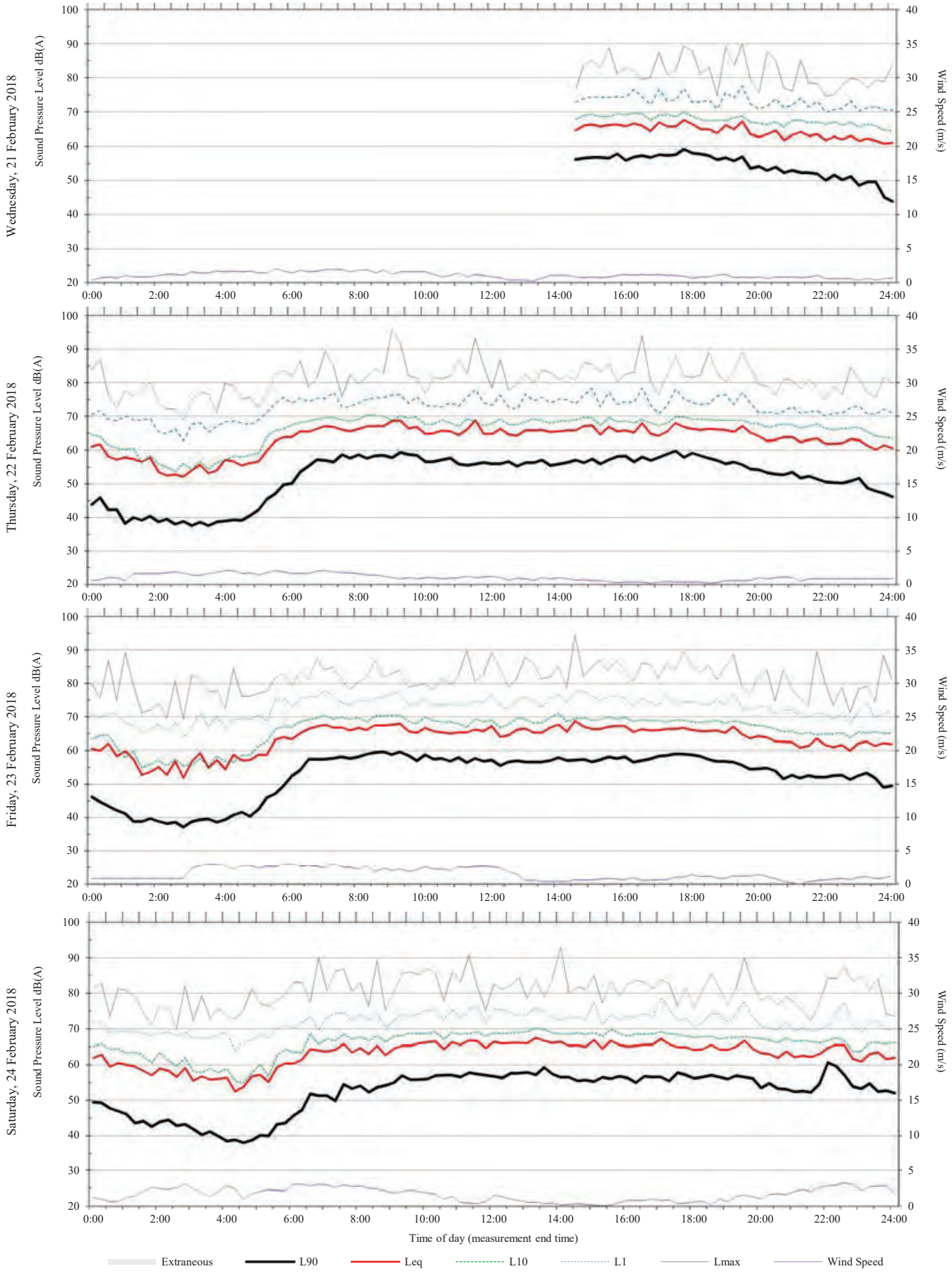
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

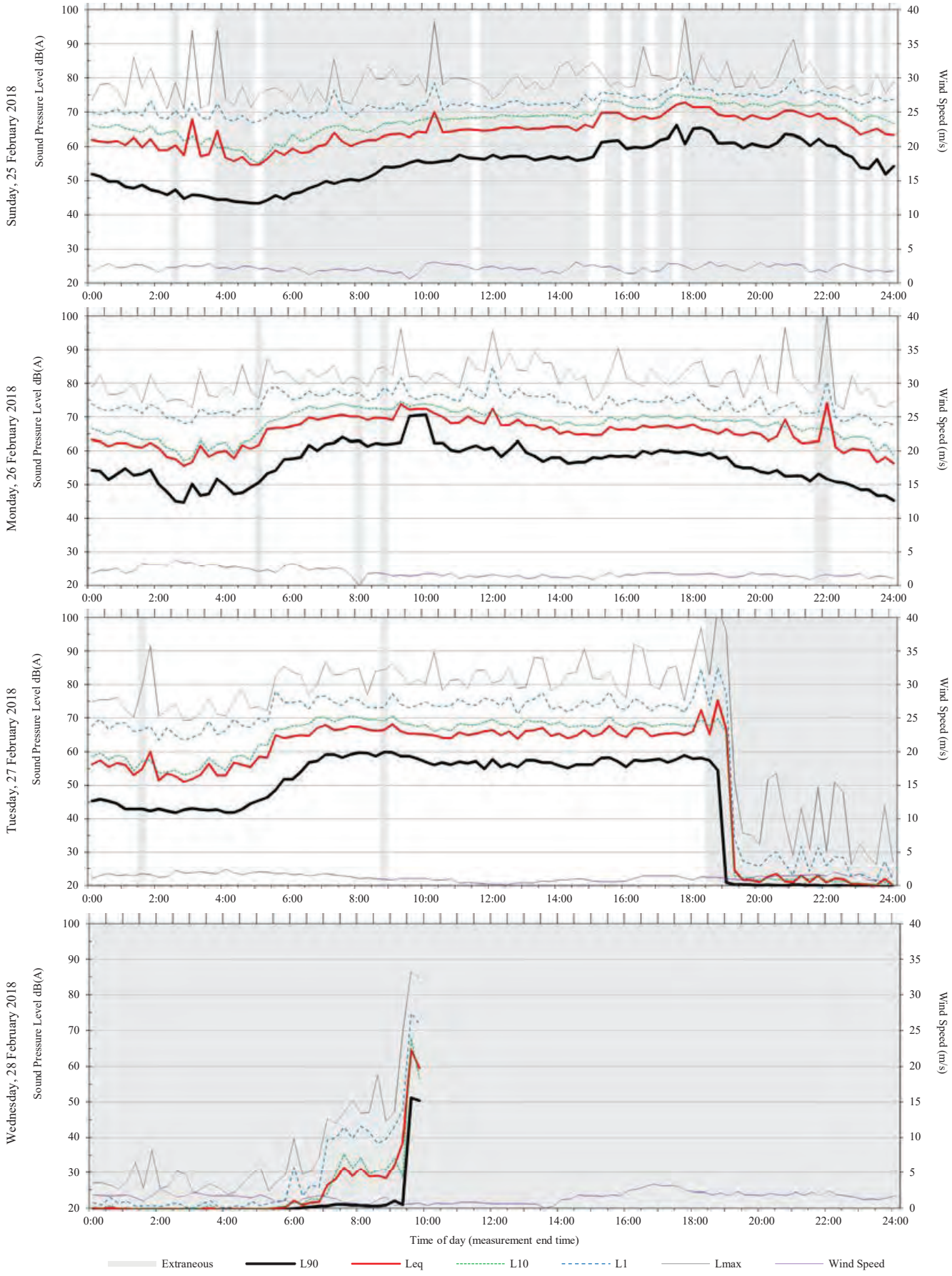
Unattended monitoring: (Free Field)

ARUP



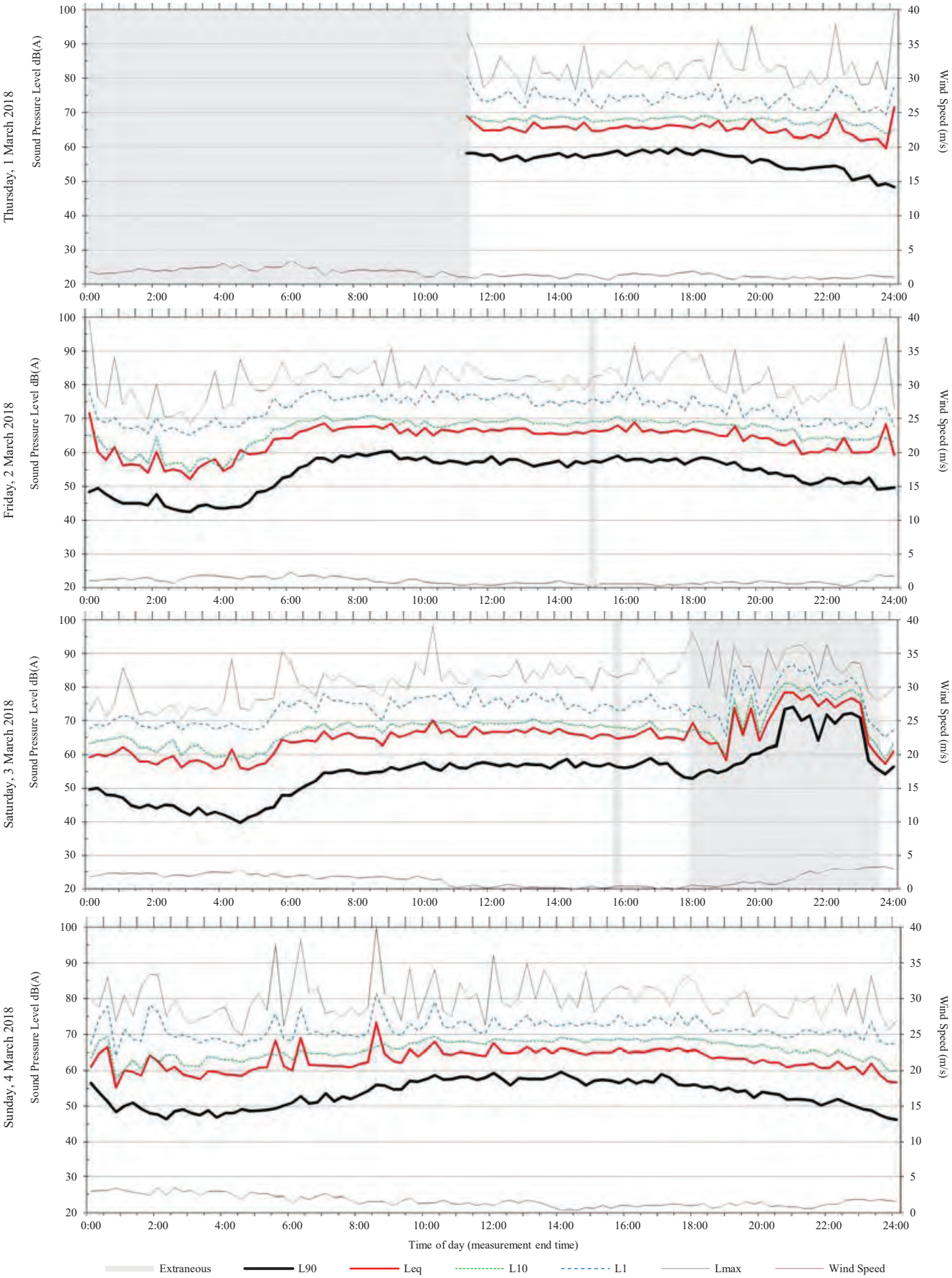
Unattended monitoring: (Free Field)

ARUP



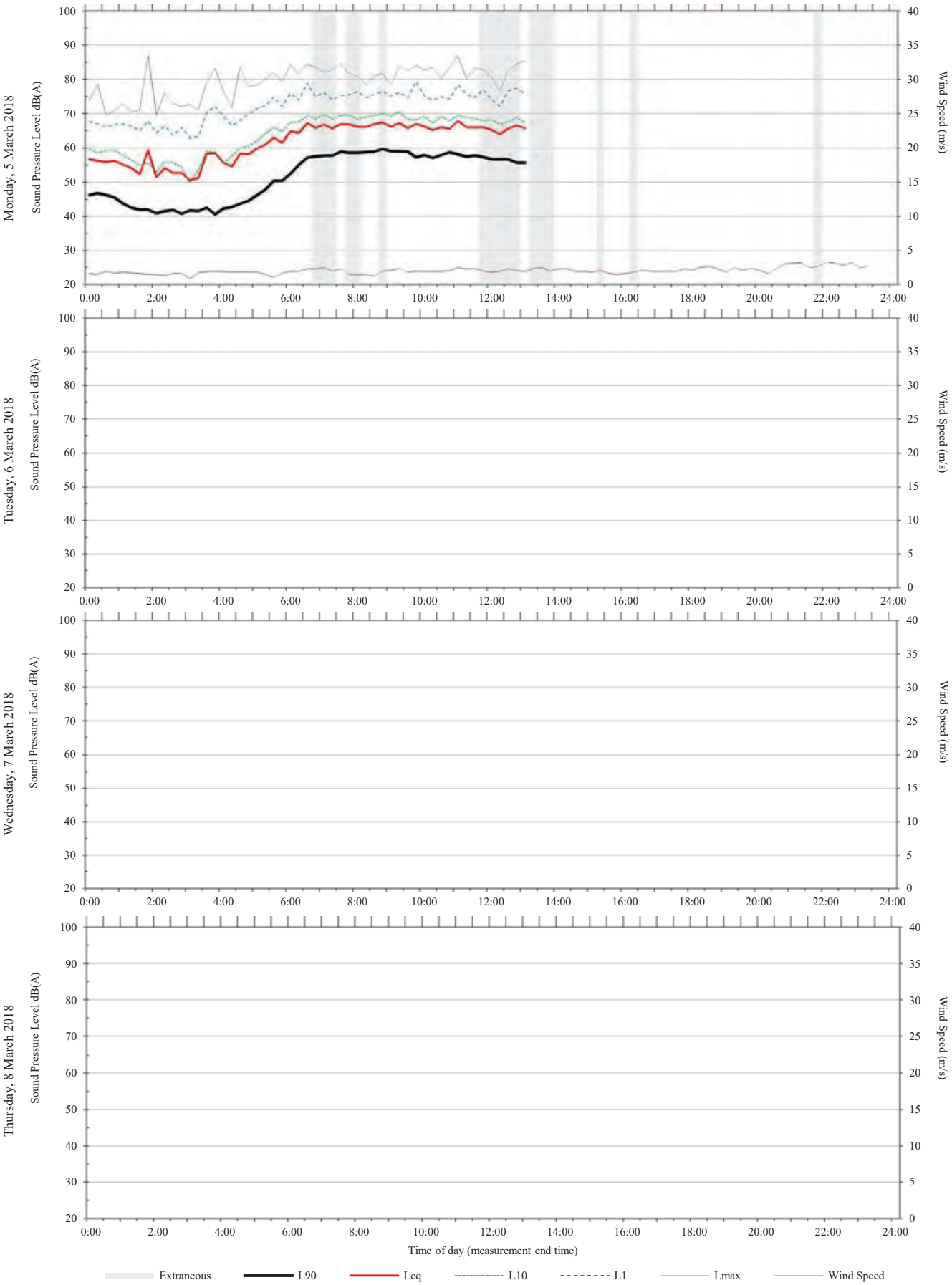
Unattended monitoring: (Free Field)

ARUP



Unattended monitoring: (Free Field)

ARUP



ARUP

256 Moore Park Rd (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		49	37		66	62
Thursday-22-February-2018	52	50	37	67	67	63
Friday-23-February-2018	53	49	38	68	66	61
Saturday-24-February-2018	52	54		66	65	
Sunday-25-February-2018						
Monday-26-February-2018	53	48	38	69	66	61
Tuesday-27-February-2018	52	50	37	67	66	62
Wednesday-28-February-2018	52	50	41	68	67	62
Thursday-01-March-2018	52	51	38	68	68	62
Friday-02-March-2018	52	49	37	68	66	63
Saturday-03-March-2018	50	49		69	65	
Sunday-04-March-2018						
Representative Weekday[5]	**52**	**49**	**37**	**68**	**67**	**62**
Representative Weekend[5]	**51**	**51**	**#NUM!**	**68**	**65**	**#DIV/0!**
Representative Week[5]	**52**	**49**	**37**	**68**	**66**	**62**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	67	62	68	67
Thursday-22-February-2018	67	63	70	68
Friday-23-February-2018	67	61	68	64
Saturday-24-February-2018	66	62	67	64
Sunday-25-February-2018	71	67	72	72
Monday-26-February-2018	69	61	72	68

Tuesday-27-February-2018	67	62	68	69
Wednesday-28-February-2018	68	62	69	68
Thursday-01-March-2018	68	62	69	69
Friday-02-March-2018	67	63	0	66
Saturday-03-March-2018	68	62	71	65
Sunday-04-March-2018				
Representative Weekday[3]	**68**	**62**	**69**	**68**
Representative Weekend[3]	**69**	**64**	**70**	**69**
Representative Week[3]	**68**	**63**	**69**	**68**

Notes:

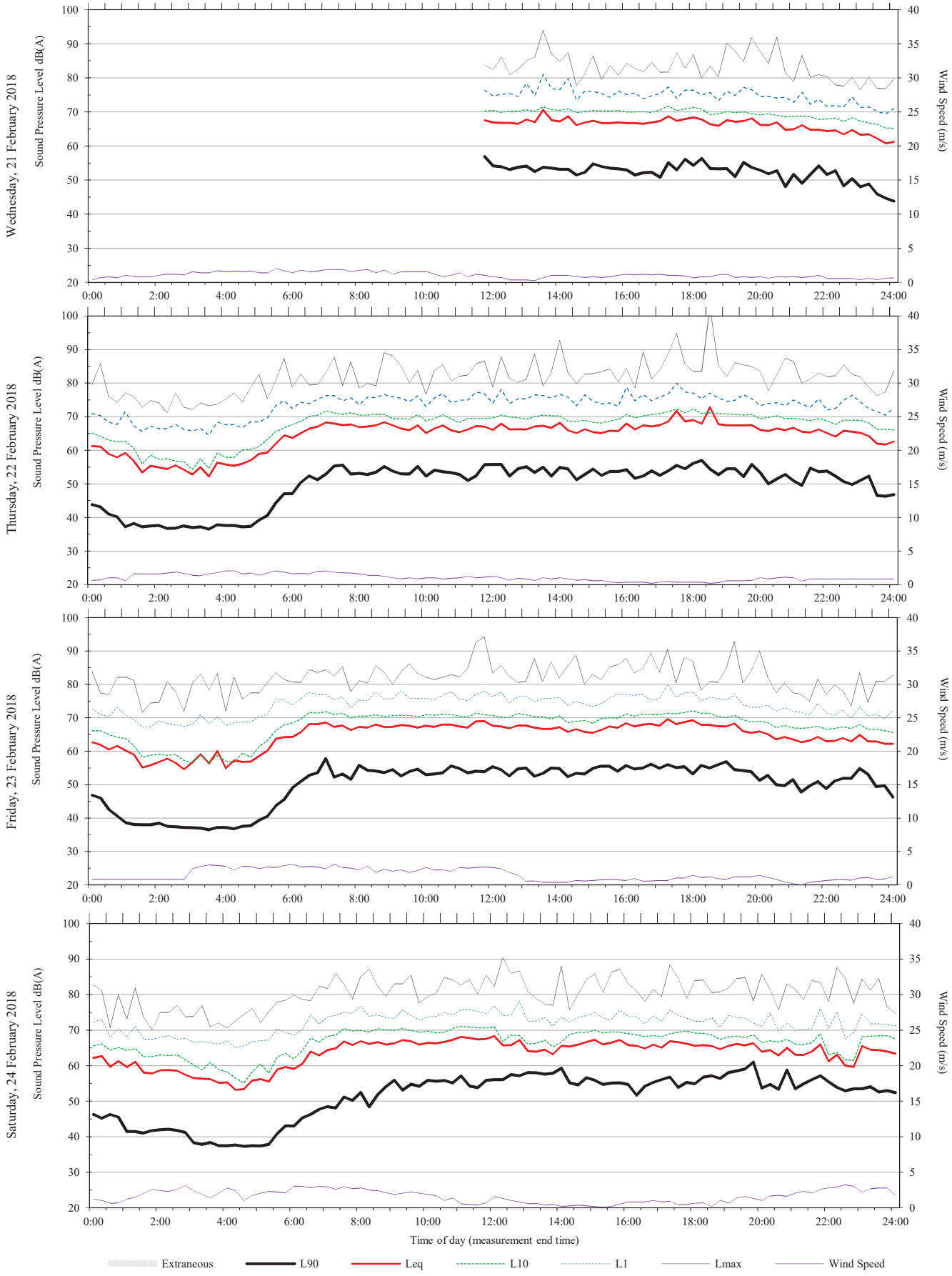
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

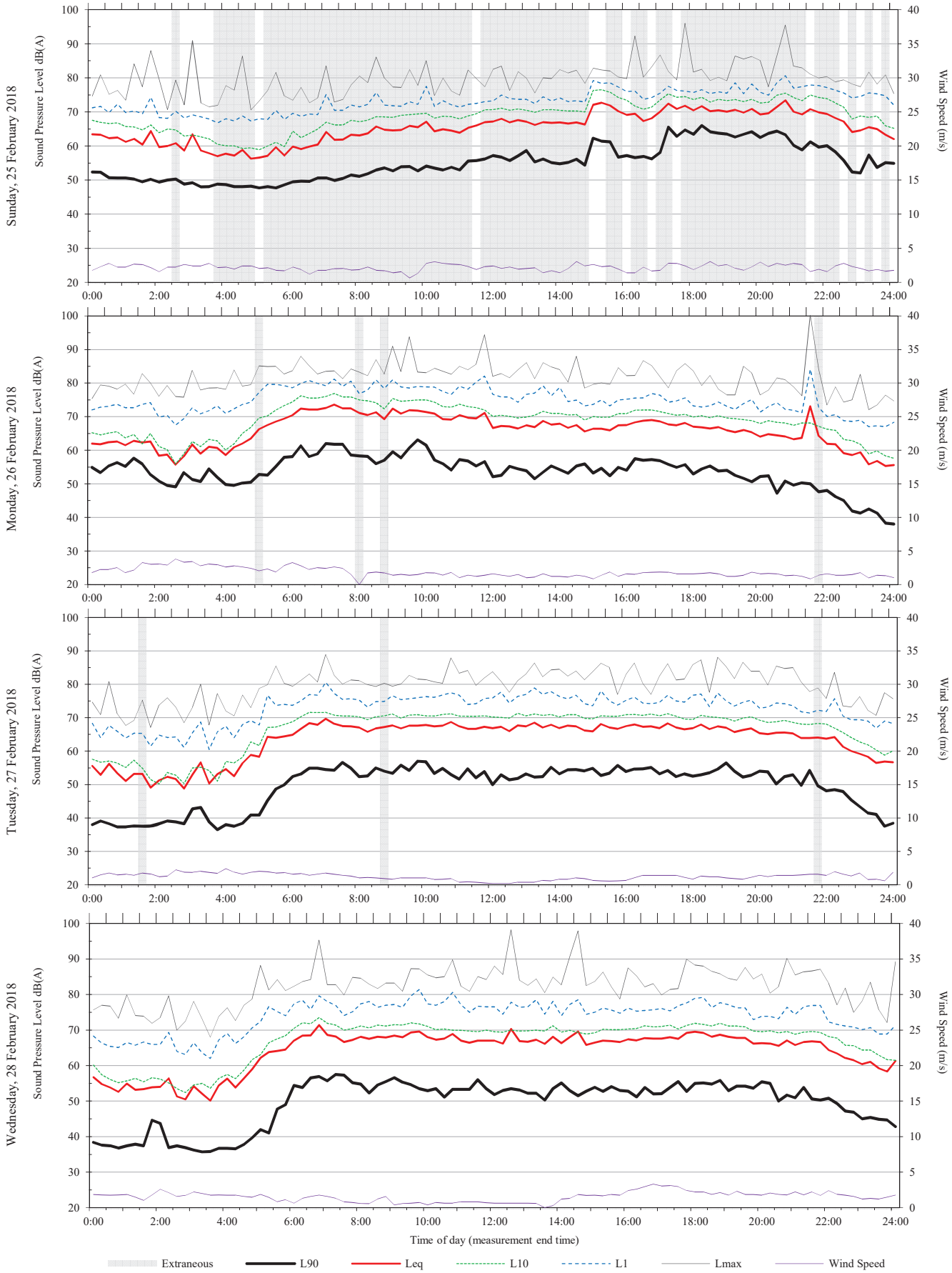
Unattended monitoring: 256 Moore Park Rd (Free Field)

ARUP



Unattended monitoring: 256 Moore Park Rd (Free Field)

ARUP



ARUP

43 Stewart St (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		39	37		53	49
Thursday-22-February-2018	40	40	37	60	55	44
Friday-23-February-2018	43	44	38	58	57	49
Saturday-24-February-2018	43	46		57	56	
Sunday-25-February-2018						
Monday-26-February-2018	45	42	38	57	53	46
Tuesday-27-February-2018	41	38	37	54	56	47
Wednesday-28-February-2018	43	45	41	59	56	53
Thursday-01-March-2018	42	40	38	60	53	46
Friday-02-March-2018	40	38	37	55	50	47
Saturday-03-March-2018	40	46	38	56	57	50
Sunday-04-March-2018	45	41	37	58	51	46
Monday-05-March-2018						
Representative Weekday[5]	**42**	**40**	**37**	**58**	**54**	**49**
Representative Weekend[5]	**43**	**46**	**38**	**57**	**55**	**48**
Representative Week[5]	43	41	**37**	**57**	**55**	**49**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	52	49	54	58
Thursday-22-February-2018	59	44	60	50
Friday-23-February-2018	57	49	58	55
Saturday-24-February-2018	57	51	59	57
Sunday-25-February-2018	59	55	65	57

Monday-26-February-2018	56	46	58	51
Tuesday-27-February-2018	55	47	56	56
Wednesday-28-February-2018	58	53	58	58
Thursday-01-March-2018	59	46	63	51
Friday-02-March-2018	54	47	0	55
Saturday-03-March-2018	56	50	57	55
Sunday-04-March-2018	56	46	60	52
Monday-05-March-2018	55		57	
Representative Weekday[3]	**57**	**49**	**58**	**55**
Representative Weekend[3]	**57**	**51**	**61**	**56**
Representative Week[3]	**57**	**50**	**59**	**55**

Notes:

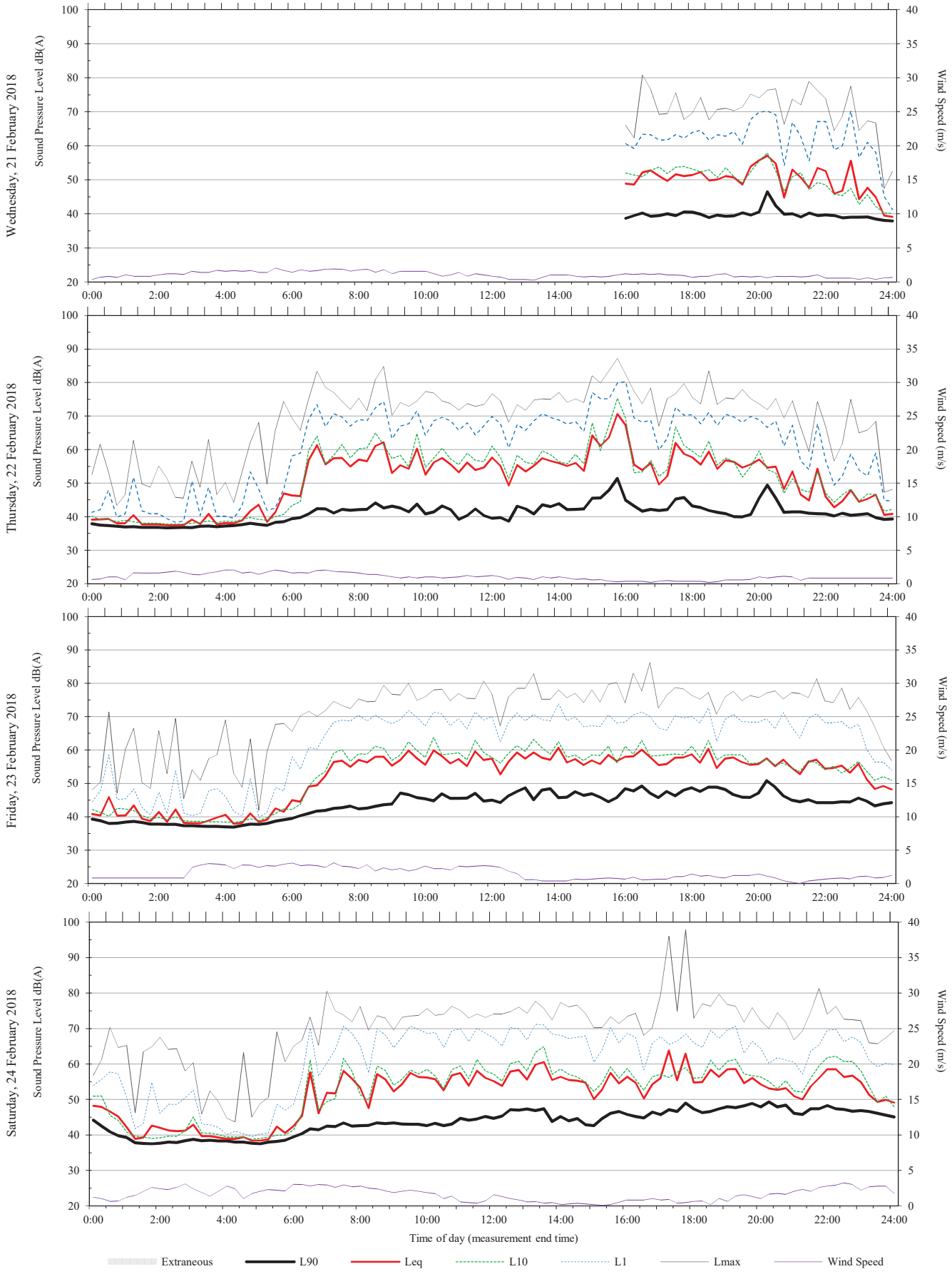
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

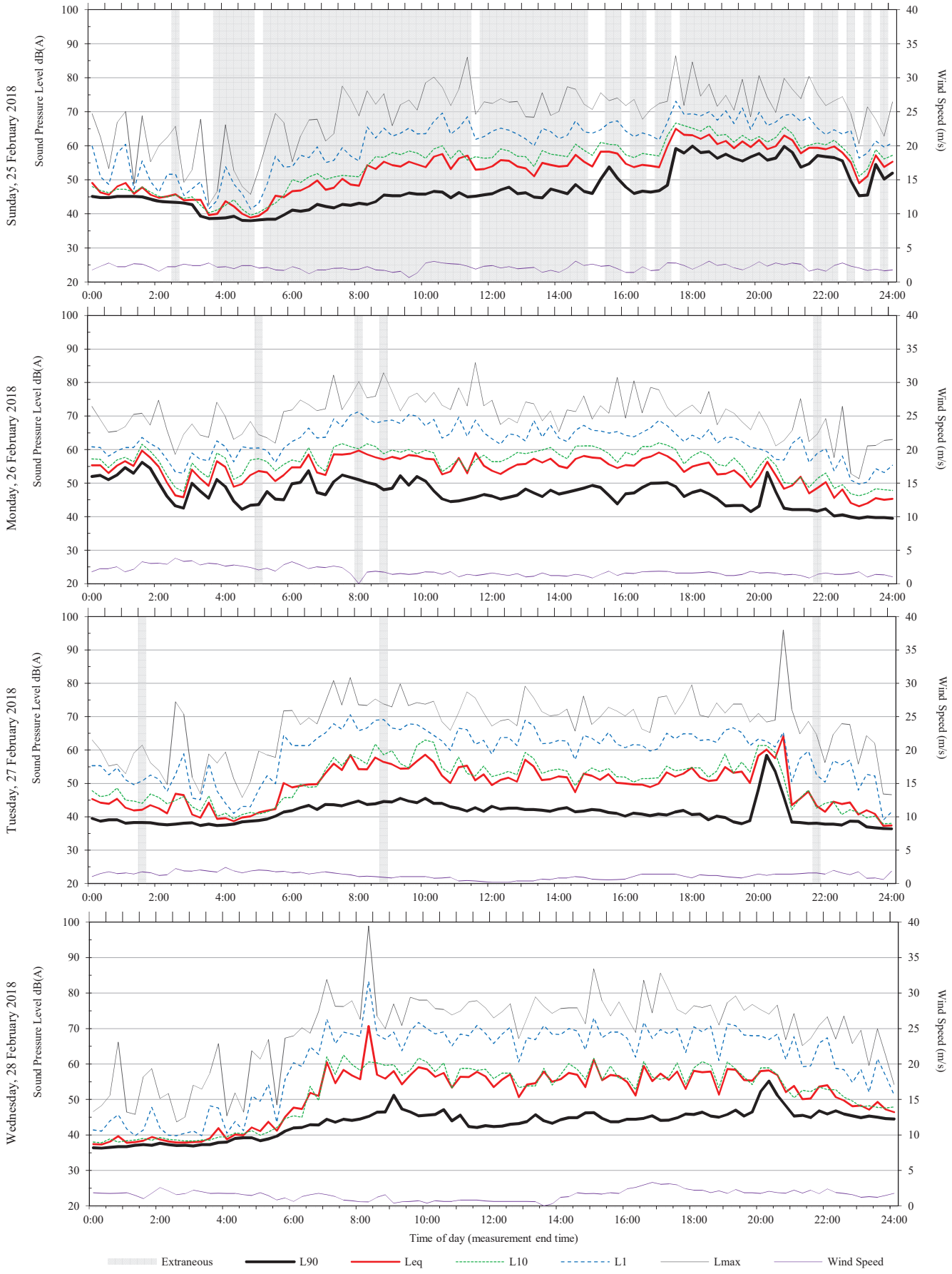
Unattended monitoring: 43 Stewart St (Free Field)

ARUP



Unattended monitoring: 43 Stewart St (Free Field)

ARUP



ARUP

11 Furber Rd (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		36	28		52	45
Thursday-22-February-2018	38	37		56	54	
Friday-23-February-2018						
Saturday-24-February-2018		43			52	
Sunday-25-February-2018						
Monday-26-February-2018	41	36	29	51	55	42
Tuesday-27-February-2018	38	35	30	54	56	40
Wednesday-28-February-2018	40	42	37	57	59	45
Thursday-01-March-2018	39	35	33	54	54	40
Friday-02-March-2018	37	32	30	49	52	44
Saturday-03-March-2018	37	43	34	68	60	47
Sunday-04-March-2018	40	36	29	51	51	39
Monday-05-March-2018						
Representative Weekday[5]	**39**	**36**	**30**	**54**	**55**	**43**
Representative Weekend[5]	**39**	**43**	**32**	**65**	**56**	**45**
Representative Week[5]	**39**	**36**	**30**	**60**	**56**	**43**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	52	45	53	52
Thursday-22-February-2018	55	41	57	41
Friday-23-February-2018				
Saturday-24-February-2018	53	46	59	51
Sunday-25-February-2018	56	49	61	52

Monday-26-February-2018	53	42	56	49
Tuesday-27-February-2018	55	40	59	45
Wednesday-28-February-2018	58	45	62	49
Thursday-01-March-2018	54	40	57	45
Friday-02-March-2018	50	44	0	52
Saturday-03-March-2018	67	47	72	54
Sunday-04-March-2018	51	39	54	44
Monday-05-March-2018	51		53	
Representative Weekday[3]	**54**	**43**	**57**	**49**
Representative Weekend[3]	**61**	**47**	**66**	**51**
Representative Week[3]	**58**	**45**	**63**	**50**

Notes:

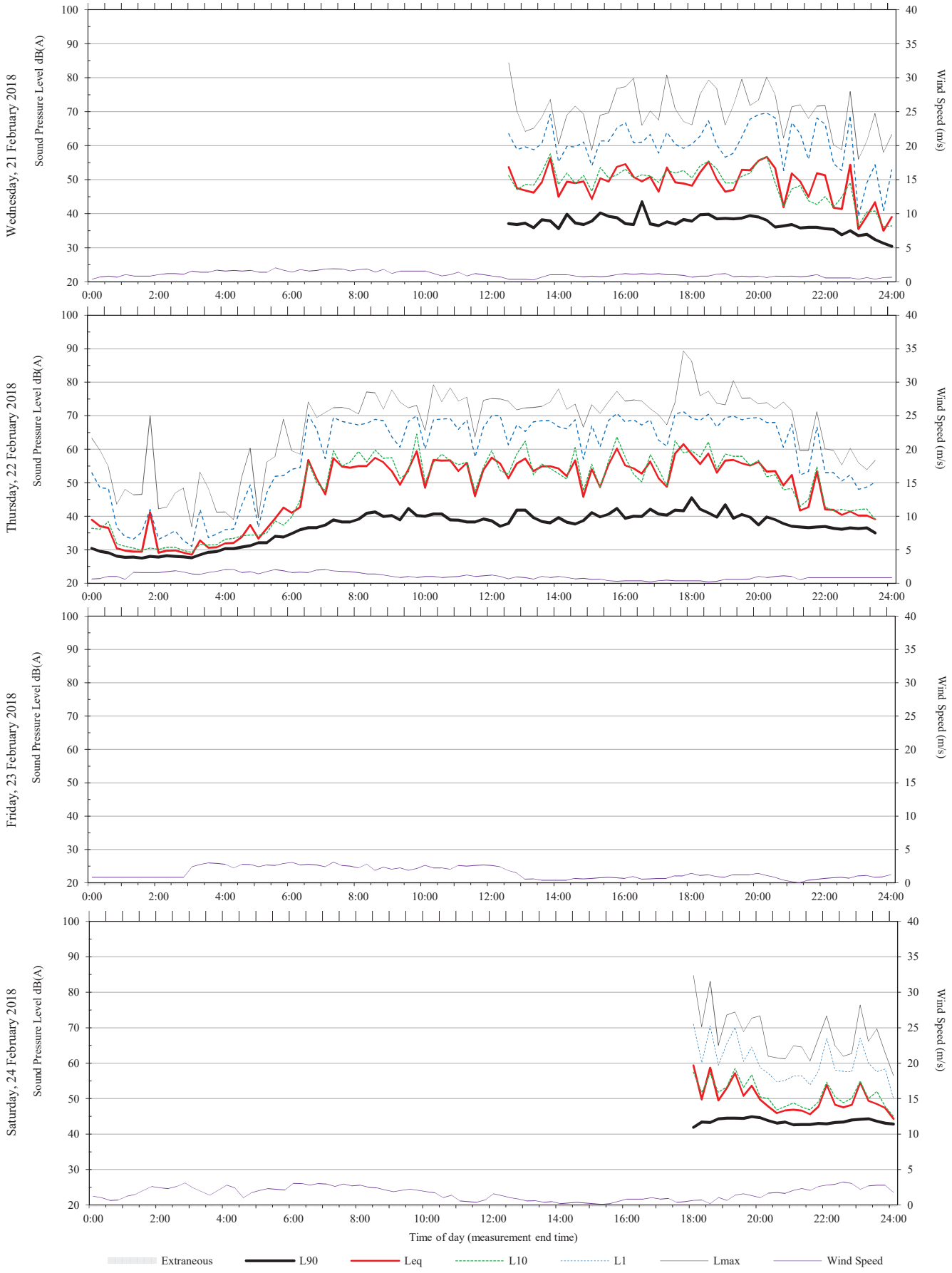
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

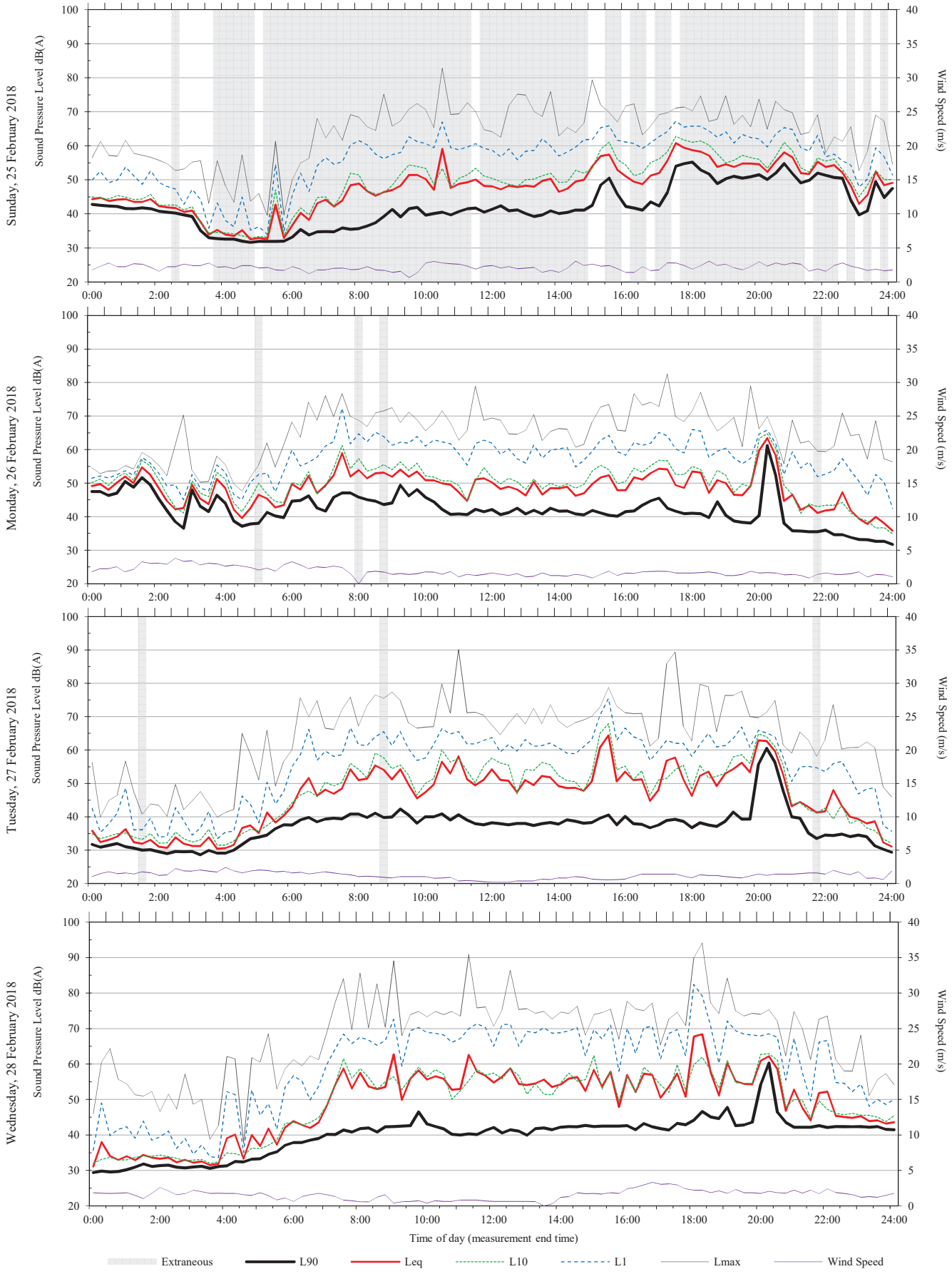
Unattended monitoring: 11 Furber Rd (Free Field)

ARUP



Unattended monitoring: 11 Furber Rd (Free Field)

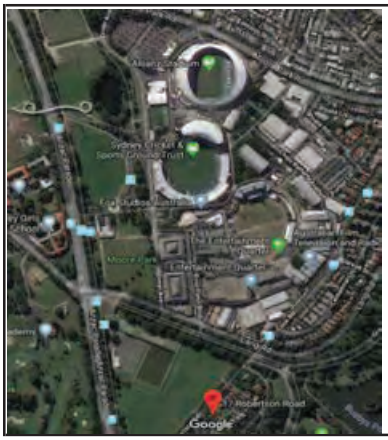
ARUP



ARUP

17 Robertson Rd (Free Field)

Additional detail:



Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		45	41		57	50
Thursday-22-February-2018	47	48	43	58	58	50
Friday-23-February-2018	50	47	40	59	57	50
Saturday-24-February-2018	48	49		57	55	
Sunday-25-February-2018						
Monday-26-February-2018	47		39	55		47
Tuesday-27-February-2018	45		42	54		51
Wednesday-28-February-2018	47	49	43	58	61	50
Thursday-01-March-2018	45		40	55		48
Friday-02-March-2018	44	43	41	55	54	49
Saturday-03-March-2018	47			57		
Representative Weekday[5]	**47**	**47**	**41**	**57**	**58**	**49**
Representative Weekend[5]	**48**	**49**	**#NUM!**	**57**	**0**	**#DIV/0!**
Representative Week[5]	**47**	**47**	**41**	**57**	**0**	**49**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	56	50	60	56
Thursday-22-February-2018	58	50	60	54
Friday-23-February-2018	59	50	60	55
Saturday-24-February-2018	57	50	58	52
Sunday-25-February-2018	58	52	64	56
Monday-26-February-2018	54	47	57	53
Tuesday-27-February-2018	54	51	55	56

Wednesday-28-February-2018	59	50	60	52
Thursday-01-March-2018	55	48	58	53
Friday-02-March-2018	55	49	0	55
Saturday-03-March-2018	57			
Representative Weekday[3]	**57**	**49**	**58**	**55**
Representative Weekend[3]	**0**	**51**	**62**	**54**
Representative Week[3]	**0**	**50**	**59**	**55**

Notes:

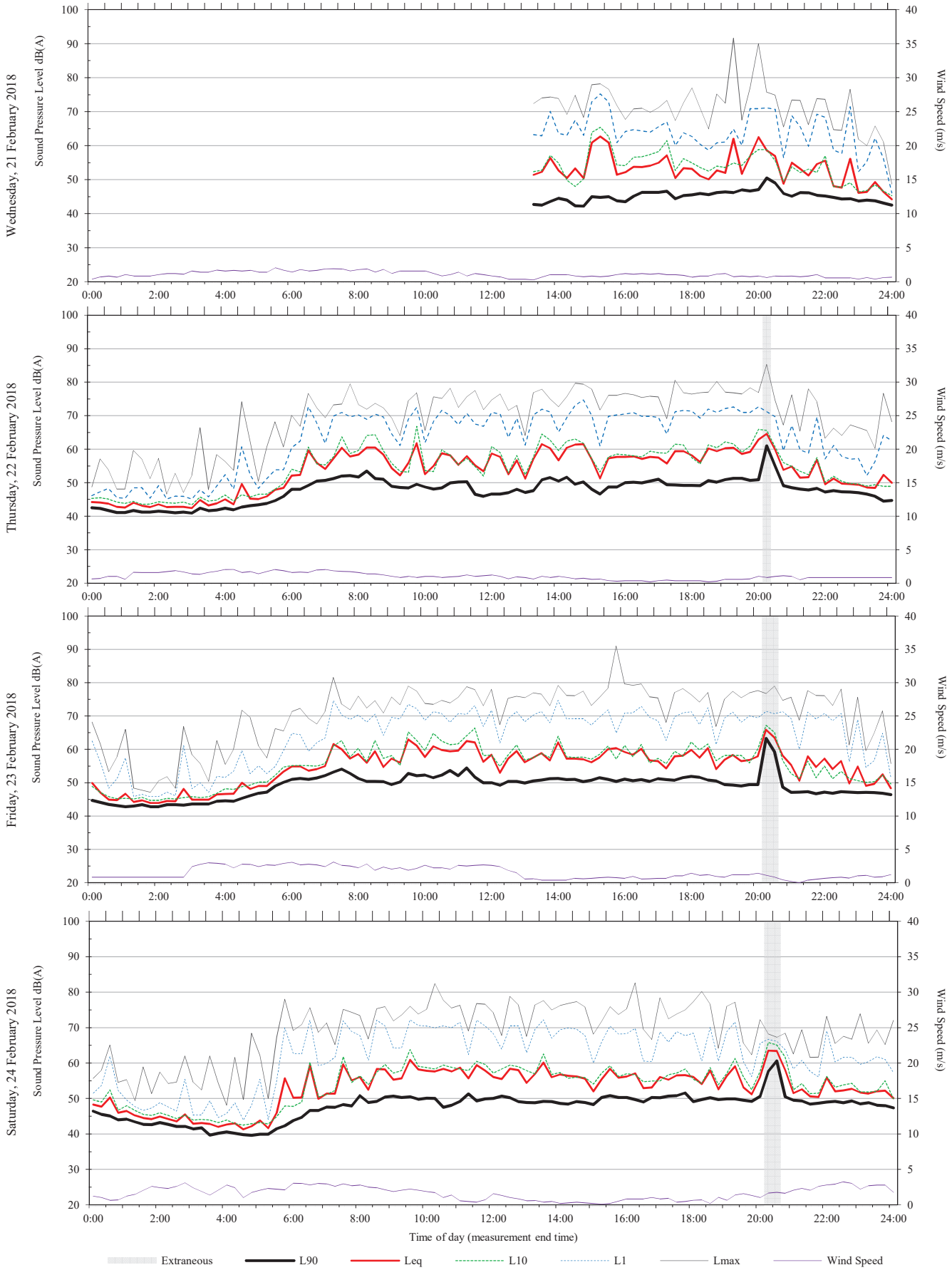
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

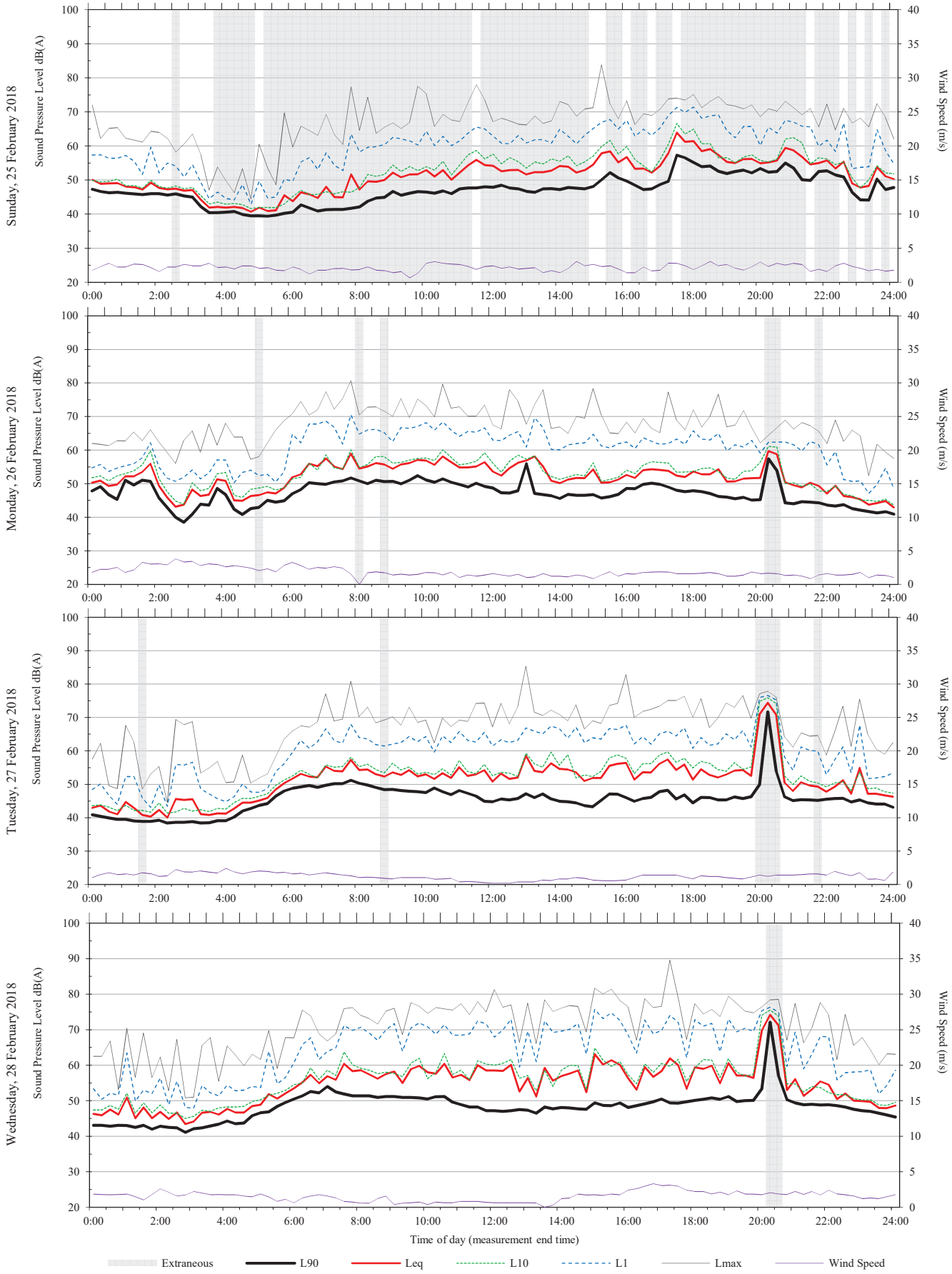
Unattended monitoring: 17 Robertson Rd (Free Field)

ARUP



Unattended monitoring: 17 Robertson Rd (Free Field)

ARUP



ARUP

Sydney Boys High School (Free Field)

Additional detail:

Background and ambient noise monitoring results - NSW 'Industrial Noise Policy', 2000

	L_{A90} Background noise levels[4]			L_{Aeq} Ambient noise levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-21-February-2018		55	52		70	66
Thursday-22-February-2018	60	56	52	72	70	67
Friday-23-February-2018	62	56	53	72	70	66
Saturday-24-February-2018	58	58		71	70	
Sunday-25-February-2018						
Monday-26-February-2018	59	55	53	73	70	67
Tuesday-27-February-2018	60	57	55	72	70	67
Wednesday-28-February-2018						
Representative Weekday[5]	**60**	**56**	**53**	**72**	**70**	**66**
Representative Weekend[5]	**58**	**58**	**#NUM!**	**71**	**70**	**#DIV/0!**
Representative Week[5]	**60**	**56**	**53**	**72**	**70**	**66**

Notes:

1. Day is 8:00am to 6:00pm on Sunday and 7:00am to 6:00pm at other times
2. Evening is 6:00pm to 10:00pm
3. Night is the remaining periods
4. Assessment Background Level (ABL) for individual days
5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq}

Road / Rail noise monitoring results

	L_{Aeq} Noise levels		$L_{Aeq\ 1hr}$ Noise levels (upper 10th percentile)	
Date	**Day[1]**	**Night[2]**	**Day**	**Night**
Wednesday-21-February-2018	71	66	72	72
Thursday-22-February-2018	71	67	72	72
Friday-23-February-2018	71	66	72	69
Saturday-24-February-2018	71	67	71	69
Sunday-25-February-2018	74	70	78	75
Monday-26-February-2018	73	67	75	72
Tuesday-27-February-2018	71	67	72	72
Wednesday-28-February-2018	71		72	
Representative Weekday[3]	**71**	**66**	**73**	**72**
Representative Weekend[3]	**73**	**69**	**75**	**73**

Representative Week[3]	**72**	**67**	**74**	**72**

Notes:

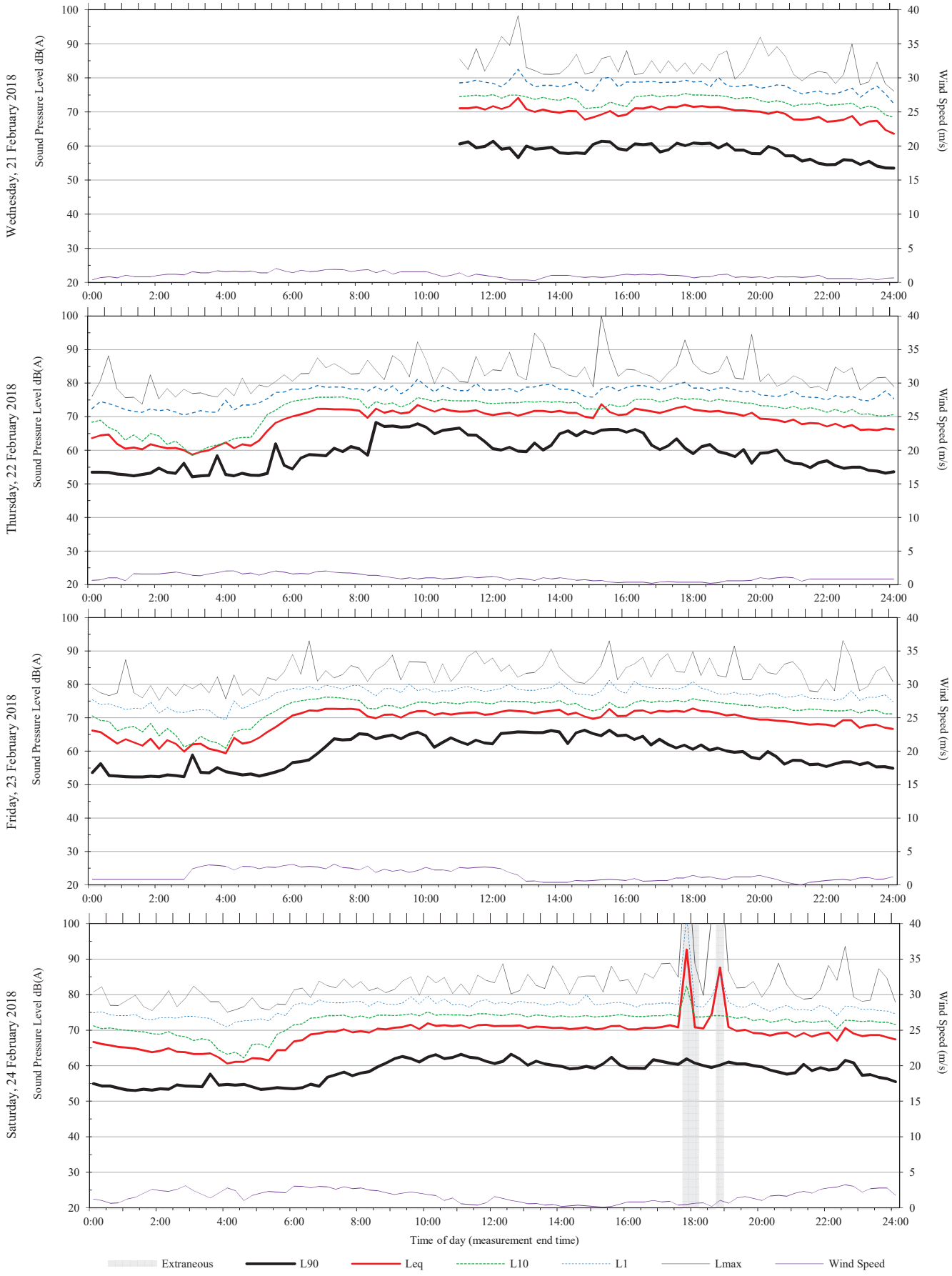
1. Day is 7:00am to 10:00pm

2. Night is 10:00pm to 7:00am

3. Logarithmic average of daily L_{Aeq}

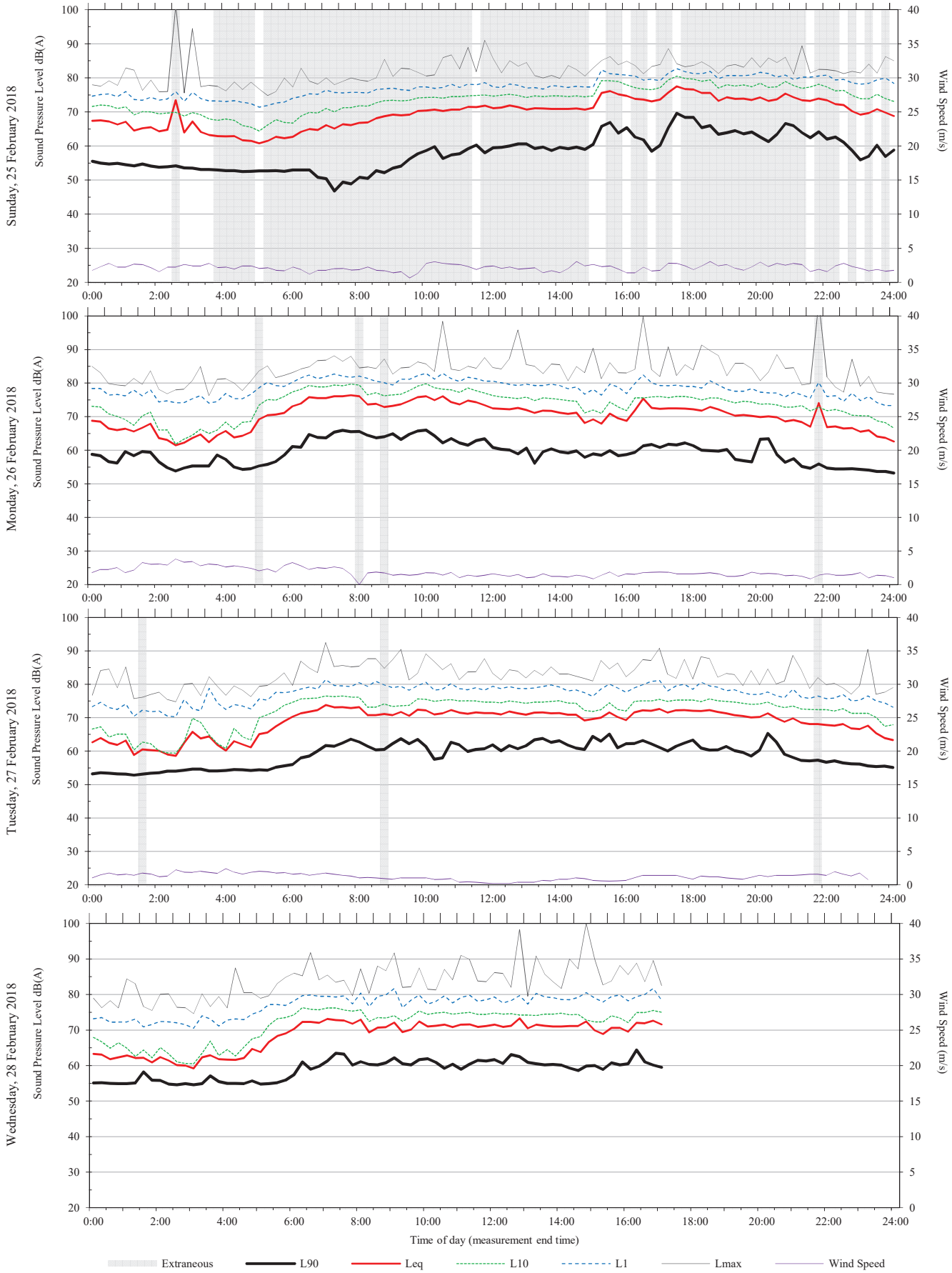
Unattended monitoring: Sydney Boys High School (Free Field)

ARUP



Unattended monitoring: Sydney Boys High School (Free Field)

ARUP



Appendix C

Methodology Statement
Working Near Busby's Bore

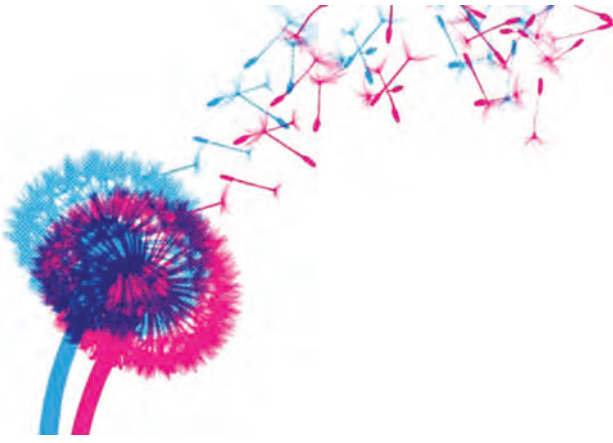
SFS Response to Submissions

(SSD9249)

Attachment 8- Methodology Statement- Working Near Busby's Bore

September 2018

INFRASTRUCTURE NSW



This methodology has been developed to support demolition and construction around Busby's Bore. It has been developed with the input of Arup (acoustics and vibration), Curio Project (heritage and archaeology) and Aver (construction and demolition management). In particular it has been developed to respond to the comment DPE12:

While the proposal is for a concept building envelope, it is considered that further assessment regarding the protection of Busby's Bore during demolition and construction works would be required. The report should include a methodology of how the bore would be identified, protected, assessed and monitored throughout the demolition and construction works. The method should be included in detail in an updated Construction Management Plan, supported by the HIA. This document should be submitted for further consideration.

This methodology also addresses comment COS34:
The site is affected by a State Heritage Listing and General Terms of Approval should be obtained from the Heritage Council. There is a potential that the demolition works through vibration could impact Busby's Bore.

It is noted that approval for construction works is not being sought as part of the Stage 1 SSDA, however it is considered the principles contained within this methodology will be applicable to those works. Adjustments may be made to this methodology to support the construction as part of the Stage 2 application when further detail regarding the construction methodology is known.

1. Identification and Assessment

Prior to the commencement of demolition, investigations will be undertaken in an effort to determine the condition of the bore through the site. This will entail access through the existing shafts on site with known locations (Shafts 9 and 10). The exact path as the Bore crosses beneath the site, and the precise locations of Shafts 11 and 'Intervening Shaft 4' remain unknown.

The steps to be followed will include:

- Land owners consent for access and support for the methodology for the investigative works to be obtained from Sydney Water prior to seeking approval from the NSW Heritage Division to undertake investigative works of the Bore.
- If land owners consent if provided, then a Section 57 (2) Heritage Exemption will be prepared by qualified historical archaeologist and submitted to the NSW Heritage Division in accordance with the requirements of the NSW Heritage Act (1977) to undertake investigation works.
- Safe Work Method Statement for access to be developed.

The results of the investigation works will be utilised to determine the current state of the Bore, where possible to further inform the design and management of impacts to known and potential sections of the Bore during Stage 1 demolition works and future Stage 2 construction works.

Figure 1, below, demonstrates the location of the known shafts and an indicative path of the tunnel beneath the site, with reference to the proposed indicative footprint of the new stadium envelope.

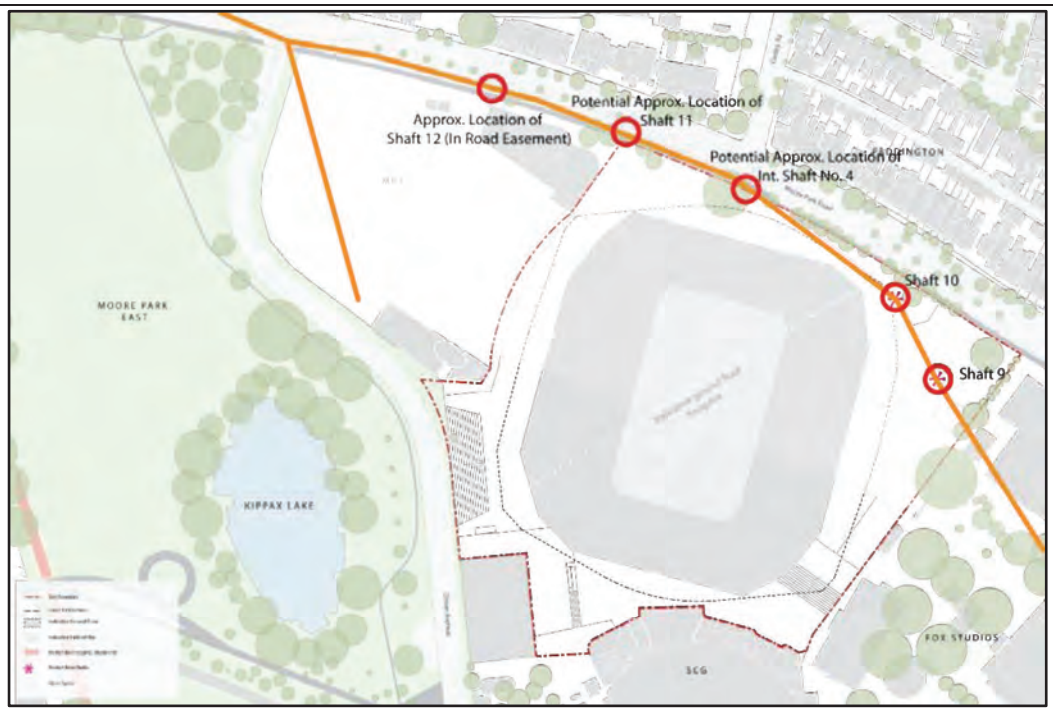


Figure 1: Locational Map of known and possible Busby's Bore shafts within SFS Redevelopment Site (Source: SJB Architects with Curio Additions 2018)

2. Protection

A physical exclusion zone will be maintained around the existing shafts and the Bore (if found during investigation works). The project archaeologist and the Site Manager will liaise regarding the best location for these barriers.

Vibration monitoring devices will be installed within the shafts of Busby's Bore in a location agreed by the project archaeologist, structural engineer and acoustic consultant. A conservative vibration criterion of 3mm/s, based on structural damage criterion for 'sensitive structures' in DIN 4150 – Part 3[1] will be applied. The vibration monitors will be calibrated to generate real-time alerts (SMS messages and/or flashing lights) when vibration criterion is exceeded.

3. Monitoring

In the event that the vibration criterion is exceeded by works on site an alert will be sent to the Site Manager. This alert will trigger a cessation of works and the project archaeologist and structural engineering advisor will be notified and requested to attend site. A visual inspect of the pits and/or Bore will be undertaken to determine whether any damage has been sustained.

An exceedance of the vibration criterion will necessitate a change in demolition and/or construction methodology. This could include:

- Re-evaluation of the vibration criterion based on results of the initial condition investigation and inspections of the structure following the commencement of works.
- Maintain vibration monitoring throughout Stage 1 and Stage 2 works.

[1] German Standard DIN 4150-Part 3 'Structural vibration in buildings – Effects on Structure'

- Reduce the size of demolition and construction equipment and develop alternative methodologies to minimise vibration.
- Use less vibration emitting demolition methods such as concrete pulverisers and smaller percussive hammers if necessary closer to Busby's Bore.
- Use rubber tracked excavators and machinery if necessary closer to Busby's Bore.
- Balance variable speed vibrating plant and operate at speeds that do not produce resonance.
- Ensure all fixed plant at the site are appropriately selected (on a risk assessment approach), and where necessary, fitted with vibration attenuation measures.
- Position vibrating plant and equipment as far apart as it practicable from each other and consider whether orientation and location of the plant can reduce vibration impacts at sensitive receivers such as Busby's Bore.
- Use non-percussive piling techniques for all piles where practicable.
- Ensure that vibratory compactors must not be used closer than 30 meters from sensitive receivers unless vibration monitoring confirms compliance with the vibration criteria specified.
- Maintain machinery and equipment.
- If necessary plan traffic flow, parking, loading/unloading areas to minimise movements within the area of Busby's Bore.

Appendix D

Construction Noise Contour Maps

Legend

- Site location
- Site compound

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Stadium bowl construction

Metres
0 100 200

Issue	Date	By	Chkd	Appd
D1	11/03/2019	KJ	MS	MS

ARUP

Level 10, 201 Kent Street
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Tel +61 (2)9320 9320
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Scale at A3	Drawing Status
1:8,000	Draft

Coordinate System
GDA 1994 MGA Zone 56

Job No	Drawing No
259997-00	001

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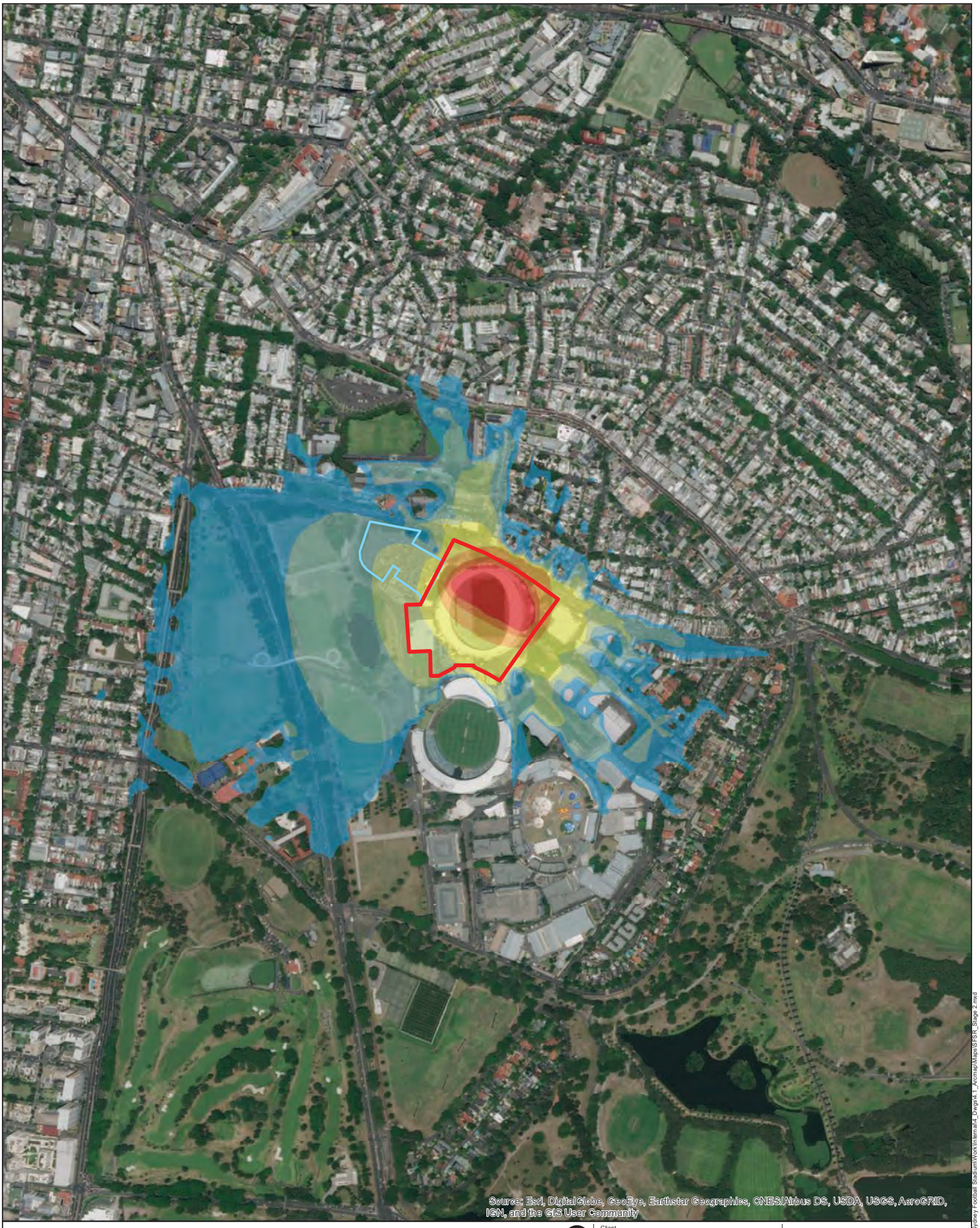

Legend

- Site location
- Site compound

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Stadium roof construction

Metres
0 100 200

Issue	Date	By	Chkd	Appd
D1	11/03/2019	KJ	MS	MS

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Scale at A3	Drawing Status
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Coordinate System
GDA 1994 MGA Zone 56

Job No	Drawing No
259997-00	001

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Legend

- Site location
- Site compound

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client: Infrastructure NSW

Job Title: Sydney Football Stadium Redevelopment

Drawing Title: Noise contours Infrastructure works

Metres: 0 100 200

Issue	Date	By	Chkd	Appd
D1	11/03/2019	KJ	MS	MS

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Coordinate System: GDA 1994 MGA Zone 56

Job No	Drawing No
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Legend

- Site location
- Site compound

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client: Infrastructure NSW

Job Title: Sydney Football Stadium Redevelopment

Drawing Title: Noise contours Concourse finishes

Metres: 0 100 200

Issue	Date	By	Chkd	Appd
D1	11/03/2019	KJ	MS	MS

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1:8,000	Draft

Coordinate System: GDA 1994 MGA Zone 56

Job No	Drawing No
259997-00	001

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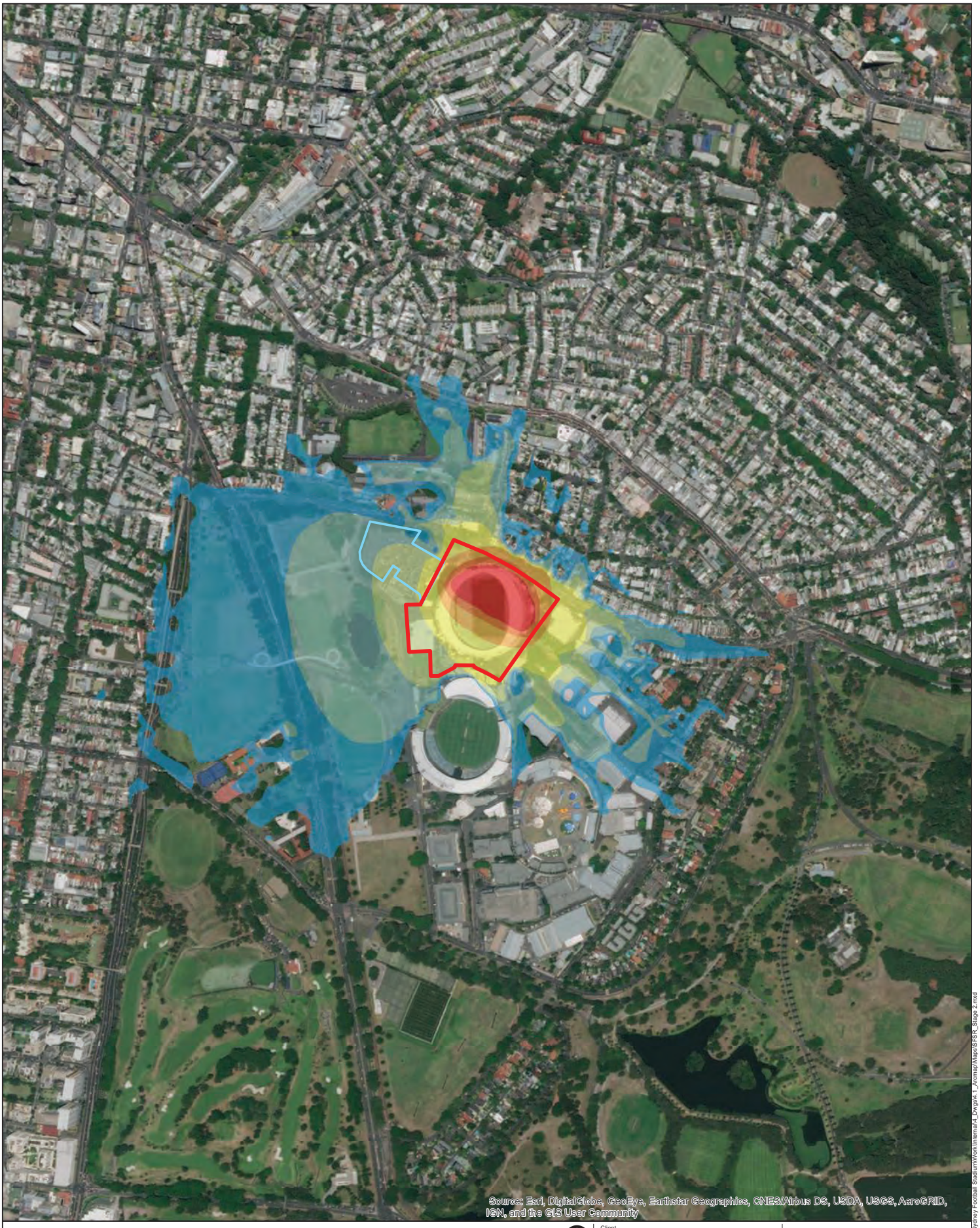

Legend

- Site location
- Site compound

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client: Infrastructure NSW

Job Title: Sydney Football Stadium Redevelopment

Drawing Title: Noise contours Internal finishes

Metres: 0 100 200

Issue	Date	By	Chkd	Appd
D1	11/03/2019	KJ	MS	MS

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Level 10, 201 Kent Street
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Job No	Drawing No
259997-00	001

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Appendix E

SFS Event Noise Management - Fact Sheet

Fact Sheet

Event Noise Management - Sydney Football Stadium

Event noise from the former Sydney Football Stadium (SFS) was regulated by a Notice of Prevention Action (Notice) issued by the Environment Protection Authority (EPA). This Notice set limits on the number of concert events as well as noise levels for events including concerts and sporting matches. A Noise Management Plan was also required to be implemented by the SCG Trust under the Notice and this has been in place since 2002.

How noise is regulated

Noise emissions, such as noise from events, can be regulated in various ways. There is no single criterion or policy that is universally adopted to regulate event noise in NSW.

The parameters that relate to the Sydney Football Stadium and its redevelopment include:

L_{max}: the maximum noise level over a given period.

L_{eq}: the average noise level over a given period.

How the existing Notice of Preventative Action works

1. Noise Limits

The existing Notice for the former SFS contains restrictions on event numbers and noise levels for events at the stadium. The Notice used an L_{max} parameter for both concert and sporting events.

The L_{max} limits set by the EPA were:

- 60 dB(A) for sound amplification equipment during sporting events; and
- 80 dB(A) and 100 dB(C) for concerts.

to be applied at:

- 'a point within 1 metre of the boundary nearest to the Stadium of 10 Alexander Street, Paddington,' and
- 'a point within 1 metre of the boundary nearest to the Stadium of 234 Moore Park Road, Paddington.'

Where wind speeds exceeded 5 metres per second, the above limits did not apply and instead the EPA required SCG Trust to take all reasonable and feasible actions to minimise noise.

2. Event Limits

The Notice placed limits on the number of concert events that could be held at both SCG and SFS. No limits were placed on the number of sporting events that could be undertaken. The limits for concerts across both SCG and SFS were:

- A total of 6 concerts in any one year; and
- Over a 5 year period, no more than an average of 4 concerts per year.

3. Management

The Noise required the SCG Trust to implement a 'Noise Management Plan' and publish this plan on their website. This plan details the requirements to be undertaken for events in terms of noise as well as the reporting on compliance with the limits.

Proposed noise management for the Redeveloped Sydney Football Stadium

As a component of the Stage 2 development application for Sydney Football Stadium, an alternate method for managing noise from events at the stadium is proposed. This method is being proposed as it is considered to be a more technically robust method of assessing noise egress from the stadium in real time and will provide a mechanism to respond to incidents rapidly, and potentially in a pre-emptive manner.

1. Noise limits

The main difference in the proposed method for managing noise from Sydney Football Stadium is the use of the L_{eq} parameter in place of the L_{max} for noise limits. L_{eq} is considered a better indicator of noise impacts to the community because it better represents a person's exposure to noise, and is less easily influenced by non-event noise (trucks, car horns, etc). It is the assessment parameter used in assessment of industrial noise, construction noise, road traffic noise and rail noise in NSW, as well as the assessment of event noise for venues such as Western Sydney Stadium NSW, Suncorp Stadium Qld and Docklands Stadium Vic.

As the main source of noise from the stadium that will be audible to the community is from concerts, a 5 minute interval has been proposed for noise measurements. This 5 minute interval has been chosen because it will enable a quick assessment of the noise levels being experienced by the surrounding community and rectification action to be taken if required.

The existing L_{max} noise limits were converted to L_{eq} noise limits using measured noise data from recent concerts at the SFS. Concert noise limits are no more or less stringent than previous. Sporting event limits have been adjusted to be more practical and more reflect community expectation than previous.

2. Event limits

No change to limits on the number of concert events is proposed for the redeveloped SFS.

3. Management

Another key benefit of the proposed parameter (L_{eq}) for managing noise at the redeveloped SFS is the ability to have 'real-time' monitoring. Under the existing Notice monitoring is undertaken by a staff member at residences using a sound level meter. This staff member monitors levels throughout an event and removes non-event noise such as road traffic noise to determine whether any exceedances are caused by the event at the stadium.

Under the proposed method, noise monitors will be installed within the stadium. The monitor will provide a continuous read out to staff operating the mixing desk (for concerts) or PA system (for sporting events). Readings will be calibrated to determine the noise levels at surrounding residences, which could include residences listed in the Notice. The readings will indicate whether the limits will be exceeded. This will enable action to be taken (e.g. turning down speaker volumes) prior to any exceedance of the criteria. This is considered a better method as it enables action to be taken before a noise level limit is breached.

Summary

A summary of the comparison between the existing Notice and the proposed method for SFS is shown below:

Criteria	Noise Prevention Notice	Proposed Method
Number of concert events	• A total of 6 in any one year; and • Over a 5 year period, no more than an average of 4 per year.	*No change:* • A total of 6 in any one year; and • Over a 5 year period, no more than an average of 4 per year
Concert event times	10am- 10:30pm	*No change:* 10am- 10:30pm
Timing of sound tests and rehearsals for concert event	10am-7pm	No change: 10am-7pm
Concert event sound limits	L_{max} 80 dB(A) and 100 dB(C)	L_{eq} 70 dB(A) and 90 dB(Z) at 63Hz
Number of sporting events	No limits	*No change:* No limits
Sporting event times	8am- 10:30pm	*No change:* 8am- 10:30pm
Sporting event sound limits	L_{max} 60 dB(A)	L_{eq} 60 dB(A)
Management regime	Noise Management Plan	*No change:* Noise Management Plan
Monitoring methodology	Subjective noise measurement by staff.	Automatic noise monitoring fed directly to operator.

Appendix F

Event Noise Contour Maps

Legend

Stadium outline

Site location

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Concerts - typical configuration
North speaker location

Metres
0 100 200

D1	28/05/2019	KJ	MS	MS
Issue	Date	By	Chkd	Appd

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www.arup.com

Scale at A3: **1:8,000**
Drawing Status: **Issue**
Coordinate System: **GDA 1994 MGA Zone 56**
Job No: **259997-00**
Drawing No: **001**

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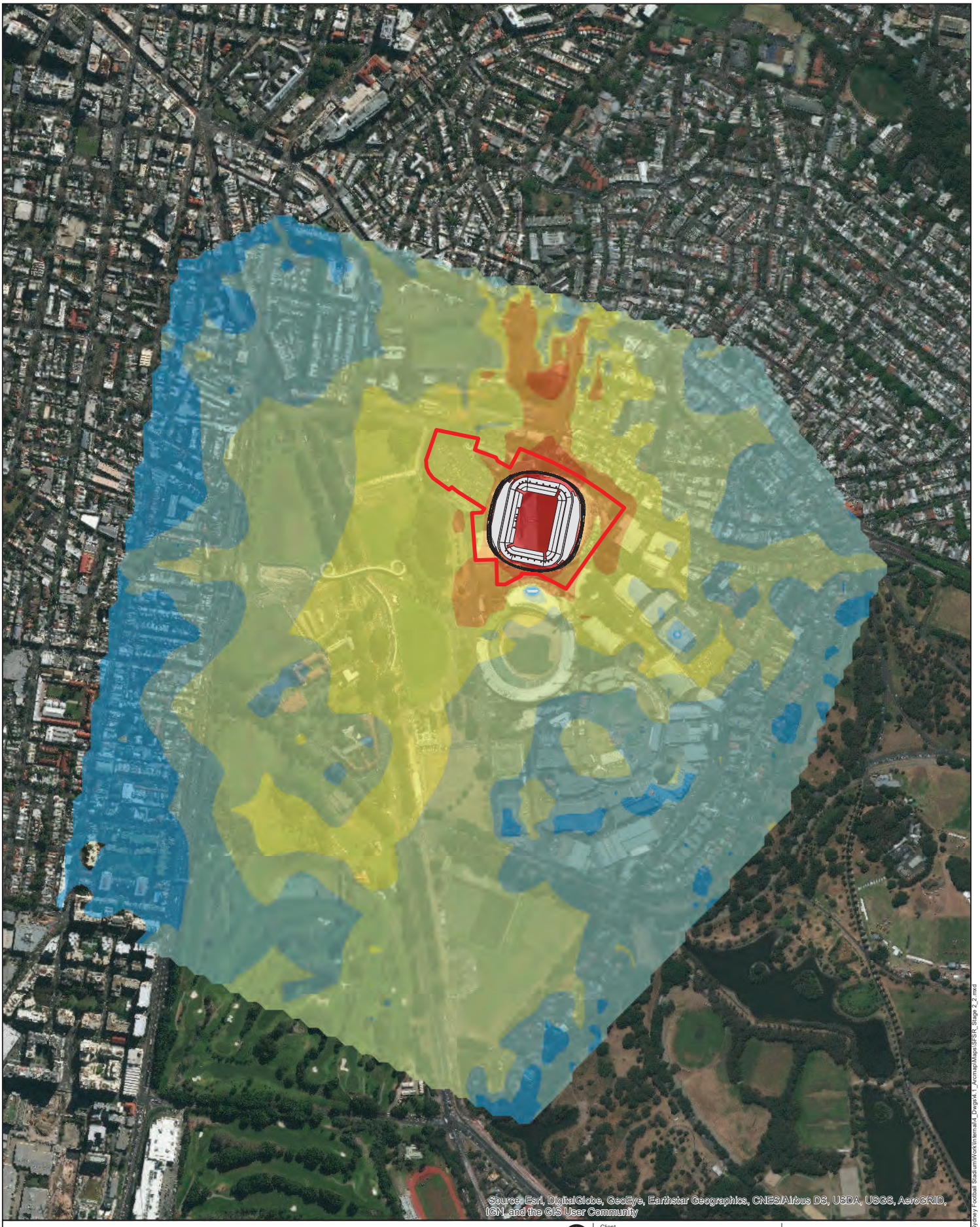

Legend

- Stadium outline
- Site location

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Concerts - non- typical configuration
Centre speaker location

Metres
0 100 200

Issue	Date	By	Chkd	Appd
D1	28/05/2019	KJ	MS	MS

ARUP
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Sydney , NSW 2000
Tel +61 (2)9320 9320
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Scale at A3	Drawing Status
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Coordinate System
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Job No	Drawing No
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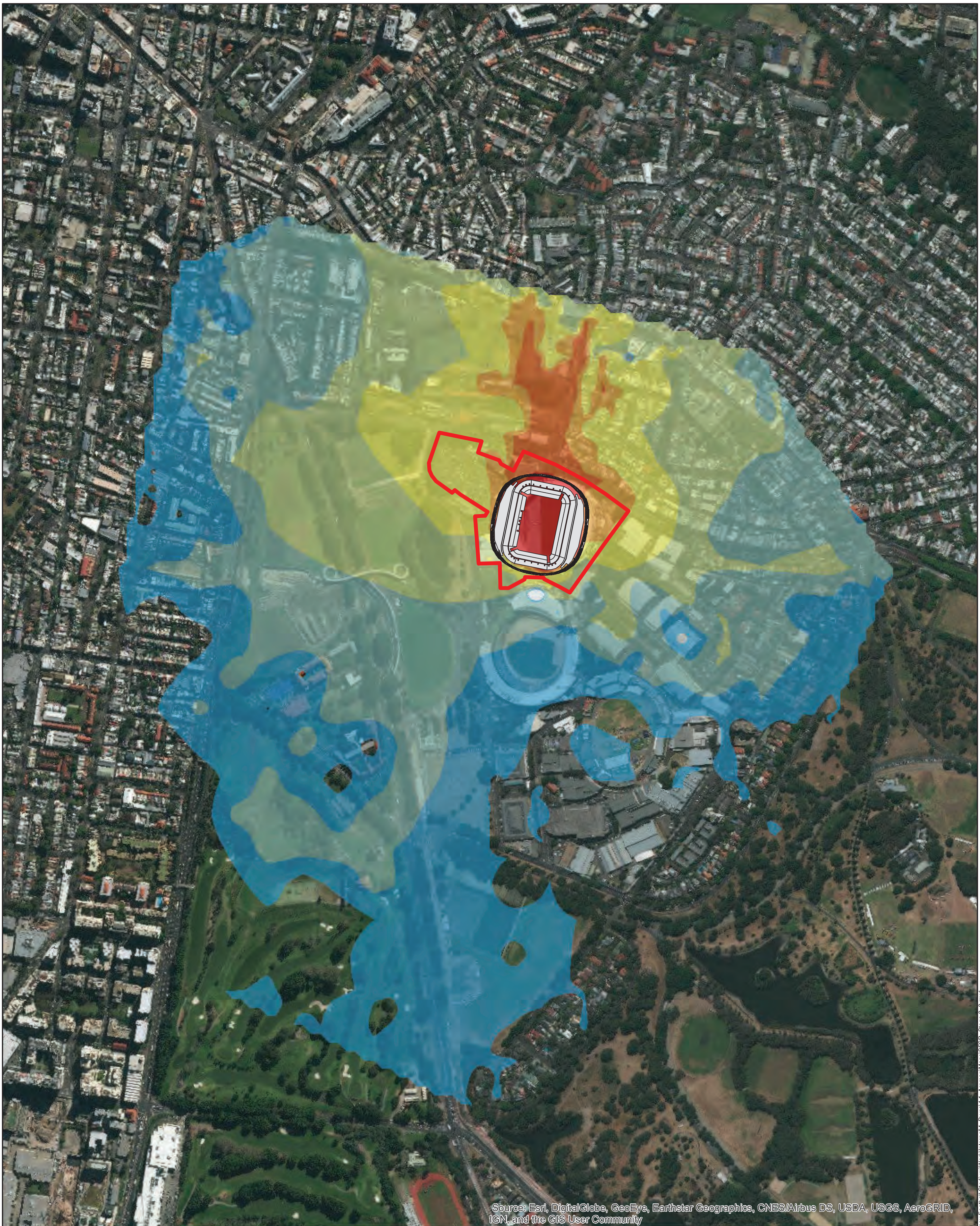

Legend

- Stadium outline
- Site location

Sound Pressure Level, L_{Aeq}, dBA

50	55	60	65	70	75	80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Concerts - non- typical configuration
South speaker location

Metres
0 100 200

Issue	Date	By	Chkd	Appd
D1	28/05/2019	KJ	MS	MS

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Legend

- Stadium outline
- Site location

Sound Pressure Level, L_{Aeq}, dBA

50 55 60 65 70 75 80

Client
Infrastructure NSW

Job Title
Sydney Football Stadium Redevelopment

Drawing Title
Noise contours
Sporting events

Metres
0 100 200

Issue	Date	By	Chkd	Appd
D1	28/05/2019	KJ	MS	MS

[redacted]

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Tel +61 (2)9320 9320
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Coordinate System
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Job No	Drawing No
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Appendix G

Draft Noise Management Plan

Sydney Cricket and Sports Ground Trust

Sydney Football Stadium Redevelopment

Draft Noise Management Plan

Issue | 31 May 2019

Job number 259997-00

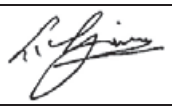
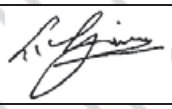
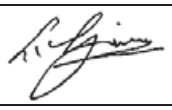
Arup Pty Ltd ABN 18 000 966 165

Arup
Level 5
151 Clarence Street
Sydney NSW 2000
Australia
www.arup.com

ARUP

Document verification

ARUP

Job title		Sydney Football Stadium Redevelopment		Job number 259997-00
Document title		Draft Noise Management Plan		File reference
Document ref				
Revision	Date	Filename	AC05-v1 Draft NMP.docx	
Draft 1	22 May 2019	Description	First draft	
			Prepared by	Checked by	Approved by
		Name	Mathew Simon	Glenn Wheatley	Glenn Wheatley
		Signature			
Draft 2	28 May 2019	Filename	AC05-v2 Draft NMP.docx		
		Description	Second draft		
			Prepared by	Checked by	Approved by
		Name	Mathew Simon	Glenn Wheatley	Glenn Wheatley
		Signature			
Issue	31 May 2019	Filename			
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	Mathew Simon	Glenn Wheatley	Glenn Wheatley
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document verification with document ✓

Contents

1 Introduction

This Draft Noise Management Plan (DNMP) has been prepared by Arup on behalf of the Sydney Cricket & Sports Ground Trust (the Trust).

The DNMP presents a set of noise management measures, including monitoring procedures and protocol, for events at the Sydney Football Stadium (SFS).

Events are defined as entertainment activities carried out outdoors with sound amplification equipment used as part of the activity.

1.1 Development approval

This DNMP has been prepared in accordance with SSD [approval number] and is consistent with the noise assessment supporting the project application. This DNMP will require update to reflect any changes following submission and exhibition of the application.

[To be updated once SSD approval is received.]

1.2 Management objectives

The overall purpose of this NMP is to manage Event noise emissions from the SFS in accordance with the Development Consent. A balance is sought between controlling Event noise impacts on the community without restricting the operation of the SFS as an Event venue.

As a venue designated under clause 90 of the POEO General Regulation, the Sydney Football Stadium is required to have a NMP in place, which comprise the following categories of management measures:

- Preventive management
- Reactive management
- Review

The management measures in this NMP are presented in this structure.

1.3 Definitions

Terminology used in this NMP are defined in Table 1.

Table 1: Definitions

Term	Definition
Accredited Acoustic Consultant	An acoustic consultant who is a member of one or more of the following organisations; The Association of Australian Acoustical Consultants, The Australian Acoustical Society or the Institution of Engineers Australia.

Term	Definition
Concert	An event which incorporates the use of sound amplification equipment other than the SFS in-house PA system. This includes not only performances but also associated activities such as rehearsals and sound checks.
Event	An entertainment activity carried out outdoors which incorporates the use of sound amplification equipment.
Event Representative(s)	A Trust employee or agent with the responsibility and appointed authority to exercise control of noise emissions from the SFS. The representative may be an appropriately trained member of the Trust, an acoustic consultant or appointed SFS staff member appointed by the Trust.
Receivers	Noise sensitive receivers which are defined as residences, classrooms in educational institutions, hospital wards, places of worship, active and passive recreation areas, child care centres and community centres such as town halls.
The Trust	The Sydney Cricket & Sports Ground Trust
Twelve-month event period	The period of twelve months after [date of approval] and each subsequent period of 12 months.

2 SFS site and surrounds

The SFS is located at 40-44 Driver Avenue, Moore Park within the Sydney Cricket Ground Precinct. It is bound by Moore Park Road to the north, Paddington Lane to the east, the existing SCG stadium to the south and Driver Avenue to the west. The site is located within the City of Sydney local government area.

2.1 Noise sensitive receivers

The most potentially affected residential and non-residential receivers are identified in

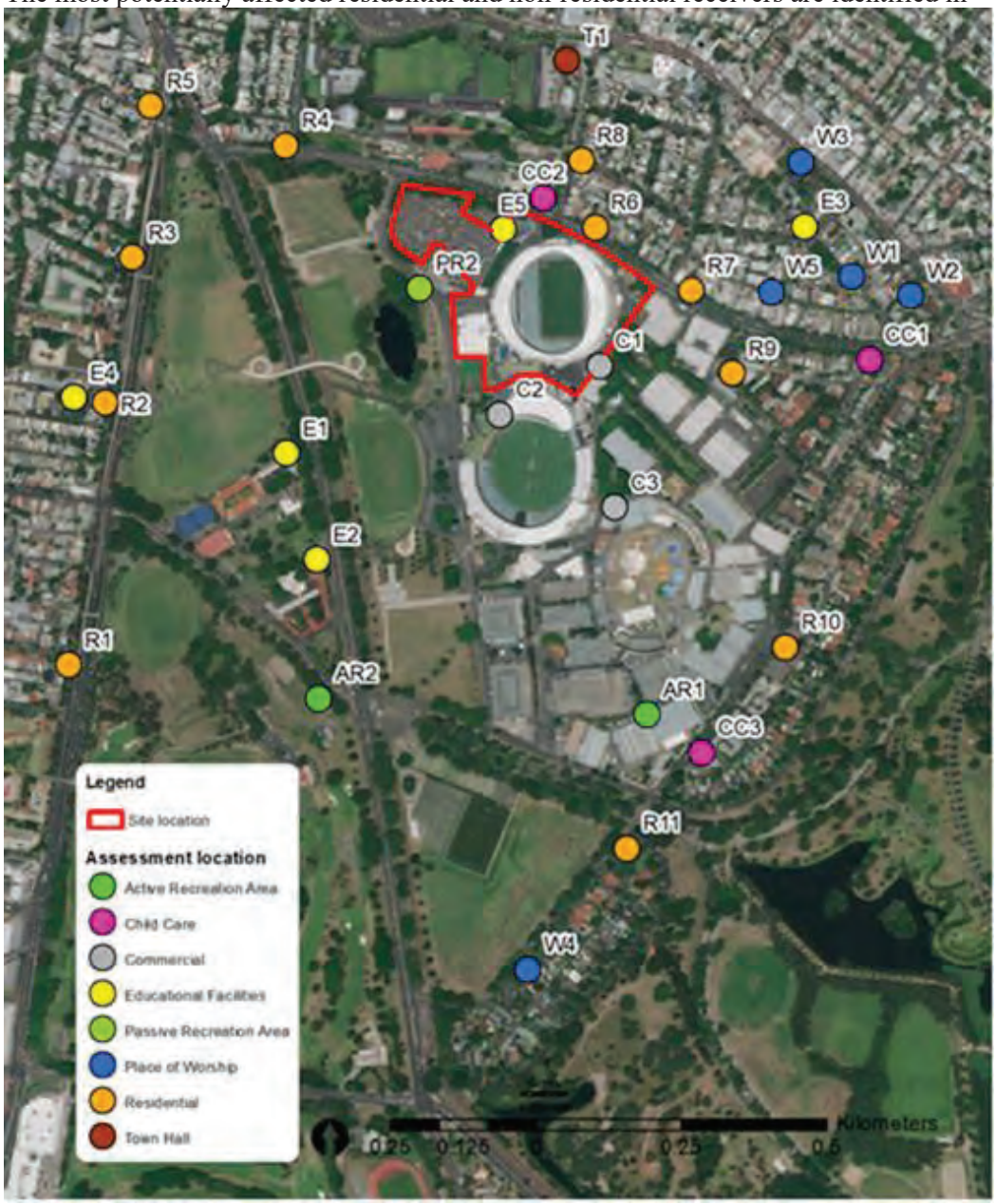


Figure 1 and listed in Table 2 and Table 3.

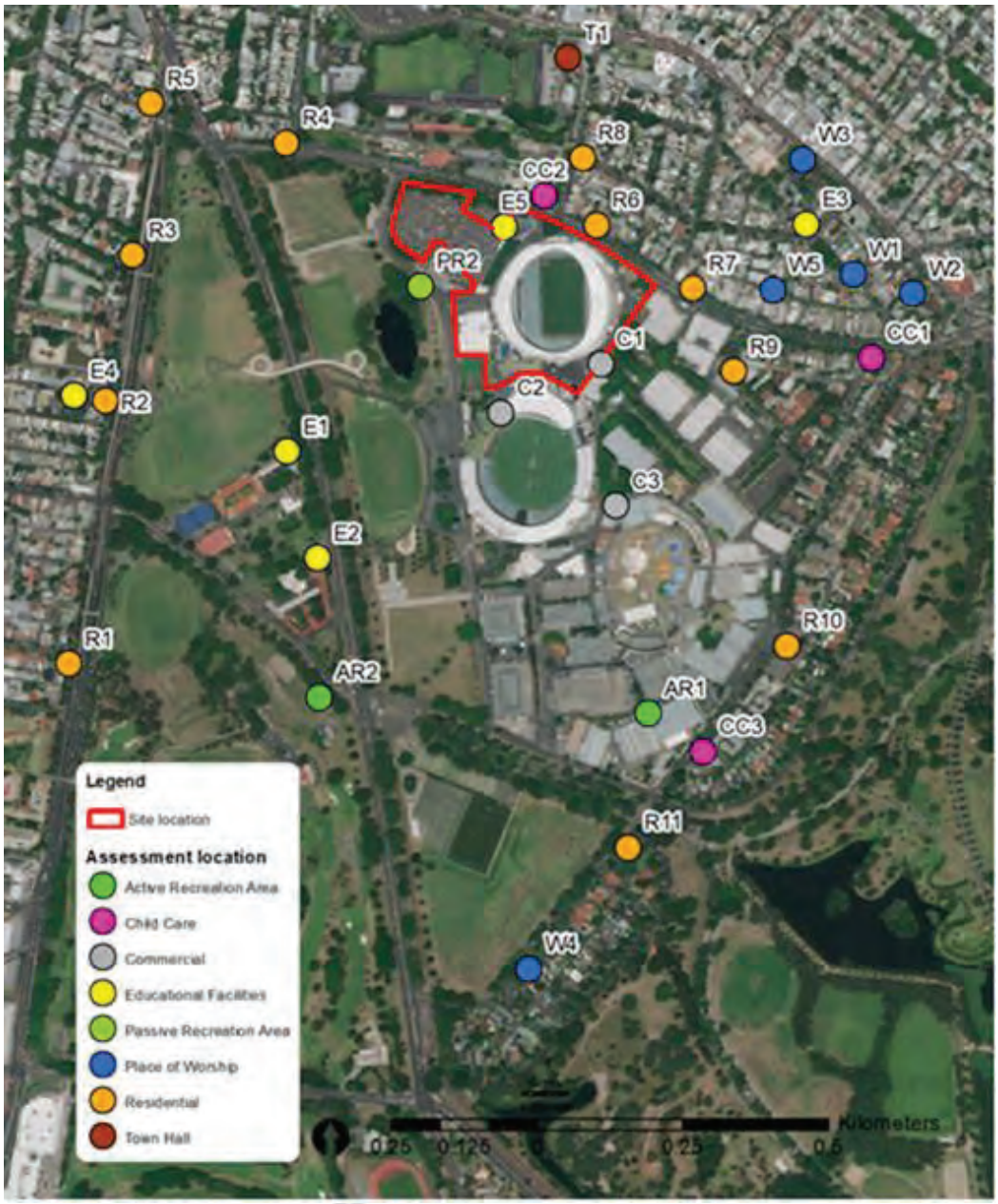


Figure 1: Site location, noise sensitive receivers

Table 2: Reasonably most-affected residential receivers

Receiver ID	Address	No. of floors
R1	749 South Dowling Street, Redfern	2
R2	635 South Dowling Street, Surry Hills	3
R3	553 South Dowling Street, Surry Hills	3
R4	111 Greens Rd, Paddington	2
R5	479 South Dowling Street, Surry Hills	3
R6	252 Moore Park Road, Paddington	2
R7	314 Moore Park Road, Paddington	2
R8	45 Oatley Road. Paddington	2

Receiver ID	Address	No. of floors
R9	5 Poate Road, Paddington	2
R10	107 Cook Road, Centennial Park	2
R11	2 Martin Road, Moore Park	3

A list of all non-residential noise sensitive receivers within the study area is presented in Table 3.

Table 3: Non-residential receivers

Receiver ID	Name	Address	No. of floors
Active Recreation Area			
AR1	Centennial Parklands Equestrian Centre	114-120 Lang Road, Moore Park	2
AR2	Moore Park Golf Course	Cleveland Street, Moore Park	0
Commercial			
C1	Fox Studios	38 Driver Avenue, Moore Park	2
C2	Sydney Cricket Ground	Driver Avenue, Moore Park	3
C3	Entertainment Quarter	122 Lang Road, Moore Park	3
C4	University of Technology Sydney Rugby Australia and NRL building	Moore Park Road and Driver Avenue, Moore Park	5
Child Care			
CC1	Gumnut Gardens Early Learning and Long Day Care Ce	61 Moore Park Road, Centennial Park	1
CC2	Kira Child Care Centre	230 Moore Park Road, Paddington	1
CC3	Bambini's Child Care Centre	157/159 Cook Road, Centennial Park	2
Educational Facilities			
E1	Sydney Boys High School	556 Cleveland Street, Moore Park	3
E2	Sydney Girls High School	Corner of Anzac Parade and Cleveland Street, Surry Hills	2
E3	Paddington Public School	399-435 Oxford Street, Paddington	2
E4	Bourke Street Public School	590 Bourke Street, Surry Hills	2
E5	University of Technology Sydney Rugby Australia and NRL building	Moore Park Road and Driver Avenue, Moore Park	5
Passive Recreation Area			
PR2	Moore Park	Moore Park	0
Town Hall			
T1	Paddington Town Hall	249 Oxford Street, Paddington	2

Receiver ID	Name	Address	No. of floors
Place of Worship			
W1	St Francis of Assisi Catholic Church	64 Gordon Street, Paddington	3
W2	St Mattias Anglican Church	471-475 Oxford Street, Paddington	2
W3	Paddington Uniting Church	395 Oxford Street, Paddington	2
W4	St. Vladimir's Russian Orthodox Church	31 Robertson Rd, Centennial Park	2
W5	Kingdom Hall of Jehovah's Witnesses	20 Leinster St, Paddington	2

3 Preventative management

3.1 Number of concert events

The combined number of concerts held on Trust land, including the SCG and the SFS must not exceed an average of four (4) concerts per calendar year averaged over any five (5) year period, and must not exceed six (6) concerts over any 'annual event period'. For the purposes of this condition, the term 'annual event period' is defined as the period of twelve months after [insert date of approval], and each subsequent period of 12 months.

3.2 Time limits

Time limits of sporting, concert and other events are provided in Table 4.

Table 4: Event time limits

Descriptor	Time limits			Maximum length of event
	Not to commence before	Not to finish after	If delayed outside of the Trust's control, may continue till	
Sporting events	8:00 AM	10:30 PM	11:00 PM	-
Concerts	10:00 AM	10:30 PM	11:00 PM	5 hours
Rehearsals and sound tests	10:00 AM	7:00 PM	-	Kept to absolute minimum
Other outdoor event with sound amplification – days preceding working days	10:00 AM	8:00 PM	-	-
Other outdoor event with sound amplification – days **not** preceding working days	10:00 AM	10:30 PM	-	-

3.3 Noise limits

Noise limits for events to take place at the SFS have been established for use of amplified sound systems. This reflects the community's sensitivity to amplified noise, functional requirements of Concerts, as well as the capacity to control amplified noise, as opposed to crowd noise.

Event noise limits for noise sensitive receivers are presented in Table 5.

Table 5: Event noise limits

Receivers	Amplified sounds during Concert event, $L_{eq(5min)}$		Amplified sounds during sporting / other event, $L_{eq(5min)}$
	dBA	1/1 octave, 63Hz dBZ	dBA
Property boundary of all residences. Apply at height of occupied floors.	70	90	60

These noise limits apply to wind speeds up to 5 m/s, above which wind generated noise is considered to be a significant contributor to event noise. During periods of wind greater than 5 m/s the Trust must continue to take all reasonable and feasible actions to minimise noise.

3.4 Definition of non-compliance

As a single exceedance of the noise limits does not directly translate to an unacceptable disturbance to the community, a single exceedance does not constitute a strict non-compliance with the consent.

An exceedance of the noise limits ($L_{Aeq(5min)}$ or $L_{Zeq(5min)}$ 63 Hz) during an event will not be taken to be a breach of Project Approval conditions unless they satisfy the conditions outlined in Table 6.

Table 6: Breach of Project Approval conditions

Exceedance of limits	No. of consecutive exceedances	No. of separate occasions
More than 2 dB	1	8
	2	3
	3	1
More than 5 dB	1	4

3.5 Notification

Notifications shall be provided to the community, consent authorities and relevant stakeholders for upcoming Concert events as outlined below.

As sporting events and other non-concert events are widely publicised through various media including television and the Trust website and constitute a lower risk to adverse noise impacts compared with Concert, notification for non-concert events is not required.

3.5.1 Community

Written notification of upcoming Concerts will be distributed by a letterbox drop to noise sensitive receivers within the notification boundary between 5 to 14 days prior to the event.

The notification boundary is identified in Figure 2 below.

Figure 2: Notification boundary

Community notification shall include:

- the name, nature (description) and size of (expected crowd attending) the Concert event;
- the date and time (duration) of the event, including sound tests and/or rehearsals;
- the date and time (duration) of any planned pyrotechnics displays; and
- a telephone number and operating hours of the Trust information Hot Line for lodgement of noise complaints.

3.5.2 Consent authorities

Notification of upcoming Concert events will be provided to consent authorities at least 28 days prior to the Concert event, and of any changes to notification details at least 7 days prior to the Concert event.

Notification shall be provided to the following consent authorities:

- NSW Environment Protection Authority (EPA)
- NSW Department of Planning and Environment (DPE)

Consent authority notification shall include:

- the name, nature (description) and size of (expected crowd attending) the Concert event;
- the date and time (duration) of the event, including sound tests and/or rehearsals;
- the date and time (duration) of any planned pyrotechnics displays; and
- the name and contact details of the Event Representative(s) (See Table 1).

3.5.3 Moore Park Events Operations Group

The Trust is a member of Moore Park Events Operations Group (MEOG) which includes precinct partners, police, transport and other government agencies. MEOG aims to ensure a coordinated approach to the management of events held at the SCG, SFS, Fox Studios, Hordern Pavilion, Royal Hall of Industries, Entertainment Quarter and Randwick Racecourse.

Key Trust event management personnel meet regularly with other MEOG members to discuss upcoming events and agree appropriate actions to be taken where potential cumulative impacts are identified due to concurrent events taking place.

Attendance at these meetings and implementation of any actions are the responsibility of the Trust event management.

3.5.4 Pyrotechnics

In addition to the above notifications, signage should be displayed on site showing details of any pyrotechnics displays to take place 5 to 14 days prior to the event. Signs should present details of times and durations of upcoming pyrotechnics displays.

A Risk Management Plan addressing noise impacts of pyrotechnic displays on local residents and wildlife shall be made available.

Aerial shells and other high noise impact pyrotechnics are not permitted to be used in any display at the SFS.

3.6 Use of permanent noise monitors

A noise monitoring system comprising permanent on-site noise monitors will be installed to manage noise emissions from the SFS.

To minimise the influence of extraneous noise, particularly road traffic noise from Moore Park Road, noise monitors are recommended to be located within the site boundary, specifically under the stadium roof.

3.6.1 Monitoring system setup

Details of the number, location and specifications of the noise monitors shall be confirmed once the design of the SFS is finalised.

Preliminary recommendations for the noise monitoring system include:

- The use of four permanently installed noise monitors to be installed in the direction of the predicted worst affected noise sensitive receiver locations. Indicative noise monitor locations are presented in Figure 3.

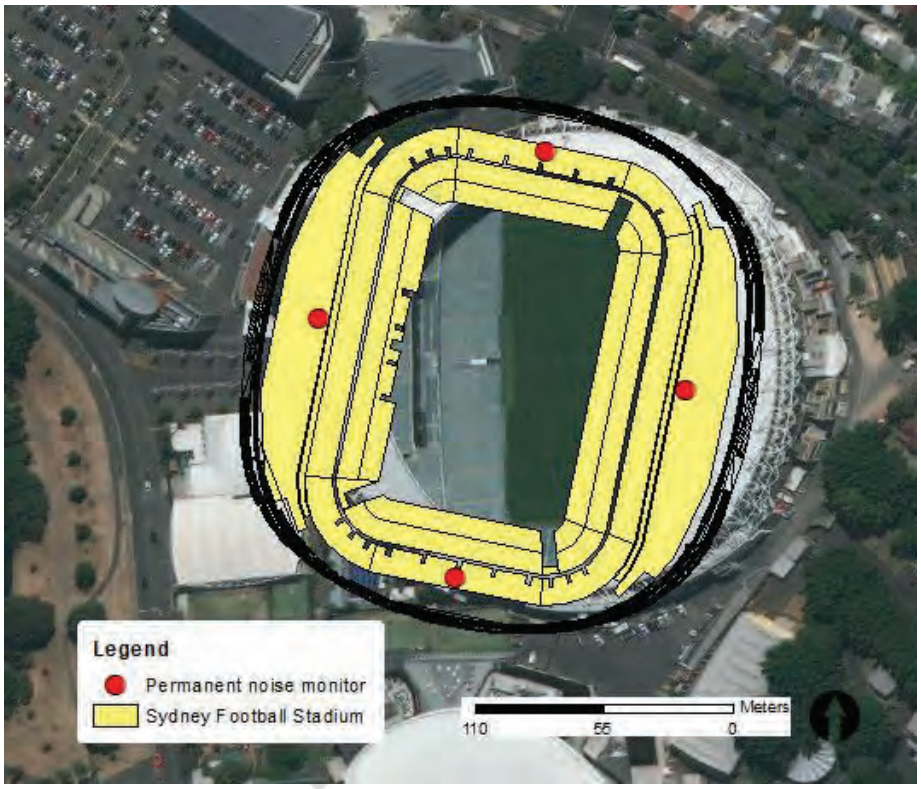


Figure 3: Indicative monitor locations

- The monitors will continuously monitor noise levels during Concerts with a feedback of real-time noise monitoring data into the event operations control room to allow both real-time management of noise emissions as well as timely response to measured exceedances of noise limits. The live read out available to front-of-house sound engineers managing the sound system.
- The installation of monitors below the stadium PTFE / ETFE roof. This will minimise the influence of wind noise on the microphones, which is likely to be minor underneath the stadium roof. Due to the relatively high acoustic transparency of PTFE / ETFE, acoustic reflections are unlikely to significantly affect measured noise levels at permanent monitors, however this shall be evaluated in the final selection of monitor locations.

- The specifications and design of the noise monitoring system should be developed early in the stadium design process to allow for the system to be incorporated into the stadium design while allowing considering of all the above factors.

3.6.2 Representative noise limits

Representative noise limits shall be established for each monitor which are equivalent to the compliance noise limits at the potentially most affected receiver to each monitor.

Preliminary representative event noise limits may be established based on predictive modelling once the SFS design has been finalised and monitor locations have been determined. The modelling shall aim to establish transfer-functions between noise levels at monitoring locations and noise limits noise sensitive receiver locations in 1/1 octave bands between 31.5 Hz and 8 kHz inclusive.

Representative noise limits may vary based on Concert sound system layout, as discussed in Section 3.8.2, and non-typical speaker layouts would require an adjustment of representative noise limits.

3.6.3 Monitoring system operation

Following the opening of the SFS, concurrent attended noise measurements at nearest noise sensitive receivers and noise measurements from the permanent noise monitoring system shall provide an event noise dataset from which the noise monitor limits can be refined to more accurately represent noise limits at nearest receivers. It is recommended that these concurrent attended noise measurements be conducted over a 'Trial Period' to extend over the first two Twelve Month Event Periods as defined in Table 1.

3.7 Staff

The Trust retains ultimate control of the noise emissions from the SFSR, including those caused by any sound amplification equipment operated outdoors.

An Event Representative(s), as defined in Table 1, shall be appointed by the Trust for each event at the SFS, with the responsibility and appointed authority to exercise control of noise emissions from the SFS.

The Event Representative(s) shall:

- be provided with and be familiar with the requirements of this NMP
- be responsible for the implementation of the requirements of this NMP
- be provided with the necessary resources and authority to implement the requirements of this NMP
- be available throughout the event to receive complaints regarding event noise
- be available throughout the event to provide event noise information via the Hot Line
- ensure prompt response and / or implementation of mitigation measures

3.8 Setup of sound amplification systems

3.8.1 In-House PA

Where practicable, amplified sound should be provided via the in-house PA sound system so that the sound levels can be controlled by a sound limiter. This may include announcements and music outside of concert events. An RMS compressor/limiter (eg. Rane HAL, BSS Blu, Symetrix Jupiter or MediaMatrix X-Frame 88) is recommended. Multi-band compression is recommended for greater control over the critical frequency bands.

3.8.2 Concert Sound Systems

Sound systems for Concert events will be provided by the event organisers. Based on previous Concert events, Concert speakers are likely to be arranged in one of three configurations:

1. Typical configuration: speakers are located at the north facing south, away from the nearest most potentially affected receivers along Moore Park Road.
2. Non-typical configuration A: Speakers located at the centre
3. Non-typical configuration B: Speakers located at the south of the stadium.

These configurations are presented in Figure 4 below. In both the north and south scenario, the figures indicate four front of house speakers at the stage with three delay speakers located further back in the crowd, indicative of a typical sound system configuration for a large arena style Concert .

Figure 4: Speaker configuration located north facing south (left), centre facing outwards (middle) and south facing north (right)

Noise modelling was conducted to investigate flexible, non-typical event scenarios and quantify the resulting differences in noise levels at nearest affected noise sensitive receivers. The middle and southern speaker configurations are however unlikely to be utilised.

Modelling results showed the lowest noise emission levels to nearest noise sensitive receivers was the typical configuration, where speakers are located at the northern end of the stadium facing south. This was primarily due to the directionality of the Concert speaker arrays.

For the non-typical speaker configuration where speakers are located in the centre of the stadium facing outwards, results showed significantly higher noise levels at the worst

affected receivers. These configurations should therefore be avoided where Concert noise levels are anticipated to be an issue. Results are presented in Table 7.

Table 7: Noise emission comparison for varying Concert speaker configurations

	Predicted event noise levels at worst affected receiver		
	North	**Centre**	**South**
Configuration	Speakers located north facing south	Speakers located centre facing outwards	Speakers located south facing north
$L_{Aeq5min}$	Lowest noise configuration	14 dB higher than North configuration	10 dB higher than North configuration
$L_{Zeq5min}$ 63 Hz	Lowest noise configuration	20 dB higher than North configuration	16 dB higher than North configuration

Representative noise limits for the permanent monitoring system, discussed in Section 3.6, will also require review if the speaker configuration is changed, as the transfer functions which relate noise limits at receivers to representative noise limits at the monitoring locations, may vary with different speaker configurations.

An optimal setup of sound amplification systems should be sought in consultation with suitably qualified acoustic consultants to minimise noise impacts at potential worst affected receivers. Details of each sound system setup adopted by each event operator should be recorded so as to potentially inform future event sound system selection.

Notwithstanding the above, it may be possible to operate with non-typical speaker configurations while complying with event noise limits should care be taken to adequately control noise emission through implementation of mitigation measures and regulation of noise levels through the analysis of noise monitoring data. Should non-typical speaker configurations be used, details of the sound system setup adopted shall be recorded to inform future event sound system selection and layout.

3.8.3 Sound Amplification Equipment Selection

In addition to the recommendations described above:

- Any sound amplification equipment used at any time on Trust lands will be installed in such a way as to minimise the noise impact on residential premises or sensitive receptors;
- The sound amplification equipment will be maintained in a proper and efficient condition so as to minimise the noise impact on residential premises or sensitive receptors; and
- The sound amplification equipment will be operated in a proper and efficient manner so as to minimise the noise impact on residential premises or sensitive receptors.
- Sound systems may also include noise limiters to prevent exceedance of established noise limits at nearby receivers, or trigger levels as indication of exceedances of noise limits. The setting of these systems will require consultation with suitably qualified acoustic and AV consultants.

Implementation of the Concert noise predictive procedure, stage optimisation and equipment selection are the responsibility of the Trust.

4 Reactive management

4.1 Complaints handling

A Trust information Hot Line should be available at all times during a Concert event. Details of the Hot Line will be provided via the notification procedures and listed on the Trust website.

The Hot Line shall be staffed by the Event Representative(s).

In the event a complaint is made, the following steps shall be undertaken:

1. Complaint details will be recorded in a complaint register, to be maintained by the Trust. Details will include:
   - Name of staff receiving complaint;
   - Date and time of complaint and corresponding event;
   - Name, address and telephone number of complainant (if available);
   - Nature of complaint; and
   - Response action taken to date.
2. The Event Representative should immediately notify the event operations control room. Following the end of the current 5-minute noise measurement period, should an exceedance of noise limits occur, noise levels shall be reduced by the amount of the exceedance.

   If no exceedance is noted, current noise levels shall be recorded in the complaint register.

The record of complaints will be held for at least five (5) years after the complaint was made.

4.2 Reporting requirements

Reporting requirements following Concert events are outlined below.

4.2.1 Trial period

As a result of a more robust noise monitoring system being implemented, potential to implement a more automated reporting system may arise. A review of reporting requirements shall be conducted following the two-year Trial Period of the noise monitoring system.

4.2.2 Reporting to the community

No more than two (2) working days after the completion of each separate Concert event the Trust will publish on its website a summary of noise monitoring results. The summary report will set out:

- Compliance or non-compliance with noise and time limits; and

- The times and duration of any occasions where exceedances of the noise and time limits and what measures were implemented to ensure that the exceedance(s) did not reoccur; and
- Determination on whether exceedances constituted a 'non-compliance' as defined in Section 3.3.

The information will be understandable to the general public, with all technical terms explained in plain language.

When available, the Trust will also publish a full copy of the noise monitoring report on its website.

4.2.3 Reporting to the EPA

At the completion of each separate Concert the Trust publish a report onto their website and no longer than two (2) working days after each Concert. This report will include the following details:

- Compliance or non-compliance with noise and time limits;
- The times and duration of any occasions where exceedances of the noise and time limits occurred and what measures were implemented to ensure that the exceedance(s) did not reoccur;
- Discussion on whether exceedances constituted a 'non-compliance' as defined in Section 3.3; and
- The number and nature of complaints received during the Event.

Not later than thirty (30) days after the completion of a Concert or series of Concerts, the Trust will provide a report in writing to the EPA Manager Sydney Local Government.

The report will contain the following:

- The name, address and telephone number of the report author;
- The relevant date(s) and the commencement and completion times of the test(s), rehearsal(s) and Concert(s) on each day;
- The estimated total number of people that were anticipated to attend the Concert(s) on each day and the number who actually attended;
- A statement of any time(s) at which the noise level limits were exceeded and why, the level(s) and duration of any exceedance(s);
- A determination on whether these exceedances constituted a 'non-compliance' in accordance with Section 3.4; and
- Any other information relevant to the consideration of the noise impact from the event on residents or other sensitive receptors.
- A summary of the number, location and times of any feedback received by the Trust;
- If any exceedances occurred or any feedback received, details of what the Trust intends to do (or do differently) for any future events; and
- Any other information relevant to the consideration of the noise impact from the event on residents or other sensitive receptors.

5 Review mechanism

The Trust implements an annual program of review for the NMP to assess its effectiveness in achieving key noise objectives.

5.1 Review of Noise Management Plan

This NMP shall be reviewed annually at the end of the Twelve-Month Event Period or more regularly on an ‘as needs’ basis. The review shall be conducted in consultation with an Accredited Acoustic Consultant.

Recommendations from any interested parties made to Trust for changes to be made to the NMP will be considered.

The NMP will be made publicly available on a website alongside information on upcoming events.

5.1.1 Methodology

In conducting the NMP review program the following steps will be undertaken:

- Review any existing 'Opportunities for Improvement' identified during the previous annual review;
- Assessment of compliance with noise and time limits through review and analysis of noise monitoring data;
- Review of the complaints register, as well as any complaints made to the EPA or City of Sydney Council regarding Event noise. This review will aim to identify common causes or locations of complaints;
- An evaluation of the complaints register will be undertaken in conjunction with the assessment of compliance with noise and time limits. This review will aim to correlate complaints with limit exceedances;
- Assessment of the adequacy and timeliness of the Trust's reporting to the community;
- Recommend 'Opportunities for Improvement' for the following Twelve-Month Event Period which have been identified as a result of the review process; and
- Consider the outcomes of the review and incorporated relevant improvements into the NMP revision in consultation with an Accredited Acoustic Consultant.