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Bankwest Stadium

Operational Noise Management Plan

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1 INTRODUCTION

This Bankwest Stadium operational noise management plan (ONMP) has been developed to address Consent Conditions D7 of State Significant Development Application 8175.

This management plan exclusively addresses noise from major events within Bankwest Stadium. Other operational noise sources such as mechanical plant and hydraulic plant have been assessed at DA stage and will be certified for compliance with noise emission goals prior to Practical Completion of the Stadium. This ONMP presents the management procedures, monitoring protocols for major sporting events, concerts and events.

2 DESCRIPTION OF MAJOR EVENTS (CONDITION D7A)

The proposed events schedule as provided by Venues NSW is presented below (note: cultural events and concerts are TBC):

Table 1 - Indicative Annual Events Schedule

Type of event – 2019	Number
NRL Competition	16
Other Rugby League matches	4
A- and W-League football	7
Other football matches	2
Rugby Union	3
Concert and other cultural events	3
TOTAL	35

As per the requirements of condition A4, 49 sporting events (excluding training and Captain's Runs) and 3 concerts are permitted in each calendar year.

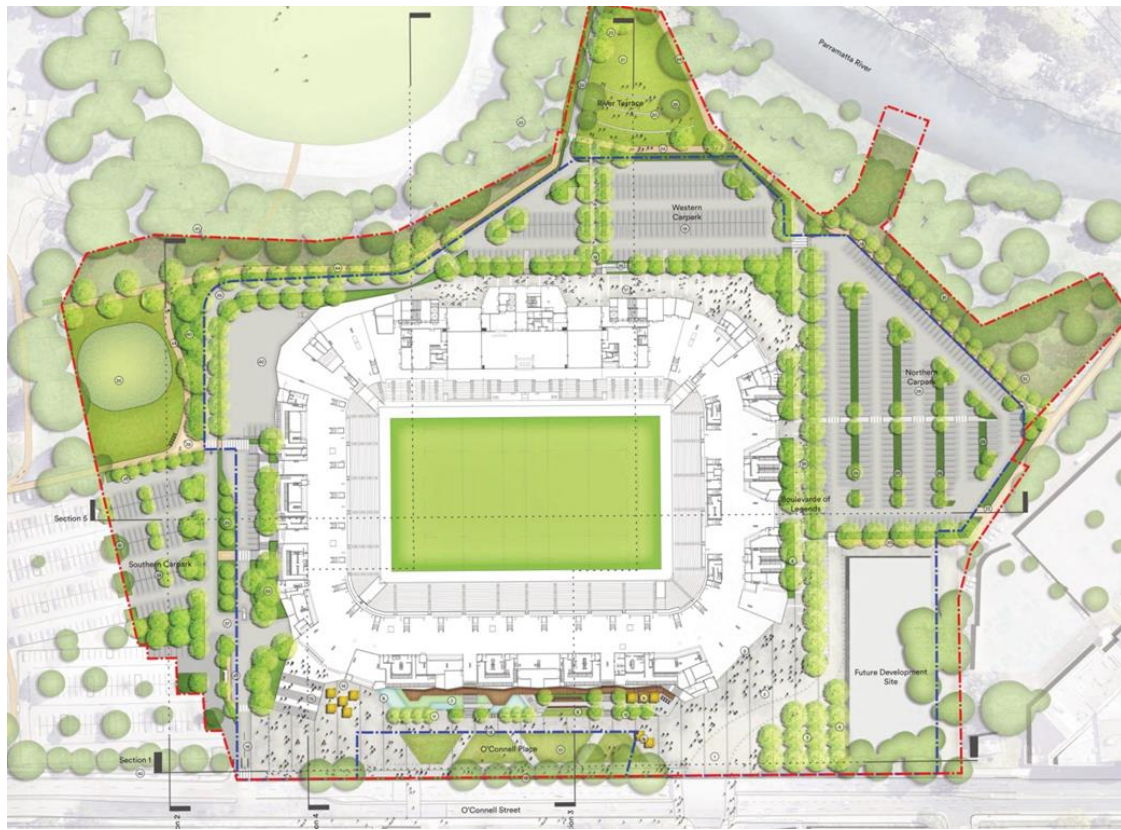
2.1 PERMANENT AMPLIFICATION SYSTEMS

Bankwest Stadium has been equipped (currently being installed) with a public address system which is used to convey instructions and information to the crowd. This system is not implemented during major concert events (or in a limited capacity for announcements only) and temporary amplification systems (j-arrays, foldback, etc) will be provided by the major concerts' artists' audio team.

3 NOISE SENSITIVE RECEIVERS (CONDITION D7B)

Bankwest Stadium is located at 11-13 O'Connell Street, within the Parramatta Park on the north-eastern edge of the Parramatta CBD. It is bound to the south and west by the Parramatta Park and the Parramatta River, the Parramatta Leagues Club to the north and O'Connell Street to the east. The Site is located within the City of Parramatta local government area (LGA).

A locational context plan is provided at **Figure 1** below.



Site Plan

— Construction Boundary

— Operational Boundary

Figure 1 – Site context Plan

3.1 NEAREST POTENTIALLY AFFECTED RECEIVERS

A survey of nearest potentially affected sensitive commercial and residential receivers has been conducted and the following sensitive receivers have been identified:

- Residential Properties between O'Connell Street and Fennell Street
- Queens Road and Park Avenue Residential Properties,
- Lichen Place and Parkside Lane Residential Properties,
- Our Lady of Mercy College,
- Parramatta Park ; and
- Grey-Headed Flying Fox camp (see Western Sydney Stadium Biodiversity Operational Management Plan)

4 NOISE MONITORING PROGRAMME (CONDITION D7C)

This Section addresses the noise monitoring programme that records noise emissions from major events proposed for Bankwest Stadium.

4.1 EVENTS TO BE MONITORED

The following events should have continuous monitoring conducted

- Every concert, including sound tests; and
- Two major sporting events per calendar year.

4.2 MONITORING LOCATIONS

Monitoring of these concerts should be conducted in the following locations:

- One engineer conducting Grose St and O'Connell Street;
- One engineer conducting attended measurements at the locations of any complaints; and
- Attended measurements periodically conducted at the Grey-Headed Flying Fox camp.

These locations are representative of the nearest affected sensitive receivers and noise emissions from concerts and sporting events at these locations will be the most conservative measurements compared to receivers with greater separation from the Stadium.

4.3 MONITORING REQUIREMENTS

Monitoring must be conducted by an acoustic consultant who is a member (or eligible for membership) of the Australian Acoustical Society. All noise emission testing is to be conducted in accordance with AS 1055.1-1997. All internal noise testing will be conducted in accordance with the AS 2107- 1987 Clause 5. All measurements will be conducted with a type 2 instrument as per the brief in AS 1259 Part 2 Sound Level Meters - Precision.

4.4 RESPONSE TO NOISE MEASUREMENTS

4.4.1 Monitoring Procedures

The following procedure should be adopted in zones attended monitoring is required. During a concert or major event, where a noise goal is exceeded the following action shall be undertaken:

- Direct contact is to be maintained between the attended monitoring engineers and the mixing desk of the concerts. An SMS notification shall be sent upon an exceedence of the trigger level to the mixing desk.
- Where the exceedence of noise emission goal is minor and does not occur for a greater than 5 minute interval per hour (ie concert start and concert end) then the activities should continue.
- If exceedences of the noise goal occur for greater than 5 minutes, the mixing desk shall be instructed by the attended monitoring engineers to reduce sound levels or implement additional noise management measures until continuous noise emissions from concert activities are within noise objectives.

4.5 RESULTS OF MONITORING AFTER MAJOR EVENTS

The results of the noise monitoring should be presented within a report which is to be made publicly available on the Bankwest Stadium website. The report should include as a minimum:

- Location of noise measurements
- Instrumentation
- Monitoring times
- Noise descriptors (dB(A) L_{max} dB(C) L_{max})
- Personnel qualifications
- Any exceedances of noise goals and a description of the Stadium noise event which resulted in the exceedence.

The report must be made available to public on request along with this ONMP.

5 NOISE MANAGEMENT OBJECTIVES (CONDITION D7D)

Clause 90 of the *Protection of Environment Operations (POEO) (General) Regulation 1997* makes the EPA the responsible authority for environmental noise emissions from outdoor concerts, festivals and cinematic or theatrical events using sound amplification equipment with 200 or more people. Specifically, Clause 90(d) nominates the EPA as the regulatory body for the trust land within the meaning of *Parramatta Stadium Trust Act 1998*.

However, the *Protection of Environment Operations (POEO) (General) Regulation 1997* does not provide any clear noise emission goals for the concerts or sporting events. The difficulty in establishing noise emission goals for stadiums is noted within the EPA Noise Guide for Local Government which states:

“There are no hard and fast rules to apply when developing noise limits for these types of events, and what is appropriate will depend upon the particular circumstances. Typically, unless the venue is very remote, it is not possible to establish noise limits that prevent annoyance at every residence. However, noise limits can prevent the noise levels from being any higher than necessary.

In the determination of noise emission goals for sporting events and concerts held within the Stadium, a study of similar facilities with comparable design and operational principles has been conducted. The study concluded that, with respect to acoustics, direct comparisons can be made between the current Bankwest Stadium design and proposed operation, and that of Allianz Stadium.

The two stadiums are comparable in that:

- Both have a similar proposed crowd capacity (30,000 for WSS and 42,000 for Allianz);
- The roof junction with the perimeter of the top seating tier on both stadiums have openings for ventilation and light (which is a source of operational noise emissions);
- WSS and Allianz have central open apertures over the pitch;
- Both stadiums and their respective potentially affected noise receivers are located in similar ambient acoustic environments; and
- The stadiums have almost identical operating principles, in that the stadiums will primarily be a venue for sporting events, with periodic concerts and other events.

Given the similarities, and the fact that Allianz has a history of operating successfully in proximity to residential properties, it is proposed that the Allianz Stadium noise management goals as presented within the Allianz Stadium Noise Management Plan (January 2017, prepared by ERM) be established as noise management levels for Bankwest Stadium.

As a result, the following noise management levels have been developed for the surrounding residential properties:

Table 2 – Bankwest Stadium Noise Emission Management Levels

Event	Compliance Location	Noise Source	Noise Management Level dB(A) L_{Amax}	Noise Management Level dB(A) L_{Cmax}
Sporting Event	Surrounding Residential Receivers	Amplification Equipment	60	N/A
Concerts & Sound Tests	Surrounding Residential Receivers	All	80	100

5.1 HOURS OF EVENTS

The following hours of operation are envisaged for the Bankwest Stadium:

Table 3 – Expected Hours of Operation

Event / Activity	Hours of Operation	Comments	Number of Events
Concerts	12:00pm – 10:30pm	Extension of hours to midnight may be considered acceptable if concert delays are outside of the control of the Bankwest Stadium Trust.	Three concerts per calendar year as per the Bankwest Stadium Project Brief
Sound tests	10:00am – 7:00pm	N/A	Sound tests associated with concerts should be restricted to the day of the proposed concert
Pyrotechnics	10:00am – 10:30pm	Extension of hours of fireworks to 12:15am may be considered to be acceptable on NYE given the cultural significance.	Separate applications should be submitted to the EPA for each event proposing the use of aerial pyrotechnics to be ignited or erupt above the roof line.*
Sporting Events	10:00am – 10:30pm	N/A	See Section 2

5.1.1 Pyrotechnics Operations

A separate specific application should be made for any pyrotechnics which are proposed to be ignited at or above the highest seating tier. In the absence of a specific assessment / application for pyrotechnics, these are to be limited from igniting at or above the highest seating tier.

Given the nature of pyrotechnics, any ignition of fireworks above the seating tier is expected to exceed any traditional noise emission goals, and should be limited to special events (New Years Eve, Australia Day, Easter) as there are no practical acoustic treatments which can be implemented to reduce noise from fireworks ignited above the highest seating tier.

6 NOISE MODEL (CONDITION D7E)

A noise model of major events has been prepared by this office and the results which were prepared and submitted at Development Application Stage are presented in Appendix One. Noise predictions have been conducted using the SoundPlan noise modelling software. Noise propagation was determined using ISO 9613-2:1996 “Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation” noise propagation standard.

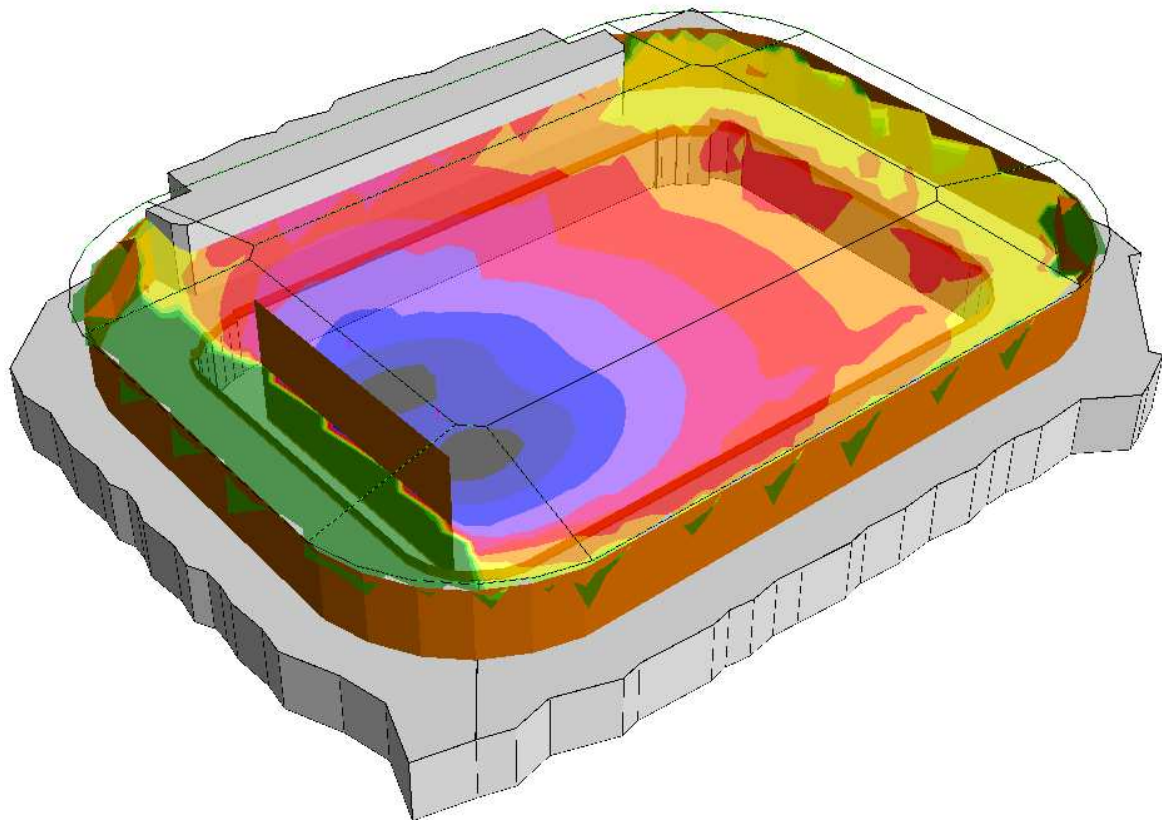


Figure 2 – SoundPLAN Bankwest Stadium Noise Model

7 NOISE COMPLAINTS (CONDITION D7F)

Noise complaints during concerts and major sporting events should be managed as follows (as detailed within the Operational Noise and Vibration Impact Assessment prepared during the Stage 2 submission):

- A Noise Management Hotline should be made available to the public for lodgement of noise complaints. The hotline should notify without delay the acoustical consultants carrying out measurements of noise, who should immediately follow complaints with noise measurements carried out at locations of complainants (see Section 4.4.1)
- A register of all noise complaints received during noisy events should be maintained including:
 - The date and time each complaint was received
 - How the complaint was received
 - The contact details of the person lodging the complaint, including the street address.

This register must be maintained and updated by Bankwest Stadium.

8 COMMUNITY CONSULTATION (CONDITION D7G)

The following community consultation should be undertaken (as detailed within the Operational Noise and Vibration Impact Assessment prepared during the Stage 2 submission):

8.1 NOTICE TO THE COMMUNITY INCLUDING RESIDENTS AND BUSINESSES

- Notify all residential premises within 1 kilometre of Parramatta Stadium and the residential premises listed in this ONMP of any planned noisy events by a letterbox drop at least 30 days before the events.

It is recommended the notice to the residential and commercial premises advise of:

- Nature (description) and size of (expected crowd attending) a major event;
- Date and time (duration) of the event, including preliminary practice sessions and/or rehearsals;
- A hotline (telephone number) for lodgement of noise complaints;
- This ONMP available on Bankwest Stadium's website; and invite post-event feedback.

8.2 COMMUNITY FEEDBACK AFTER MAJOR EVENTS

Occupiers of the residential and commercial premises are able to express their opinion on the impact of noise emanating from noisy events held at WSS and provide suggestions on minimising the impact through letter box drops.

This ONMP should be made publicly available on a website alongside information on upcoming major events.

9 REVIEW OF NOISE MANAGEMENT PLAN (CONDITION D7J/K)

A regular review and update the Operational Noise Management Plan should be conducted each calendar year, taking into account:

- Complaints regarding noise;
- The results of the active attended noise monitoring and reporting;
- Recommendations from acoustic engineers engaged in monitoring of noise during the events;
- Results of all community consultation; and
- Any other community reaction (via emails or phone calls to Bankwest Stadium)

During the annual review, if there is found to be regular, continuous exceedances of the operational noise management levels during major events, the location of temporary sound reinforcement should be reviewed.

Whilst achieving the main audio objectives of the main event the following techniques could be investigated for major event temporary sound reinforcement system in the event of exceedances of noise emission goals:

- Relocation of temporary equipment to a location further from residents (noting that this is likely to have a limited impact as the sound reinforcement system is ideally engineered to fill the entire stadium equally).
- Use of directional loudspeakers with less “spill” than traditional J arrays (subject to main event’s artist’s requirements for sound distribution).


10 CONCLUSION

An operational noise management plan (ONMP) has been prepared for Bankwest Stadium. Noise emissions from Bankwest Stadium have been assessed and managed as follows:

- All major concerts (up to three per calendar year) and two major sporting events are to have a regime of attended monitoring conducted at two locations
- The results of this monitoring are to be reported and any exceedance of the formulated noise emission goals is to be reported with identification of the Stadium noise source reported.
- The monitoring reports are to be made publicly available on the Bankwest Stadium website.
- Community notification is to be undertaken before major events.
- This noise management plan should be updated regularly in response to both the active attended monitoring results and the community response.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Thomas Aubusson', written in a cursive style.

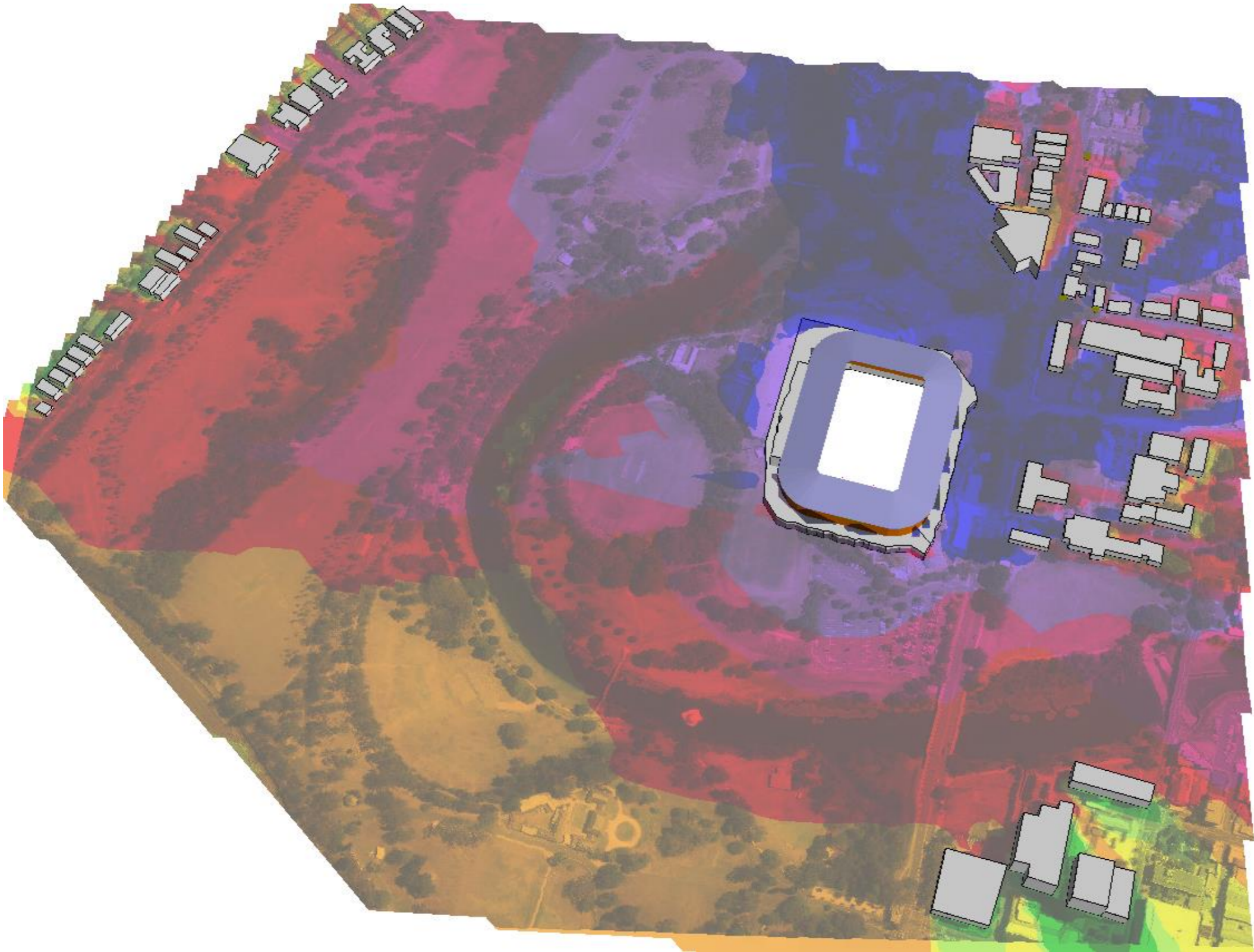
Thomas Aubusson MAAS

**APPENDIX ONE –
RESULTS OF NOISE MODELLING**

Western Sydney Stadium

Operational Noise Prediction

Rock Music Noise



Noise Level

L_{max}
in dB(A)

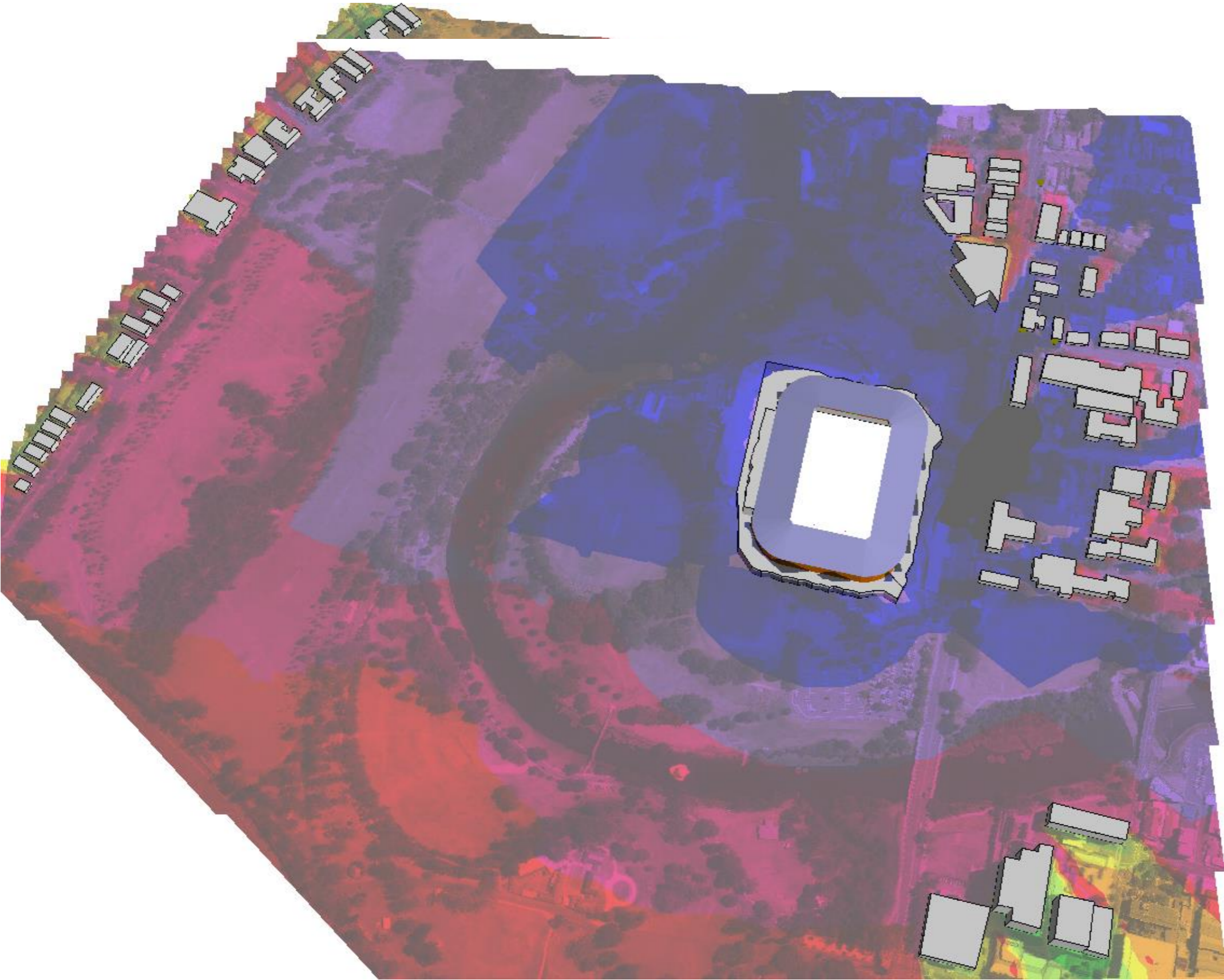
- < 61
- 61 - 64
- 64 - 67
- 67 - 70
- 70 - 73
- 73 - 76
- 76 - 79
- 79 - 82
- 82 - 85
- 85 - 88
- 88 - 91
- ≥ 91



Western Sydney Stadium

Operational Noise Prediction

Rock Music Noise



Noise Level

L_{max}
in dB(C)

Green	< 80
Light Green	80 - 83
Yellow-Green	83 - 86
Yellow	86 - 89
Orange	89 - 92
Red	92 - 95
Pink	95 - 98
Purple	98 - 101
Blue	101 - 104
Dark Blue	104 - 107
Black	107 - 110
Black	≥ 110

