MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

Atlassian Building Central, 8-10 Lee Street, Haymarket

Construction Noise, Vibration and Dust Management Plan

SYDNEY
9 Sarah St
MASCOT NSW 2020
(02) 8339 8000

ABN 98 145 324 714
www.acousticlogic.com.au

Project ID	20211393.1
Document Title	Construction Noise, Vibration and Dust
Attention To	Built Pty Ltd & Obayashi Corporation

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	12/11/2021	20211393.1/1211A/R0/SN	SN		GW
1	24/11/2021	20211393.1/2411A/R1/SN	SN		SN
2	8/03/2022	20211393.1/0803A/R2/SN	TB		GW
3	24/03/2022	20211393.1/2403A/R3/SN	SN		SN
4	1/06/2022	20211393.1/0106A/R4/SN	SN		SN
5	2/06/2022	20211393.1/0206A/R5/SN	SN		SN
6	2/06/2022	20211393.1/0206A/R6/SN	SN		SN

TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic (AL) has been engaged to prepare a construction noise, vibration and dust management plan for the proposed commercial development "Atlassian" to be located at 8-10 Lee Street, Haymarket.

This report has been prepared to address the requirements of development consent *'SSD 10405'* conditions, namely:

- C6 *Temporary Protection Plan*. (d) provide a protection strategy for the duration of the construction works detailing how the proposed works will ensure that heritage buildings are to be suitably protected and stabilised during the construction process including from any construction waste, dust, damp, water runoff, vibration or structural disturbance or damage;
- E.15 *Construction Environmental Management Plan* (viii) air quality management including issues associated with odour, minimising dust on site and prevention of dust from leaving the site during construction works; and
- E.18 *'Construction Noise and Vibration Management Sub-Plan'* as detailed below.

Construction Noise and Vibration Management Sub-Plan

E18. Prior to the commencement of any demolition, earthworks or construction, the Applicant shall submit to the satisfaction of the Certifier a Construction Noise and Vibration Management Sub-Plan (CNVMP) prepared in consultation with Council. The CNVMSP must address, but not be limited to, the following:

(a) be prepared by a suitably qualified and experienced noise expert;

(b) describe procedures for achieving the noise criteria / management levels in the *City of Sydney Construction Hours /Noise Code of Practice 1992*. Where resultant site noise levels are likely to be in exceedance of this noise criteria then a suitable proposal must be given as to the duration and frequency of respite periods that will be afforded to the occupiers of neighbouring property;

(c) incorporate the recommendations of the noise reports prepared by Stantec titled *'Atlassian Central Noise & Vibration Impact Assessment Ref: 45474'* dated 23 September 2020 as updated by *'Atlassian Central Acoustics, Noise & Vibration Schematic Design Report – 2.0 Ref: 45474'* dated 16 April 2021;

(d) details of non-tonal alarms, materials handling and work site training;

(e) include strategies that have been developed with the community for managing high noise generating works and describe the community consultation/liaison undertaken to develop the strategies;

(f) details of any noise mitigation measures that have been outlined by an acoustic consultant or otherwise that will be deployed on site to reduce noise impacts on the occupiers of neighbouring noise sensitive property to a minimum;

(g) what plant and equipment is to be used on site, the level of sound mitigation measures to be undertaken in each case and the criteria adopted in their selection taking into account the likely noise impacts on the occupiers of neighbouring property and other less intrusive technologies available;

(h) include a complaints management system that would be implemented for the duration of the construction; and

(i) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures in accordance with **Condition E14**.

2 SITE DESCRIPTION

The site is located at 8-10 Lee Street, Haymarket. The site is bound to the north-west by George Street, east by Central Station *'Platform 1'* and associated rail network, north by Pitt Street and to the south by commercial receivers and the Devonshire Street pedestrian tunnel.

See Figure 1 below for an aerial site map of the proposed *'Atlassian'* development.

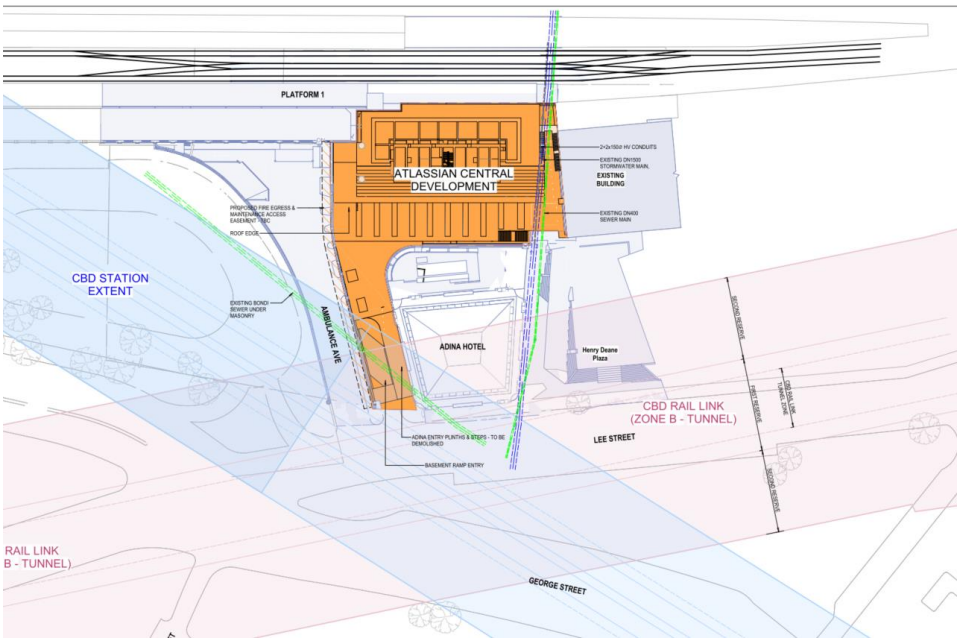


Figure 1: Aerial site map of the *'Atlassian Central Development'* project site

The closest affected sensitive receivers within the vicinity of the site are as follows:

- **Receiver 1:** *'Adina Hotel'* located at 2 Lee Street, Haymarket to the west. The commercial receiver is multi-storey and has windows which overlook the proposed construction site.
- **Receiver 2:** Central Station *'Platform 1'* to the north-east of the proposed construction site.
- **Receiver 3:** Devonshire Street pedestrian tunnel to the south of the proposed construction site.
- **Receiver 4:** Commercial receiver located at 12-30 Lee Street, Haymarket. The commercial receiver is multi-storey and has windows which overlook the proposed construction site.
- **Receiver 5:** Sydney water pipelines located to the south of the proposed construction site, beneath the Devonshire Street tunnel.
- **Receiver 6:** *'Wake Up'* commercial receiver located at 509 Pitt Street, Haymarket. Commercial receiver is multi-storey and has windows which overlook the proposed construction site.
- **Receiver 7:** Commercial receiver located at 815 – 825 George Street, Haymarket. Commercial receiver is multi-storey and has windows which overlook the proposed construction site.
- **Receiver 8:** Residential receiver located at 107-121 Quay Street, Haymarket. Residential receiver is multi-storey and has windows which overlook the proposed construction site.
- **Receiver 9:** Existing heritage structures and assets surrounding the proposed construction site.

See an aerial photo in Figure 2 below for detailed sensitive receiver locations. It is noted based on discussions with Built that the Adina Hotel being Receiver 1 and the commercial receiver at 12-30 Lee Street, Haymarket being Receiver 4 in Figure 2 of this report are to be unoccupied during the time period the Atlassian construction works are to be undertaken. Therefore, noise impacts to occupants of receivers 1 and 4 are considered inconsequential.

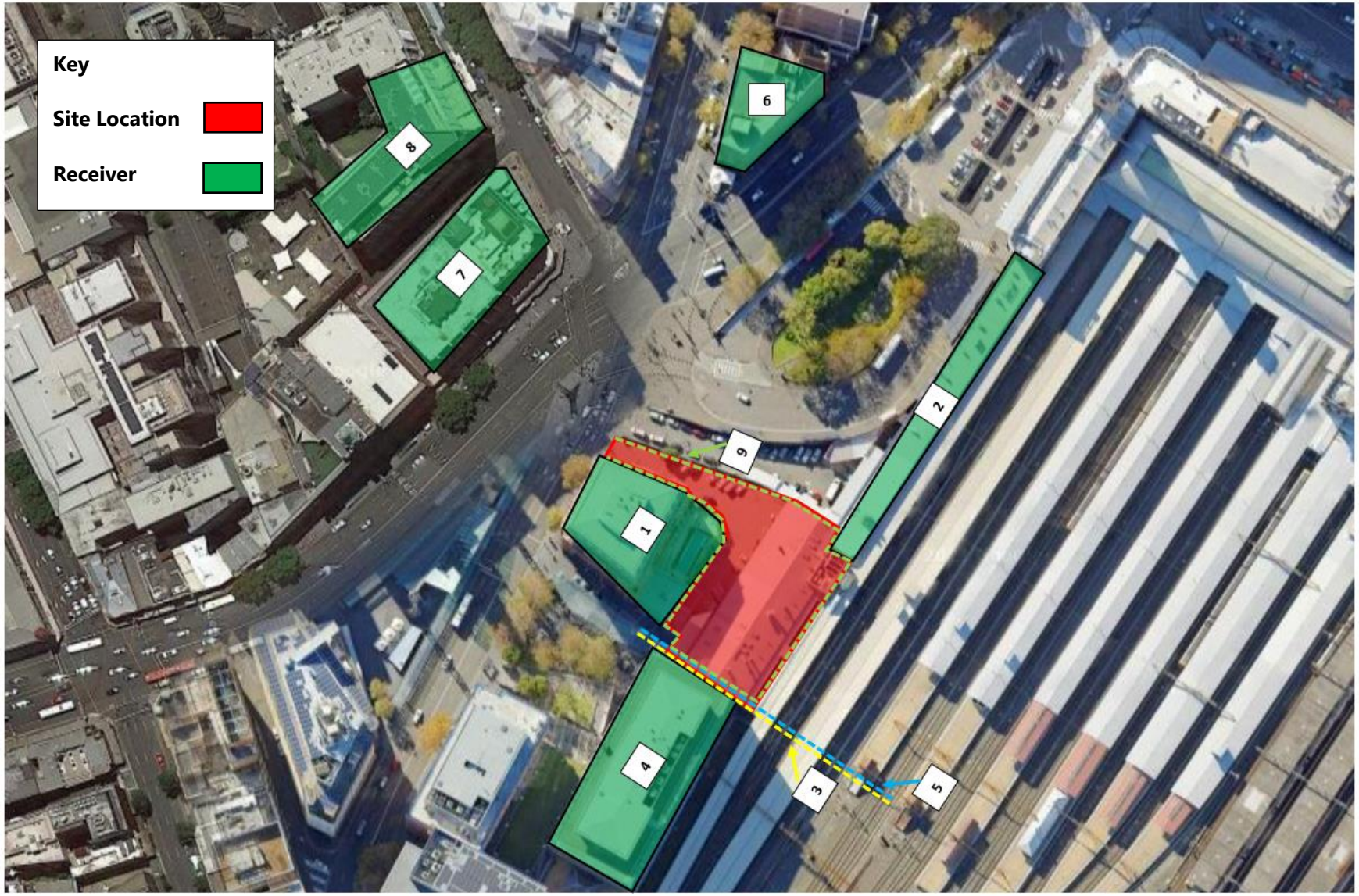


Figure 2: Aerial site map with Nearest Sensitive Receivers and Monitoring Location

3 CONSTRUCTION ACTIVITIES

The information provided to this Office of the noise, vibration and dust producing activities associated with the site are as follows below:

Phase 1: Demolition and Heritage Dismantle (28/03/2022 to 15/10/2022, approximately 7 months)

- Three (3) excavators with bucket attachments. (Noise and dust sources, Vibration if building elements drop)
- One (1) excavator with hydraulic hammer attachment. (Noise, vibration and dust source)

Phase 2: Excavation and Piling (22/10/2022 to 28/04/2023, approximately 6 months)

- Three (3) excavators with bucket attachments. (Noise and dust sources)
- One (1) excavator with hydraulic hammer attachment. (Noise, vibration and dust source)
- Two (2) pile boring machines. (Noise and vibration sources)
- Loader trucks (semi-trailers). (Noise and dust sources)

Phase 3: Construction (21/05/2022 to 29/12/2025, approximately 3 years and 7 months)

- Two (2) concrete trucks (two truck feed at any one time). (Noise sources)
- One (1) concrete pump. (Noise, vibration source pipeline)
- One (1) common tower hoist located along the northern boundary of the project site. (Noise source)
- Hand tools. (Noise sources)
- Concrete saw & core drilling equipment. (Noise sources)
- Two (2) stationary tower cranes. One tower crane to be positioned along the western boundary of the project site nearest to the Adina Hotel with a second tower crane to be positioned within the core of the proposed Atlassian building. See Figure 3 below for a mark-up. (Noise sources)

Trucks are proposed to enter the construction site from Lee Street onto Ambulance Avenue with the concrete trucks and pump accessing the construction site via the Adina Ramp. (Noise sources)

See Figure 3 below for an aerial view of the construction zone layout provided to this office.

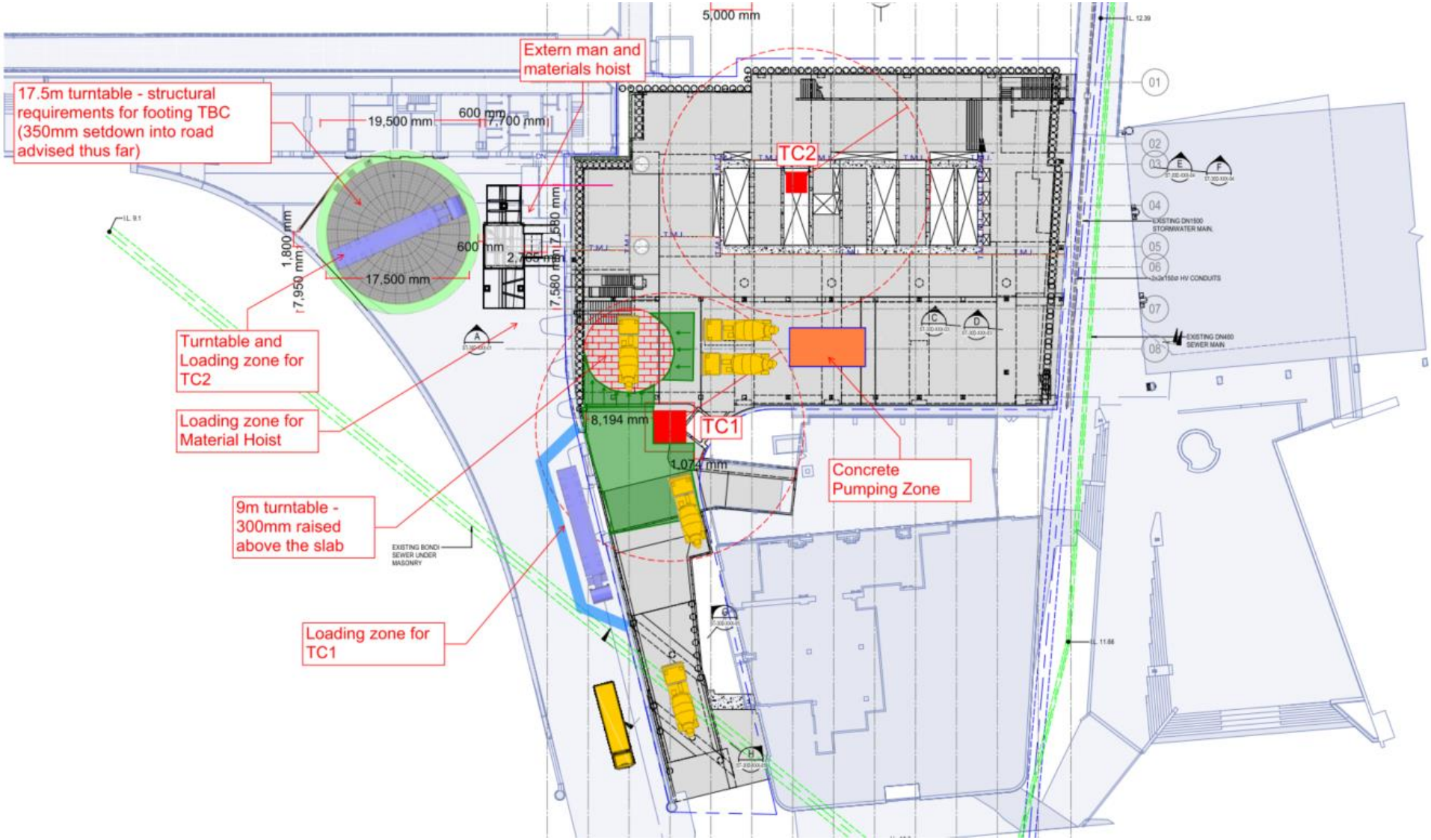


Figure 3: Aerial view of construction zone and logistics plan

4 HOURS OF WORK

SSDA conditions F.5 to F.8 outlines the hours of work for construction activities, and these are presented below (Ref: *SSD 10405*).

Construction Hours

F5. Construction, including the delivery of materials to and from the site, may only be carried out between the following hours:

(a) between 7am and 7pm, Mondays to Fridays inclusive; and

(b) between 7am and 3pm, Saturdays.

No work may be carried out on Sundays or public holidays.

F6. Construction activities may be undertaken outside of the hours in **Condition F5** if required:

(a) by TfNSW to prevent significant disruption to public transport, access to public transport or public safety; or

(b) by the Police or a public authority for the delivery of vehicles, plant or materials; or

(c) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm.

F7. Notification of such construction activities as referenced in **Condition F6** must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

F8. Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

(a) 9am to 12pm, Monday to Friday;

(b) 2pm to 5pm Monday to Friday; and

(c) 9am to 12pm, Saturday.

5 AMBIENT NOISE SURVEY

Short-term and long-term noise measurements have been carried out by this office at the nearest surrounding receivers to the Atlassian project site. Site investigation indicated that long-term unattended noise monitoring at all sensitive receivers was not feasible; therefore, short term noise measurements were undertaken to establish ambient background noise levels at the nearest sensitive receivers to supplement previous unattended noise monitoring data conducted by this office within the vicinity.

5.1 SHORT TERM AMBIENT BACKGROUND NOISE MEASUREMENTS

Short term attended ambient background noise measurements have been undertaken by this office.

5.1.1 Measurement Position

Attended noise measurements were undertaken to validate the background noise levels at nearest sensitive receivers surrounding the site. The measurement locations are visualised within Figure 5 below.

5.1.2 Measurement Period

The attended noise measurements were conducted on Monday the 25th of October 2021 between 10:00am and 2:00pm.

5.1.3 Measurement Equipment

The measurement was conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

5.1.4 Measured Background Noise Levels

The measured background noise levels for the attended measurements are presented in the table below.

Table 1 – Measured Background Noise Levels at Attended Measurement Location

Measurement Location (See Figure 5 below)	Time of day	Measured Background Noise Level dB(A)$L_{90(Period)}$
Location 1	Monday the 25th of October 2021 10:00am – 2:00pm	56
Location 2		52
Location 3		57
Location 4		59
Location 5		60
Location 6		61
Location 7		59
Location 8		57
Location 9		61
Location 10		59

5.2 LONG TERM BACKGROUND NOISE MEASUREMENTS

5.2.1 Equipment Used

Unattended noise monitoring was conducted using a Rion NL-42 (Type 2). The monitoring was continuous, with statistical noise levels recorded at 15-minute intervals throughout the monitoring period. Measurements were taken on "A" frequency weighting and fast time response.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

5.2.2 Monitoring Period

Unattended long term noise monitoring was undertaken from 9th June 2021 to 21st June 2021.

5.2.3 Monitoring Location

The noise monitor was placed in the First-Floor carpark at 815 George Street, Haymarket. The microphone was extended and protruded out the louvres in order to capture environmental noise in Bijou Lane, nearest to residential receiver 8 at 107-121 Quay Street, Haymarket. See Figure 5 for a detailed location.

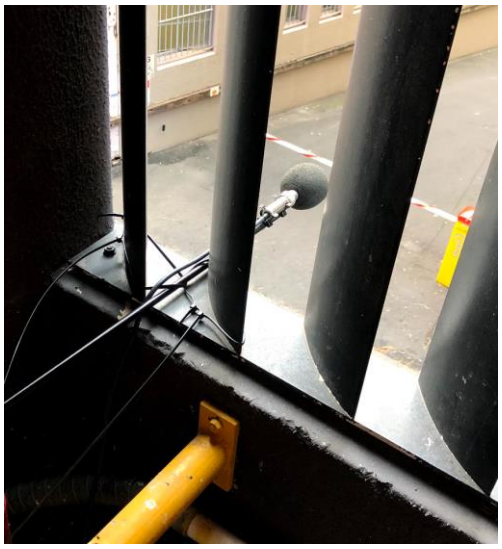


Figure 4 – Noise Monitor Microphone Placement

5.2.4 Calculated Background Noise Levels

Background levels have been calculated from the long term, unattended noise monitoring data in Appendix A.

The assessment and rating background levels have been determined using based on the methodology in the Noise Policy for Industry Fact Sheet B. Periods affected by adverse weather conditions (as defined by NPfI Fact Sheet B) or extraneous noise are also indicated. Weather data was obtained from records provided by the Bureau of Meteorology for the weather station located at Observatory Hill.

The day, evening and night periods correspond to the NPfI guideline, being:

Day - period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays.

Evening - period from 6 pm to 10 pm.

Night - remaining periods.

The following tables summarise the assessment background noise levels (ABL) for each location. Note that where no ABL is indicated, this is because that period was affected by adverse weather or other extraneous noise.

Table 2 – NPfI Assessment Background Noise Levels

Location	Date	Assessment Background Noise Level dB(A)L_{90}		
		Day	Evening	Night
815 George Street, Haymarket (See Figure 5)	09/06/21	-	58	55
	10/06/21	59	59	56
	11/06/21	59	58	57
	12/06/21	58	59	55
	13/06/21	58	58	56
	14/06/21	58	58	54
	15/06/21	59	58	56
	16/06/21	59	59	56
	17/06/21	59	59	58
	18/06/21	59	59	55
	19/06/21	63	63	63
	20/06/21	63	64	63
	21/06/21	-	-	-

The following table summarises the rating background noise levels determined for the day, evening and night periods as defined in the NPfI.

Table 3 – NPfI Rating Background Noise Levels

Location	Rating Background Noise Level dB(A)L_{90}		
	Day	Evening	Night
815 George Street, Haymarket (See Figure 5)	59	59	56

The short-term noise measurements during the daytime period have been referenced against the long-term unattended noise monitoring data undertaken along Bijou Lane by this office being the nearest façade of residential receiver 8. The lowest measured day time background noise level has been adopted for setting up the noise management level based on the requirements of City of Sydney.

The summarised background noise levels are presented below.

Unattended Noise Monitoring Location

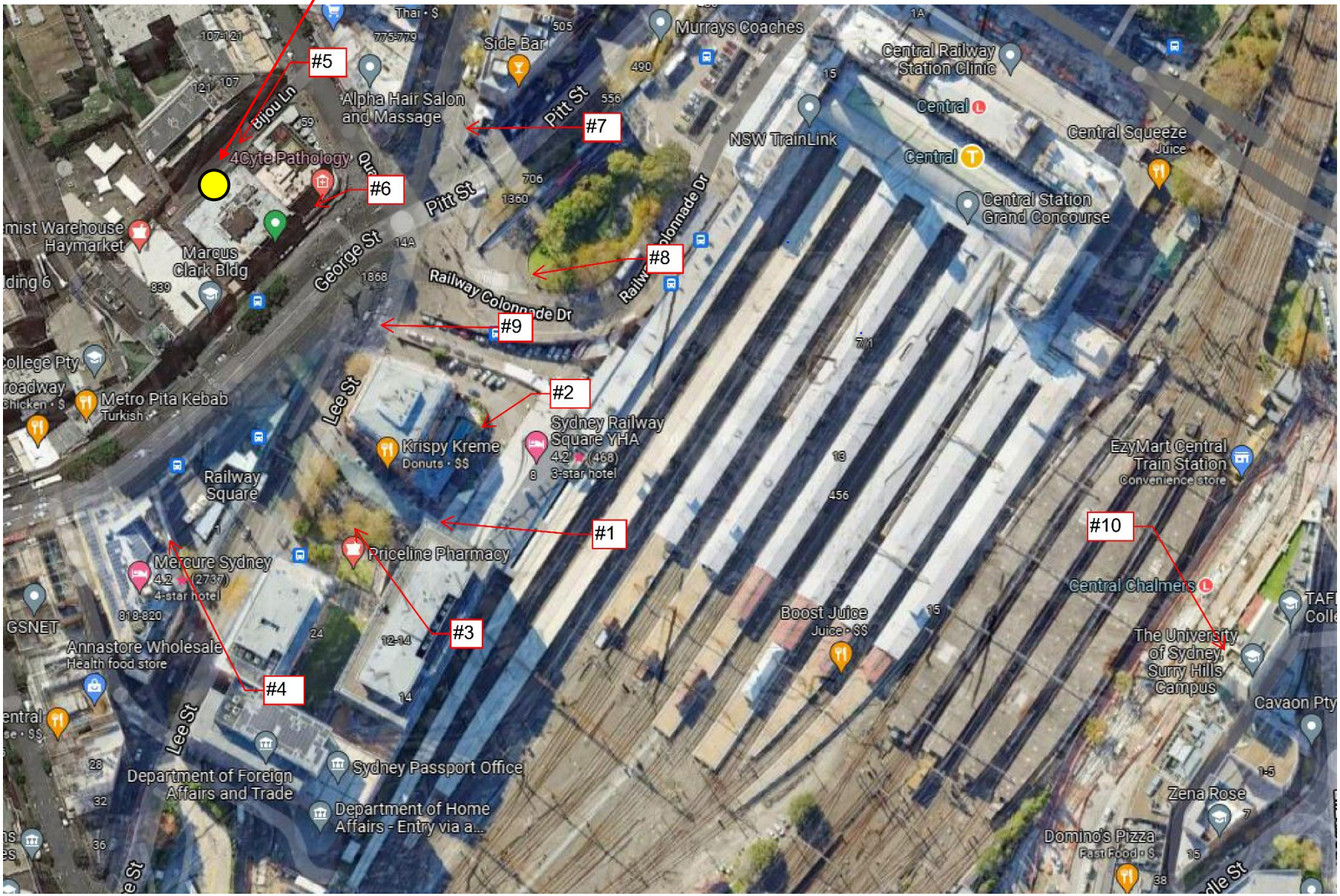


Figure 5: Background Noise Measurement Locations

5.3 SUMMARISED BACKGROUND NOISE LEVELS

The following table presents the summarised background noise levels for individual sensitive receivers maintained near the proposed Atlassian construction site.

Table 4 - Summarised Rating Background Noise Level

Receiver Location	Time of day	Rating Background Noise Level dB(A)$L_{A90(Period)*}$
Receiver 1 (See Figure 2)	Monday the 25th of October 2021 10:00am – 2:00pm	52
Receiver 2 (See Figure 2)		57
Receiver 3 (See Figure 2)		56
Receiver 4 (See Figure 2)		56
Receiver 6 (See Figure 2)		59
Receiver 7 (See Figure 2)		59
Receiver 8 (See Figure 2)		59

*Based on the lowest background noise levels measured between the short-term and long-term noise measurement periods.

Note: Receivers 5 and 9 as presented in Figure 2 have not been included in the above table given that these receiving locations are vibration sensitive structures only.

6 AMBIENT DUST LEVELS

An ambient dust survey was not carried out in preparation for the construction noise, vibration and dust plan as the dust levels at that time may not have been representative of ambient levels at the time of construction as:

- Dust levels can vary with seasonal wind directions.
- There were construction works in progress at Central station for the metro works which may have influenced the ambient dust levels.
- Due to covid Country Link rail, Coachlines and surrounding Sydney bus services that use diesel engines may not have been to pre-covid timetables and capacity. Diesel engines are sources of PM2.5 and PM10 particles that require monitoring.

It is recommended that ambient dust levels are measured in the fortnight prior to the commencement of the site establishment stage. Dust levels may also be checked against the Department of Planning and Environment's dust monitors at Randwick, Rozelle, Earlwood and Domain depending on wind direction when demolition commences.

7 CONSTRUCTION NOISE AND VIBRATION LIMITS

7.1 SSDA 10405 CONDITION F19-F27 – CONSTRUCTION NOISE AND VIBRATION LIMITS

SSDA 10405 Conditions F19 to F27 state the following with regards to construction noise limits and vibration criteria:

Construction Noise Limits

F19. All work, including demolition, excavation and building work, and activities in the vicinity of the site generating noise associated with the preparation for the commencement of work in connection with the development must comply with the *City of Sydney Construction Hours/Noise within the Central Business District Code of Practice 1992* and Australian Standard 2436-2010 *Guide to Noise Control on Construction, Maintenance and Demolition Sites*. All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures identified in the CNVMP required by **Condition E18** of this consent.

F20. The Applicant must ensure all construction vehicles do not arrive at the site outside of the construction hours of work outlined under **Condition F5**.

F21. The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, the use audible movement alarms of a type that would minimise noise impacts on surrounding noise sensitive receivers.

F22. Any noise generated during construction of the development must not be offensive noise within the meaning of the *Protection of the Environment Operations Act 1997* or exceed approved noise limits for the site.

F23. Where all noise control measures have been implemented and the resultant noise and/ or vibration levels at any sensitive receiver still exceed the Council's applicable criteria stated in the *City of Sydney Construction Hours/Noise Code 1992* and are giving rise to sustained complaints then the contractor must provide regular, appropriate and sustained periods of respite in consultation with Council's Health and Building unit. Approval to vary the authorised noise and vibration levels must be received in writing by the proponent from Council prior to activities being undertaken that exceed sanctioned emission levels.

F24. The immediately adjoining neighbours must be given a minimum of 48 hours notice that excavation, shoring or underpinning works or use of high noise emission appliances / plant are about to commence.

Vibration Criteria

F25. Vibration caused by construction at any residence or structure outside the site must be limited to:

(a) for structural damage, the latest version of *DIN 4150-3 (1992-02) Structural vibration - Effects of vibration on structures* (German Institute for Standardisation, 1999); and

(b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: a technical guideline* (DEC, 2006) (as may be updated or replaced from time to time).

F26. Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in **Condition F25**.

F27. The limits in **Condition F25** and **Condition F26** apply unless otherwise outlined in the CNVMP required by **Condition E18** of this consent.

7.2 CITY OF SYDNEY COUNCIL – CODE OF PRACTICE FOR CONSTRUCTION HOURS/NOISE WITHIN THE CENTRAL BUSINESS DISTRICT 1992

As required by condition F19, assessment of construction noise from the site will be made with reference Code of Practice for Construction Hours/Noise Within the Central Business District 1992.

The City of Sydney code of practice establishes various categories for construction works based on the time of day they are undertaken, as detailed and highlighted below.

Table 5 – Categories of Working Hours and Noise Levels

Day	Time Zone	Category	Noise Criteria dB(A) $L_{Av, Max(15min)}$
Monday to Friday	00.00 – 07.00	4	Background + 0 dB(A)
	07.00 – 08.00	1	Background + 5dB(A)
	08.00 – 19.00	1	Background + 5dB(A) + 5 dB(A) (to be determined on a site basis)
	19.00 – 23.00	2	Background + 3 dB(A)
	23.00 – 24.00	4	Background + 0dB(A)
Saturday	00.00 – 07.00	4	Background + 0dB(A)
	07.00 – 08.00	1	Background + 5dB(A)
	08.00 – 17.00	1	Background + 5dB(A) + 5 dB(A) (to be determined on a site basis)
	17.00 – 23.00	2	Background + 3 dB(A)
	23.00 – 24.00	4	Background + 0dB(A)
Sundays and Public Holidays	00.00 – 07.00	4	Background + 0dB(A)
	07.00 – 17.00	3	Background + 3 dB(A)
	17.00 – 24.00	4	Background + 0dB(A)

7.2.1 Australian Standard AS2436:2010 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*"

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites, AS2436 nominates the following:

a. That reasonable suitable noise criterion is established,

b. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and

c. The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the construction site.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic comprises between construction sites and potential noise affected receivers.

Based on these criteria the following procedure will be used to assess noise emissions:

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- Adopt management conditions as per AS2436 in the event of a non-compliance.

7.2.2 Summary of Relevant Construction Noise Limits

A summary is presented below.

Table 6 – Summarised Construction Noise Requirements During Proposed Hours

Receiver	Period/Time	Background Noise Level	Construction Noise Levels
Receiver 1 (See Figure 2)	Monday – Friday 7.00am – 8.00am	52 dB(A) L_{90}	57 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	52 dB(A) L_{90}	62 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	52 dB(A) L_{90}	57 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	52 dB(A) L_{90}	62 dB(A) $L_{10(15min)}$
Receiver 2 (See Figure 2)	Monday – Friday 7.00am – 8.00am	57 dB(A) L_{90}	62 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	57 dB(A) L_{90}	67 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	57 dB(A) L_{90}	62 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	57 dB(A) L_{90}	67 dB(A) $L_{10(15min)}$
Receiver 3 (See Figure 2)	Monday – Friday 7.00am – 8.00am	56 dB(A) L_{90}	61 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	56 dB(A) L_{90}	66 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	56 dB(A) L_{90}	61 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	56 dB(A) L_{90}	66 dB(A) $L_{10(15min)}$
Receiver 4 (See Figure 2)	Monday – Friday 7.00am – 8.00am	56 dB(A) L_{90}	61 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	56 dB(A) L_{90}	66 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	56 dB(A) L_{90}	61 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	56 dB(A) L_{90}	66 dB(A) $L_{10(15min)}$

Table 7 – Summarised Construction Noise Requirements During Proposed Hours

Receiver	Period/Time	Background Noise Level	Construction Noise Levels
Receiver 6 (See Figure 2)	Monday – Friday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$
Receiver 7 (See Figure 2)	Monday – Friday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$
Receiver 8 (See Figure 2)	Monday – Friday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Monday – Friday 8.00am – 7.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$
	Saturday 7.00am – 8.00am	59 dB(A) L_{90}	64 dB(A) $L_{10(15min)}$
	Saturday 8.00am – 3.00pm	59 dB(A) L_{90}	69 dB(A) $L_{10(15min)}$

Note: Receivers 5 and 9 as presented in Figure 2 have not been included in the above table given that these receiving locations are vibration sensitive structures only.

7.3 VIBRATION

Vibrations caused by any proposed activities on site, at the façade or incident on the structure of any surrounding sensitive receivers, will be assessed against the following provisions:

- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*.
- For human exposure to vibration, the evaluation criteria presented in NSW Environmental Protection Authority (EPA) "*Assessing Vibration: A Technical Guideline*" guideline.
- Vibration limit requirements of Sydney Water detailed in the *'Sydney Water Specialist Engineering Assessment'*.
- Vibration limit requirements of TfNSW detailed in the *'NSW Transport Asset Standards Authority Development Near Rail Tunnels'*.

The criteria and the application of these guidelines are discussed in separate sections below.

7.3.1 Structure Borne Vibrations

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 8.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 8 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

	TYPE OF STRUCTURE	PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

= Receivers 4,6,7

= Receiver 1 & 8

= Receivers 3 & 9

7.3.2 Assessing Amenity

The NSW Environment Protection Authority's (EPA) publication "Assessing Vibration: A Technical Guideline" (Feb 2006), outlines vibration criteria to assess the effects on human exposure to vibration from industry, transportation and machinery. This will ensure the amenity of tenants within surrounding residential properties is not adversely impacted.

This document classifies vibrations in buildings into continuous (with magnitudes varying or remaining constant with time), impulsive (such as shocks) or intermittent (with the magnitude of each event being either constant or varying with time). Criteria stipulated in this publication is based on the type of vibrations generated by the source.

Criteria relevant to the proposed excavation and construction activities on site are detailed below.

Table 9 – EPA Recommended Human Comfort Vibration Criteria

		RMS acceleration (m/s^2)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	**Time**	**Preferred**	**Maximum**	**Preferred**	**Maximum**	**Preferred**	**Maximum**
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

7.3.3 Requirements of Sydney Water *'Sydney Water Specialist Engineering Assessment'*

The vibration limits presented below are detailed within the *'Sydney Water Specialist Engineering Assessment'* document for threshold vibration limits of pipe assets. It has been identified to this office that there are three (3) Sydney Water pipework assets underground nearby the Atlassian construction site.

Table 6: Threshold Vibration Limits

Asset type	Threshold values for velocity (PPV) measured on the asset in mm/s
Brittle Pipe assets – RC, VC/ EW, CICL	Maximum PPV for intermittent vibrations 10mm/s Maximum PPV for continuous vibrations 5mm/s
Ductile Pipe assets – SCL, DI, PVC, PE, PP, GRP	Maximum PPV for intermittent vibrations 20mm/s Maximum PPV for continuous vibrations 10mm/s
Masonry	3 mm/s
Unreinforced concrete	3 mm/s

Note: Table 6 is applicable for buried assets, in sound condition, and laid in a typical soil trench in stable ground. Alternative criteria shall be developed for other asset types, above ground assets, concrete encased pipes, pipes on piled/ special supports and pipes in tunnels or of other unusual construction or ground conditions.

Given the above vibration limits outlined in the *'Sydney Water Specialist Engineering Assessment'* and the information provided to this office in the *'Structural Monitoring Alert and Response Plan'* prepared by TTW (Ref: 191797) dated 22 November 2021, the following vibration limits are applicable:

- Platform 1 Stormwater Pipe – A05b assumed to be constructed from unreinforced concrete: 3mm/s (PPV).
- Sewer Pipe – A08b identified to be a vitrified clay pipe: 5mm/s (PPV).
- Stormwater Pipe – A08c identified to be a reinforced concrete pipe: 10mm/s (PPV).

7.3.4 Requirements of TfNSW *'NSW Transport Asset Standards Authority Development Near Rail Tunnels'*

The vibration limits presented below are detailed within the TfNSW *'NSW Transport Asset Standards Authority Development Near Rail Tunnels'*. The below vibration limits are applicable to rail tunnels, and it is recommended this vibration limit be applied to the Platform 1 TfNSW asset.

9.4.1. Effects of development on rail tunnels

Any development that occurs within a distance of 25 m horizontally from first reserve shall assess the vibration on the rail tunnels. The assessment criteria shall be a maximum peak particle velocity (PPV) of 15 mm/s at the tunnel lining for brick or mass concrete in good condition or a maximum PPV of 20 mm/s at the tunnel lining for cast iron, steel or concrete segment lining.

7.3.5 Recommended Vibration Limits

The recommended vibration limit at the nearest vibration sensitive receivers are summarised below:

- **Receiver 1**- Adina Hotel: Heritage items ≤3mm/s PPV; Remaining items ≤5mm/s PPV.
- **Receiver 2:** Central Station *'Platform 1'*: ≤15mm/s PPV.
- **Receiver 3:** Devonshire Street pedestrian tunnel: ≤3mm/s PPV.
- **Receiver 4:** Commercial receiver located at 12-30 Lee Street, Haymarket: ≤20mm/s PPV.
- **Receiver 5:** Sydney water pipelines.
    - Platform 1 Stormwater Pipe – A05b assumed to be constructed from unreinforced concrete: 3mm/s (PPV).
    - Sewer Pipe – A08b identified to be a vitrified clay pipe: 5mm/s (PPV).
    - Stormwater Pipe – A08c identified to be a reinforced concrete pipe: 10mm/s (PPV).
- **Receiver 6:** *'Wake Up'* commercial receiver located at 509 Pitt Street, Haymarket: ≤20mm/s PPV.
- **Receiver 7:** Commercial receiver located at 815 – 825 George Street, Haymarket: ≤20mm/s PPV.
- **Receiver 8:** Residential receiver located at 107-121 Quay Street, Haymarket: ≤5mm/s PPV.
- **Receiver 9:** Existing heritage structures and assets surrounding the proposed construction site: ≤3mm/s PPV.

8 CRITERIA FOR DUST EMISSIONS

There are dust emissions criteria for respirable dust and for nuisance dust which make up the total suspended particulates (TSP). For respirable dust the PM2.5 and PM10 particulate matter sizes which are linked to adverse health effects are typically monitored in real-time and electronic warnings issued when hourly levels are excessive. Nuisance dust is measured by dust deposition gauges (bottles). These are collected in monthly intervals and post processed by a laboratory before the results are reported.

8.1 RESPIRABLE DUST

The NSW EPA air pollutants Impact assessment criterion applicable to the project site with regards to health concerns is shown in Table 10 below.

Table 10 - Dust Impact Criterion

Pollutant	Averaging Period	Concentration
$PM_{2.5}$	24 hours	25 µg/m^3
PM_{10}		50 µg/m^3

The EPA has air quality categories based on particle concentration averaged over one hour as shown in Table 11. The dust monitor will be programmed to send an alert via SMS or email when the average hourly concentration reached the 'Poor' category in either particle size concentration. This short-term level warning shall be used to control respirable dust from the site. However, the assessment level is the 24-hour average level as outlined in Table 10.

Table 11– Alert Limits Based on EPA Hourly Air Quality Categories

Pollutant	Averaging Time	Concentration	Air Quality Category
$PM_{2.5}$	1 hour	< 27 μg/m^3	Good
		27-62 μg/m^3	Moderate
		62-97 μg/m^3	Poor
		97-370 μg/m^3	Very Poor
		> 370 μg/m^3	Hazardous
PM_{10}	1 hour	< 40 μg/m^3	Good
		40-80 μg/m^3	Moderate
		80-120 μg/m^3	Poor
		120-240 μg/m^3	Very Poor
		> 240 μg/m^3	Hazardous

8.2 NUISANCE DUST

Unlike the smaller PM2.5 and PM10 dust particles the larger and heavier particles fall out of suspension and are deposited on the surfaces such as on cars, windows and on the ground. This nuisance dust is measured not in concentration but as mass over area (g/m2) and are averaged over a year, however monthly monitoring is carried out and the following limits presented in Table 12 apply. If the existing dust deposition rate is unknown, then the maximum rate is used.

Table 12 - EPA Dust Deposition Rates

Criterion	Rate
Increment above existing rate	2g/m2/month
Maximum rate	4g/m2/month

9 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES

Noise impacts will be determined from primary processes and equipment. The sound power levels of these activities are presented below.

Table 13 - Sound Power Levels of the Proposed Equipment

Stage	Equipment/Process	Sound Power Level dB(A)
Demolition	Excavator w/ Bucket Attachment	114
	Excavator w/ Hydraulic Hammer Attachment	118
Excavation/Piling	Semi-Trailer Truck	105
	Excavator w/ Bucket Attachment	114
	Excavator w/ Hydraulic Hammer Attachment	118
	CFA Bore Piling	103
Construction	Angle Grinder	105
	Concrete Pump	105
	Concrete Saw	114
	Concrete Truck	105
	Hammering	105
	Materials Hoist	105
	Semi-Trailer Truck	105
	Tower Crane	96

The noise levels presented in the above table are derived from the following sources, namely:

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

10 ACTIVITIES TO BE CONDUCTED AND POTENTIAL AIRBORNE DUST GENERATION

The potential for dust generation from the expected site activities are presented below in Table 14. It would be expected that the greatest potential for airborne dust will be during the demolition and excavation stages. Some potential dust generation may occur during the concrete floor preparation stages before the façade is installed.

Table 14 - Sound Power Levels of the Proposed Equipment

Stage	Equipment/Process	Airborne Dust Potential
Demolition	Excavator w/ muncher	low*
	Excavator w/ Bucket loading dump trucks/trailer	high
	Excavator w/ Bucket stockpiling	medium
	Excavator w/ Hydraulic Hammer	high
	Uncovered dry stockpile	high
	Dump trucks leaving site	medium
Excavation/Piling	Excavator w/ Bucket loading dump trucks/trailer	high
	Excavator w/ Bucket stockpiling	medium
	Excavator w/ Hydraulic Hammer	high
	Excavator w/ Rock Saw	high
	Uncovered dry stockpile	high
	CFA Bore Piling	minimal
	Dump trucks leaving site	medium
Construction	Formwork removal, jump form movement	low
	Drilling concrete slabs	medium
	jackhammering of concrete slabs	high
	Grinding of concrete surfaces	high
	Wet concrete cutting and coring	low**

Table Notes:

*potential for dust generated by falling elements

** Slurry must be cleaned or washed away so it doesn't form dry dust

11 NOISE EMISSION ASSESSMENT

11.1 PREDICTED NOISE EMISSIONS

An assessment of the principal sources of noise emissions has been undertaken to identify the activities that may produce noise and/or vibration impacts so that appropriate ameliorative measures can be formulated. In addition, SoundPLAN noise modelling has been conducted based on information provided to this office of construction methodology and activities likely to be undertaken and presents the cumulative predicted external noise levels to the nearest surrounding receivers.

Noise levels from construction works have been predicted at the nearby development and assessed with reference to the City of Sydney - Code of Practice for Construction Hours/Noise Within the Central Business District 1992.

With regard to the noise level generated at the nearest receivers, noise levels will vary depending where on the construction site the work in undertaken. To address this, a range of predicted noise levels is provided. Predicted noise levels are presented below.

The predicted noise levels are based on the assumption that the recommendations in section 9 have implemented/observed.

11.2 SOUNDPLAN MODELLING

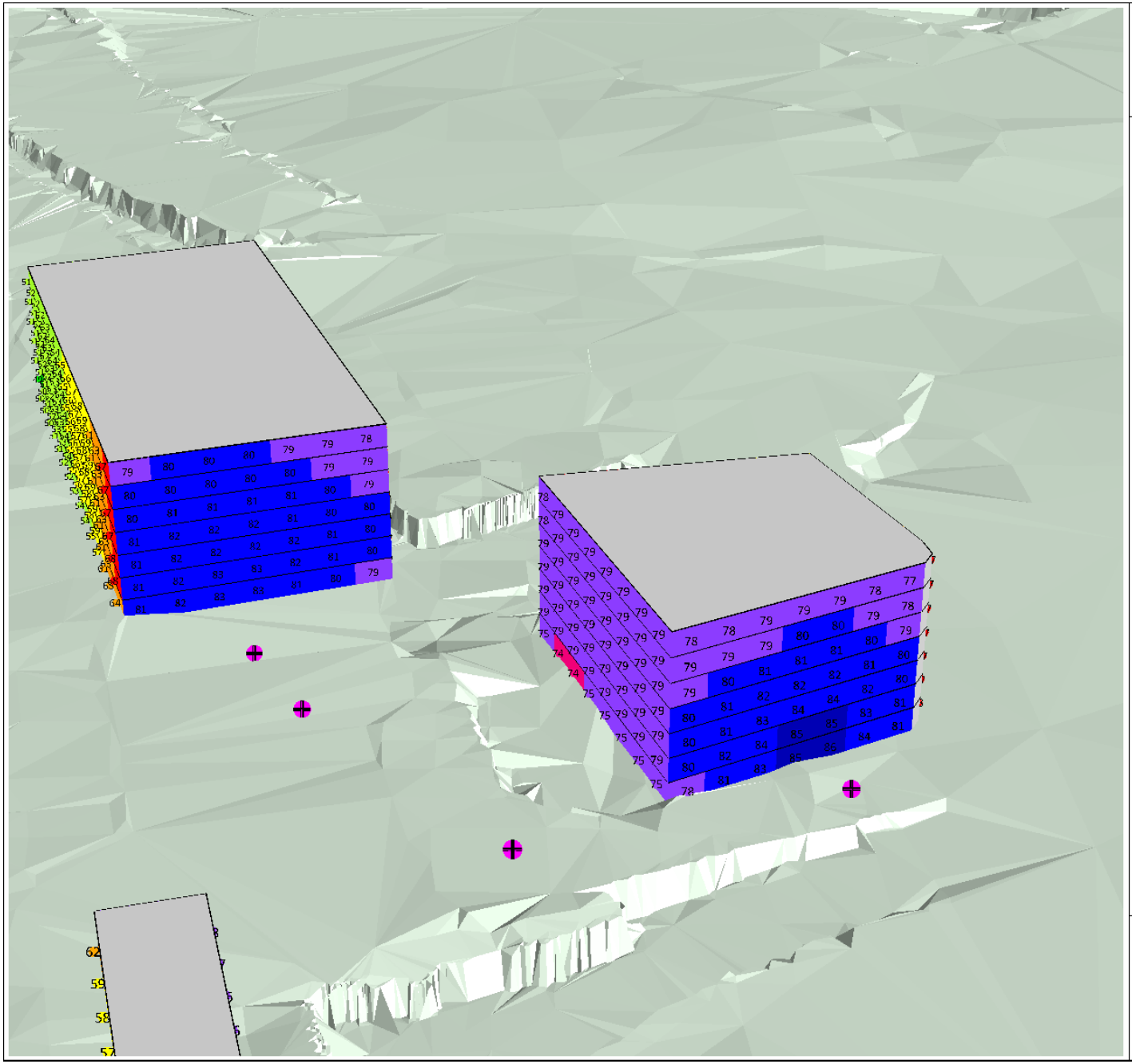
Noise levels have been predicted at the receiver locations using SoundPlan™ 8.0 modelling software implementing the ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation standard.

Noise enhancing meteorological effects have been adopted as recommended by the NPfI, noting that the ISO 9613 modelling approach assumes that all receivers are 'downwind' (i.e., that noise enhancing wind conditions are in effect at all times).

Ground absorption was conservatively calculated with a ground factor of 0 for all areas except for localised lawns and greenery with a ground factor of 0.6 as recommended in *Engineering Noise Control* (Bies & Hanson).

In line with Factsheet C of the NPfI, penalties for annoying noise characteristics should be applied at the receiver, where applicable. Based on the predicted noise levels, no penalty should be applied (either for tonality, intermittency, or otherwise).

The following figures present the results of the SoundPlan Noise modelling, and results are summarised in Tables 15-17 below.



8-10 Lee St, Haymarket

Predicted Demolition Noise Levels

Noise Sources Leq SWL

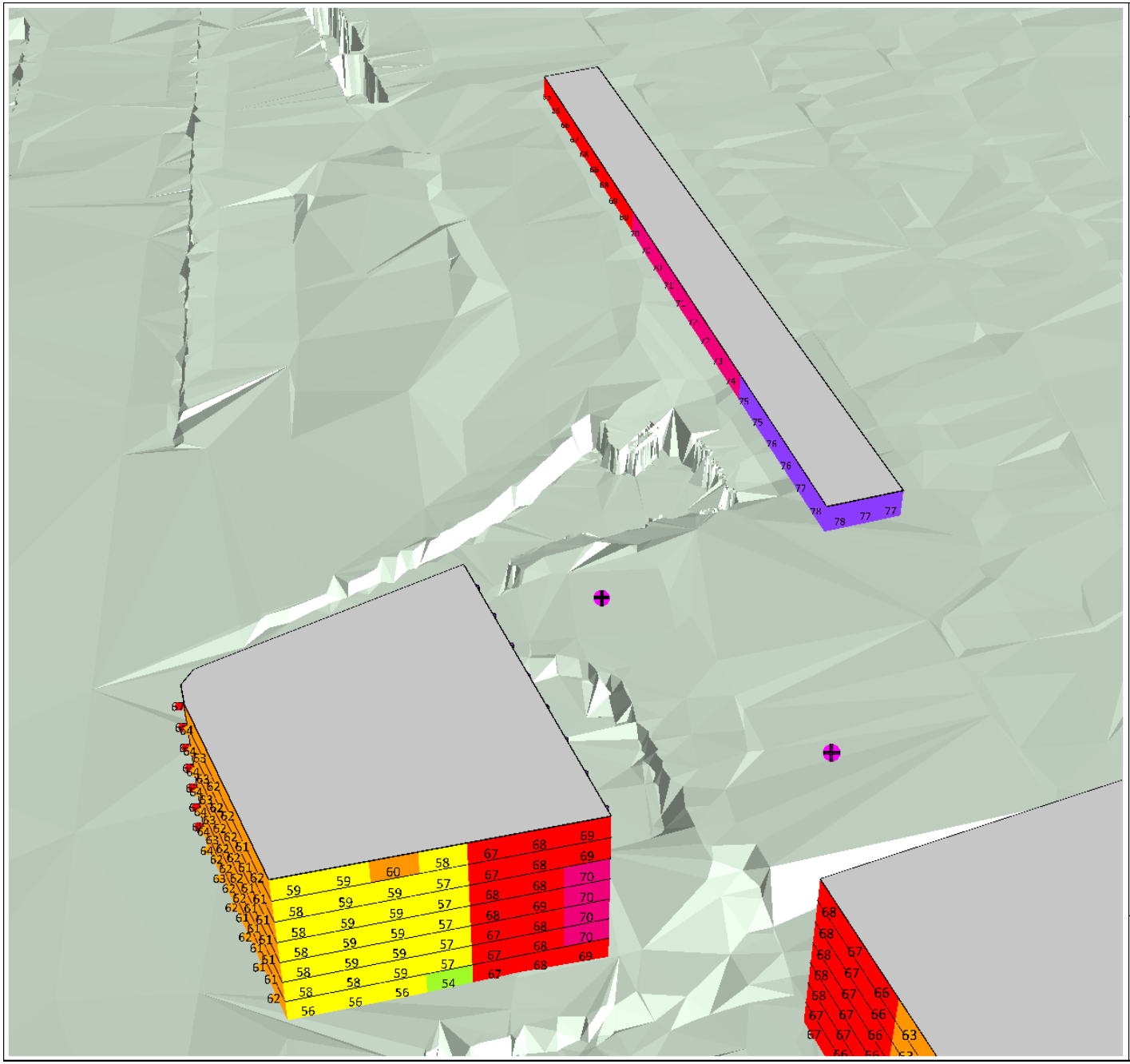
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Demolition Noise Levels

Noise Sources Leq SWL

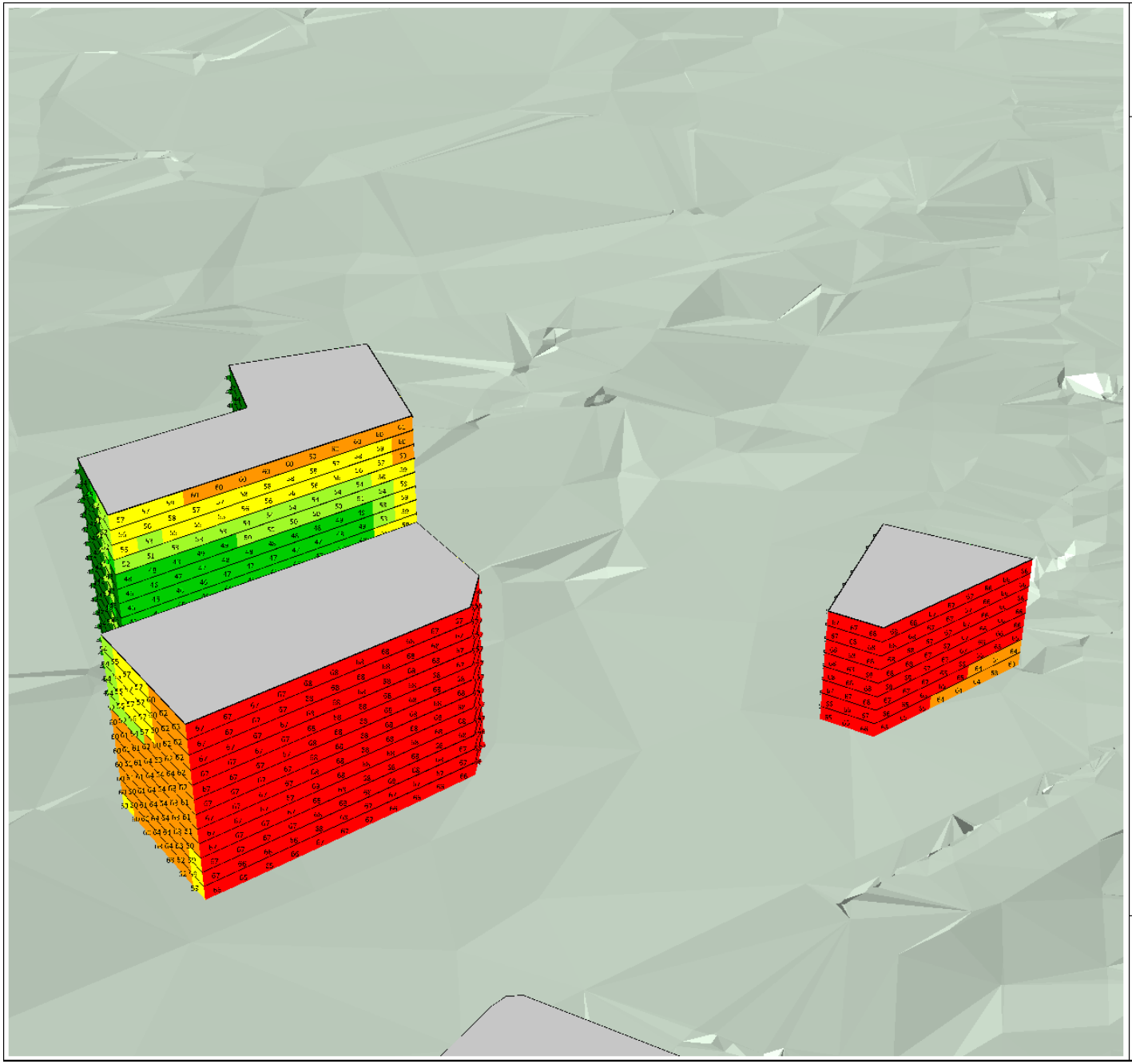
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Demolition Noise Levels

Noise Sources Leq SWL

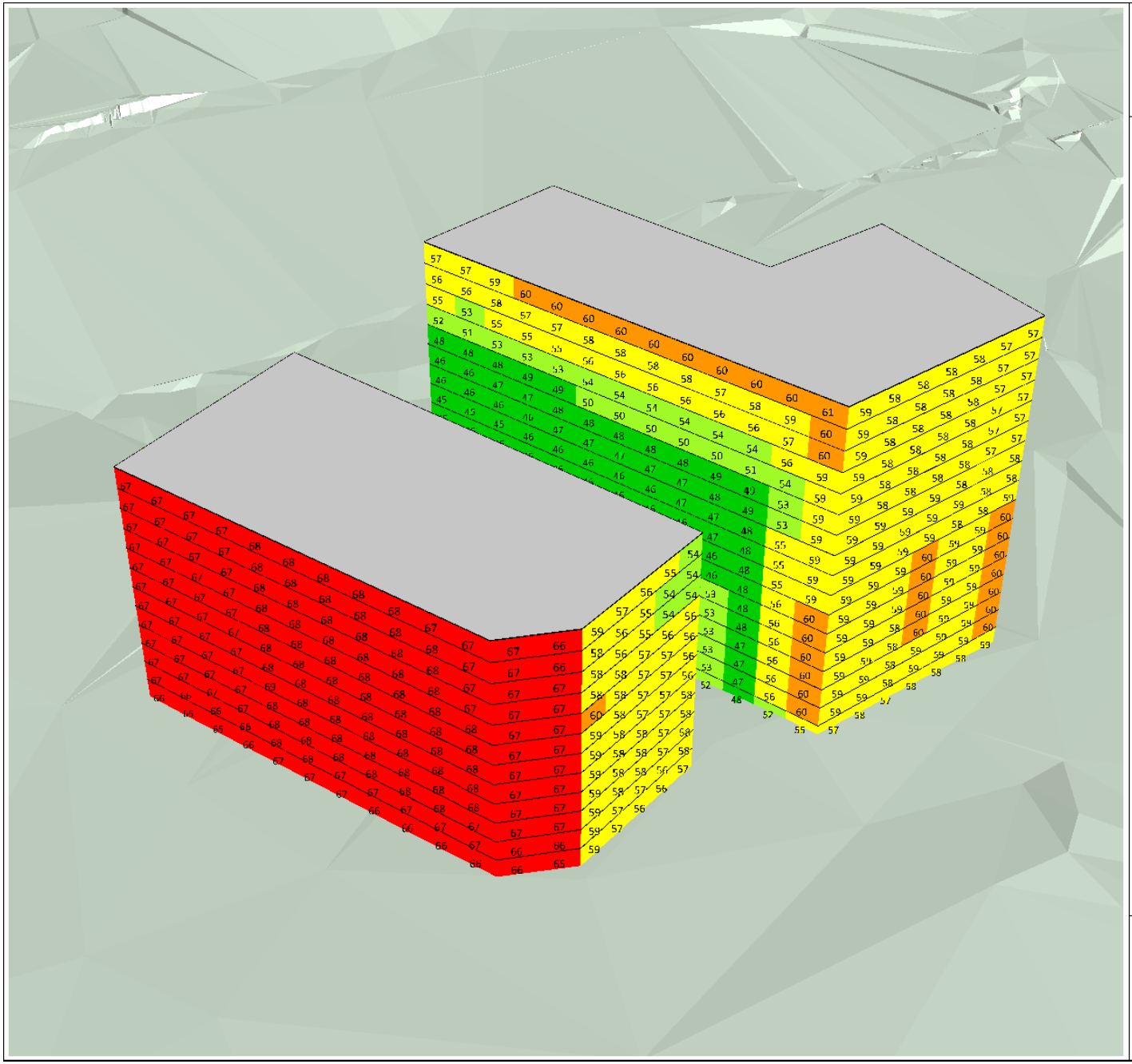
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Demolition Noise Levels

Noise Sources Leq SWL

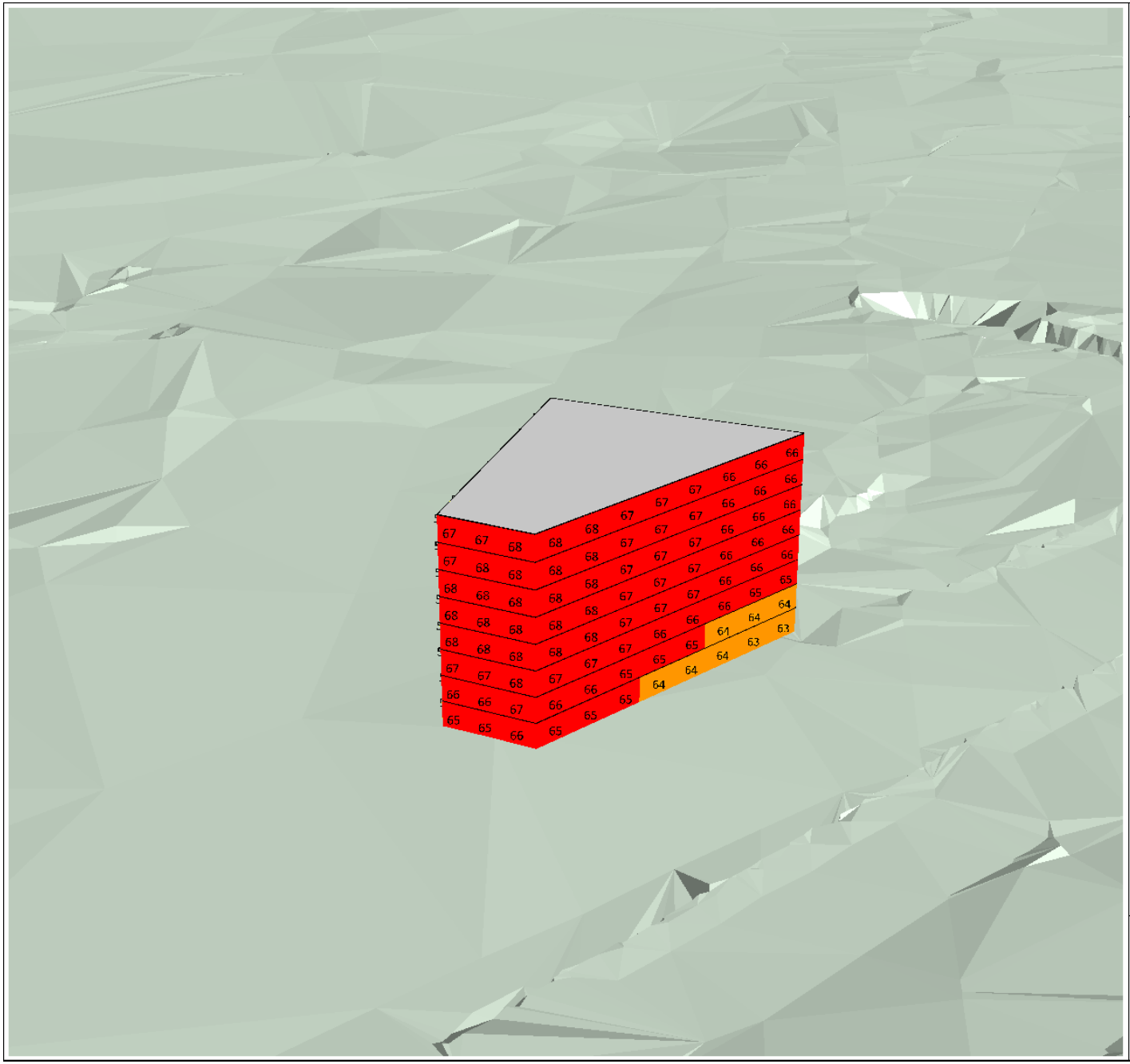
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)

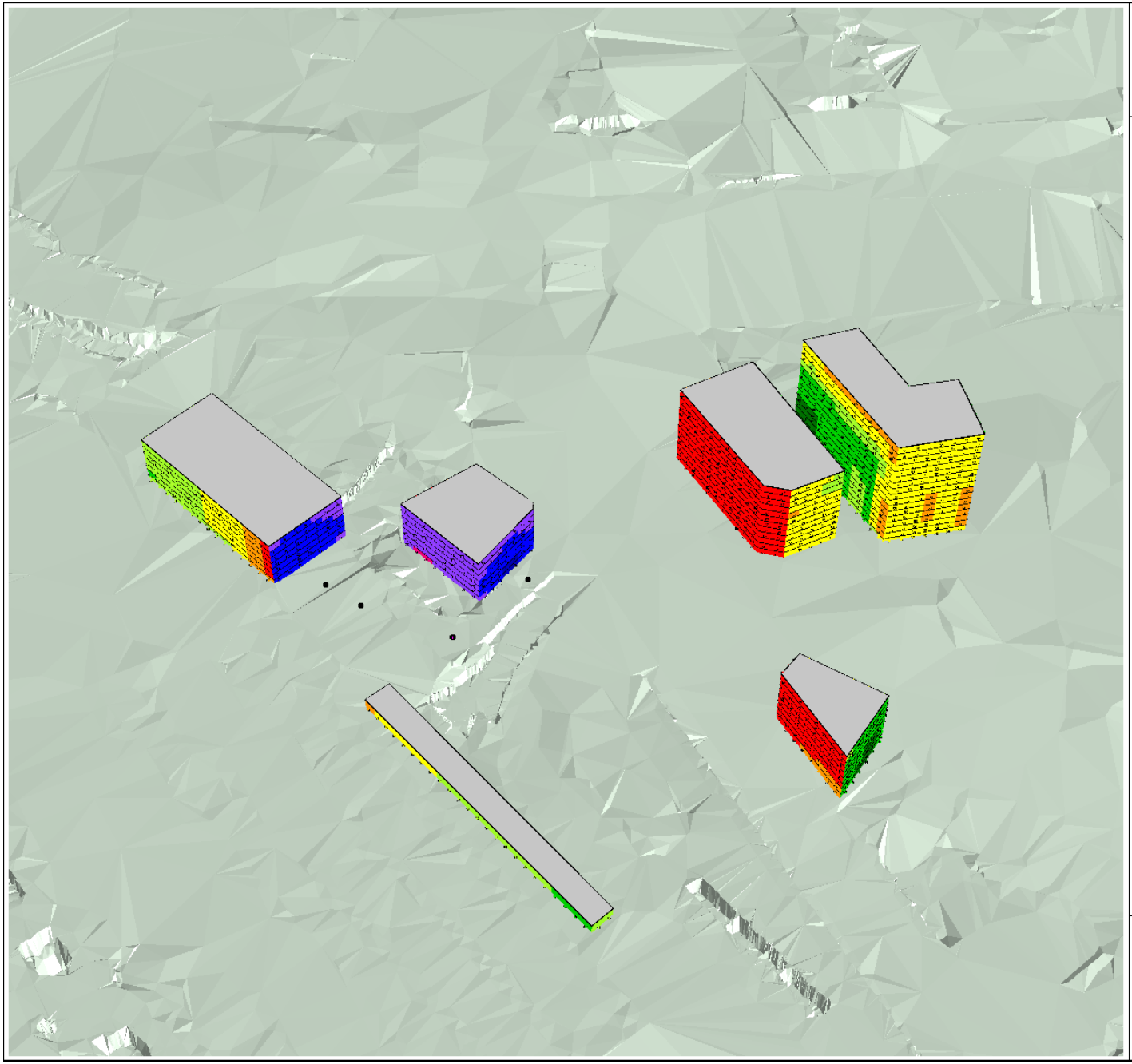
Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	>= 95

ACOUSTIC LOGIC


8-10 Lee St, Haymarket
Predicted Demolition Noise Levels
Noise Sources Leq SWL
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Prepared by: OB
Date: 15/11/2021
Noise Level
Leq
in dB(A)
< 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
85 - 90
90 - 95
>= 95
ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Demolition Noise Levels

Noise Sources Leq SWL

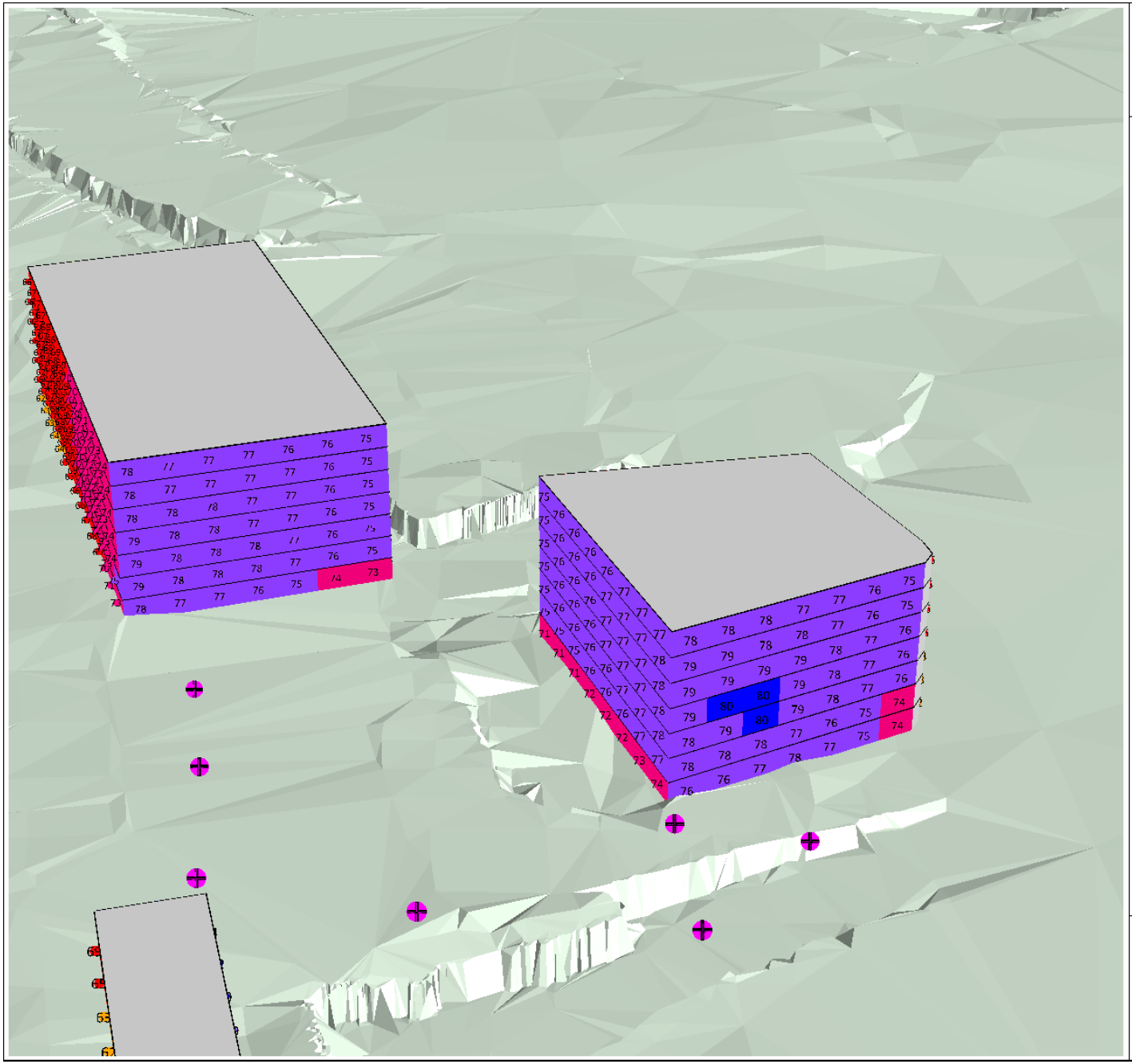
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
45	- 50
50	- 55
55	- 60
60	- 65
65	- 70
70	- 75
75	- 80
80	- 85
85	- 90
90	- 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

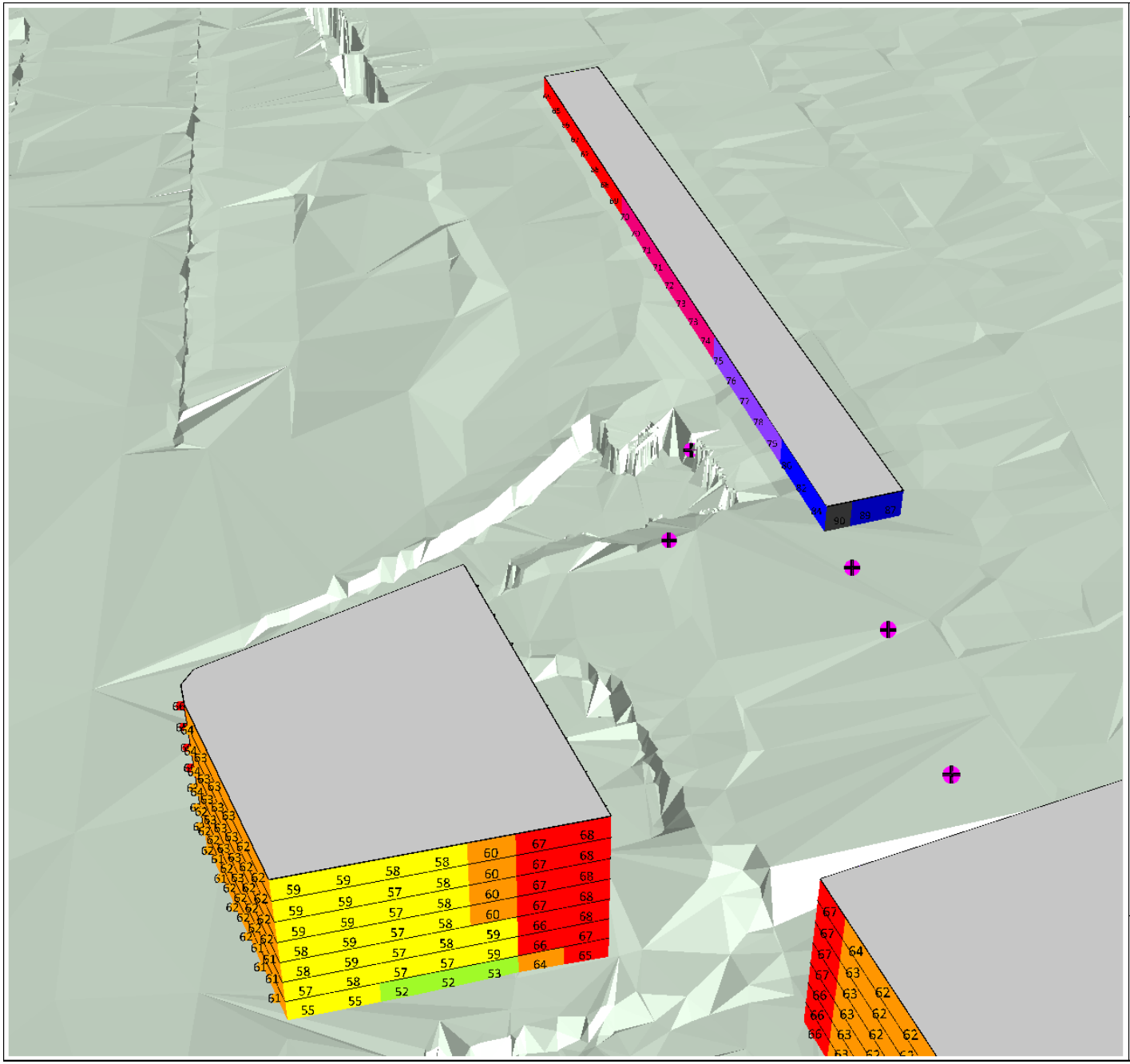
CFA Bore Piling 103dB(A)
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Semi-Trailer 105dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
45	- 50
50	- 55
55	- 60
60	- 65
65	- 70
70	- 75
75	- 80
80	- 85
85	- 90
90	- 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

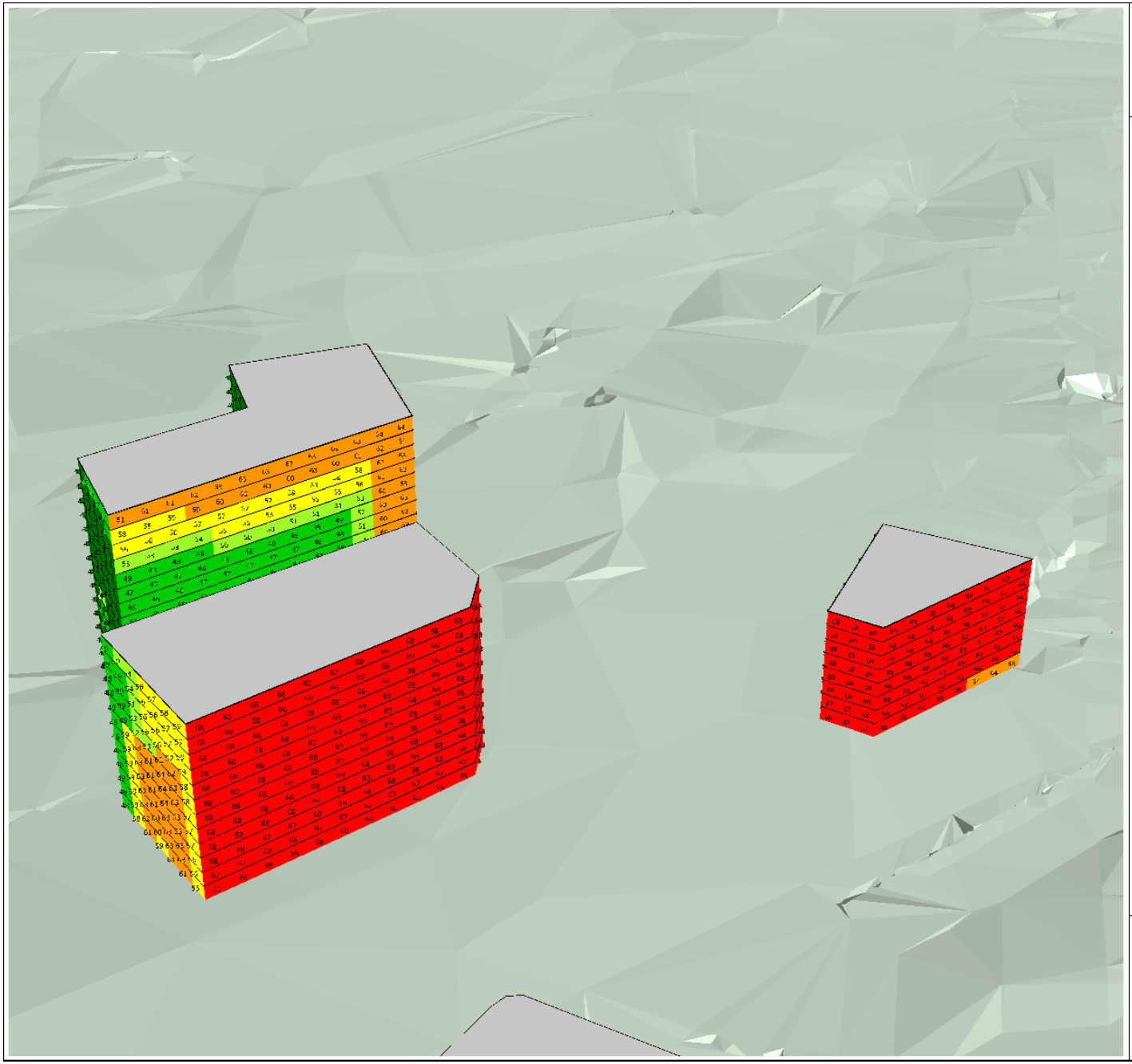
CFA Bore Piling 103dB(A)
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Semi-Trailer 105dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

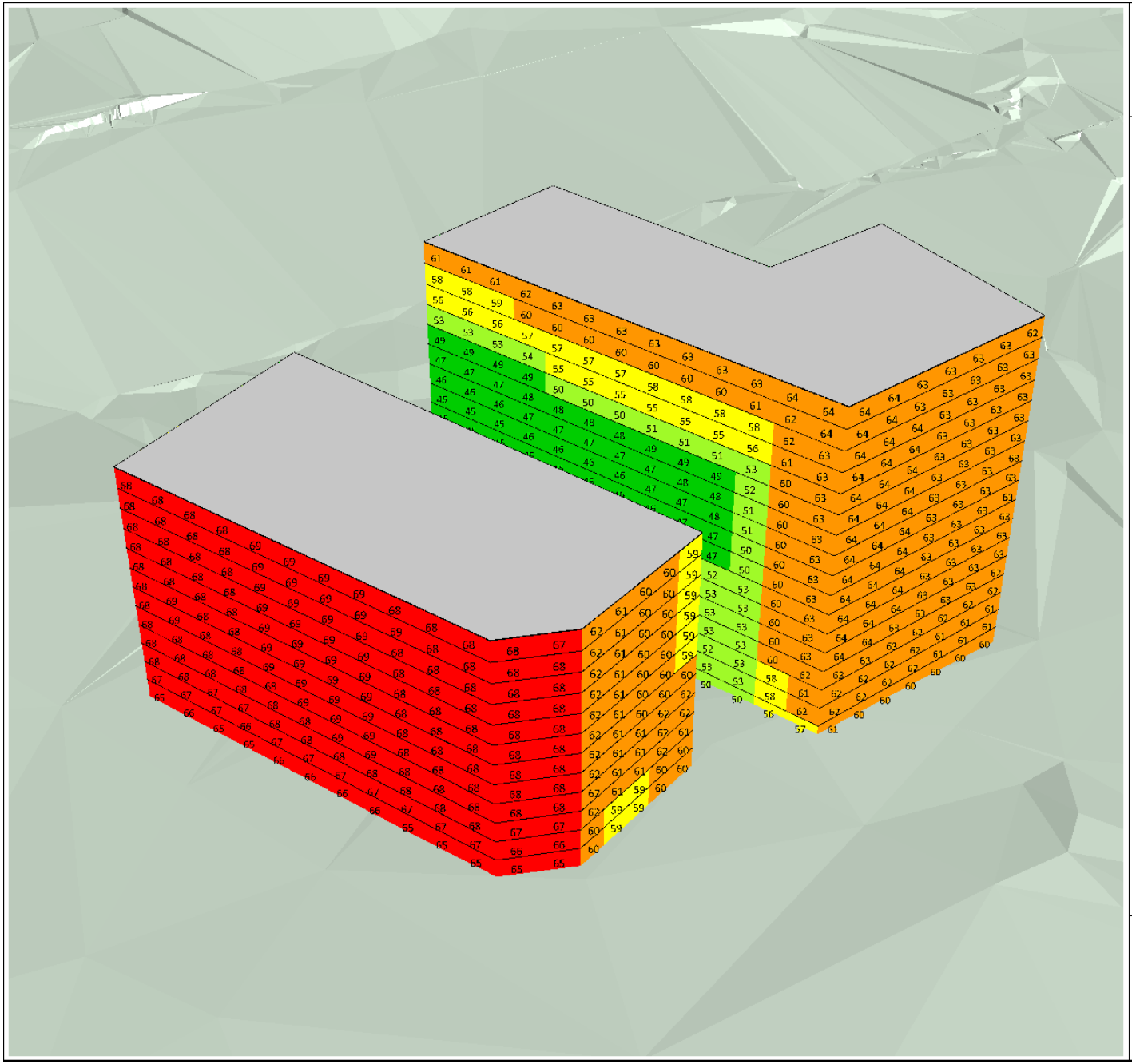
CFA Bore Piling 103dB(A)
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Semi-Trailer 105dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

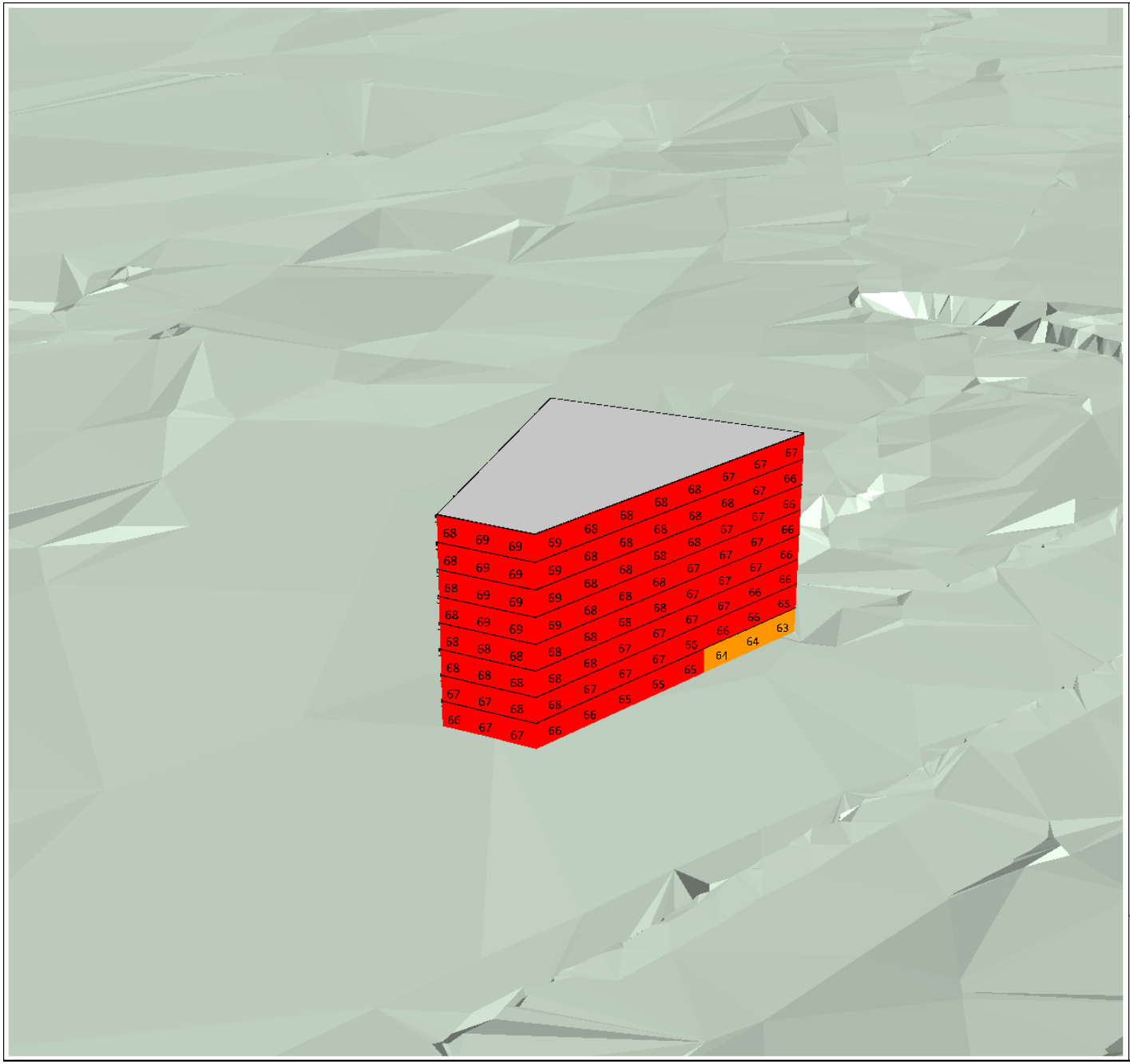
CFA Bore Piling 103dB(A)
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Semi-Trailer 105dB(A)

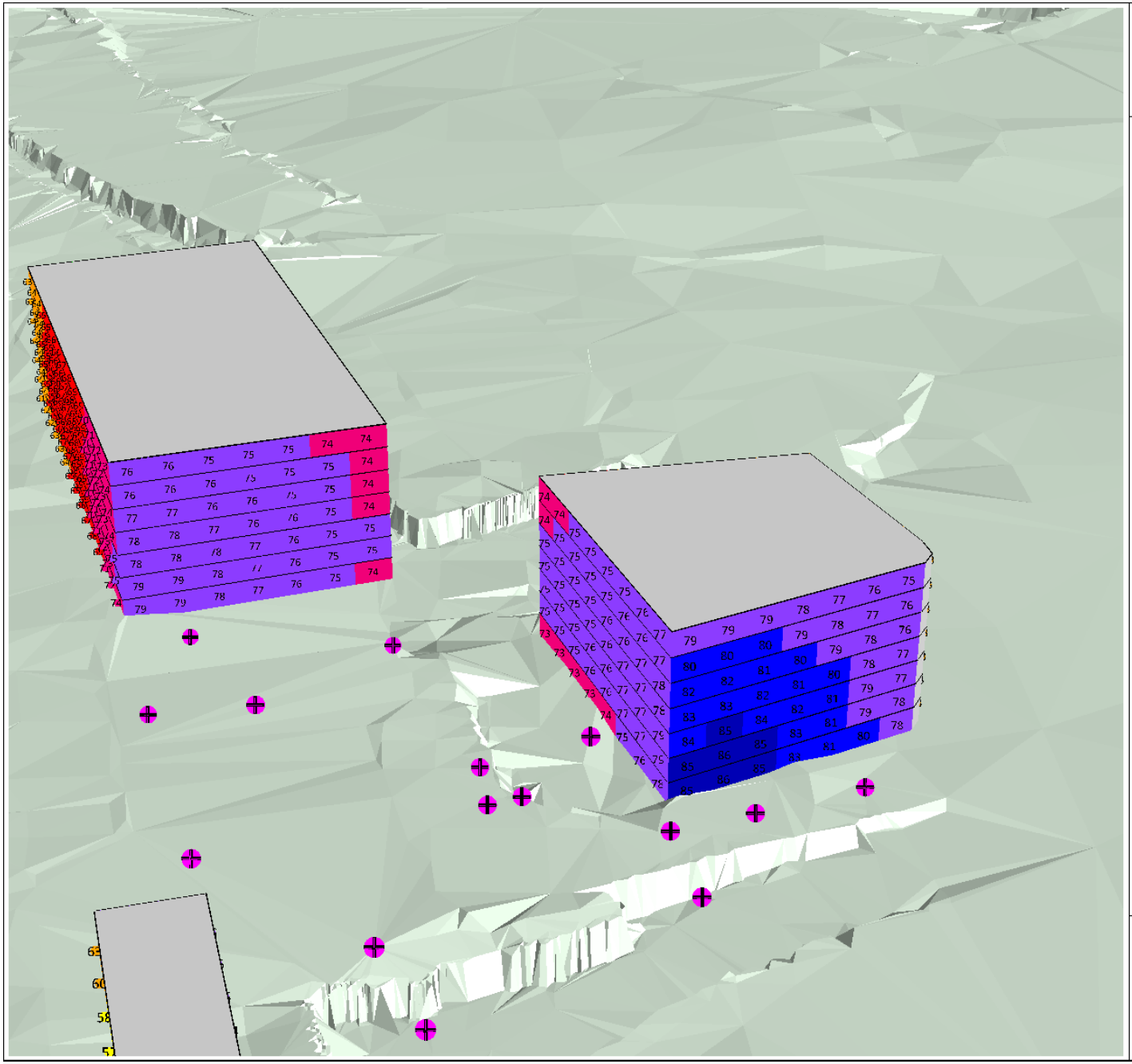
Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC


8-10 Lee St, Haymarket
Predicted Excavation and Piling Noise Levels
Noise Sources Leq SWL
CFA Bore Piling 103dB(A)
Excavator w/ Bucket 114dB(A)
Excavator w/ Hammer 118dB(A)
Semi-Trailer 105dB(A)
Prepared by: OB
Date: 15/11/2021
Noise Level
Leq
in dB(A)
< 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
85 - 90
90 - 95
>= 95
ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling
Noise Levels

Noise Sources Leq SWL

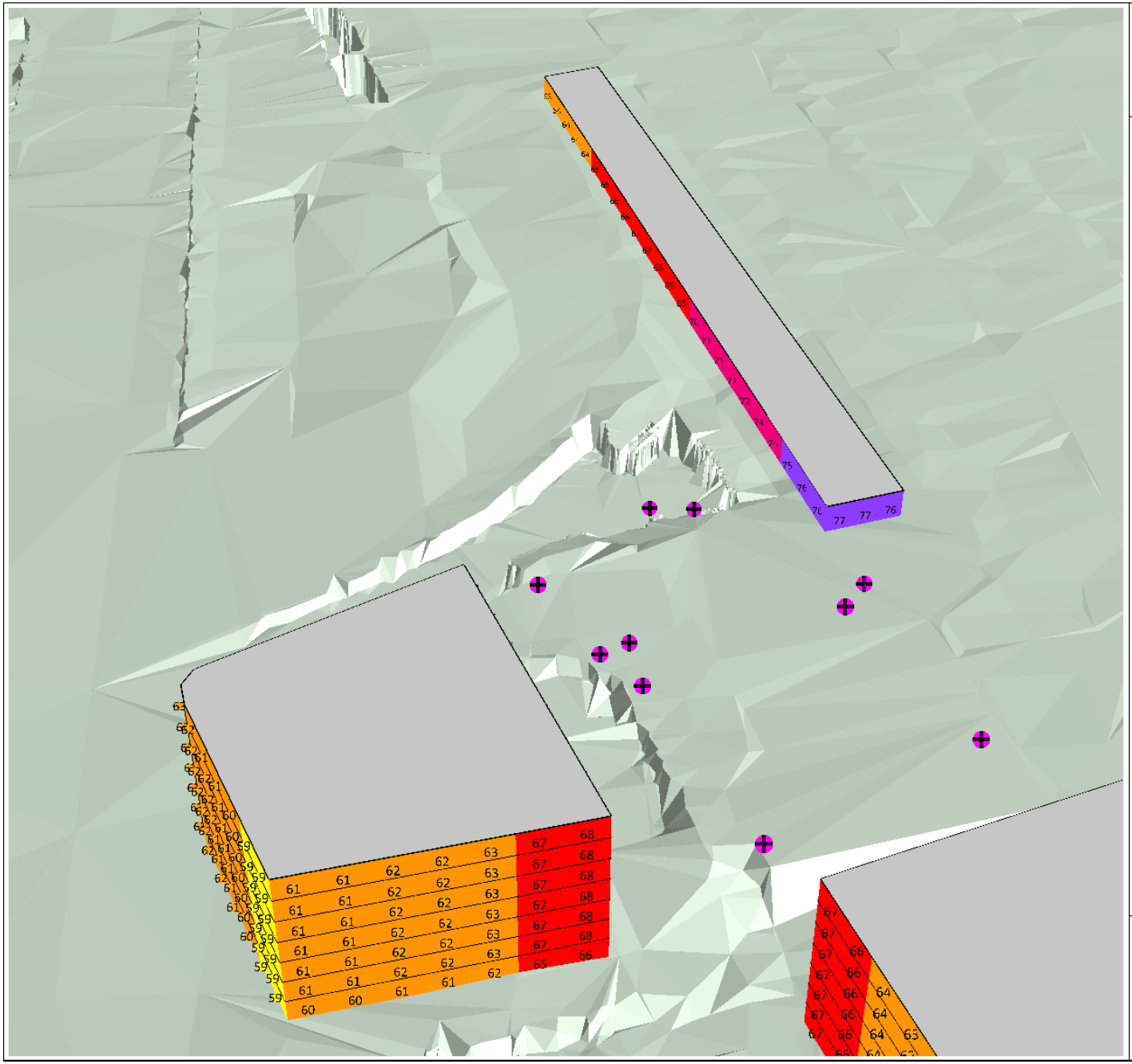
Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

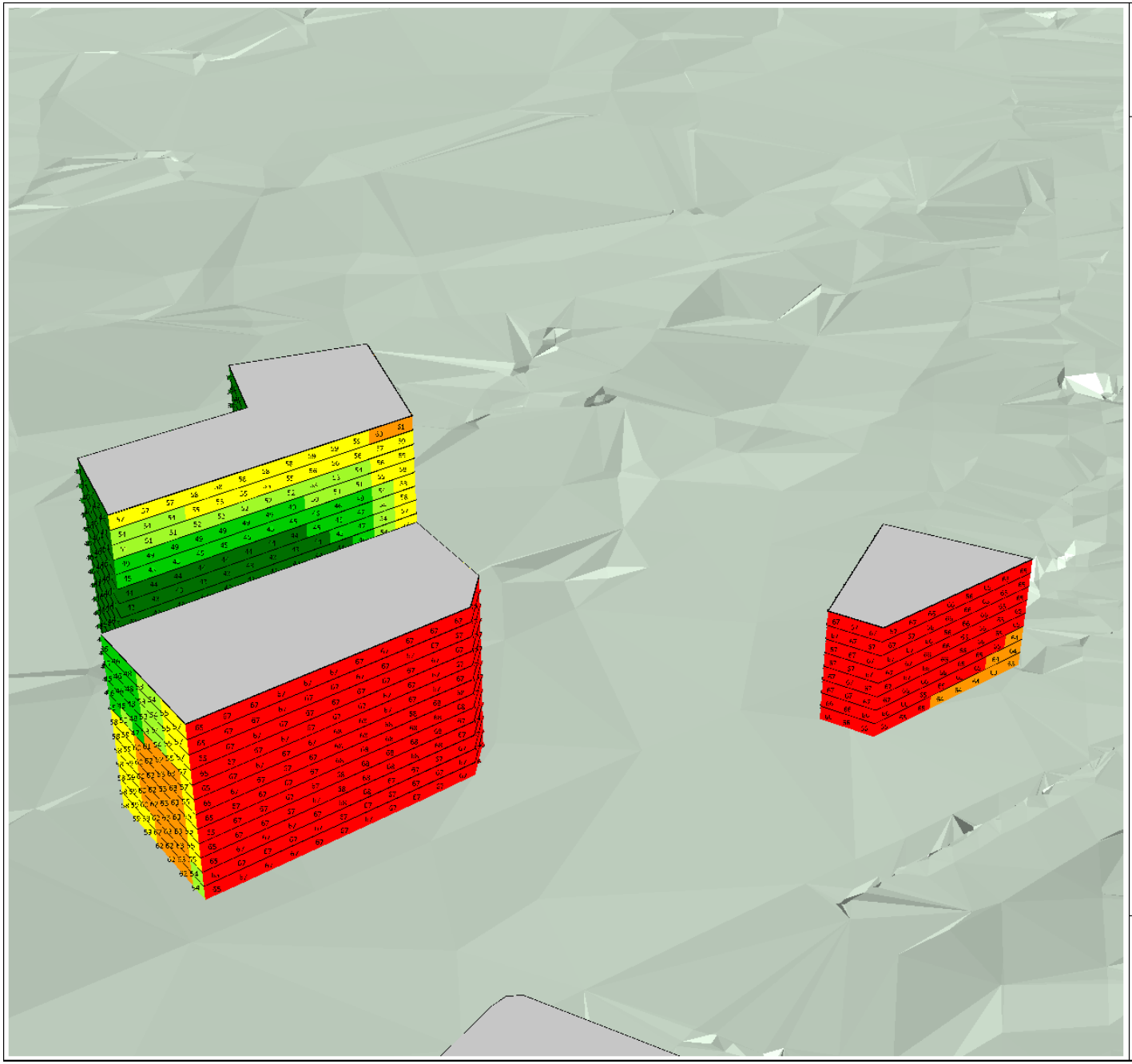
Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

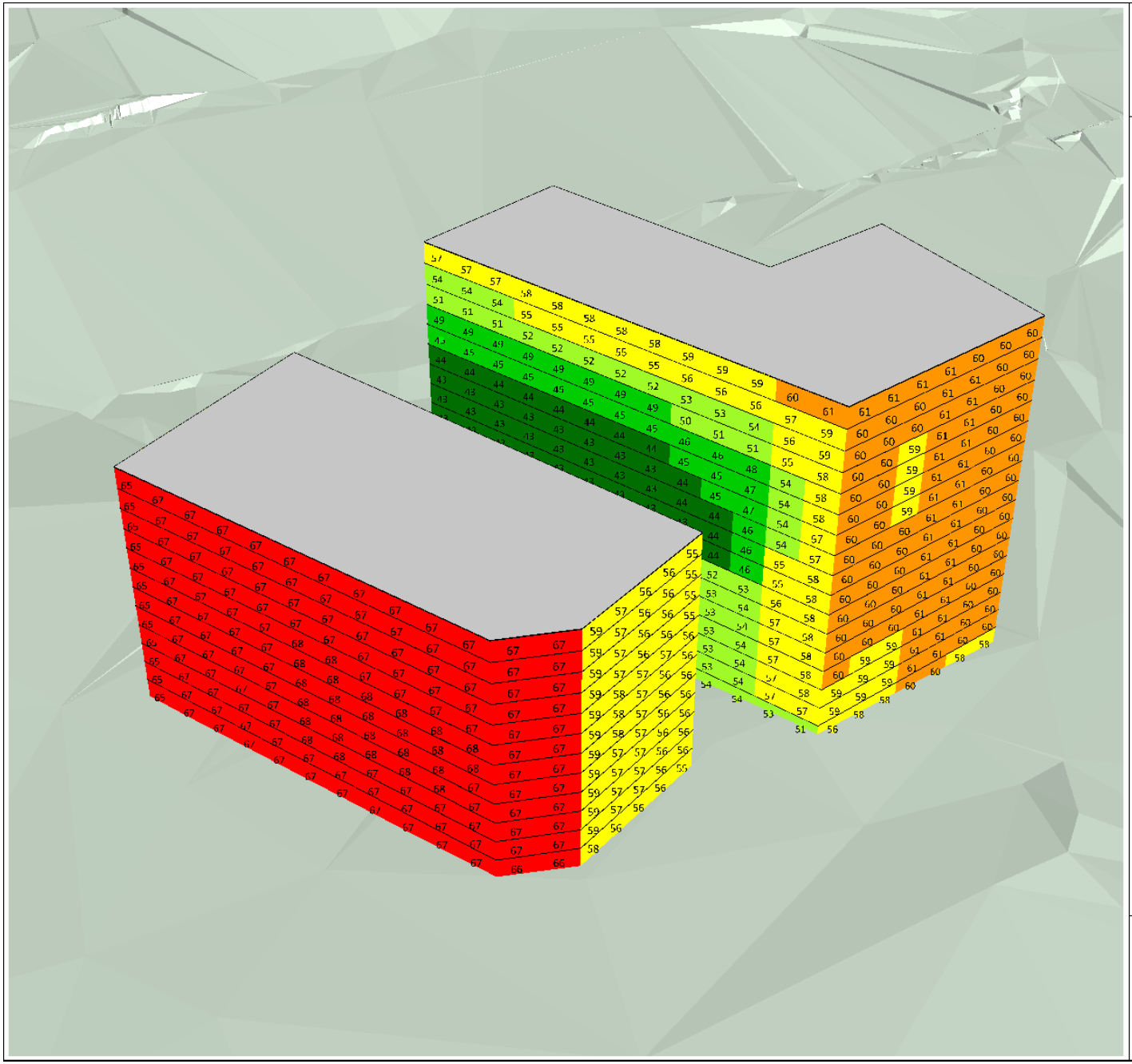
Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

	< 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	70 - 75
	75 - 80
	80 - 85
	85 - 90
	90 - 95
	>= 95

ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling
Noise Levels

Noise Sources Leq SWL

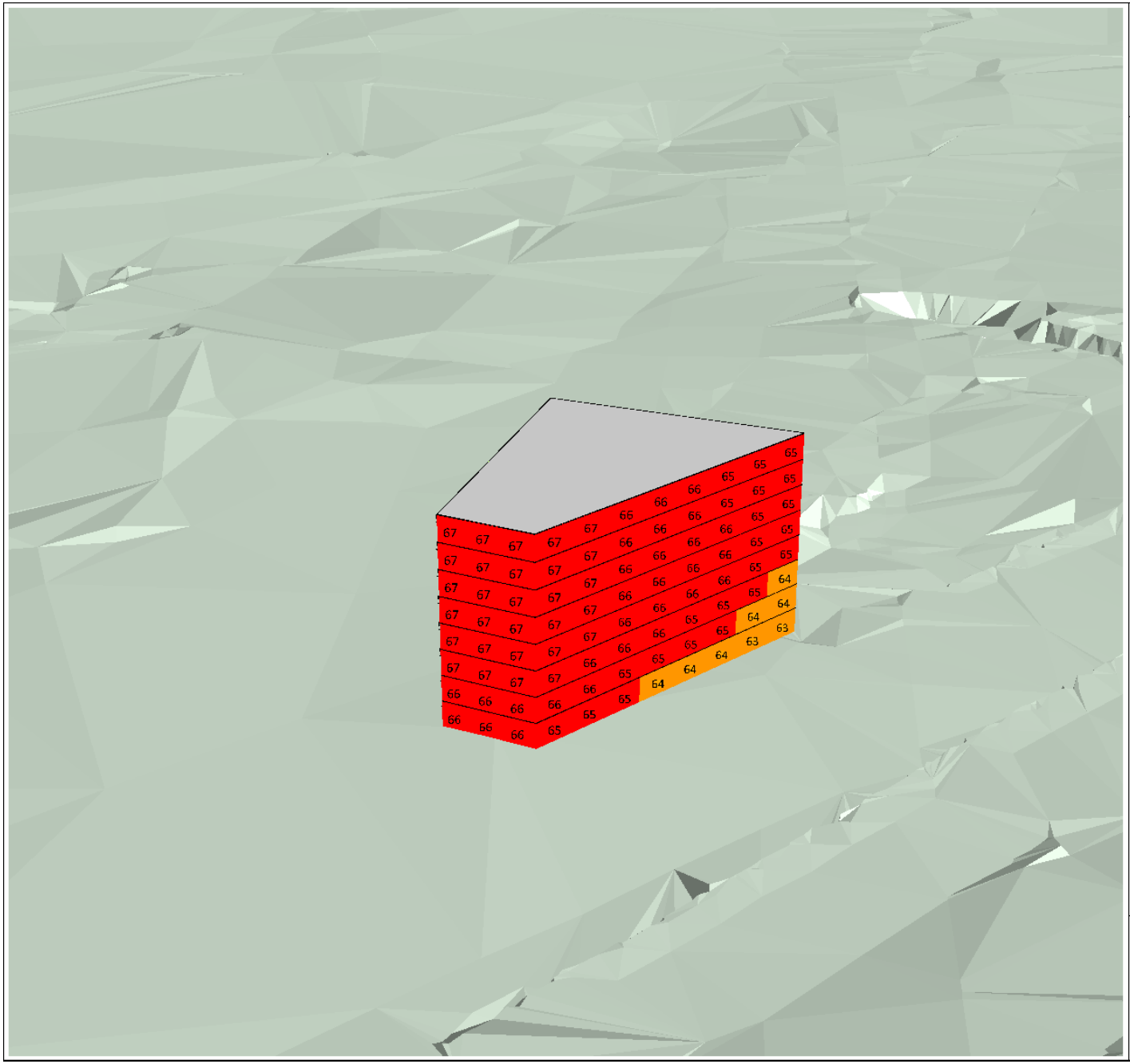
Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)

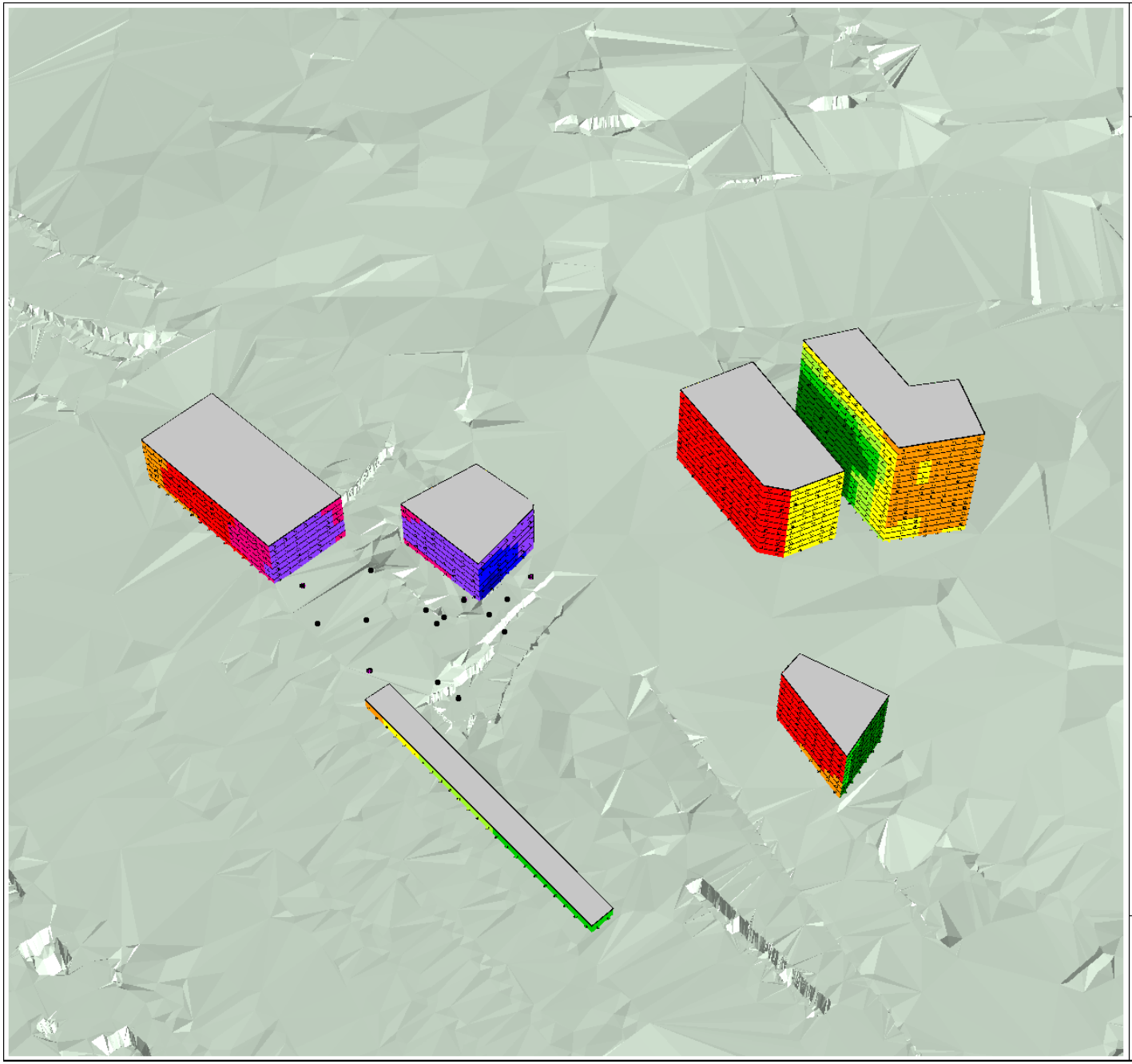
Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC


8-10 Lee St, Haymarket
Predicted Excavation and Piling
Noise Levels
Noise Sources Leq SWL
Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)
Prepared by: OB
Date: 15/11/2021
Noise Level
Leq
in dB(A)
< 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
85 - 90
90 - 95
>= 95
ACOUSTIC LOGIC



8-10 Lee St, Haymarket

Predicted Excavation and Piling Noise Levels

Noise Sources Leq SWL

Angle Grinder 105dB(A)
Concrete Pump 105dB(A)
Concrete Saw 114dB(A)
Concrete Truck 105dB(A)
Hammering 105dB(A)
Materials Hoist 105dB(A)
Semi-Trailer 105dB(A)
Tower Crane 96dB(A)

Prepared by: OB
Date: 15/11/2021

Noise Level
L_{eq}
in dB(A)

<	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
85 -	90
90 -	95
>=	95

ACOUSTIC LOGIC

11.3 PREDICTED NOISE LEVELS AT SENSITIVE RECEIVERS

The predicted external noise levels at nearest sensitive receivers are presented in the tables below.

*It is noted based on discussions with Built that the Adina Hotel being Receiver 1 and the commercial receiver at 12-30 Lee Street, Haymarket being Receiver 4 in Figure 2 of this report are to be unoccupied during the time period the Atlassian construction works are to be undertaken. Therefore, noise impacts to occupants of receivers 1 and 4 are considered inconsequential.

Table 15 –Predicted External Noise Levels at Nearest Sensitive Receivers – Demolition Stage

Receiver Location	Demolition Stage Predicted External Noise Level dB(A) $L_{eq(15\ min)}$	City of Sydney Construction Noise Level Limit dB(A)$L_{10\ (15min)}$	Recommendations
R1	86	Monday – Friday (7.00am – 8.00am) = **57**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **62**	
		Saturday (7.00am – 8.00am) = **57**	
		Saturday (8.00am – 3.00pm) = **62**	
R2	78	Monday – Friday (7.00am – 8.00am) = **62**	Predicted to exceed the COS construction noise level limit. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **67**	
		Saturday (7.00am – 8.00am) = **62**	
		Saturday (8.00am – 3.00pm) = **67**	
R4	83	Monday – Friday (7.00am – 8.00am) = **61**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **66**	
		Saturday (7.00am – 8.00am) = **61**	
		Saturday (8.00am – 3.00pm) = **66**	
R6	68	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R7	68	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R8	61	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to be below the COS construction noise level limit.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	

Table 16 –Predicted External Noise Levels at Nearest Sensitive Receivers – Excavation/Piling Stage

Receiver Location	Excavation/Piling Stage Predicted External Noise Level dB(A) $L_{eq(15\ min)}$	City of Sydney Construction Noise Level Limit dB(A)$L_{10\ (15min)}$	Recommendations
R1	80	Monday – Friday (7.00am – 8.00am) = **57**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **62**	
		Saturday (7.00am – 8.00am) = **57**	
		Saturday (8.00am – 3.00pm) = **62**	
R2	90	Monday – Friday (7.00am – 8.00am) = **62**	Predicted to exceed the COS construction noise level limit. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **67**	
		Saturday (7.00am – 8.00am) = **62**	
		Saturday (8.00am – 3.00pm) = **67**	
R4	78	Monday – Friday (7.00am – 8.00am) = **61**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **66**	
		Saturday (7.00am – 8.00am) = **61**	
		Saturday (8.00am – 3.00pm) = **66**	
R6	69	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R7	69	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R8	64	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to be below the COS construction noise level limit.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	

Table 17 – Predicted External Noise Levels at Nearest Sensitive Receivers – Construction Stage

Receiver Location	Construction Stage Predicted External Noise Level dB(A) $L_{eq(15\ min)}$	City of Sydney Construction Noise Level Limit dB(A)$L_{10\ (15min)}$	Recommendations
R1	86	Monday – Friday (7.00am – 8.00am) = **57**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **62**	
		Saturday (7.00am – 8.00am) = **57**	
		Saturday (8.00am – 3.00pm) = **62**	
R2	77	Monday – Friday (7.00am – 8.00am) = **62**	Predicted to exceed the COS construction noise level limit. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **67**	
		Saturday (7.00am – 8.00am) = **62**	
		Saturday (8.00am – 3.00pm) = **67**	
R4	79	Monday – Friday (7.00am – 8.00am) = **61**	N/A*
		Monday – Friday (8.00am – 7.00pm) = **66**	
		Saturday (7.00am – 8.00am) = **61**	
		Saturday (8.00am – 3.00pm) = **66**	
R6	68	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R7	67	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to exceed the COS construction noise level limit during 7am-8am Monday to Friday and Saturday. See Section 10 *'Ameliorative Measures'* for recommendations.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	
R8	61	Monday – Friday (7.00am – 8.00am) = **64**	Predicted to be below the COS construction noise level limit.
		Monday – Friday (8.00am – 7.00pm) = **69**	
		Saturday (7.00am – 8.00am) = **64**	
		Saturday (8.00am – 3.00pm) = **69**	

12 AMELIORATIVE MEASURES

12.1 SITE SPECIFIC RECOMMENDATIONS

- Notification - Prior to commencement of each month, neighbouring receivers should be notified of the anticipated works for that month and the potential noise and vibration generation from the anticipated construction activity.
- Excavation and Piling:
    - Wherever feasible, hydraulic hammering should be minimised in favour for the use of excavators with a bucket.
- High Noise Generating Works:
    - Where high noise generating works are proposed to be undertaken, respite hours should be implemented to reduce the impact on surrounding receivers. Limit the use of any required hydraulic hammers and grinding activities to between 9:00am – 12:00pm and 2:00pm - 5:00pm Monday to Friday and between 9:00am - 12:00pm on Saturdays. This equates to a maximum of three-hour blocks of high generating noise activity, separated by a minimum 2-hour respite period.
    - It is noted that condition F8 refers specifically to the following construction activities: *'Rock breaking, rock hammering, sheet piling, pile driving and similar activities'* which belong to the Group A category of Schedule 1 of the *'Construction Hours/Noise within the Central Business District, City of Sydney Code of Practice 1992'*. As the proposed construction activities such as pile boring, canopy tube boring, loading out, tower cranes and concrete pumping to be undertaken at the project site is expected to induce significantly less noise and vibration in comparison to construction activities listed in condition F8, these activities would therefore not be limited to time period restrictions of condition F8.
- Vehicle Noise - Trucks must turn off their engines during idling to reduce impacts on nearby receivers (unless truck ignition needs to remain on during concrete pumping). Minimise truck reversing. Plant and equipment should be off when not in use.
- Vehicles for construction activity must arrive and depart site within the approved hours of work (7am-7pm Monday to Friday, 7am-3pm Saturdays)
- Deliveries should use straps in place of chains for handling materials wherever possible. Deliveries should be scheduled during less sensitive time periods (After 9am) wherever practical.
- When selecting construction equipment to be used on the project, the noise levels of plant and equipment should be considered, whereby equipment selected has an equivalent or lower sound power level than the predictive sound power levels of equipment maintained within this report.
- A conscientious effort should be made to avoid works near the nearest sensitive receivers wherever feasible. Compounding high generating activities simultaneously near receivers should be avoided where possible.
- All employees, contractors and sub-contractors are to undergo an environmental induction which outlines noise management techniques.
- Unnecessary shouting should be avoided on site, and appropriate signage should be installed to remind workers of their responsibility to reduce noise impacts where feasible. Loud music from radios and stereos is not permitted.
- Materials should be placed gently and not thrown to avoid making crashing noises.
- During the construction stage and where practical and safe to do so, handheld construction equipment should be used within the building shell to minimise noise impacts on adjacent receivers.
- Non-tonal reversing beepers should be implemented on all construction equipment and mobile plant used regularly on site.
- Maximum delivery vehicle speed of 10km/h through service road.

- Reduce or cease work if any dust plumes are observed offsite in the direction of any railway platforms.
- Weekly inspections for dust build-up on surfaces within the rail station.

In the event of a complaint, noise management procedure identified in section 11 of this report are to be followed. Notwithstanding above, general management techniques and acoustic treatments are included below which may be implemented on a case-by-case basis to reduce noise emissions to surrounding receivers.

12.2 GENERAL RECOMMENDATIONS

Other noise management practices which may be adopted are discussed below. In addition, notification, reporting and complaints handling procedures should be adopted as recommended in section in this report.

12.2.1 Acoustic Barrier

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver.

The placement of barriers at the source is generally only effective for static plant (tower cranes). Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.

Barriers can also be placed between the source and the receiver.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15 dB(A) can be affected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance which is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10 or 15mm plywood would be acceptable for the barriers.

12.2.2 Silencing Devices

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

12.2.3 Material Handling

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

12.2.4 Treatment of Specific Equipment

In certain cases, it may be possible to specially treat a piece of equipment to reduce the sound levels emitted. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

12.2.5 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. This includes locating fixed plant items as far as possible from residents as well as rotating plant and equipment to provide respite to receivers.

Construction vehicles accessing the site should not queue in residential streets and should only use the designated construction vehicle routes. Loading of these vehicles should occur as far as possible from any sensitive receiver.

12.3 NOISE MONITORING

Noise monitors are recommended to be installed at the property boundaries of the neighbouring properties nearest to the subject site to monitor noise levels. See Figure 5 below for a mark-up of recommended noise monitoring locations.

12.3.1 Downloading of Noise Monitor Data

Downloading of the noise monitor data will be conducted on a regular basis. In the event of consistent high noise level periods, downloading of the noise monitor data will be conducted more frequently. Results obtained from the noise monitor will be presented in a graph format and will be forwarded to the client for review. It is proposed that reports are provided fortnightly, presenting the measured noise levels in reference to the noise management levels detailed in this report.

12.3.2 Presentation of Noise Monitor Results

A fortnightly report will be submitted to the client via email summarising the measured noise level events. Complete results of the continuous noise logging will be presented in fortnightly reports including graphs of the collected data.

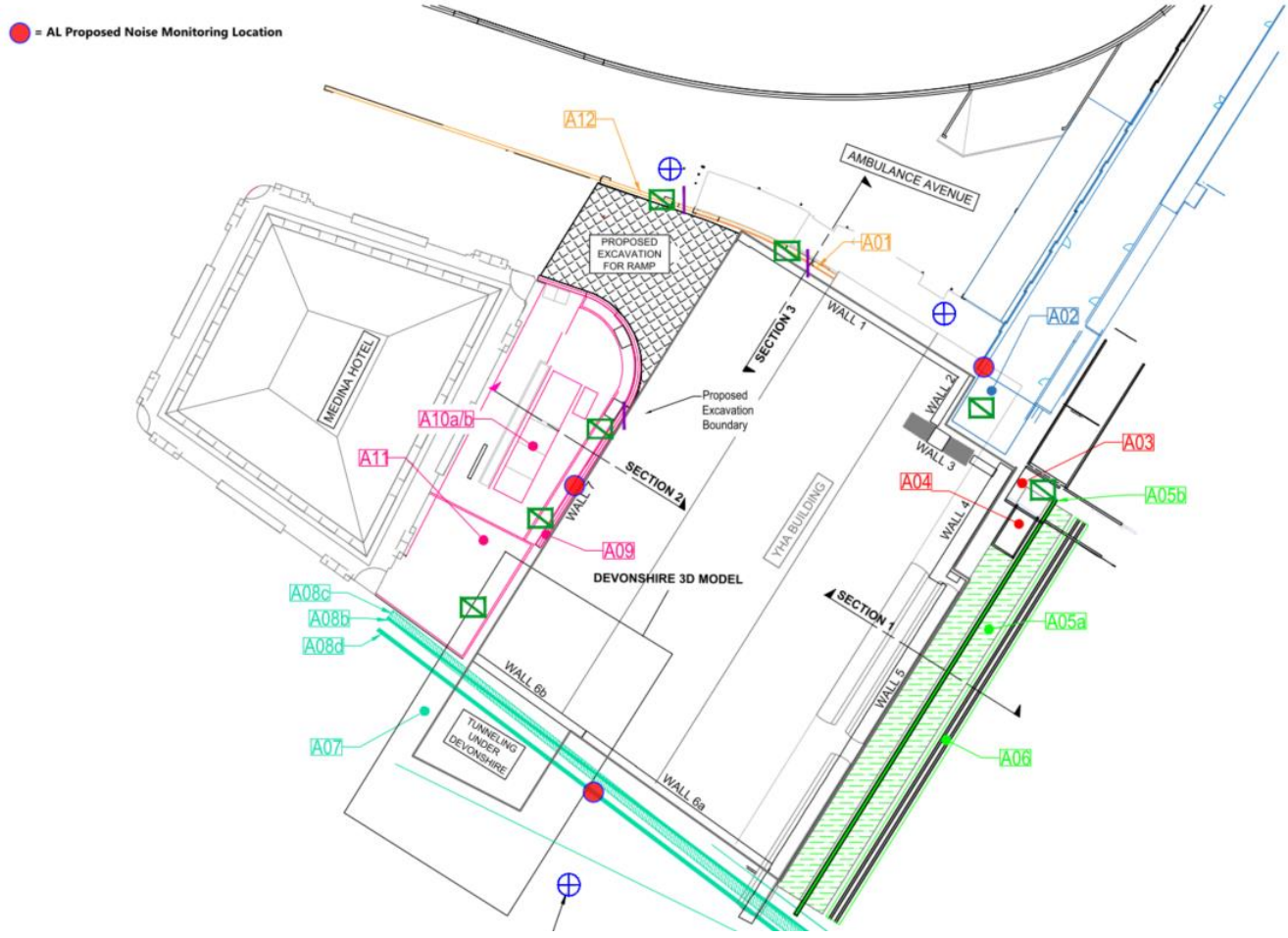


Figure 5: Recommended Noise Monitoring Locations

12.3.3 Noise Level Prediction to Receiver Location

Where noise monitoring at the receiver boundary is not feasible, noise predictions based on the recorded noise levels at the noise monitoring location could be used to determine indicative predicted noise impact at the receiver. This is provided that the noise monitor location has a direct line of sight to the construction site and associated noise sources.

$$SPL = SWL - 20 \times \log(d) - 8$$

SWL: Sound Power Level

d: Distance (m).

The following table presents the typical noise reduction expected when measured over a nominated distance with direct line to the noise source for point sources such as one (1) item of construction equipment i.e., jackhammer. If multiple items of construction equipment are used simultaneously, this is considered a plane noise source and should be predicted on a case-by-case basis.

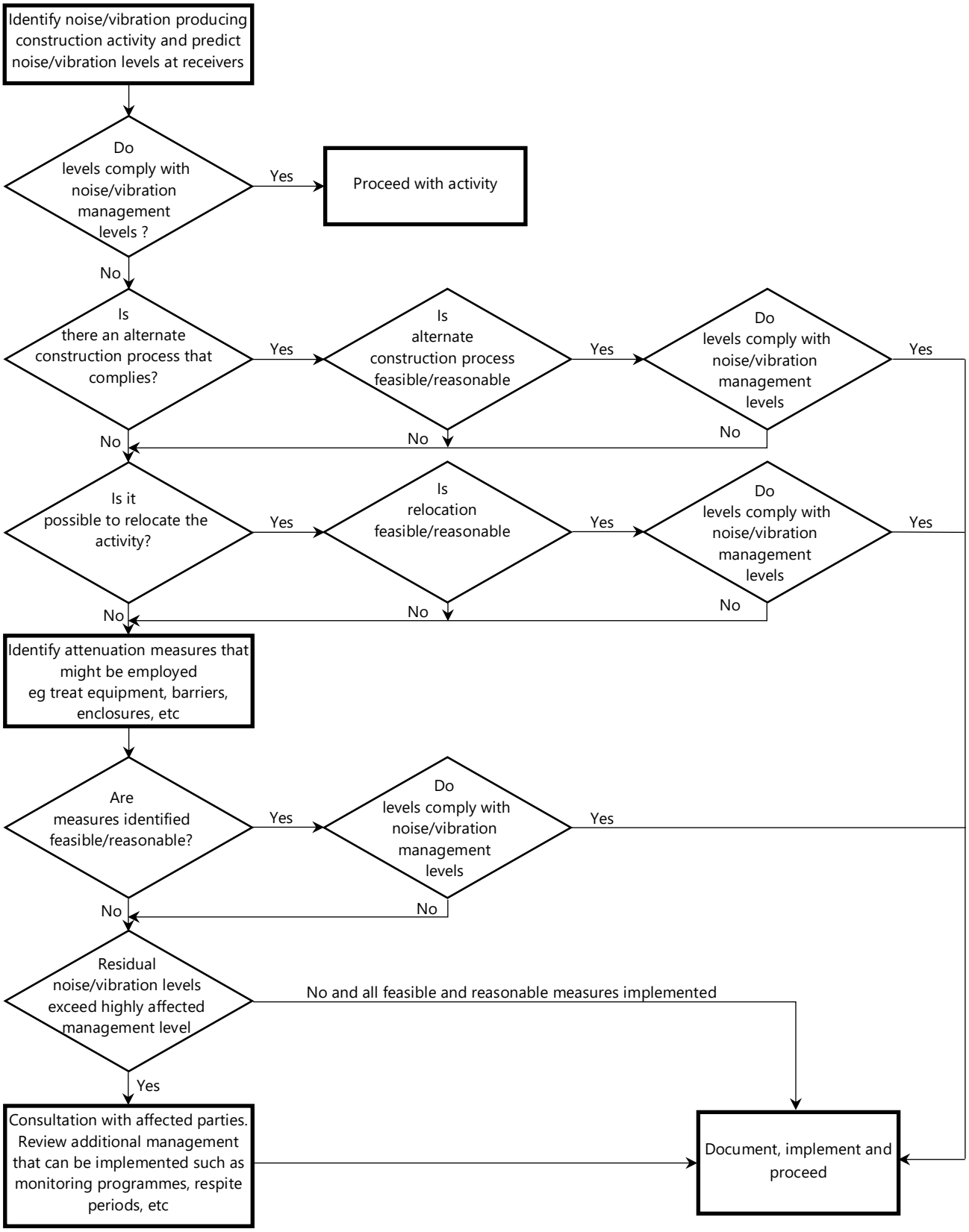
Table 18 – Indicative Point Source Typical Noise Reduction Over Nominated Distance

Distance (m)	20	30	40	50	60	70
Noise Reduction dB	- 34	- 37	- 40	- 42	- 44	- 45

13 ASSESSMENT METHODOLOGY AND MITIGATION METHODS

The flow chart that follows illustrates the process to be followed to minimise the impact associated with these activities.

Noise sources with the potential to exceed the criteria set out in section 6 have been identified and discussed in section 8.



14 ASSESSMENT OF VIBRATION

14.1 VIBRATION PRODUCING ACTIVITIES

Proposed activities that have the potential to produce significant ground vibration include:

- Demolition.
- Excavation Work.
- Piling.

14.2 SAFEGUARDS TO PROTECT SENSITIVE STRUCTURES

It is impossible to predict the vibrations induced by the demolition, excavation and piling operations on site at potentially affected receivers. This is because vibration levels are principally proportional to the energy impact which is unknown, the nature of the terrain in the area (type of soil), drop weight, height etc.

14.3 VIBRATION MONITORING

AL recommends that vibration monitoring is undertaken in the following locations throughout the construction of the project as presented in Figure 5 below. These receivers are particularly sensitive to vibration impacts, and therefore are to be constantly monitored. Any vibration monitor is to have SMS notification capability to enable contractor to be immediately informed when vibration limits are reached.

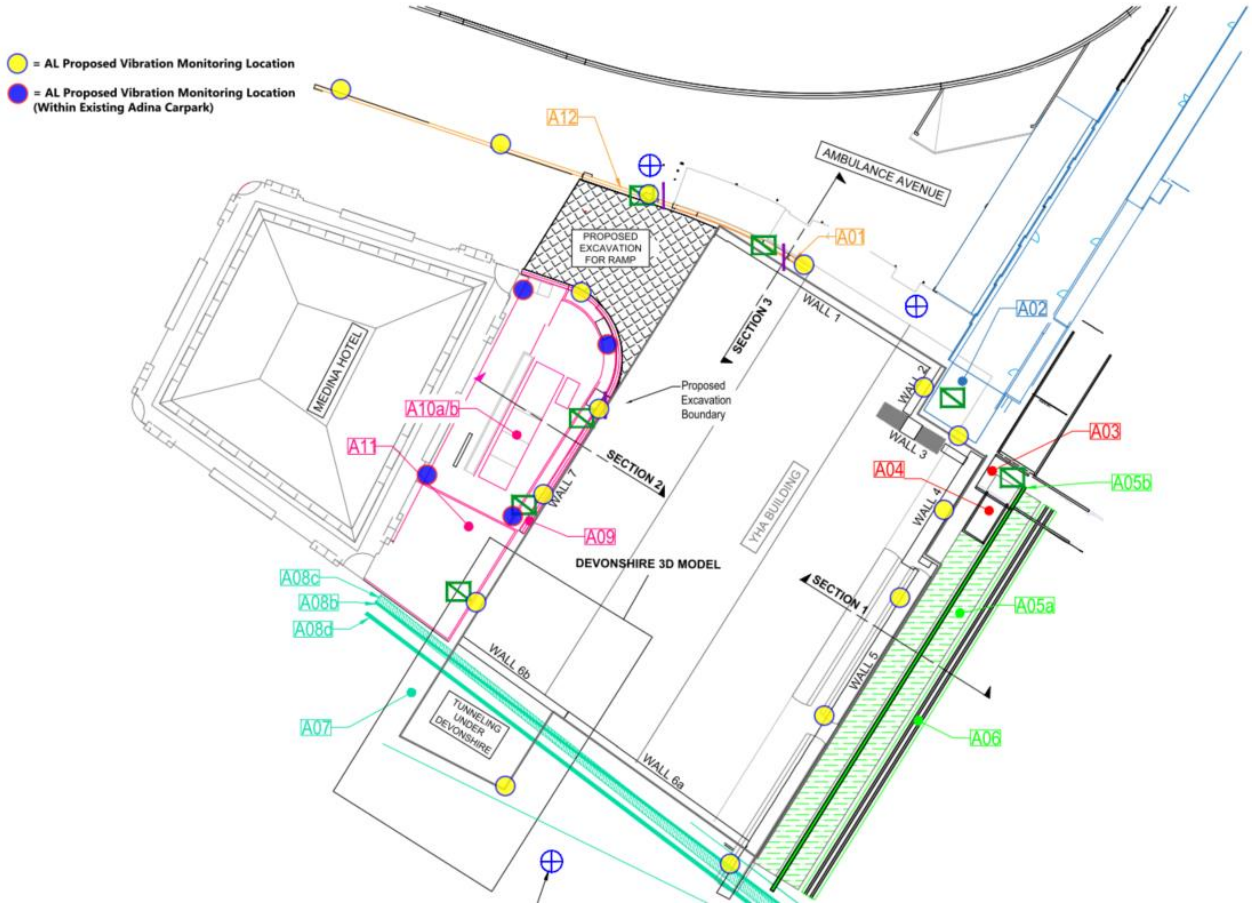


Figure 6: Recommended Vibration Monitoring Locations

14.3.1 Downloading of Vibration Monitor Data

Downloading of the vibration monitor data will be conducted on a regular basis. In the event of exceedance of the vibration criteria, downloading of the vibration monitor data will be conducted more frequently. Results obtained from the vibration monitor will be presented in a graph format and will be forwarded to the client for review. It is proposed that reports are provided fortnightly with any exceedances in the vibration criteria reported as detailed in this report.

14.3.2 Presentation of Vibration Monitor Results

A fortnightly report will be submitted to the client via email summarising the vibration events. The vibration exceedance of criteria is recorded, and the report shall be submitted within 24 hours. Complete results of the continuous vibration logging will be presented in fortnight reports including graphs of the collected data.

15 CONTROL OF DUST

15.1 MONITORING

The potentially significant source of dust is associated with the demolition and excavation stages of the project. See Figure 7 for AL recommended dust monitoring locations.

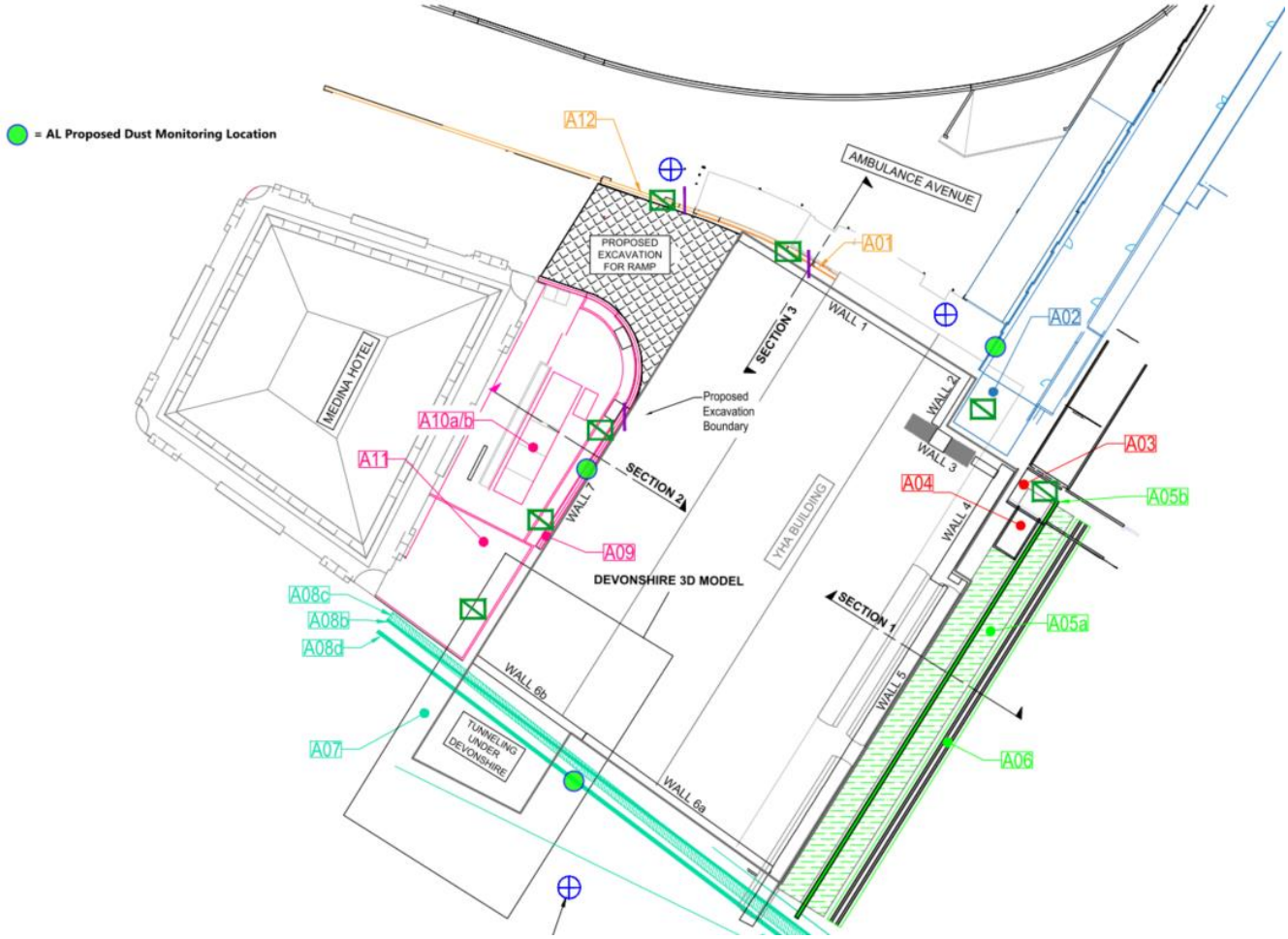


Figure 7: Recommended Dust Monitoring Locations

Where complaints are received associated with dust the complaints procedure listed in this report will be followed and where required dust monitoring will be implemented. Two types of dust monitors will then be required on site to control airborne dust emissions, namely:

- Realtime PM2.5 and PM10 dust monitors which can provide email or sms alerts when dust levels are excessive.
- Dust deposition gauges to measure surface dust.

15.2 DUST SUPRESSION AND PREVENTION

To regulate dust emanating from the demolition and excavation processes, the demolition and excavation contractors will need to allow for the following measures to be implemented such as:

- **Water sprays and dust suppression surfactants:**
    - Directly hosing the hydraulic hammer or rock saws.
    - Site perimeter water mist spray system.
    - Truck wash bay.
    - Sprinklers on spoil mounds.
- **Barriers:**
    - Solid perimeter hoarding, solid site entry doors.
    - Wind breaks (temporary cyclone fence with fine shade cloth).
    - Tarps over spoil mounds.
    - Traps over dump truck trays and trailers.
- **Other measures:**
    - Carry out concrete crushing/recycling off site.
    - Carry out sorting, sifting of spoil off site.
    - Use of gravel, asphalt paving or road base to seal dusty and trafficable area.s
    - Daily review of wind forecast and proposed works at morning tool box meetings to program works or implement measures if unfavourable wind conditions are forecast to reduce impact on railway buildings, staff and patrons.
- **Fine Particle Emissions:**
    - Machinery should be checked on arrival to site that its in good working order.
    - Proper maintenance and tuning of engines.
    - Catalytic converters and exhaust filters (if available).
    - Correct fuel specification.
    - Limiting idling time.
    - Avoiding overloading.
    - Appropriate height of exhaust discharge above ground level.
- **Warning System:**
    - An audible, visual or electronic messaging alert system is required if a dust monitoring system is implemented. AL suggests a warning level set at 85% of the lower bound of the POOR air quality category.
    - Given that water mist dust suppression techniques are implemented on most sites it is recommended that the dust monitor have a heated inlet otherwise spurious results may arise.

16 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

16.1 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous communication is required between; all parties which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented.
- Increase understanding of all acoustic issues related to the project and options available.
- Identify group concerns generated by the project, so that they can be addressed.
- Ensure that concerned individuals or groups are aware of and have access to the Site Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular scheduled meetings may be required for a finite period, until all issues have been addressed and the evidence of successful implementation is embraced by all parties.

An additional step in this process is to produce a newsletter informing nearby residents of upcoming activities that are likely to generate higher noise/vibration levels.

16.2 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise, vibration or dust occur, immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration and dust limits, all work potentially producing vibration or dust shall cease until the exceedance is investigated. The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Required remedial action, if required.
- Validation of the remedial action.
- If necessary, setup vibration monitoring at the location representing the nearest affected vibration receiver, with alarm device which can inform the project manager on site if the vibration exceedance happened.
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable.

- noise measurements at the affected receiver.
- an investigation of the activities occurring at the time of the incident.
- inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

17 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process.
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical.
5. If necessary, setup noise and vibration monitoring devices at locations representing the nearest noise/vibration and dust affected receivers and provide data for each complain time period. Analysis is required to determine suitable mitigation measures.

Complaints associated with noise and vibration generated by site activities shall be recorded on a Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager to the general public and their contact telephone number.

18 CONCLUSION

This report presents a construction noise, vibration and dust management plan for the associated construction activities proposed to be conducted for the *'Atlassian'* commercial development to be located at 8-10 Lee Street, Haymarket.

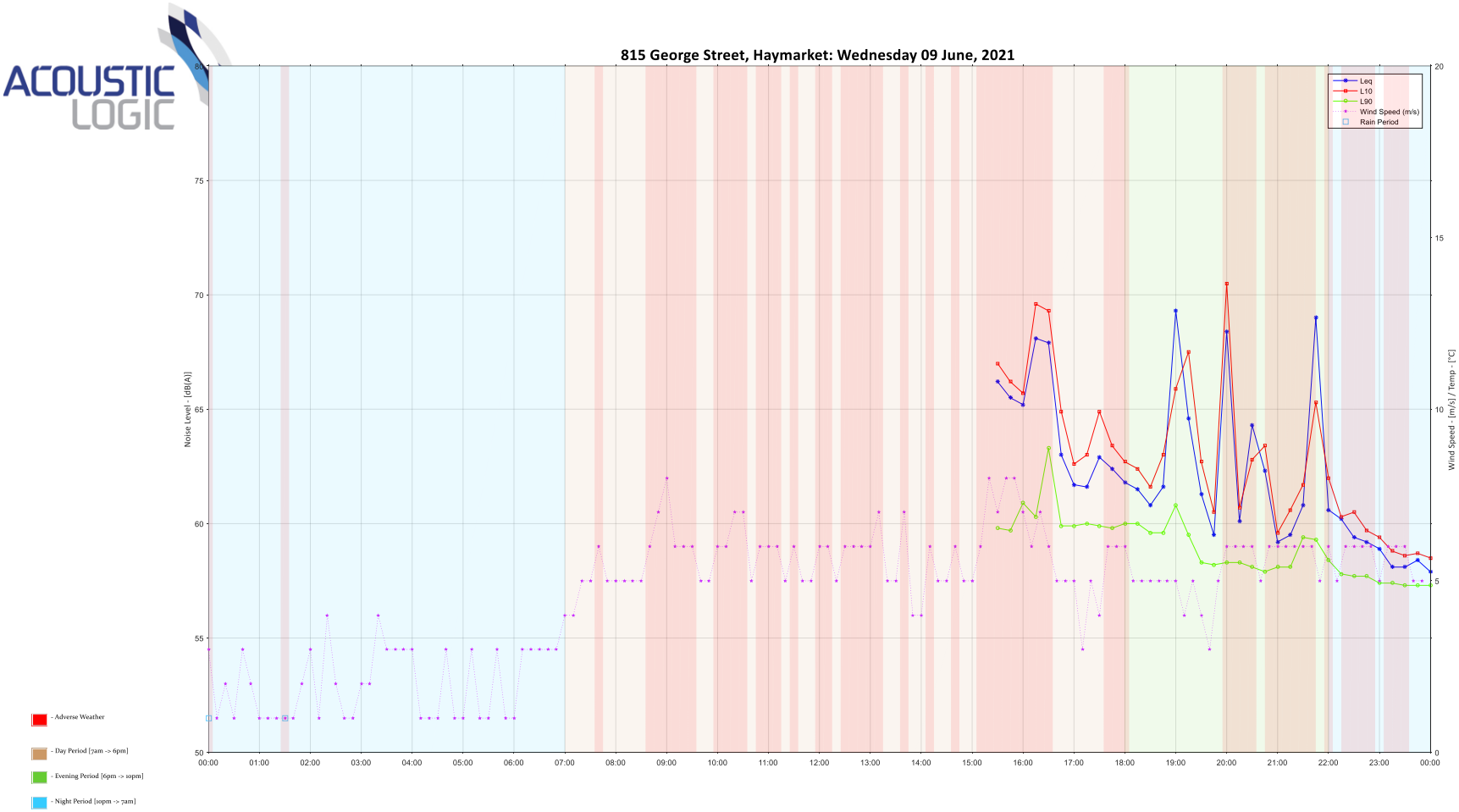
Provided that the practices and recommendations in this report are implemented, the noise, vibration and dust impacts during the demolition, excavation and construction stages will be minimised.

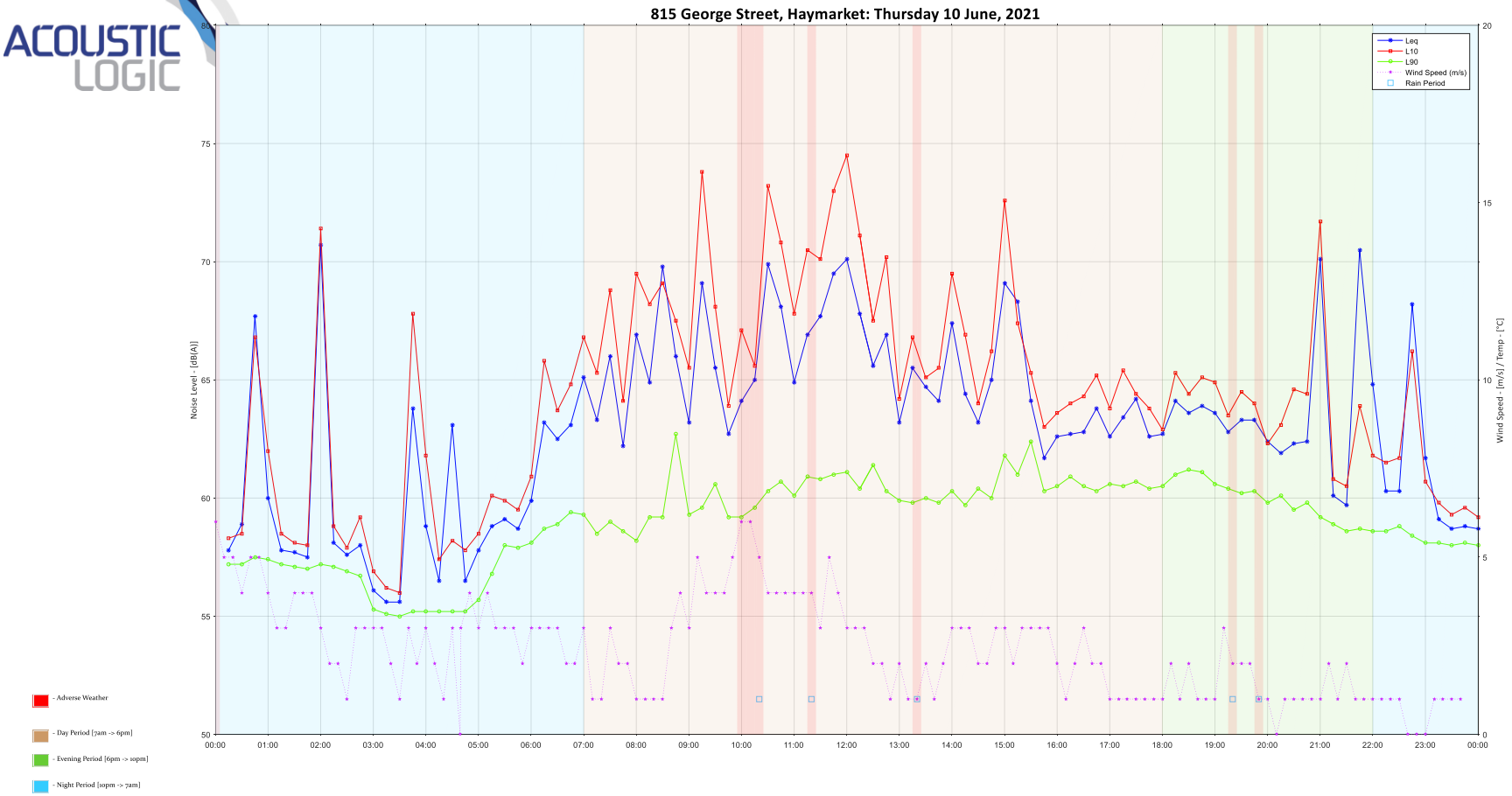
We trust this information is satisfactory. Please contact us should you have any further queries.

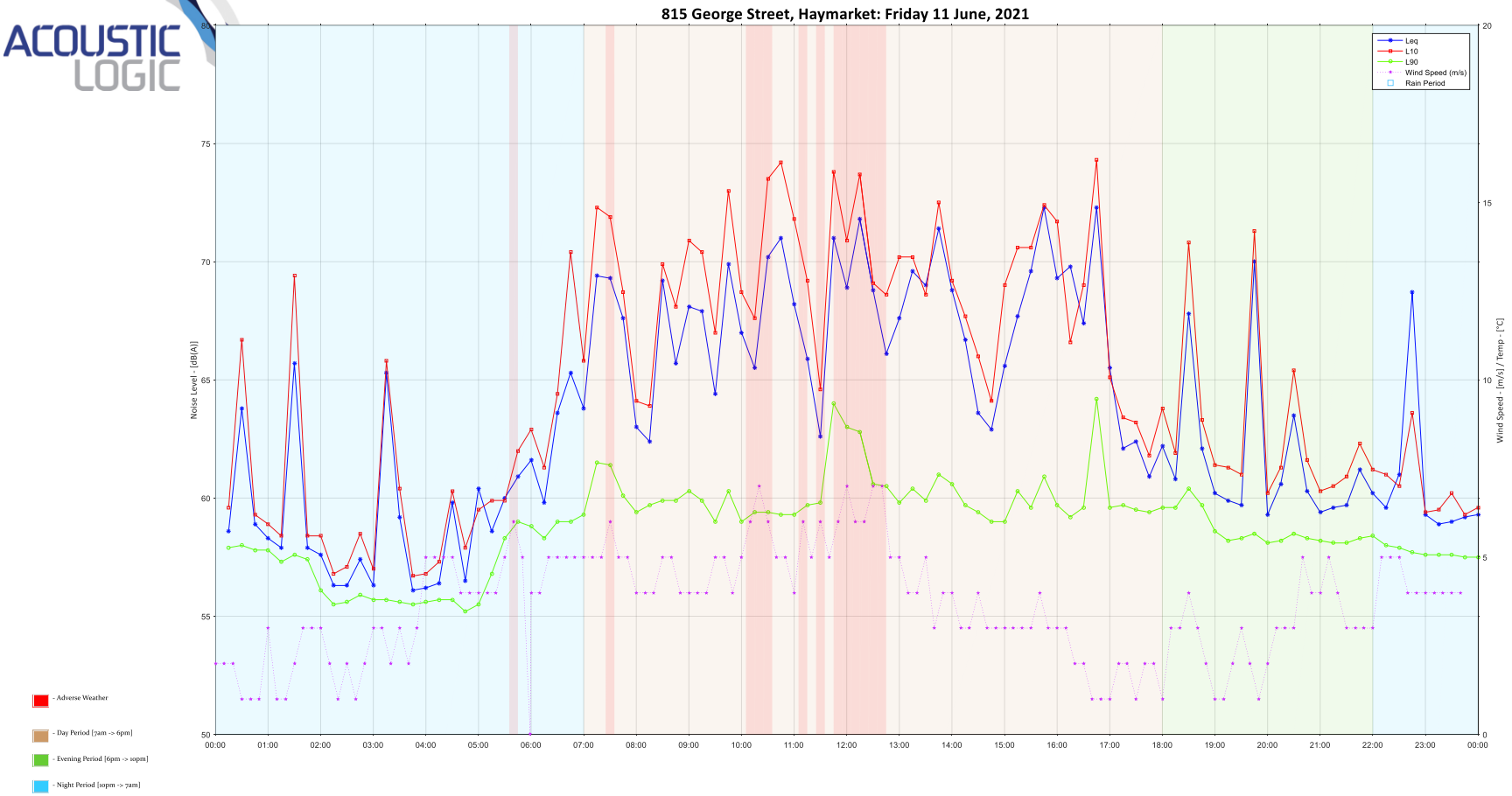
Yours faithfully,

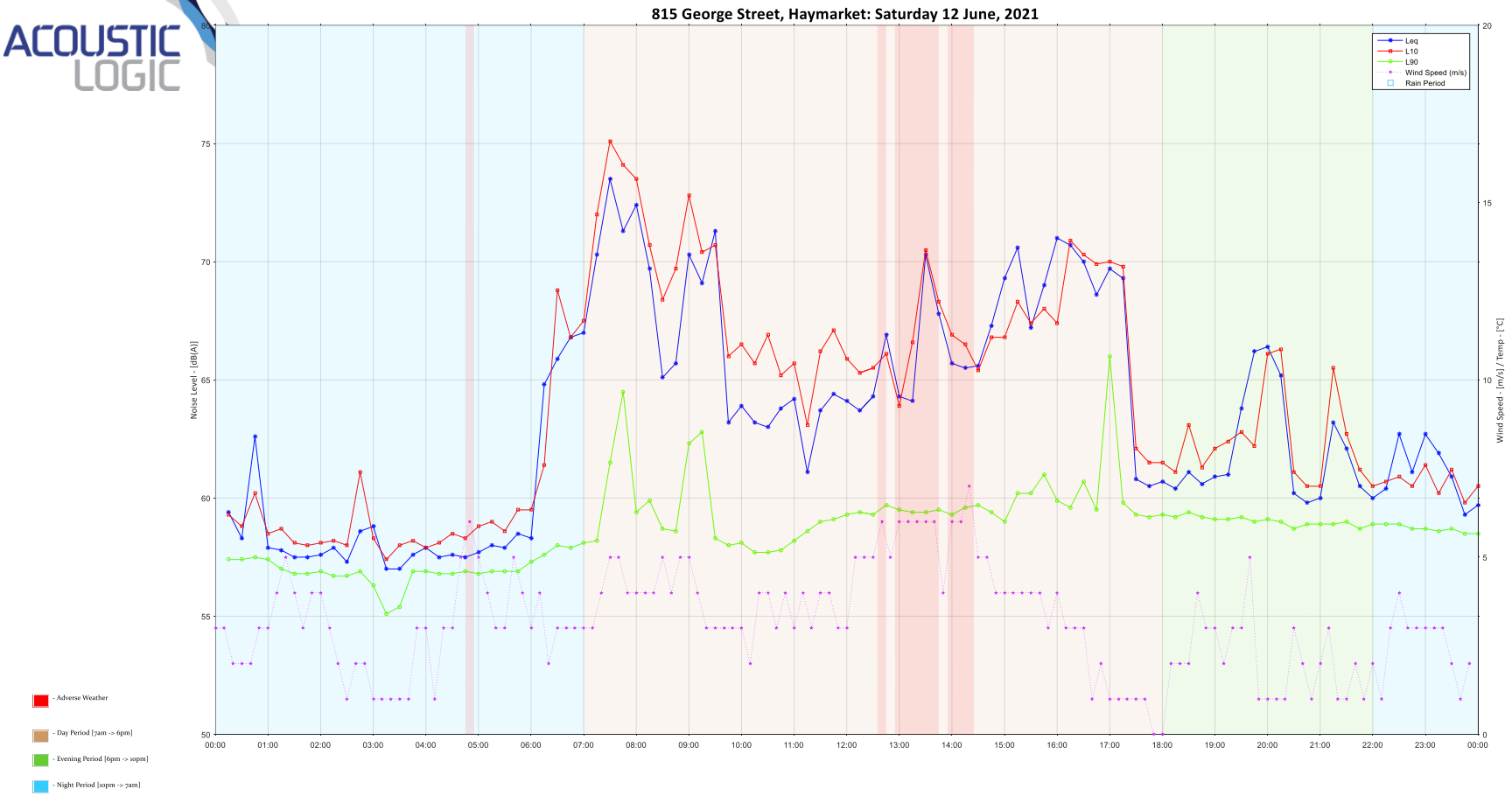
Acoustic Logic Pty Ltd
Shane Nichols

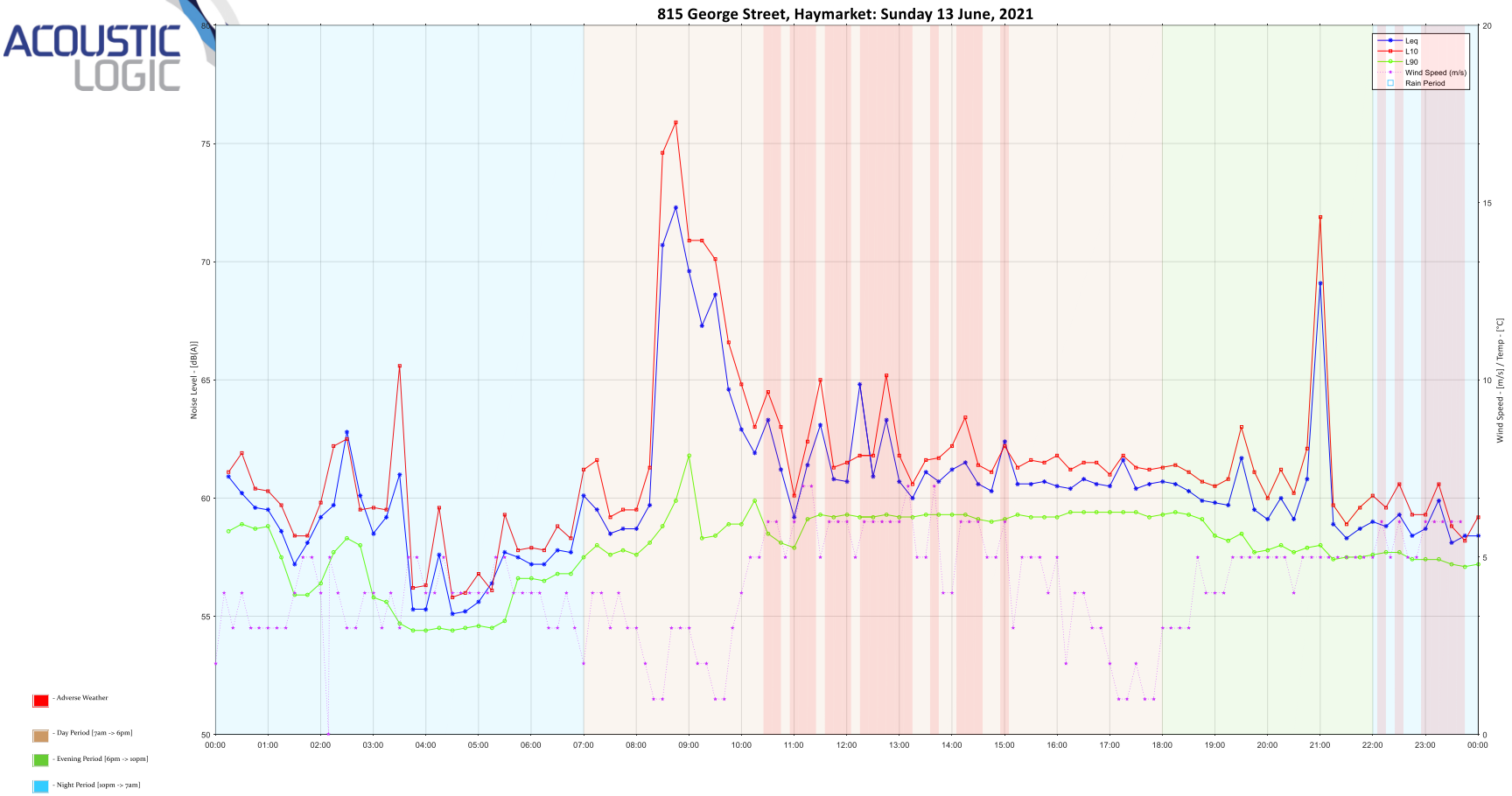
APPENDIX A – UNATTENDED NOISE MONITORING DATA

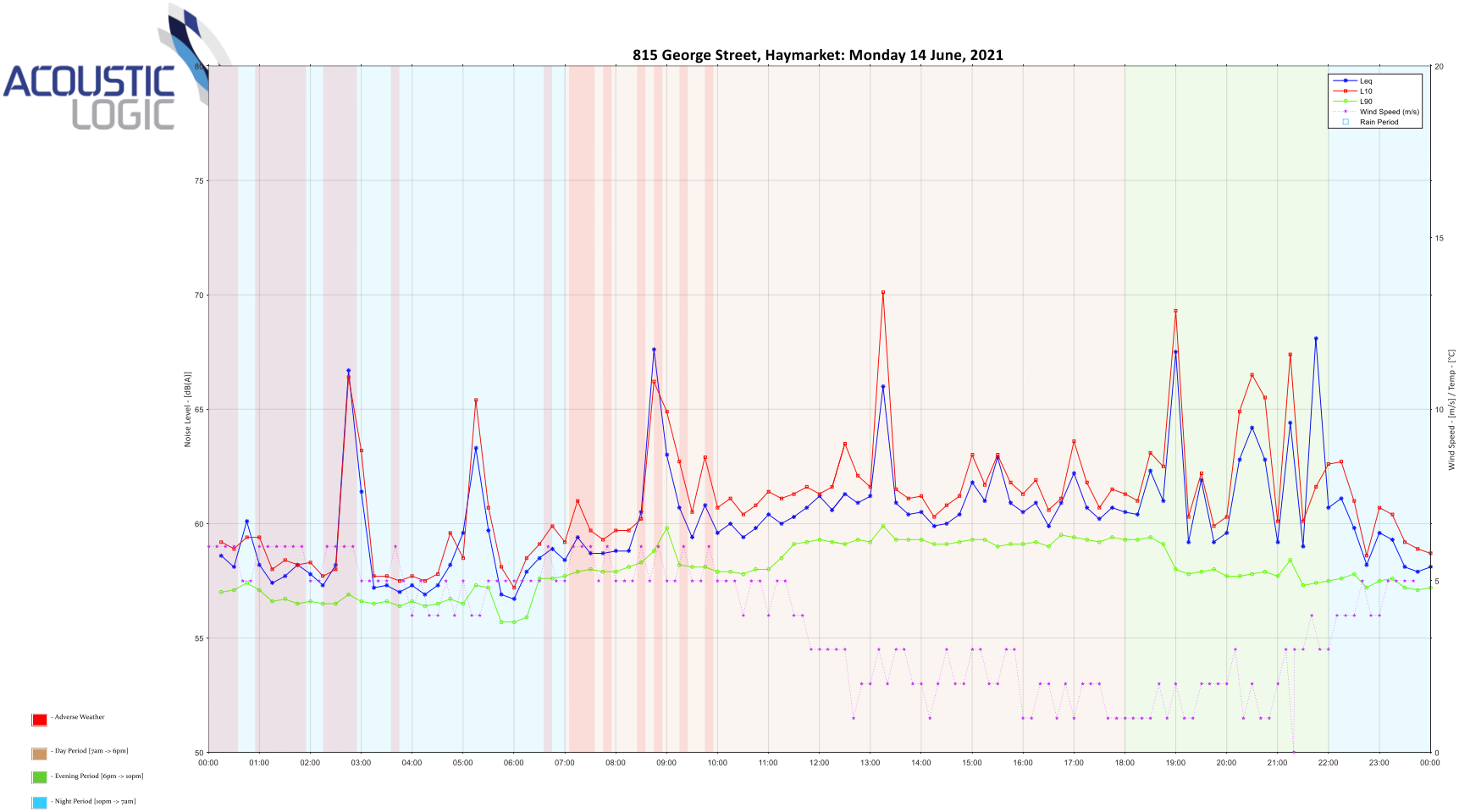

815 George Street, Haymarket: Wednesday 09 June, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

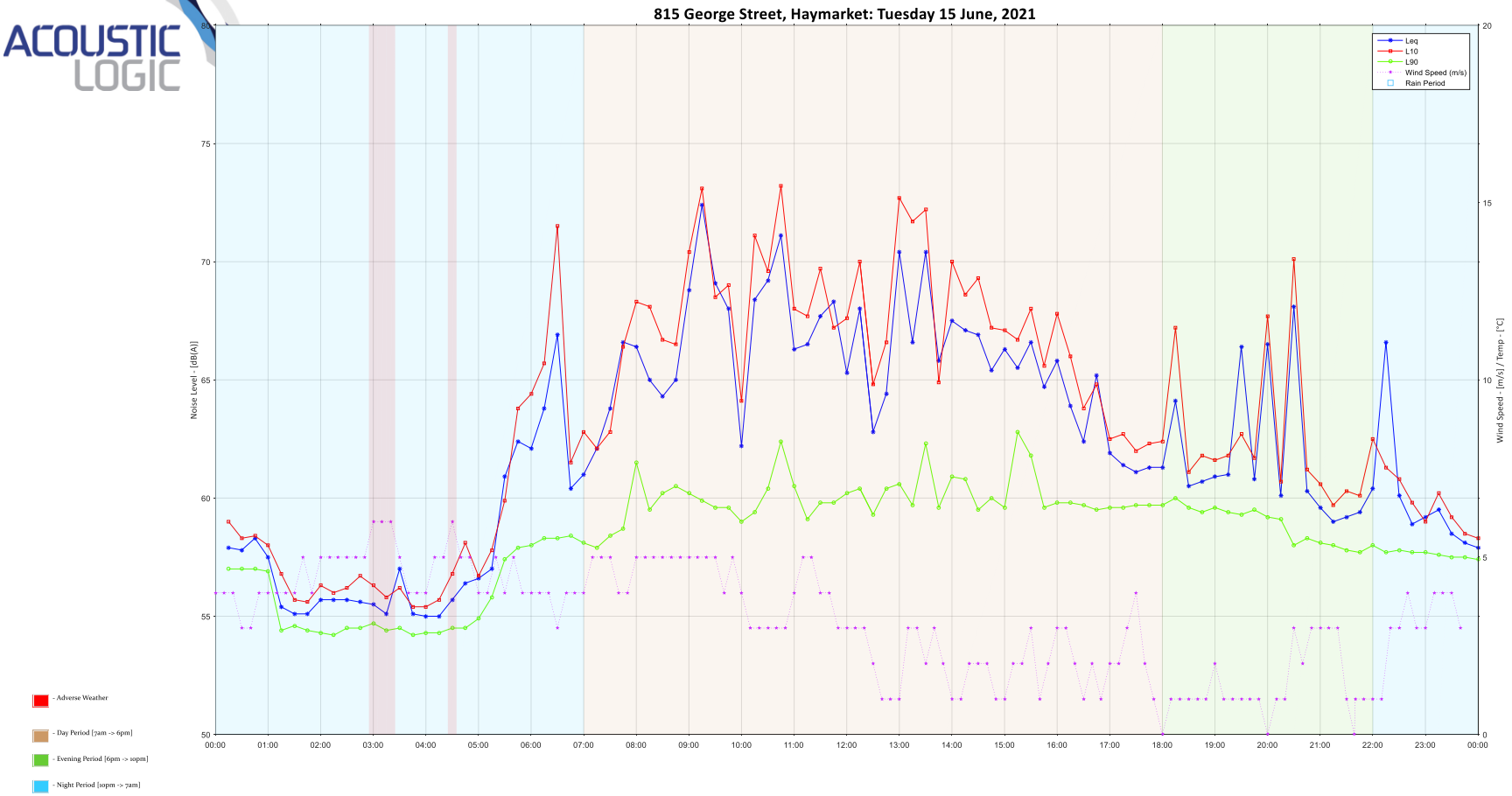

815 George Street, Haymarket: Thursday 10 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

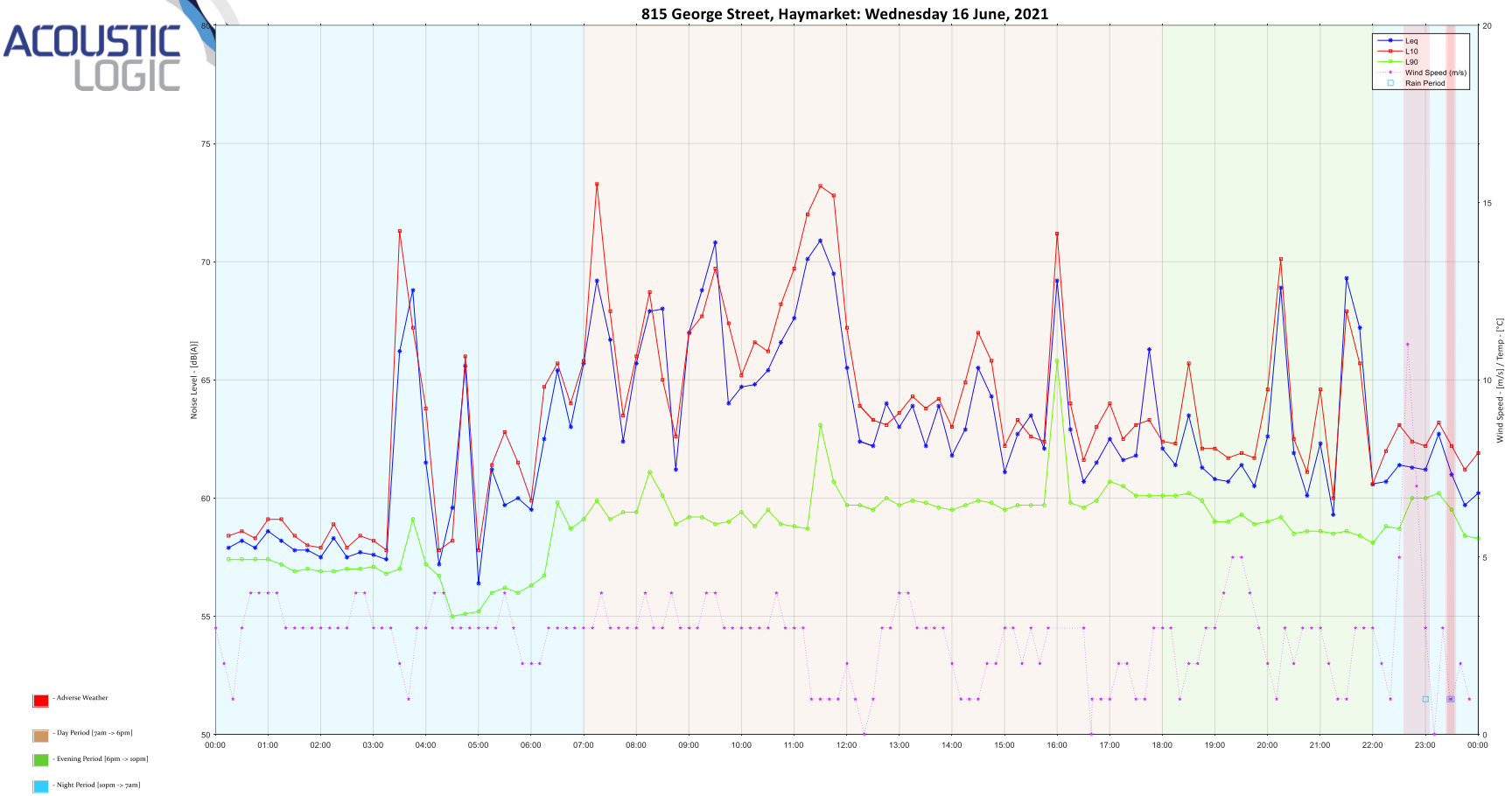

815 George Street, Haymarket: Friday 11 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

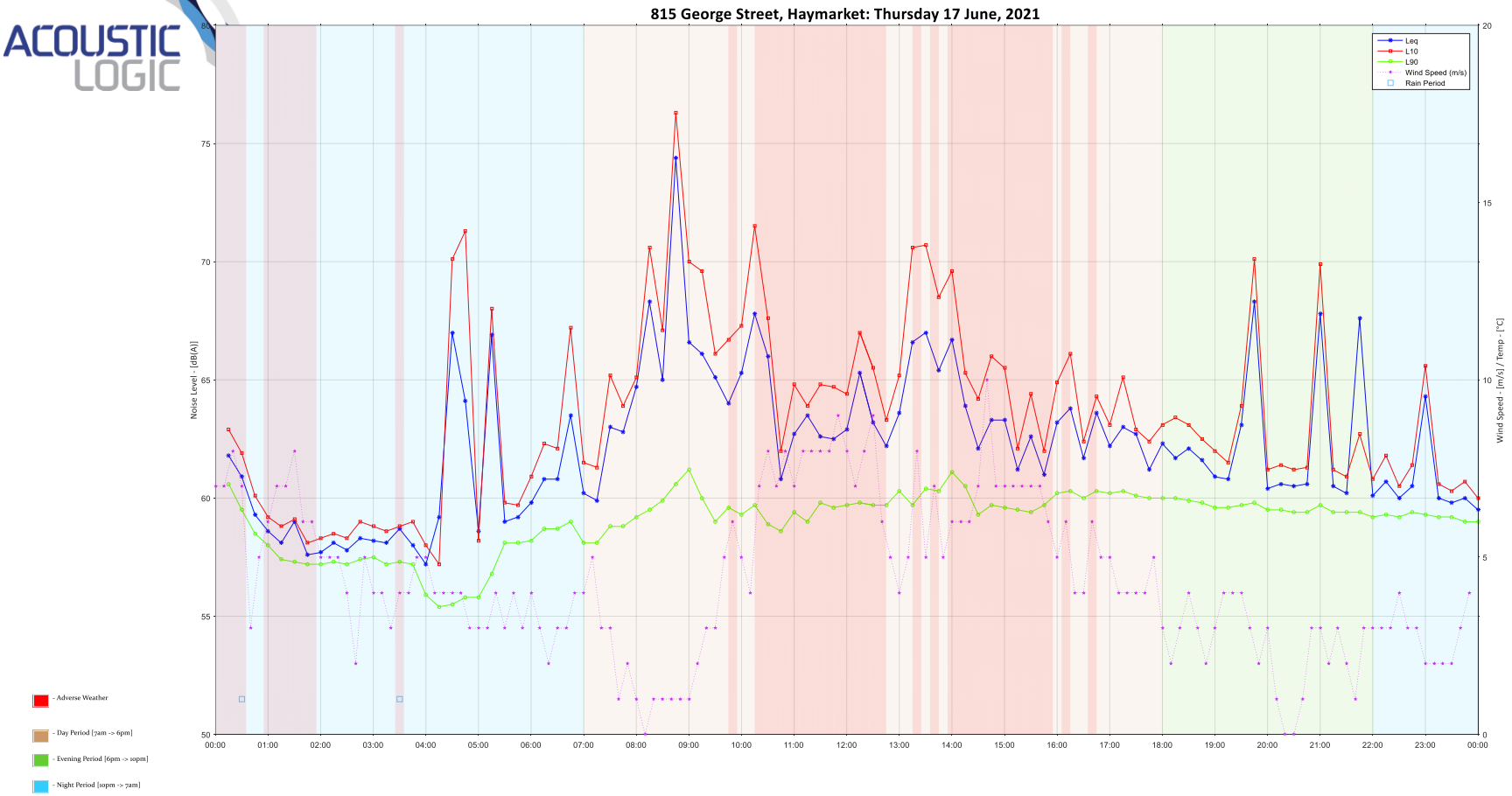

815 George Street, Haymarket: Saturday 12 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

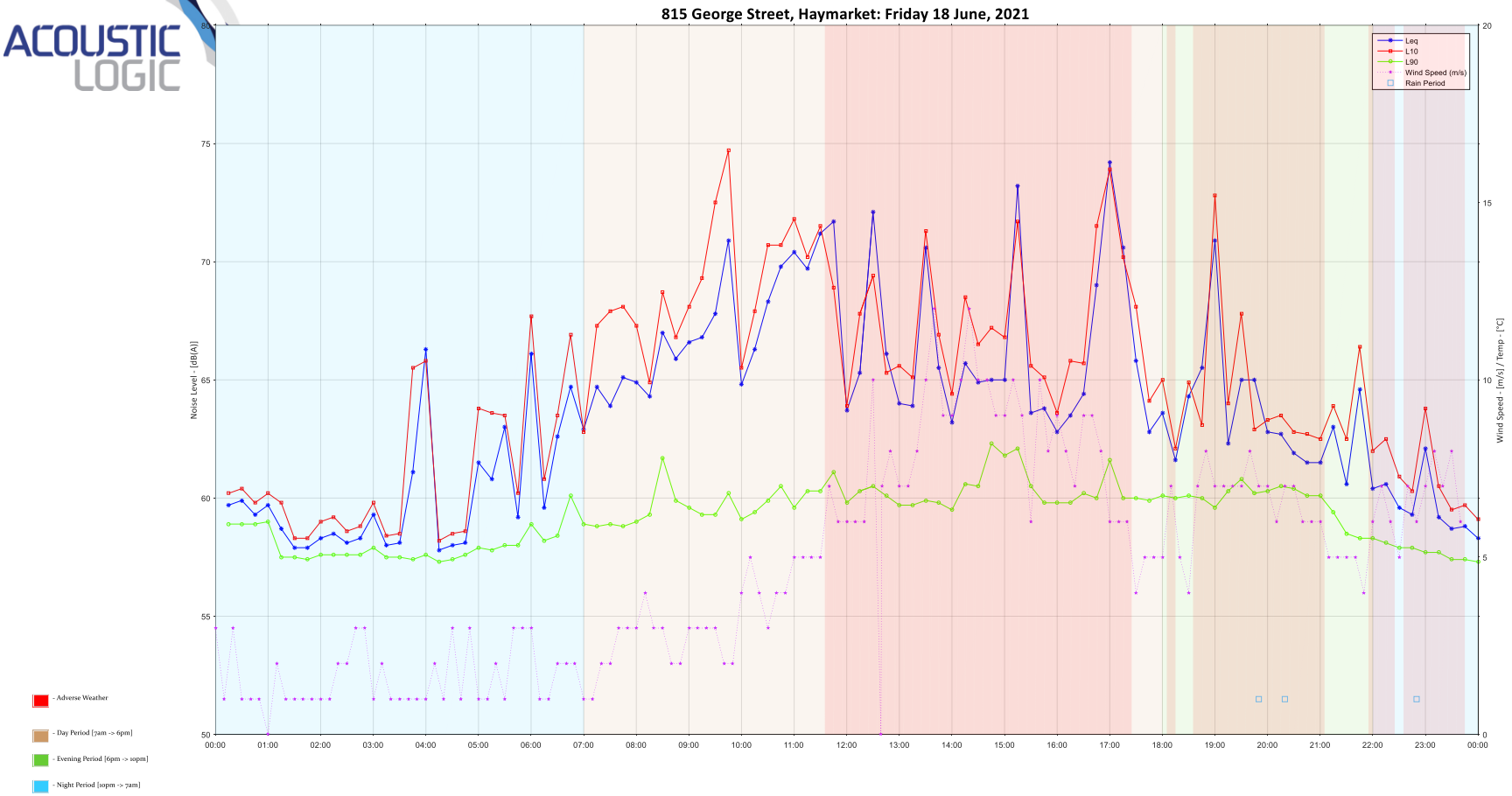

815 George Street, Haymarket: Sunday 13 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

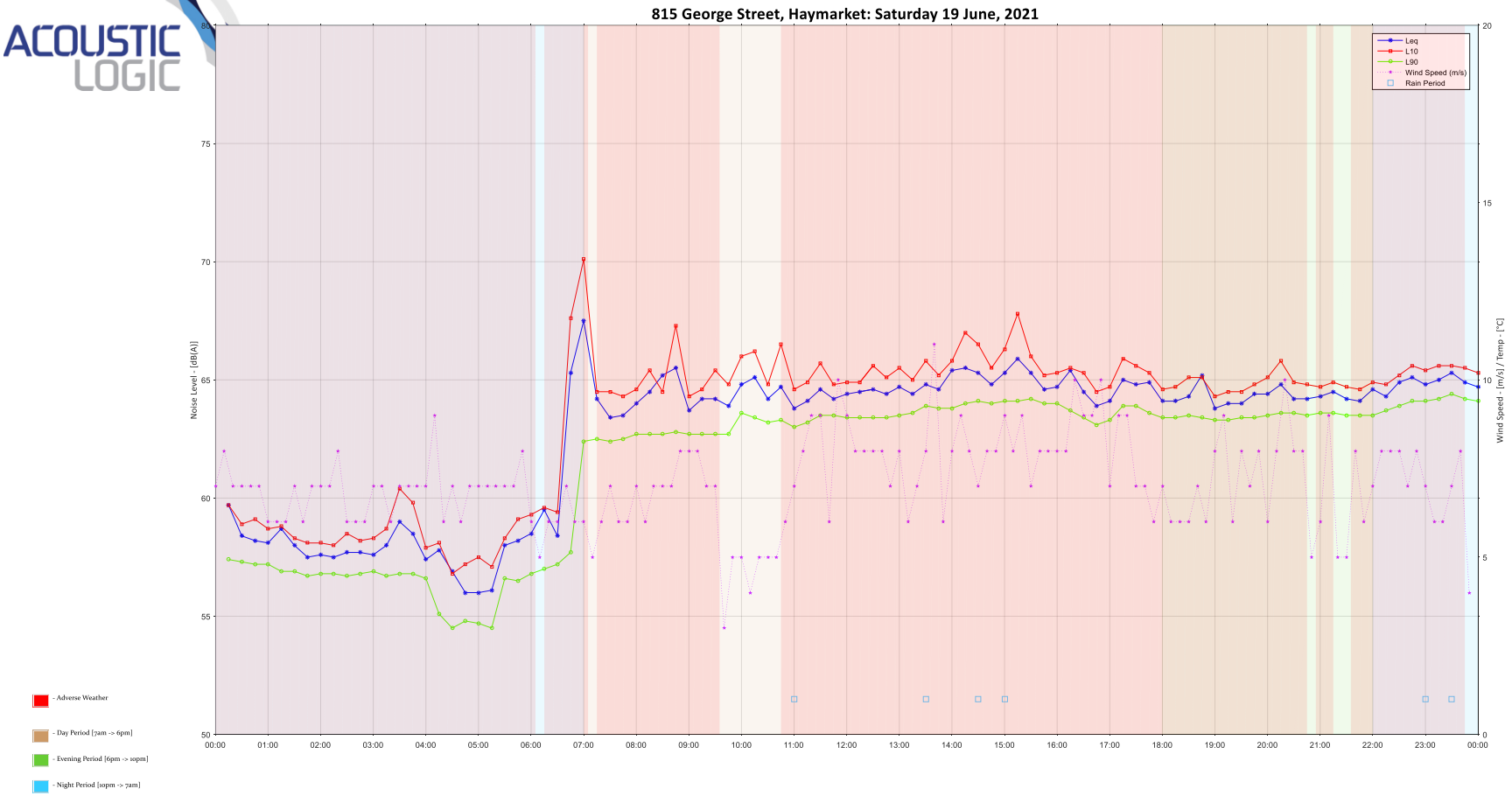

815 George Street, Haymarket: Monday 14 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

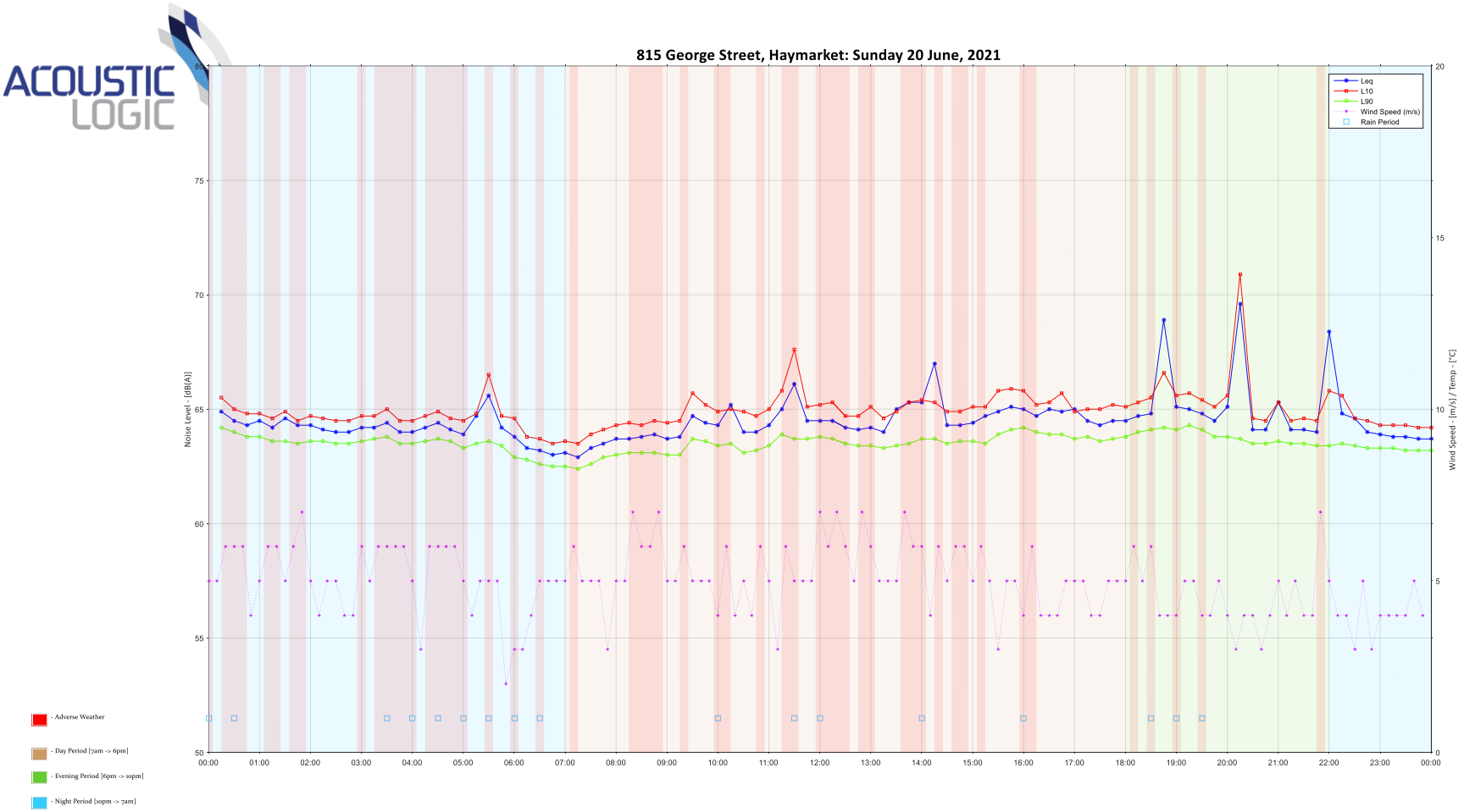

815 George Street, Haymarket: Tuesday 15 June, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

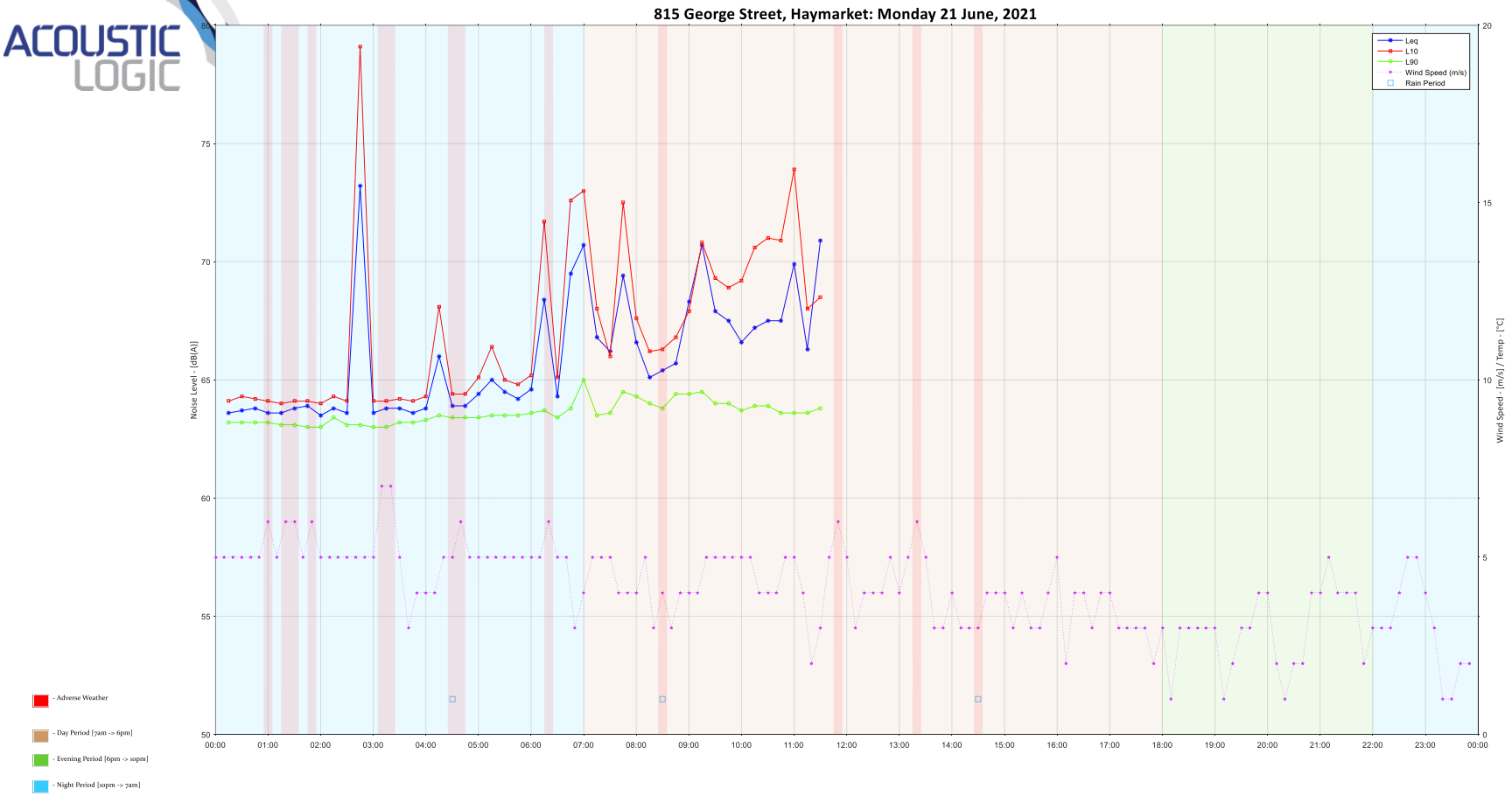

815 George Street, Haymarket: Wednesday 16 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


815 George Street, Haymarket: Thursday 17 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


815 George Street, Haymarket: Friday 18 June, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


815 George Street, Haymarket: Saturday 19 June, 2021
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


815 George Street, Haymarket: Sunday 20 June, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


815 George Street, Haymarket: Monday 21 June, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]