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NEWINGTON COLLEGE - CONCEPT MASTERPLAN AND STAGE 1 SSDA

NOISE AND VIBRATION IMPACT ASSESSMENT

24 April 2026

Council of Newington College; c/- AJC ARCHITECTS

TP616-02F01 NVIA (r5)

40 YEARS 1982-2022 ACOUSTIC ENGINEERING EXCELLENCE

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Document details

Detail	Reference
Doc reference:	TP616-02F01 NVIA (r5)
Prepared for:	Council of Newington College; c/- AJC ARCHITECTS
Address:	Click or tap here to enter text.
Attention:	CHRIS TAYLOR

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
28.11.2025	1st issue	0		H.Pearce		
24.12.2025	Minor amendments		1	H.Pearce		
22.01.2026	Minor amendments		2	H.Pearce		
16.04.2026	Minor amendments		3	H.Pearce		
16.04.2026	Minor amendments		4	H.Pearce		
24.04.2026	Minor Amendments		5	H.Pearce		R. Corbett
File Path: R:\AssocSydProjects\TP601-TP650\TP616 hpe Newington college\1 Docs\TP616-02F01 NVIA (r5).docx						

Executive summary

Renzo Tonin & Associates has been commissioned by the Council of Newington College (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-78268465) for alterations and additions to the Newington College Senior Campus in Stanmore.

This report presents the outcomes from Renzo Tonin & Associates site investigations to address the Noise and Vibration components of the Secretary's Environmental Assessment Requirements (SEARs) dated 25 October 2025 including Item 11 (Concept Proposal) and Item 16 (Stage 1 Works)..

Renzo Tonin & Associates have undertaken unattended noise measurements around the site to quantify the background noise environments and road traffic noise impacts. Aircraft noise impacts on the site are taken from tabulated values in AS2021:2015. Existing environmental noise impacts from road traffic noise on Stanmore Road are capable of complying with the requirements of the SEPP (Transport & Infrastructure) 2021 and ISEPP Guideline 2008 subject to detailed design.

Noise emission goals from the use of mechanical plant and equipment and vehicles being driven on site have been set in accordance with the NSW EPA Noise Policy for Industry 2017 (NPfI). Compliance with those goals to existing residential receivers is achievable (subject to detailed design and mitigation).

The recommendations are summarised in the following table:

Guidelines / Policies / Standards	Report section	Recommendations / Findings
SEPP (Transport & Infrastructure) DPIE Development in Rail Corridors and Busy Roads - Interim Guideline (road noise) 2008 AS/NZS 2107:2016 AS/NZS 2021:2015	6	Indicative glazing for facades fronting the roads. Indicative glazing for aircraft noise intrusion. Assessment for the Stage 1 works is based on the building design, whilst Concept Proposal works is only indicative.
NPfI	7	Project noise trigger levels have been set in accordance with the NPfI, relevant to the operation of services plant and equipment. Indicative assessment has been undertaken for Concept Proposal and Stage 1. However, the final building layout, glazed areas, façade construction etc can impact the services requirements and in turn the acoustic treatments. The Concept Proposal works shall be reviewed in the detailed application phase. The Stage 1 works design is more resolved and is unlikely to change substantially but still requires a review prior to construction.
DEC Assessing Vibration: A technical guideline Interim Construction Noise Guideline	9	High level construction vibration impacts have been assessed and managed in accordance with DEC Guidelines. High level construction noise impacts have been assessed and managed in accordance with the ICNG.

Contents

List of tables

List of figures

1 Introduction

Renzo Tonin & Associates has been commissioned by the Council of Newington College (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-78268465) for alterations and additions to the Newington College Senior Campus located at 200-244 and 221-235 Stanmore Road, Stanmore.

This report presents the outcomes from Renzo Tonin & Associates site investigations to address the Noise and Vibration components of the Secretary's Environmental Assessment Requirements (SEARs) dated 25 October 2025 including Concept Proposal: Items 11 and 17; and Stage 1 Works: Item 12 (point 2) and Item 16.

Renzo Tonin & Associates have undertaken unattended noise measurements around the site to quantify the background noise environments and road traffic noise impacts. Aircraft noise impacts on the site are taken from tabulated values in AS2021:2015. Existing environmental noise impacts from road traffic noise on Stanmore Road are capable of complying with the requirements of the SEPP (Transport & Infrastructure) 2021 and ISEPP Guideline 2008 subject to detailed design.

Noise emission goals for the Concept Proposal and Stage 1 works from the use of mechanical plant and equipment and vehicles being driven on site have been set in accordance with the NSW EPA Noise Policy for Industry 2017 (NPfI). Compliance with those goals to existing residential receivers is achievable (subject to detailed design and mitigation).

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. APPENDIX A contains a glossary of acoustic terms used in this report.

2 Site Description

The Newington College Senior Campus is located at 200-244 Stanmore Road, Stanmore and is bordered by Stanmore Road to the north, Newington Road to the south and College Lane to the west. The College boundary also includes the Concordia building to the north at 221-235 Stanmore Road. The main campus is legally described as Lot 8 in DP710369 and the Concordia site is legally described as Lot A in DP109269, Lot 1 in DP49, Lot B in DP330028, and Lot 1 in DP526319.

Key features of the site include:

- The main campus site is a regular shaped allotment with an area of 8.7ha. The Concordia site (and access handle to Cavendish Street), immediately north of the main campus is irregular in shape and is 2,903sqm in area.
- The topography of the main campus is a defining characteristic, particularly the grassed slope from the historic Founders Building down to Johnson Oval. The site has an overall fall of approximately 18m from the north-west corner to south-east corner.
- The at-grade car park adjacent to the Concordia building sits approximately 2.8m above the Stanmore Road street level, and is accessed via Cavendish Street (to the rear).
- The existing school buildings are largely located along the College Lane and Newington Road edges of the site. Existing buildings generally range from 2-4 storeys in scale. The balance of the site comprises at-grade car parking and sporting facilities, including sporting ovals and tennis courts.
- The Concordia building across Stanmore Road is a two-storey building with basement and car parking accessed from Stanmore Road. An at-grade car park is located within the eastern portion of this site, with vehicular access from a driveway to Cavendish Street (to the north). Under the proposed amendments the Cavendish Street driveway would be reduced to entry only
- The site has a primary frontage to Stanmore Road (which accommodates both vehicular and pedestrian access to the site) and a secondary frontage to Newington Road, which is generally limited to pedestrian access and service vehicles.
- The area surrounding the site is predominantly zoned R2 Low Density Residential and includes a combination of single dwellings and residential flat building ranging from 1-3 storeys in height. Stanmore Train Station is located approximately 220m to the north. An existing pedestrian bridge and signalised traffic lights provide pedestrian access over Stanmore Road to Stanmore Train Station, further north.

The site is identified in Figure 1 overleaf.

Figure 1 - Aerial view of the subject site and surroundings (Source: Urbis 2024)

3 Project Description

The SSDA seeks consent for staged alterations and additions to the Newington College Senior Campus comprising:

Concept Proposal for the provision of new and upgraded facilities, including:

- Building envelope for the redevelopment of Sevington Courts to accommodate recreational facilities and teaching spaces (refer to detailed Stage 1 Works below).
- Building envelope for alterations and additions to Centenary Hall and development of an adjoining, four storey teaching and learning facility (College Lane building). This development will accommodate a cafeteria and dining hall, lecture theatre, multi-purpose teaching spaces and additional pastoral spaces.
- Building envelope for the redevelopment of the Concordia building to accommodate a performance theatre, multi-purpose gallery and exam centre, new teaching spaces and basement car parking. The Concordia redevelopment includes a new pedestrian bridge across Stanmore Road to the main campus.
- Landscaping design strategy across the campus.
- Car parking provision and circulation arrangements.
- Increase of 368 students (from 1492 to 1860) and 45 full-time equivalent (FTE) staff.

Detailed Stage 1 Works, including:

- Earthworks and the associated demolition of Sevington Courts.
- Construction, fit-out and operation of 3 storey building comprising multi-purpose indoor and rooftop courts, fitness centre, multi-purpose teaching spaces, amenities and basement car parking.
- Construction, fit-out and operation of 4 storey building comprising multi-purpose teaching spaces, administrative functions and amenities.
- Alterations to the existing driveway within the site to facilitate vehicle access to the new basement car park.
- Temporary car park during construction phase of Stage 1 Works.
- Tree removal and new landscaping adjacent to the Stage 1 development site.
- Increase of 368 students and 45 FTE staff.

At the time of preparing this report, there are currently no relevant approved and / or likely significant future developments in the immediate vicinity. This is based on Urbis' review of the Major Projects Portal and Inner West DA Tracker in November 2025.

No demolition, excavation, or demolition works are proposed as part of the conceptual components of this application. Further approval will be sought for the detailed design and construction of the future Concept Proposals. Therefore, the cumulative noise impacts of any construction activities related to the future Concept Proposals will be assessed as part of any subsequent Detailed SSDA(s).

4 Secretary's Environmental Assessment Requirements

The NSW Department of Planning, Industry & Environment ('DPIE') issued Secretary's Environmental Assessment Requirements ('SEARs') for the site (SSD-78268465), dated the 25th of October 2025. Key Concept Proposal: Items 11 and 17; and Stage 1 Works: Item 12 (point 2) and Item 16 related to noise and vibration, with requirements as follows:

Concept Proposal

11. Noise and Vibration

- Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail operational noise (including any public-address system, events, and out of hours use of school facilities) and vibration impacts on nearby sensitive receivers and structures, considers noise intrusion, and outline the proposed management and mitigation measures that would be implemented.

- Provide an assessment of aircraft noise in relation to the requirements of Australian Standard AS2021-2015 - Acoustics - Aircraft Noise Intrusion-Building Siting and Construction.

- Outline the proposed measures to minimise and mitigate the potential noise impacts of aircraft noise on school operations.

Under Key Issue 17, the first part relates to acoustics (whilst the second point falls to others):

17. Aviation

- Addressed in this Assessment: Where the site is located within any of the Australia Noise Exposure Forecast (ANEF) contours, assess the potential impacts to the concept development.

- Assessed by others: Identify and assess the potential impacts of the concept development on the aviation operations of any nearby airports/airfields, affected flight paths or helicopter landing sites.

Stage 1 Works

12. Aviation

- Where the site is located within any of the Australia Noise Exposure Forecast (ANEF) contours, assess the potential impacts to the Stage 1 works.

- Assessed by others: Identify and assess the potential impacts of the Stage 1 works on the aviation operations of any nearby airports/airfields, affected flight paths or helicopter landing sites.

16. Noise and Vibration

- Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise (including any public-address system, events, and out of hours use of school facilities) and vibration impacts on nearby sensitive receivers and structures, considers noise intrusion, and outline the proposed management and mitigation measures that would be implemented.

- Provide a quantitative assessment of the main noise and vibration generating noise sources and activities during construction in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines.

- Outline measures to minimise and mitigate the potential construction noise impacts on nearby sensitive receivers including proposed management and mitigation measures that would be implemented.

- Provide a quantitative assessment of aircraft noise in relation to the requirements of Australian Standard AS2021-2015 - Acoustics - Aircraft Noise Intrusion-Building Siting and Construction.

- Outline measures to minimise and mitigate the potential noise impacts of aircraft noise on school operations.

5 Ambient and background noise surveys

Long-term unattended noise measurements were undertaken surrounding the project site to capture the existing ambient and background noise environment.

5.1 Monitoring Locations

The short-term attended and long-term unattended monitoring was undertaken at the locations shown in below.

Figure 2: Locations of unattended long-term noise monitors and short-term noise measurements

Table 1: Noise monitoring locations

Location ID	Description
Long-term noise monitoring	
L1	Noise monitor installed within the upstairs of the Concordia building, with the microphone protruding approximately 1m from the façade, facing Stanmore Road (microphone approximately 7m from the near side of curb).
L2	Noise monitor installed on the north side of the Concordia building. The monitor was installed at a height of approximately 2m from the ground.
L3	Noise monitor installed on the west side of the site near College Lane. The monitor was installed at a height of 1.5m from the ground and approximately 5m from College Lane.

5.2 Long Term Unattended Monitoring

5.2.1 Monitoring Period

The three unattended long-term noise monitors were installed on site from Wednesday the 30th of April 2025 to Friday the 9th of May 2025. Monitors were installed to determine the existing level of ambient and background noise levels pertinent to the site.

Supplementary monitoring was undertaken at L3 from Friday 28th November to Friday 5th December 2025 (inclusive). The more recently acquired data has been used for the assessment.

Locations of the long-term noise monitors are presented in and detailed in Table 1.

5.2.2 Equipment Used

The equipment used for noise measurements was three (3) NTi Audio Type XL2 precision sound level analysers which is a class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) '*Electroacoustics - Sound Level Meters*' and IEC 60942 '*Electroacoustics - Sound calibrators*' and carries current NATA certification (or if less than 2 years old, manufacturers certification).

The noise monitors recorded noise levels on a continuous basis and stored data every fifteen minutes. The monitors were calibrated before and after measurements and no significant deviation in calibration was noted.

5.2.3 Long-term unattended noise monitoring results

The summary results of the long-term unattended noise monitoring are presented in Table 2 below.

Table 2 - Long-term unattended noise monitoring results

Location	Rating Background Noise Levels[1] dB(A) $L_{90\ (15min)}$				Environmental Noise (at 1m from a façade[3]) dB(A) $L_{eq(period)}$	
	Day	Evening	Night	Morning shoulder	Day (7am -10pm)	Night (10pm – 7am)
L1- Stanmore Road	60	59	41	50	74	72
L2- Rear of Concordia	40	39	34	38	65	59
L3- College Lane[2]	42	42	33	36	64	59

1. Periods are as defined by the NSW EPA Noise Policy for Industry. Day is 7am – 6pm Monday to Friday and 8am – 6pm Saturday, Sunday and Public Holidays; Evening is 6pm – 10pm daily; Night is 10pm – 7am Monday to Friday and 10pm-8am Saturday, Sunday and Public Holidays. Morning shoulder is 5am – 7am.
2. College Lane levels are from November/December.
3. Includes façade reflection (+2.5dB is added to loggers located in the free field)

Detailed results of the background and ambient noise monitoring undertaken are presented in APPENDIX B.

The unattended noise monitoring data relied on in this assessment are broken down as follows:

- L1 is representative of residential receivers on Stanmore Road, adjacent to and opposite Newington College.
- L2 is representative of residential receivers shielded from Stanmore Road i.e. Cavendish Road receivers.
- L3 is representative of residential receivers on College Lane.

5.3 Short-term Attended Measurements

5.3.1 Period of monitoring

Short term attended monitoring was undertaken on Friday the 28th of November 2025.

5.3.2 Measurement locations

Short-term noise measurements were undertaken at multiple locations simultaneous to the long-term noise monitoring. Locations of the long-term noise monitors and short-term noise measurements are presented in and detailed Table 1.

5.3.3 Equipment used

The equipment used for noise measurements was an NTi Audio Type XL2 precision sound level analysers which is a class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) '*Electroacoustics - Sound Level Meters*' and IEC 60942 '*Electroacoustics - Sound calibrators*' and carries current NATA certification (or if less than 2 years old, manufacturers certification).

The monitor was calibrated before and after measurements and no significant deviation in calibration was noted.

5.3.4 Short-term noise measurement results

Results from the short-term noise measurements are summarised in Table 3 below.

Table 3: Summary of short-term noise measurements

Location (refer and Table 3)	Measurement date and time	$L_{eq,\ 15min}$ dB(A)	$L_{90,\ 15min}$ dB(A)
Location S1 Concordia Building on grade	28th November 2025 09:55am – 10:10am	72	61
Location S2 Cavendish driveway	28th November 2025 10:33am – 10:48am	54	43

6 Noise intrusion assessment

6.1 Noise intrusion criteria

6.1.1 State Environmental Planning Policy (Transport & Infrastructure) 2021 (T&ISEPP)

Stanmore Road on the Northern boundary of the main campus is marked red on the Transport for NSW (TfNSW) map 12D, indicating the requirement for a mandatory noise assessment under T&ISEPP (Refer to Section 6.1.3 for criteria). College Lane does not carry significant traffic and so façade treatments to the western side of the site will predominantly be to address aircraft noise intrusion.

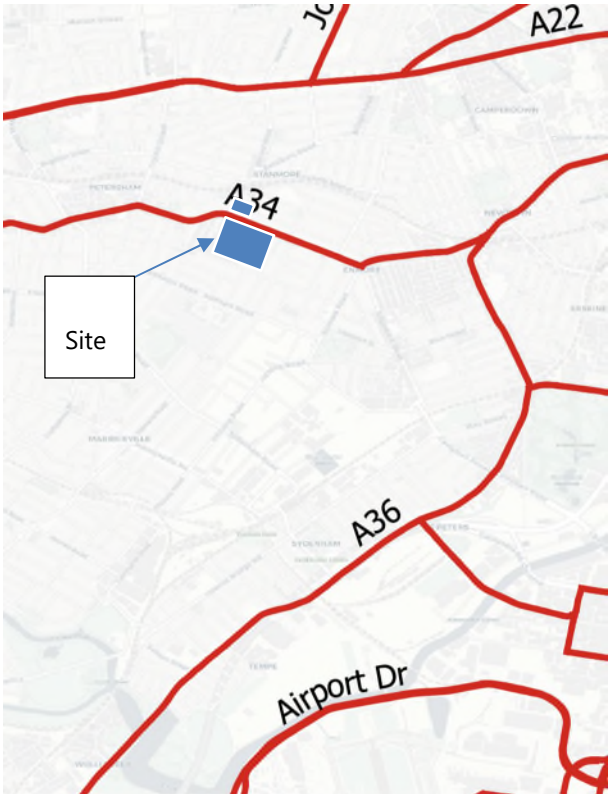


Figure 3 - Excerpt from TfNSW Map 12D, showing the site and Stanmore Road marked red

The NSW State Environmental Planning Policy (Transport &Infrastructure) 2021 (known as 'T&ISEPP') came into force in NSW in March 2022 to facilitate the effective delivery of infrastructure across the State. The aim of the policy includes identifying the environmental assessment category into which different types of infrastructure and services development fall and identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure.

Application of the T&ISEPP is mandatory for new educational establishments in or adjacent to road corridors carrying in excess of 20,000 vehicles per day (Clause 2.120). Pertinent to noise assessment, the T&SEPP Clause 2.120 is as shown overleaf:

2.120 Impact of road noise or vibration on non-road development

(1) This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

(a) residential accommodation,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or centre-based child care facility.

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

(3A) Subsection (3) does not apply to a building to which State Environmental Planning Policy (Housing) 2021, Chapter 3, Part 7 applies.

*(4) In this section, **freeway**, **tollway** and **transitway** have the same meanings as they have in the Roads Act 1993.*

6.1.2 Department of Planning publication 'Development near rail corridors and busy roads – Interim guideline'

To support the T&ISEPP, the DPIE, previously known as the Department of Planning, released the *Development in Rail Corridors and Busy Roads – Interim Guideline* (December 2008) ('ISEPP Guideline'). The ISEPP Guideline assists in the planning, design and assessment of developments in, or adjacent to, major transport corridors in terms of noise, vibration and air quality. While the T&SEPP is mandatory only to roads with an AADT greater than 20,000 vehicles, the ISEPP Guideline is also recommended for other road traffic noise affected sites.

For educational establishments, the internal noise goal is 40dB(A) L_{eq} (15hour/9hour). Given the noise exposure during the day period is greater than the night, the day period is the critical criterion for noise intrusion into the educational environment.

6.1.3 Clarification of T&ISEPP noise limits

The ISEPP Guideline clarifies the time period of measurement and assessment. Section 3.4 '*What Noise and Vibration Concepts are Relevant*' and Table 3.1 of Section 3.6.1 confirms that noise assessment is based over the following time periods:

Daytime 7:00am - 10:00pm $L_{Aeq(15hr)}$

Night-time 10:00pm - 7:00am $L_{Aeq(9hr)}$

The noise criteria nominated in the T&ISEPP apply to internal noise levels with windows and doors closed. However as the preliminary noise assessment is based on measurements/predictions at external locations, equivalent external noise criteria has been established. The equivalent external noise criterion is used to determine which areas of the development may require acoustic treatment in order to meet the internal noise requirements of the T&ISEPP. The equivalent external goals have been determined on the following basis:

The ISEPP Guideline states: "*If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia*." The internal screening test for the provision of supplementary ventilation is therefore 10dB(A) above the criteria explicitly outlined in the ISEPP when the windows are open for natural ventilation.

The generally accepted noise reduction through an open window from a free-field external position is 10dB(A). Windows/doors are assumed to be open no more than 5% of room floor area, in accordance with the Building Code of Australia (BCA) ventilation requirements. Table 4 presents the T&ISEPP and ISEPP Guideline internal noise criteria along with the equivalent external noise criteria for residential premises. Whilst only those buildings affected by noise from traffic on Stanmore Road require a mandatory assessment under the ISEPP, for consistency across the development the same project noise intrusion goals are proposed for all the educational uses (refer Table 4).

Table 4: ISEPP noise criteria for new education uses

Room	Location	$L_{Aeq, 15hr}$ Day 7am – 10pm[3]
Education	Internal, windows closed	40
	Internal, windows open	50
	Screening test for provision of alternative ventilation[2]	60

Notes: 1 Requisite for 40,000AADT Roads only under ISEPP 2007.

2 ISEPP Guideline states that where internal noise criteria are exceeded by more than 10dB(A) when the windows are open for natural ventilation, then alternative ventilation shall be provided. External screening test levels have been calculated on the basis of nominal 10dB(A) reduction through an open window to a free-field position. Windows open to 5% of floor area in accordance with the National Construction Code 2022 requirements.

3. Compliance in Day (7am -10pm) implies compliance with the same internal goal at night, when the traffic is quieter.

6.1.4 Australian/New Zealand Standard AS/NZS 2107:2016

It is proposed to utilise Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics - Recommended design sound levels and reverberation times for building interiors" (AS2107) to set design internal noise goals for spaces not implicated by the T&ISEPP. Based on advice received to date on the type of uses likely on site, the corresponding internal noise goals from AS2107 are presented in Table 5. If a proposed use is not included below, refer to AS2107 for guidance.

The sound levels given in this Standard are for the design of spaces in buildings and are provided as a range with a recommended lower level and upper level. Sound levels within the given ranges have been found to be acceptable by most people for the space under consideration. When the sound level is greater than the upper level of the range most people occupying the space will become dissatisfied with the level of sound. When the sound level is below the lower level of the range, the inadequacy of background sound to provide masking sound can become problematic, for example, by allowing other intermittent noise sources to cause distraction, annoyance, or lack of privacy.

Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics - Recommended design sound levels and reverberation times for building interiors" recommends design criteria for conditions affecting the acoustic environment within building interiors to ensure a healthy, comfortable and productive environment for the occupants and the users. The background sound levels recommended take into account the function of the area(s) and apply to the sound level measured within the space unoccupied but ready for occupancy. The Standard is applicable to steady-state or quasi-steady-state sounds such as mechanical services equipment and road traffic noise intrusion, but not intended for transient or variable sources such as aircraft noise, railways and construction noise. The reverberation times recommended are for the occupied state of the space.

Table 5: Design sound levels and reverberation times for different areas of occupancy in buildings

Item	Type of occupancy/activity	Design sound level (LAeq,t) range	Design reverberation time (T) range, s
1	**EDUCATIONAL BUILDINGS**		
	Art/craft studios	40 to 45	< 0.8
	Assembly halls up to 250 seats	30 to 40	0.6 to 0.8
	Assembly halls over 250 seats	30 to 35	Curve 1*
	Audio-visual areas	35 to 45	0.6 to 0.8
	Computer rooms –		
	Teaching	40 to 45	0.4 to 0.6
	Laboratories	45 to 50	0.4 to 0.6
	Conference rooms	35 to 40	0.6 to 0.7
	Corridors and lobbies	< 50	< 0.8
	Drama studios	35 to 40	0.6 to 0.7
	Engineering workshops -		
	Teaching	< 45	See Note 1
	Non-teaching	< 60	See Note 1

Item	Type of occupancy/activity	Design sound level (LAeq,t) range	Design reverberation time (T) range, s
	Weight training/Fitness room	< 50	< 1.0
	Interview/ counselling rooms	40 to 45	0.3 to 0.6
	Laboratories -		
	Teaching	35 to 45	0.5 to 0.8
	Working	40 to 50	0.5 to 0.8
	Lecture rooms up to 50 seats	30 to 35	Curve 3*
	Lecture theatres -		
	Without speech reinforcement	30 to 35	Curve 3*
	With speech reinforcement	30 to 40	Curve 3*
	Libraries		
	General areas	40 to 50	< 0.6
	Reading areas	40 to 45	< 0.6
	Manual art workshops	< 45	< 0.8
	Medical rooms (First Aid)	40 to 45	0.6 to 0.8
	Music practice rooms	40 to 45	0.7 to 0.9
	Music studios	30 to 35	Curve 2* (see Note 3)
	Office areas	40 to 45	0.4 to 0.7
	Professional and administrative offices	35 to 40	0.6 to 0.8
	Teaching spaces/single classroom -		
	Open plan teaching spaces	35 to 45	Curve 3* (see Note 1)
	Primary schools	35 to 45	Curve 3* (see Note 2)
	Secondary schools	35 to 45	Curve 3*
	Staff common rooms	40 to 45	< 0.6
	Staff studies/collegiate	40 to 45	0.4 to 0.6
	Sports hall	< 50	Curve 4*
	Toilet /change/showers	< 55	-
4	**SPORTS AND CLUBS BUILDING**		
	Indoor pools	50 to 60	< 2.0
	Indoor sports		
	With coaching	< 45	Curve 4*
	Without coaching	< 50	Curve 4*
	Leisure centre and gaming	40 to 50	Curve 4*
5	**OFFICE BUILDINGS**		
	Board and conferences rooms	30 to 40	0.6 to 0.8
	Cafeterias	45 to 50	< 1.0
	Call centres	40 to 45	0.1 to 0.4
	Corridors and lobbies	45 to 50	< 1.0
	Executive office	35 to 40	0.4 to 0.6
	General office areas	40 to 45	0.4 to 0.6

Item	Type of occupancy/activity	Design sound level (LAeq,t) range	Design reverberation time (T) range, s
	Meeting room (small)	40 to 45	< 0.6
	Open plan office	40 to 45	0.4 (see Note 1)
	Public spaces	40 to 50	0.5 to 1.0
	Quiet rooms	40 to 45	< 0.6
	Reception areas	40 to 45	0.6 to 0.8
	Rest rooms and break-out spaces	40 to 45	0.4 to 0.6
	Toilets	45 to 55	-
	Undercover carparks	<65	-
	Video/audio conference rooms	30 to 40	0.2 to 0.4
6	**PUBLIC BUILDINGS**		
	Airport terminals -		
	Departure lounges	45 to 50	Curve 1* (see Note 1)
	Luggage dispatch and collection areas	45 to 55	Curve 1* (see Note 1)
	Passenger check in areas	45 to 50	Curve 1* (see Note 1)
	Art galleries	40 to 45	See Note 1
	Auditoria -		
	Cabarets and theatre restaurants	35 to 40	Curve 1*
	Concert and recital halls	See Note 3	See Note 3
	Cinemas (see Notes 3 and 6)	30 to 35	Curve 1*
	Conference and convention centres -		
	Without sound reinforcement -		
	Up to 50 persons	35 to 40	Curve 1*
	From 50 to 250 persons	30 to 35	Curve 1*
	With sound reinforcement	35 to 45	Curve 1*
	Corridors and lobbies	45 to 50	0.6 to 0.8
	Courts -		
	Court rooms	30 to 35	Curve 1*
	Hearing rooms	30 to 40	Curve 1*
	Judges' chambers	35 to 40	0.4 to 0.6
	Mediation rooms	35 to 40	0.4 to 0.6
	Legal and interview rooms	40 to 45	0.4 to 0.6
	Video interview rooms	30 to 35	0.2 to 0.4
	Waiting areas	40 to 50	0.6 to 0.8
	Drama theatres (see Notes 3 and 6)	25 to 30	Curve 1*
	Exhibition areas	40 to 50	See Note 1
	Libraries -		
	Administrative office areas	40 to 45	0.6 to 0.8
	Reading areas	40 to 45	0.4 to 0.6
	Stack areas	45 to 50	0.6 to 0.8

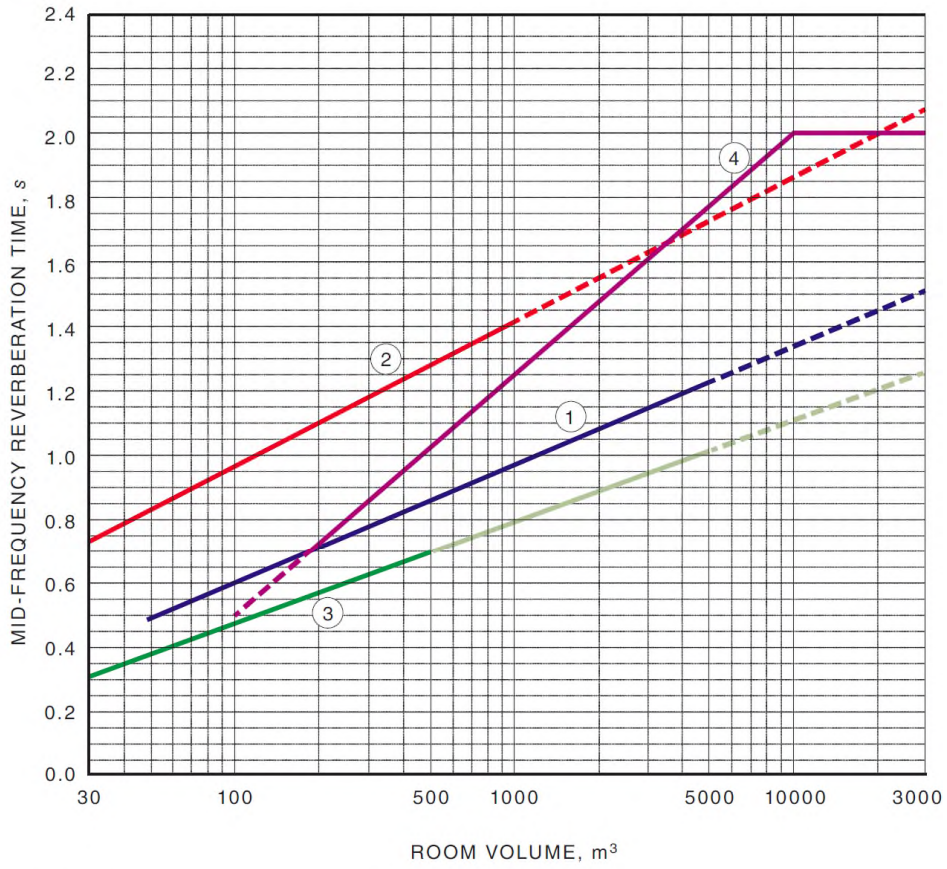
Item	Type of occupancy/activity	Design sound level (LAeq,t) range	Design reverberation time (T) range, s
	Workshop areas	45 to 55	0.4 to 0.6
	Municipal buildings -		
	Council chambers -		
	Without speech amplification system	30 to 35	Curve 1*
	With speech amplification system	35 to 40	Curve 1*
	Executive offices	35 to 40	0.6 to 0.8
	General offices	40 to 45	0.4 to 0.6
	Conference and meeting rooms	30 to 40	0.6 to 0.8
	Function areas	40 to 45	See Note 1
	Public spaces	40 to 50	< 0.8
	Museums (exhibition spaces)	40 to 45	See Note 1
	Opera halls	See Note 3	See Note 3
	Parking stations (carpark areas)	55 to 65	-
	Post offices and general banking areas	45 to 50	< 0.8
	Railway and bus terminals -		
	Ticket sales areas	45 to 50	0.6 to 0.8
	Waiting areas	45 to 55	See Note 1
	Restaurants and cafeterias -		
	Cafeterias	40 to 50	See Note 1
	Food courts	45 to 55	See Note 1
	Coffee shops	40 to 50	See Note 1
	Restaurants	40 to 50	See Note 1
	Sport clubs or clubrooms -		
	Bars	< 50	0.6 to 1.0
	Function areas	40 to 45	See Note 1
	Change rooms	< 50	-
	Theatres for operetta and musical plays	See Note 3	See Note 3
9	**STUDIO BUILDINGS (see Notes 3, 6 and 7)**		
	Drama studios	20 to 30	Curve 1*
	Film or television studios	25 to 30	0.3 to 0.7
	Music recording studios	20 to 25	Curve 2*
	Sound stages	20 to 25	See Note 3
	Voice over booth	25 to 30	0.2 to 0.4

* See Appendix A for all references to 'Curve' in this Table.

Item	Type of occupancy/activity	Design sound level (LAeq,t) range	Design reverberation time (T) range, s

NOTES:

1. Reverberation time should be minimized for noise control.
2. Certain teaching spaces, including those intended for students with learning difficulties and students with English as a second language, should have reverberation times at the lower end of the range.
3. Specialist advice should be sought for these spaces.
4. In situations where traffic noise levels may vary widely over a 24 h period, measurement to assess compliance with this Standard should be taken at the relevant time and for an appropriate measurement period according to the area of occupancy or activity in the building. Where traffic noise fluctuates rapidly with the passage of individual vehicles, the community reaction may not correlate well with the equivalent continuous noise level as measured.
5. The overall sound pressure level in dB(A) should conform to the recommended design sound level given in Table 1. In these spaces, a balanced sound pressure level across the full frequency range is essential. These spaces should therefore be evaluated in octave bands across the full frequency spectrum. The recommended maximum sound pressure levels for the individual octave bands corresponding to the overall dB(A) value are given in Appendix C.
6. In spaces in which high quality sound recordings are to be made, the levels set for low frequency octave bands should not be exceeded (see Appendix C). Subsequent replay of the recordings might cause an amplification of the low-frequency sound resulting in an overemphasis of its low-frequency components. Specialist advice should always be sought when these spaces are being designed. In some circumstances, for purposes of very high quality recording, lower levels than those in Table 1 may be necessary.



LEGEND:
Curve 1 = Speech/Lecture
Curve 2 = Music
Curve 3 = Teaching/Communication
Curve 4 = Sport

NOTE: The graphic in Figure A1 is based on DIN 18041.

FIGURE A1 MEAN REVERBERATION TIMES

6.1.5 Facade road traffic noise levels

Long term unattended noise monitoring was conducted on the site with a microphone protruding from Level 1 of Concordia. The following levels were measured.

The setback from Stanmore Road for the new Sevington Building (Stage 1 works) is approximately the same as the distance from the road traffic to the Concordia logger (L1), so noise levels are assumed to be the same.

Table 6 - Long-term unattended noise monitoring results

Location	Environmental Noise (at 1m from a façade[3]) dB(A) $L_{eq(period)}$	
	Day (7am -10pm)	Night (10pm – 7am)
L1- Stanmore Road (Front of Concordia)	74	72
L2- Rear of Concordia	65	59
L3- College Lane[2]	64	59

1. Periods are as defined by the NSW EPA Noise Policy for Industry. Day is 7am – 6pm Monday to Friday and 8am – 6pm Saturday, Sunday and Public Holidays; Evening is 6pm – 10pm daily; Night is 10pm – 7am Monday to Friday and 10pm-8am Saturday, Sunday and Public Holidays.
2. College Lane levels are from November/December monitoring.
3. Includes façade reflection (+2.5dB is added to loggers located in the free field)

Table 7 – Predicted levels at facade

Location	Environmental Noise (at 1m from a façade[2]) dB(A) $L_{eq(period)}$	
	Day (7am -10pm)	Night (10pm – 7am)
East and West facades of Sevington (north half)	71	69
East and West facades of Sevington (south half)	68	66
East and West facades of Concordia (south half)	71	69
East and West facades of Concordia (north half)	68	66

1. Periods are as defined by the NSW EPA Noise Policy for Industry. Day is 7am – 6pm Monday to Friday and 8am – 6pm Saturday, Sunday and Public Holidays; Evening is 6pm – 10pm daily; Night is 10pm – 7am Monday to Friday and 10pm-8am Saturday, Sunday and Public Holidays.
2. Includes façade reflection (+2.5dB is added to loggers located in the free field)

Taking into account -2.5dB correction to free field at façade, the traffic noise reduction required for education uses fronting to Stanmore road is (71-40=31).

The façade constructions will need to satisfy the more stringent out of the requirements for aircraft and traffic noise intrusion, and external noise emissions to neighbours.

6.2 Aircraft noise intrusion

The site is located approximately 3.5km to the north of the Sydney's Kingsford Smith Airport, essentially directly over the site. From our site inspections it was observed that the development is most affected by aircraft movement on the main north-south runway, namely take offs to the north from the 34L runway and landings to the south on runway 16R. The Australian Standard AS2021-2015 – "Acoustics –

Aircraft Noise Intrusion – Building Siting and Construction" provides internal design noise levels, zoning information and guideline for evaluating aircraft noise impacts on residential and commercial buildings.

Table 8 below is an extract of Table 2.1 in AS2021-2015 with the building types relevant to this assessment.

Table 8: Building Site Acceptability Based on ANEF Zones (Table 2.1 – AS2021-2015)

Building Type	ANEF Zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
School, university	Less than ANEF 20	20 to 25 ANEF	Greater than 25 ANEF

The Standard also recommends the following internal design noise levels for the proposed residential development:

Table 9: Recommended Maximum Internal Aircraft Noise Levels (Table 3.3 – AS2021-2015)

Building Type and Activity	Indoor design aircraft sound level, LA,max dB(A)
Schools, universities	
Libraries, study areas	50
Teaching areas, assembly areas	55[1]
Workshops, gymnasia	75
Hotels, motels, hostels	
Social activities[2]	70

1.Consider the spatial usage as certain activities may be more noise sensitive and 50dB(A) may be more desirable.

2. Most applicable criterion for the Function spaces in Sevington Pavillion and Sevington.

The above sound levels are the maximum levels from an aircraft flyover which, when heard inside the specified area by the average listener will be judged as not intrusive or annoying by that listener.

6.2.1 ANEF Zoning

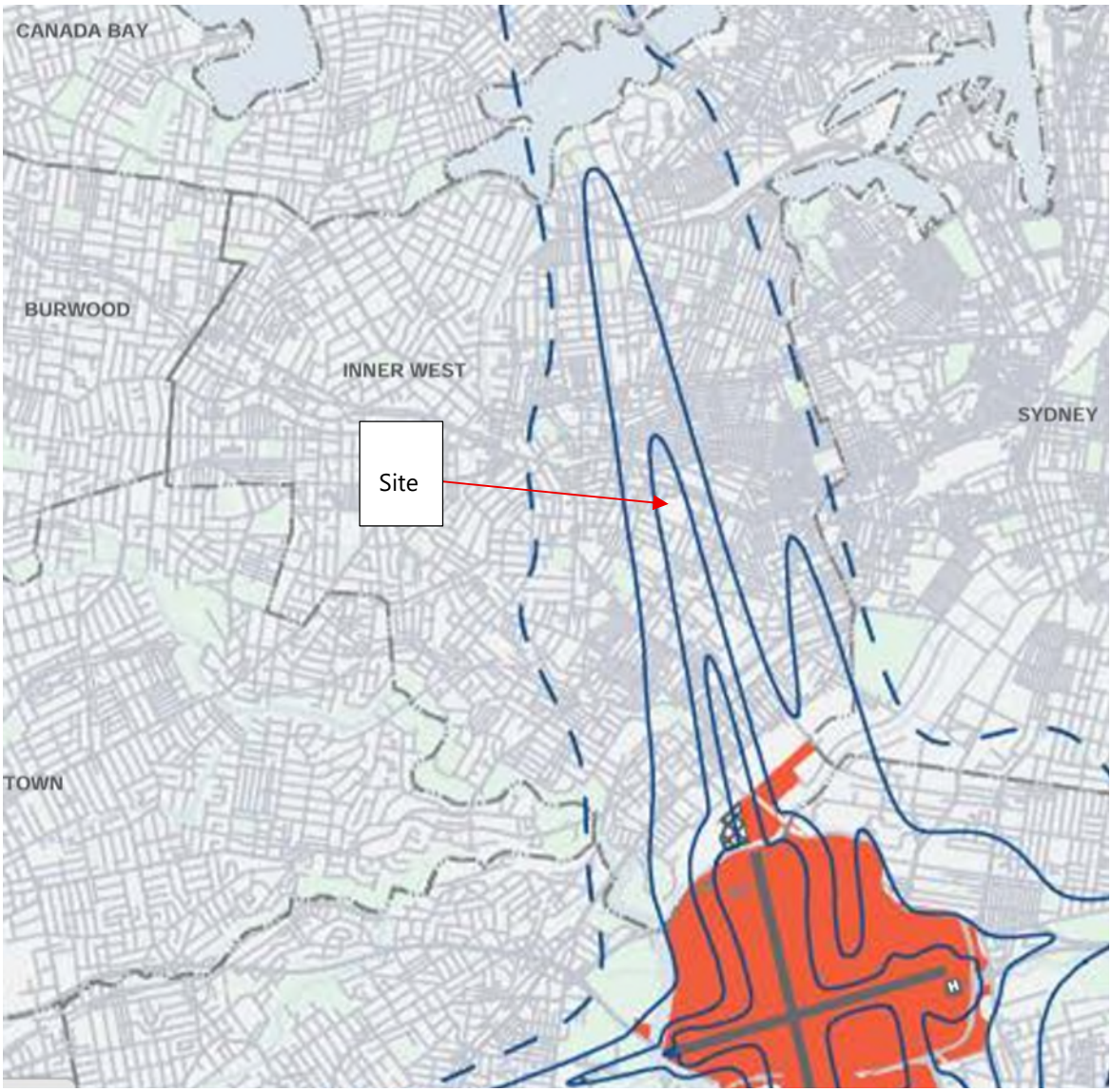
The current ANEF map for Kingsford Smith Airport is the ANEF 2039.

The applicable noise exposure zones obtained from the ANEF contours are summarised in Table 10

Table 10: Location of Site Relevant to Aircraft Noise Exposure Charts

Assessment Chart	ANEF Zone
ANEF 2039	30-35

According to the ANEF map, the residential component of the property lies within the **Unacceptable** zone nominated in Australian Standards AS2021-2015 – "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction". However, given that the site already includes the existing school, they are aware of the acoustic environment, and noise intrusion can be controlled with façade treatments etc.



6.2.2 Aircraft Noise Levels

Aircraft noise exposure levels were calculated for the development site based on Australian Standard AS2021-2015.

To determine resultant aircraft noise levels the following factors were considered as specified in the Standard;

- The site's position relative to each runway, including take-off and landing distances and runway centre line offsets;
- Elevation of the site compared with the elevation of the runways; and,
- Type of aircraft and associated maximum noise level during take-off and landing.

Using these factors, the resultant maximum noise levels were determined for each aircraft type. This calculation is not based on ANEF contours but on the location of the site relative to the runways.

It has been determined that the aircraft operation on the main north-south runway (runway 34L for departure) impacts most onto the proposed development site.

Clause 3.1.4 of the Standard, "where there is evidence that the particular aircraft type and movement which produced that noise level do not constitute a typical operation, then the noise level can be ignored and the next lowest noise level selected".

In accordance with the above Clause, aircraft operations not constituting a typical operation have been excluded from this study. In this case, the upper 5% of movements are assumed to "not constitute a typical operation" and were excluded.

Based on published aircraft noise levels in the Standard AS2021-2015, the maximum external noise levels resulting from aircraft flyovers has been determined.

The table below shows the maximum design noise level at the development site.

Table 11: Maximum Noise Levels at Assessment Location as per AS2021

Aircraft Type	Maximum Noise Level dB(A)	
	Arrivals (Runway 16R)	Departure (Runway 34L - long-range curved flightpath)
Boing 777-300	82	79
Airbus A330	81	79
Airbus A380	81	75
Boeing 737-800	80	77

The maximum external aircraft noise levels resulting from aircraft flyovers have been calculated in accordance with AS2021-2015. Accordingly, the design noise level at the subject site is 82dB(A).

It should be noted that variations in flight paths and aircraft operational characteristics may generate external noise levels greater than calculated here. The accuracy of noise calculations made in accordance with the AS2021-2015 has been the subject of discussion by the Association of Australian Acoustical Consultants (AAAC) and communicated to various Council's affected by aircraft noise.

The required aircraft noise reductions (ANR) for areas in the proposed development are as follows:

Table 12: Required Aircraft Noise Reduction for the Proposed Development

Area	Required ANR
Schools, universities	
Libraries, study areas	32
Teaching areas, assembly areas	27
Workshops, gymnasia	7

The external noise levels are used to calculate the expected internal noise level by taking into account the sound attenuation provided by the building facade. Where internal noise levels exceed the criteria

nominated in AS2021-2015, noise mitigation can be implemented using well-established noise control methods such laminated glass and treatment to the facades, roof and ceiling.

6.3 Recommended façade treatments for road and aircraft noise control

This section presents the indicative façade requirements for the control of road traffic noise and aircraft noise intrusion. The treatments outlined below for the Concept Proposal and Stage 1 are subject to confirmation in the detailed design phase.

Sevington Building and Pavillion – all the GLA, the gymnasium (intended to be multi-purpose), staff room - **12.38mm laminated glazing (Rw37)**. External walls and concrete roof are to be nominally minimum 180mm concrete, or acoustically equivalent alternative.

Sevington Pavillion - ground floor Function and Auditorium – **12.5vlam hush** for all the fixed (Rw39) and hinged glazing (Rw36). External walls and concrete roof are to be nominally minimum 180mm concrete, or acoustically equivalent alternative. With the large proportion of hard walls, it is recommended that the ceilings be absorptive with an NRC >0.8 for the maximum possible extent, and that the solid walls are lined with absorptive with an NRC >0.8 for the maximum possible extent. Client may consider Acoustic Blinds and Curtains sheer curtains (or equal) to assist with reverberant noise control in those spaces (to be refined in Detailed Design).

Similar levels of glazing construction (R_w 37-39) will be required for the Centenary Hall Stage 2 works noise intrusion mitigation – but the light weight roof, walls and suspended floor (open to outside air beneath) will require detailed review. We anticipate compliance with the internal noise goals of AS2021:2015 is achievable subject to detailed design.

Similar glazing constructions (R_w 37) and concrete roof construction would also be required for College Lane building Stage 3 (the GLA Building just north of Centenary Hall and west of the Chapel).

Concordia GLAs are likely to require glazing in the order of 12.38mm lam, unless thicker is required for the control of breakout to neighbours.

Concordia auditorium has been thoughtfully shown with an outer and inner skin – given the high aircraft and traffic noise levels incident on the site, this approach allows both skins to contribute to the building shell performance (which will assist for both noise in and noise out). Particular constructions will be determined in the detailed design phase.

7 Operational noise emission assessment

Newington College typical operating hours are outlined below noting that some functions and activities occur outside of these hours from time to time:

- 6.00am to 6.00pm Monday to Friday
- 7.00am to 5.00pm Saturday

Newington College start and finish times are outlined below:

- Start bell 8.25am for 8.30am start
- Finish bell 3.20pm

No changes are proposed to school hours as part of this SSDA.

External noise emissions from the operation of mechanical plant and equipment and vehicles being driven on site shall be designed for compliance with the NSW Environment Protection Authority (EPA) Noise Policy for Industry (NPfI), where reasonable and feasible. Criteria have been defined at the critical locations based on the Concept Proposal and detailed Stage 1 works.

Noise from detailed Stage 1 works at the Sevington Courts for sporting activities on the site shall be assessed with reference to the NSW EPA Environmental Noise Control Manual. These criteria are only relevant to.

The following sections present assessments of the operational noise emissions, with detail commensurate with the design resolution i.e. Stage 1 Sevington Courts and Pavillion is the SSDA detailed Stage 1 portion of the application, whilst Stage 2 to 6 are the Concept Proposal.

As presented in Section 5.2.3, unattended noise monitoring data relied on in this assessment are broken down as follows:

- L1 is representative of residential receivers on Stanmore Road, adjacent to and opposite Newington College.
- L2 is representative of residential receivers shielded from Stanmore Road i.e. Cavendish Road receivers.
- L3 is representative of residential receivers on College Lane.

7.1 Anticipated schedules of use

7.1.1 Detailed Stage 1 - Sevington Courts and Pavillion

The College has identified opportunities for shared use of the new Sevington facilities with the broader community in Stanmore. As outlined below, the Sevington facilities will be available for hire outside of school hours and when not in use by the College for sport and extracurricular activities.

Facility	Hours of Operation
Sevington Development, including: Indoor courts Rooftop courts Gymnasium Classrooms	When not in use by Newington College: Monday to Friday 6pm-10pm Saturday and Sunday 5pm – 8pm

Notwithstanding the typical operating hours identified in Section 7, the following table presents the various uses based on maximum hours of operation available to assess worse-case noise impacts during operation of the new facilities. As outlined above, some functions and activities may occasionally take place outside the typical operating hours.

Table 13 - Schedule of usage - Stage 1 - Sevington Courts Building

SEVINGTON COURTS REDEVELOPMENT				
SPACE	**MODE**	**FREQUENCY**	**HOURS OF OPERATION**	**PATRON / USER CAPACITY**
Basement Carpark		Mon - Sun	05:30 - 23:00 Mon-Fri 06:30-21:00 Sat - Sun	100 Car spaces (for staff, students and visitors)
Level 01				
Fitness Centre	Physical education / Student sport	Mon - Sun	06:00 - 18:00 Mon-Fri 07:00 - 17:00 Sat - Sun	
GLAs	Student Learning		07:00 - 17:00 Mon-Fri 07:00 - 17:00 Sat-Sun	
Fitness Centre and GLAs	Community Use (after school hours)		18:00 - 22:00 Mon-Fri 17:00 - 20:00 Sat-Sun	
Level 02				
Sports Courts	Physical education / Student sport	Mon - Fri	06:00 - 18:00 Mon-Fri	
	Sports competitions vs External Schools	Mon – Sun	07:00 – 17:00 Mon – Fri 07:00 – 17:00 Sat-Sun	
	Student Gathering non sport use	Mon - Fri	06:00 - 18:00 Mon-Fri	
	School Assembly	Once per week during school terms	2 hours between 08:00 – 16:00 (weekday only)	up to 2100-2200 people
	Community use (after school hours)	Mon - Sun	18:00 - 22:00 Mon-Fri 17:00-20:00 Sat-Sun	

SEVINGTON COURTS REDEVELOPMENT				
Function Space	School related use	Mon - Sun	06:00 - 20:00 Mon-Fri 07:00 -17:00 Sat - Sun	
	Community use	Mon - Sun	18:00 - 22:00 Mon-Fri 17:00 - 20:00 Sat - Sun	
Level 03				
Function Space	School related use	Mon - Sun	06:00 - 20:00 Mon-Fri 07:00 - 17:00 Sat - Sun	
Function Space	Community use	Mon - Sun	18:00 - 22:00 Mon-Fri 17:00 - 20:00 Sat - Sun	
Level 04				
Staff Room	School related use only	Mon - Sun	06:00 - 18:00 Mon-Fri 07:00 - 17:00 Sat - Sun	Approx 12 max occupants
Level 05				
Rooftop Sports Courts	Physical education classes	Mon - Fri	08:30 -15:30 Mon-Fri	350 max Capacity
	Sports training and competitions	Mon - Sun	06:00 - 08:30 & 15:30 – 18:00 Mon – Fri 07:00-17:00 Sat - Sun	350 max Capacity
	Community Function and / or non-sport use	Daily Mon - Sun	18:00 - 20:00 Mon-Fri 17:00 - 20:00 Sat - Sun	350 max Capacity
	Special Events (School related)	Occasional events	17:00 - 22:00 Mon-Fri 17:00 - 22:00 Sat	350 max Capacity
Outdoor Learning Spaces	As per rooftop sports	As per rooftop sports	As per rooftop sports	Capacity included in sports courts figure above
Pavilion				
Function space	School related use	Mon - Sun	06:00 - 22:00 Mon-Fri 07:00-20:00 Sat - Sun	Approx 60 people
	Community use	Mon - Sun	18:00 - 22:00 Mon-Fri 17:00 - 20:00 Sat - Sun	Approx 60 people
GLAs	Student Learning	Mon - Sun	07:00 - 18:00 Mon-Fri	24 Students per class room
Staff Rooms	School related use only	Mon - Sun	06:00 - 18:00 Mon-Fri 07:00-17:00 Sat - Sun	Approx 12 max occupants

We have assumed that the carpark may be used up to 30minutes prior to commencement of use of the Sevington Building, and up to 60 minutes after. The usage of the carpark would align with the College's typical usage of the internal and rooftop spaces i.e. typically 06:00 – 18:00 Monday to Friday and 07:00-17:00 Saturday and Sunday, however occasional functions and activities, and community use may occur outside of these hours as identified above. The hours of use for the basement carpark account for staff/students arriving a little early to set up, or staying back after use to pack down the spaces after conclusion of use (e.g. storing chairs or sporting nets etc) before returning to their vehicles and exiting the site. From the traffic engineer's assessment, the peak usage would be for arrivals 7:15am – 8:15am and departures 3:30-4:30pm.

7.1.2 Concept Proposal

7.1.2.1 Stage 2 – Centenary Hall

REFURBISH CENTENARY HALL				
SPACE	**MODE**	**FREQUENCY**	**HOURS OF OPERATION**	**PATRON/ USER CAPACITY**
Centenary Hall	Musical performance for parents/community	Up to twice per term (8 times per year)	In the window 08:00-22:00 but typically 18:00-22:00	450 guests (plus staff coordinating and students performing)
Centenary Hall	Musical practice	School Days and Saturdays	06:00-20:00 Mon-Fri 07:00-19:00 Sat	No audience. Staff coordinating and students performing
Centenary Hall Cafeteria	Musical performance for parents/community	Up to twice per term (8 times per year)	In the window 08:00-20:00	450 guests before event or in intermission (plus staff coordinating, typically xx people)
Centenary Hall Cafeteria	Normal	Week days	07:00-18:00	200 approx

7.1.2.2 Stage 3 – new College Lane building

NEW COLLEGE LANE BUILDING				
SPACE	**MODE**	**FREQUENCY**	**HOURS OF OPERATION**	**PATRON/ USER CAPACITY**
Ground				
GLAs	Student Learning	Daily Mon - Sun	06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room
Level 01				
GLAs	Student Learning	Daily Mon - Sun	06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room
Level 02				
GLAs	Student Learning	Daily Mon - Sun	06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room
Level 03				
GLAs	Student Learning	Daily Mon - Sun	06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room

7.1.2.3 Stage 6 Concordia Redevelopment

CONCORDIA REDEVELOPMENT				
SPACE	**MODE**	**FREQUENCY**	**HOURS OF OPERATION**	**PATRON/ USER CAPACITY**
Basement Carpark			05:30 - 23:00 Mon-Fri 06:30 - 21:00 Sat-+Sun	60 Car spaces
Ground Floor				
Lecture Hall	Musical performance for parents/community	Up to twice per term (8 times per year)	06:00-20:00 Mon-Fri 07:00-22:00 Sat	Approx 250 occupants (plus staff)
Multipurpose Hall			06:00-18:00 Mon-Fri 07:00-17:00 Sat	190 max capacity depending on mode
Level 01				
GLAs			06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room
Level 02				
GLAs			06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room
Level 03				
GLAs			06:00 - 18:00 Mon-Fri 07:00-17:00 Sat	24 Students per class room

7.2 Noise emission assessment guidelines & policies

7.2.1 Road Noise Policy assessment criteria - residential land uses

Table 3 of the RNP, which is repeated in Table 14 below, sets out the assessment criteria for residences to be applied to particular types of project, road category and land use. These criteria are for assessment against façade corrected noise levels when measured in front of a building facade. In Table 3 of the RNP, freeways, arterial roads and sub-arterial roads are grouped together and attract the same criteria.

Table 14: Road traffic noise assessment criteria for residential land uses

Road category	Type of project/land use		Assessment criteria – dB(A)	
			Day 7:00am-10:00pm	**Night 10:00pm-7:00am**
Freeway/ arterial/ sub-arterial roads	1.	Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq,(15\ hour)}$ 55 (external)	$L_{Aeq,(9\ hour)}$ 50 (external)
	2.	Existing residences affected by noise from redevelopment of existing freeway / arterial / sub-arterial roads	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)
	3.	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day 7:00am-10:00pm	Night 10:00pm-7:00am
Local roads	4. Existing residences affected by noise from new local road corridors	$L_{Aeq,(1\ hour)}$ 55 (external)	$L_{Aeq,(1\ hour)}$ 50 (external)
	5. Existing residences affected by noise from redevelopment of existing local roads		
	6. Existing residences affected by additional traffic on existing local roads generated by land use developments		

Note: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for sensitive developments near busy roads (refer to Appendix C10 of the RNP).

Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

For existing residences and other sensitive land uses affected by *additional traffic on existing roads generated by land use developments*, any increase in the total traffic noise level (where the assessment criteria cannot be achieved) should be limited to 2 dB above that of the corresponding 'no build option'.

Given that the Concordia noise monitors recorded greater than the RNP targets, we would be seeking to not increase the existing by more than 2dB.

7.2.2 Noise emissions from school operational activities

The Sevington Courts Building is going over the top of existing sports courts. A similar quantum of courts is then moved up to the roof of the building, and there is the provision of the new hall for indoor sports activities. The school seeks approval to use the sports courts (both the rooftop and indoor) for assemblies.

We note that use of the rooftop for assemblies would be limited due to noise from aircraft flyovers – but the intention would be for those assemblies to be informal year group meetings or similar.

The Pavillion includes a small auditorium and function room.

There are no formal policy requirements for noise emissions from the use of schools (Reference: Meriden School v Pedavoli 2009 NSWLEC 183). Whilst the NSW EPA Noise Policy for Industry (NPfI) is a useful policy for industrial type noises, it was not designed for the management of sporting facilities.

7.2.2.1 Noise from detailed Stage 1 sporting facilities

This section relates to sporting uses of the Sevington Courts building i.e. part of the detailed Stage 1 works. Whilst there are no formal numerical requirements for the noise emissions from use of a school, it is reasonable to assess noise emissions, to consider potential operational noise emission levels and to nominate feasible and reasonable measures to mitigate noise emissions.

Noise from sporting facilities was addressed in the NSW EPA Environmental Noise Control Manual (ENCM). The NSW EPA Noise Guide for Local Government (2007) states that whilst the ENCM "...has been superseded by other DEC policy documents... it may still be a useful source of information for councils developing a policy or dealing with a particular noise issue."

The ENCM Chapter 159 relates to noise from sporting activities.

ENCM Chapter 159 - Lawful Sporting Activities

For the purposes of this Guideline "lawful sporting activities" are broadly divided into three parts:

(i) athletic sporting events (see below),

(ii) motorised sporting events (see chapter 152),

(iii) shooting ranges (chapter 164).

ATHLETIC SPORTING EVENTS

Athletic sporting events involve crowds gathering to participate in or watch sporting competitions such as tennis, football and BMX races.

The primary sources of noise from such events are public address systems and crowd noise including arrival and departure.

The control of noise from public address systems is described in chapter 156.

The extent to which athletic sporting activities cause noise in residential areas can be minimised firstly by appropriate planning of the venue site. Thereafter, control usually is most equitably and effectively achieved by regulation of the frequency and duration of events

The following criteria should be considered as guidelines only and variations may be made according to local conditions

Time Restrictions

Where offensive noise occurs, athletic sporting events should be restricted to:

7 am to 6 pm any weekday

8 am to 6 pm Saturdays and Sundays

6 pm to 10 pm two nights per week excluding Sundays or Public Holidays

Where no offensive noise is likely to be caused, restrictions are not applicable.

The number of nights per week could be extended to all nights except Sunday if the intrusive noise level (L_{A10} for the activity measured over 15 minutes at the affected receiver) does not exceed the background noise level (L_{A90}) by more than 5 dB(A) for new events or 10 dB(A) for existing activities.

- *No impulsive or intermittent correction shall be applied to the measured levels.*
- *The abovementioned hours may be extended to 11 pm provided intrusive noise does not exceed the background noise level. This applies to both new and existing activities.*
- *Noise should be inaudible between 11 pm and 8 am.*
- *Noise means noise from the sport itself and the associated activities including the use of sound reproduction equipment.*
- *Participants should be encouraged by the management to leave the premises quickly and quietly at night to lessen the likelihood of noise complaints.*

To allow for special events such as state, national or international competitions, the EPA will consider applications for extension of these times for up to three weekends per year.

Whilst the ENCM proposes a screening test of L_{A10} = BG + 5 for new uses and BG + 10 for existing uses, we propose a screening test of sport noise emissions from the school grounds of L_{Aeq} = BG + 10 during the day and evening (7am – 10pm) and L_{Aeq} = BG + 5 in the morning shoulder (6-7am Monday - Friday and 6-8am Saturday, Sunday and public holidays).

Based on the results of monitoring at Concordia, the following table presents the proposed screening tests.

Table 15 – Screening test for school operational noise emissions

Location	Time of Day	Rating Background Noise Levels[1] dB(A) $L_{90\ (15min)}$	School Operational Noise Emissions Screening Test LAeq (dB)
Stanmore Road residential receivers opposite	Day	60	BG + 10 = 70
	Evening	59	BG + 10 = 69
	Night	41	Not in use 10pm – 6am
	Morning shoulder (6am – 7am)	55	BG + 5 = 59

1. Periods are as defined by the NSW EPA Noise Policy for Industry. Day is 7am – 6pm Monday to Friday and 8am – 6pm Saturday, Sunday and Public Holidays; Evening is 6pm – 10pm daily; Night is 10pm – 7am Monday to Friday and 10pm-8am Saturday, Sunday and Public Holidays. Morning shoulder is 6am – 7am, also applicable to 6am – 8am Saturday, Sunday and Public Holidays.

7.2.3 Noise from the use of licensed premises to residential receivers

It could be possible for alcohol to be served at events/functions in either the detailed Stage 1 works or the Concept Proposal, but the outcome is the same in either case. Noise from the use of a licensed premises impacting neighbouring residential receivers (external to the site) would usually be assessed for compliance with the Liquor and Gaming NSW (L&GNSW) standard LA10 noise criteria. However, with school functions, it tends to be the catering service who brings the capacity to serve alcohol on the site rather than a school itself having dedicated licensed areas. As such, no “licensed premise" noise assessment is required for detailed Stage 1 works and similarly for the Concept Proposal (no permanent liquor licensed areas are anticipated at this time).

7.2.4 Industrial type noise - NSW Noise Policy for Industry

Noise impact from services plant and equipment and vehicles being driven on the site is assessed in accordance with the NSW ‘Noise Policy for Industry’ (NPfI), 2017. The assessment procedure has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level which is the lower value of the project intrusiveness noise levels and project amenity noise levels.

As presented in Section 5.2.3, unattended noise monitoring data relied on in this assessment are broken down as follows:

- L1 is representative of residential receivers on Stanmore Road, adjacent to and opposite Newington College. Whilst L1 was at Concordia building, the data is still representative of the acoustic environment opposite Sevington courts.

- L2 is representative of residential receivers shielded from Stanmore Road i.e. Cavendish Road receivers.

- L3 is representative of residential receivers on College Lane.

These criteria apply to both detailed Stage 1 works and Concept Proposal works. An in-principle assessment of key plant items has been undertaken for detailed Stage 1 works only.

7.2.4.1 Project intrusive noise levels

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the LAeq,15min descriptor) does not exceed the background noise level measured in the absence of the source by more than 5dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15minute}$ Intrusiveness noise level = Rating Background Level ('RBL') plus 5dB(A)

Based on the background noise monitoring results and the proposed operating hours of the facility, the intrusiveness noise levels for residential receivers are reproduced in Table 16 below.

Table 16: Intrusiveness noise levels

Receiver	Intrusiveness noise level, LAeq,15min			
	Day	Evening	Night	Morning Shoulder
Stanmore Road Residences	60 + 5 = 65	59 + 5 = 64	41 + 5 = 46	50 + 5 = 55
Cavendish Road Residences	40 + 5 = 45	38 + 5 = 43	34 + 5 = 39	38 + 5 = 43
College Lane Residences	42 + 5 = 47	42 + 5 = 47	33 + 5 = 38	36 + 5 = 41

Notes: Day: 7:00 to 18:00 Monday to Saturday and 8:00 to 18:00 Sundays & Public Holidays
Evening: 18:00 to 22:00 Monday to Sunday & Public Holidays
Night: 22:00 to 7:00 Monday to Saturday and 22:00 to 8:00 Sundays & Public Holidays
Morning shoulder is 5am – 7am

7.2.4.2 Amenity noise levels

The project amenity noise levels for different time periods of day are determined in accordance with Section 2.4 of the NPfI. The NPfI recommends amenity noise levels (LAq,period) for various receivers including residential, commercial, industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended amenity noise levels" represent the objective for total industrial noise experienced at receiver location. However, when assessing a single industrial development and its impact on an area, "project amenity noise levels" apply.

The recommended amenity noise levels applicable for the surrounding area are reproduced in Table 17 below.

Table 17: Project amenity noise levels (potentially relevant)

Type of Receiver	Noise Amenity Area	Time of Day	Recommended amenity noise level, L_{Aeq}, dB(A)
Residential	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom (internal)	All	Noisiest 1-hour period when in use	35

Type of Receiver	Noise Amenity Area	Time of Day	Recommended amenity noise level, L_{Aeq}, dB(A)
Hospital ward	All		
Internal		Noisiest 1-hour	35
external		Noisiest 1-hour	50
Place of worship (internal)	All	When in use	40
Passive recreation (e.g. national park)	All	When in use	50
Active recreation (e.g. school playground, golf course)	All	When in use	55

Notes: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.

On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

LAeq,period Project amenity noise level = LAeq,period Recommended amenity noise level – 5dB(A)

Furthermore, given that the intrusiveness noise level is based on a 15 minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the LAeq,period level to a representative LAeq,15minute level in order to standardise the time periods.

LAeq,15minute = LAeq,period + 3dB(A)

The project amenity noise levels (LAeq, 15min) applied for this project are reproduced in Table 18 below, based on a 'suburban' noise amenity area.

Table 18 Project amenity noise levels

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Noise Level, dB(A)	
			$L_{Aeq,\ Period}$	$L_{Aeq,}$ 15min
Residence	Urban	Day	60 – 5 = 55	55 + 3 = **58**
		Evening	50 – 5 =45	45 + 3 = **48**
		Night	45 – 5 = 40	40 + 3 = **43**
	Suburban	Day	55 – 5 = 50	50 + 3 = **53**
		Evening	45 – 5 = 40	40 + 3 = **43**
		Night	40 – 5 = 35	35 + 3 = **38**

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Noise Level, dB(A)	
			$L_{Aeq, Period}$	$L_{Aeq, 15min}$

Notes: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

High levels of transport noise, particularly road traffic noise can provide masking for industrial noise. Section 2.4.1 of the NPfI presents alternative Amenity noise levels in areas where there are high levels of existing traffic noise levels (and the traffic noise is unlikely to decrease in the future). A site can qualify for the alternative criteria if the existing traffic noise level is 10dB or more above the recommended amenity noise level for the area.

The High Traffic Project Amenity Noise Level = $L_{Aeq\ period\ (traffic)}$ minus 15dB(A)

Residential receivers	Noise Amenity Area	Time of Day	Existing traffic noise level $L_{Aeq, Period}$	Qualifies high traffic?	Project Amenity Noise Level, dB(A) $L_{Aeq, Period}$	Project Amenity Noise Level, dB(A) $L_{Aeq, (15min)}$
Stanmore Road	Urban	Day	72	Yes	72 - 15 = 57	57 + 3 = 60
		Evening	71	Yes	71 - 15 = 56	56 + 3 = 59
		Night	68	Yes	68 – 15 = 53	53 + 3 = 56
		Morning shoulder (5-7am)	72	Yes	72 - 15 = 57	57 + 3 = 60

Notes: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am. Morning shoulder is 5-7am.
On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

7.2.4.3 Project noise trigger levels

In accordance with the NPfI the project noise trigger levels, which are the lower (i.e. more stringent) value of the project intrusiveness noise level and project amenity noise level, have been determined as shown in Table 19 below.

Table 19 Project noise trigger levels

Receiver Location	LAeq, 15min Project noise trigger levels, dB(A)			
	Day	Evening	Night	Morning Shoulder
Residential Receivers Stanmore Road	60	59	46	55
Residential Receivers Cavendish Street (shielded from Stanmore Road)	45	43	38	43
Residential Receivers College Lane	47	43	38	41

Receiver Location	LAeq, 15min Project noise trigger levels, dB(A)			
	Day	Evening	Night	Morning Shoulder

Notes: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

7.2.4.4 Sleep disturbance noise levels

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. In accordance with NPfI, a detailed maximum noise level event assessment should be undertaken where the subject development night-time noise levels at a residential location exceed:

- LAeq,15min 40dB(A) or the prevailing RBL plus 5dB, whichever is the greater, and/or
- LAFmax 52dB(A) or the prevailing RBL plus 15dB, whichever is the greater.

Where there are noise events found to exceed the initial screening level, further analysis is undertaken to identify:

- The likely number of events that might occur during the night assessment period,
- The extent to which the maximum noise level exceeds the rating background noise level.

The sleep disturbance noise levels for the project are presented in Table 20.

Table 20: Sleep disturbance assessment levels

Receiver type	Assessment Level LAeq,15min	Assessment Level LAFmax
Stanmore Rd Residences	41 + 5 = 46	56
Cavendish St Residences (shielded from Stanmore)	(34 + 5 = 39) 40	53
College Lane Residences	38 + 5 = 43	54

7.3 Assessment of operational noise emissions

Assessment of operational noise intrusion from the operation of the school are assessed herein. Detailed assessment is provided for the detailed Stage 1 works i.e. Sevington Courts Building sports and activity use, and in-principle assessment is presented for noise emissions from the services plant and equipment. These will be refined during the detailed design phase.

7.3.1 Noise from traffic generated by the development

Traffix have prepared a Transport & Accessibility Impact Assessment (reference: 20.38r02v02). In that report they advise that the school currently provided a total of 88 off-street parking spaces within various areas of the campus including:

- 38 at the Concordia Building (accessed via Stanmore Road and Cavendish Street). Of those, approximately 18 are accessed via the entry/exit driveway to/from Cavendish Street.
- 19 staff spaces and 8 visitor spaces on grade adjacent to the existing Sevington Courts (accessed via Stanmore Road)
- 15 staff spaces on the Internal Road (accessed via Stanmore Road)
- 3 visitor spaces and 3 other uses at the Founders Building
- 2 staff spaces at the Centenary Building.

The development (across the detailed Stage 1 and the Concept Proposal) will provide the following off-street parking space post Stage 6 – Concordia Redevelopment (total of 177 spaces in the ultimate development):

- 163 x staff parking spaces comprising;
    - 92 x spaces under Sevington;
    - 60 x spaces under Concordia;
    - 9 x spaces near Stanmore Road exit;
    - 2 x spaces near Centenary.
- 11 x visitor parking spaces comping;
    - 3 x spaces near Founders;
    - 8x spaces under Sevington;
- 3 x other use spaces near Founders.

In addition:

- 8 x drop-off/pick-up spaces accessed via Stanmore Road (existing to be retained).

The on site parking provisions are increasing by approximately 70% and the student population is proposed to increase by 25% (which would naturally increase the volume of vehicles for school drop off). However, when considering the existing network movements, the increase in any location would be less than 60% and so less than 2dB increase. Furthermore, Traffix have proposed operational traffic management procedures to reduce broader traffic impacts and improve use of public transport.

Further to the permanent provisions outlined above, it is proposed that all staff car parking removed as part of the Sevington development construction (about 31 spaces) will be relocated to two tennis courts in the north-eastern corner of the College. A proposed car park plan is included within the submitted architectural set and demonstrates that 36 parking spaces can be accommodated within the proposed temporary car park. A temporary driveway crossing will be provided to Stanmore Road, and limited vegetation will be removed to facilitate access and provide adequate sight distance to pedestrians and

motorists. The peak usage would continue to be arrivals 7:15am – 8:15am and departures 3:30-4:30pm. The temporary carpark is approximately 45m from the residential flat building at 142 Stanmore Road adjacent to Newington College and approximately 25m to residential flat buildings opposite on Stanmore Road. The car park will be for staff only and therefore use will generally be within the typical operating hours:

- 6.00am to 6.00pm Monday to Friday
- 7.00am to 5.00pm Saturday

7.3.2 Noise from school operation noise (sports courts, assemblies)

For the detailed Stage 1 works, we have assessed potential noise emissions from sports uses in/on the Sevington Building based on file data for sports activities measured at another site in Sydney. The assumed sports noise levels are as follows:

- 60 spectators – supporting with occasional cheering –96dB(A) L_w $L_{eq\ (15min)}$.
- Soccer – NPL game play – one field (no spectators) –107dB(A) L_w $L_{eq\ (15min)}$.
- Soccer – NPL game play – one field + 60 spectators –107dB(A) L_w $L_{eq\ (15min)}$.
- Soccer – Training – no spectators - 90dB(A) L_w $L_{eq\ (15min)}$.
- Basketball – game play – one court (no spectators) –93dB(A) L_w $L_{eq\ (15min)}$.
- Basketball – game play – one court + 60 spectators –99dB(A) L_w $L_{eq\ (15min)}$.
- Basketball – game play – one court + 340 spectators –104dB(A) L_w $L_{eq\ (15min)}$.
- Tennis – doubles game play – one court (no spectators) –84dB(A) L_w $L_{eq\ (15min)}$.
- Tennis – doubles game play – three courts + 60 spectators –96dB(A) L_w $L_{eq\ (15min)}$.
- Tennis – doubles game play – one court +350 spectators –103dB(A) L_w $L_{eq\ (15min)}$.
- Teacher voice with light amplification – assumed 85dB(A) L_p $L_{eq\ (15min)}$ uniform level in the listening area.

Assessment of the sport noise emissions were undertaken with no perimeter acoustic screening, and with an acoustically solid screen with a finished height 1.5m above the floor of the sports court, running along the Northern edge and wrapping around the east and west corners for approximately 13m.

The potentially most affected neighbouring receiver is 207 Stanmore Road, due to its elevated upstairs windows.

Table 21 - Typical worst case receiver noise levels from Sevington sports noise emissions

Receiver Location	Activity	Source Level L_w $L_{Aeq(15min)}$	No Screen - Predicted Receiver Level $L_{Aeq(15min)}$	1.5m Screen - Predicted Receiver Level $L_{Aeq(15min)}$
207 Stanmore Road – upstairs window	Rooftop - Soccer – NPL game play – one field (60 spectators)	107	67	61
	Rooftop – Soccer – training (no spectators)	97	57	51
	Rooftop - Basketball – game play – one court + 340 spectators	104	65	59
	Rooftop - Tennis – doubles game play – one court +350 spectators	103	61	55
	Internal – Basketball – 3 courts + 340 spectators (North highlight windows open)	104	53	N/A
	Combined: rooftop sports training without spectators + internal basketball with 340 spectators (North highlight windows open)	96 + 104	58	56
	Combined: rooftop soccer with 60 spectators + internal basketball with 340 spectators (North highlight windows open)	107 + 104	67	62
	Internal breakout – assembly for 2000	90dB(A) L_p internal	50	Roof not in use during large assembly

Table 22 - Screening test for operational noise emissions

Location	Time of Day	Rating Background Noise Levels[1] dB(A) $L_{90\ (15min)}$	School Operational Noise Emissions Screening Test LAeq (dB)
Stanmore Road residential receivers opposite	Day	60	BG + 10 = 70
	Evening	59	BG + 10 = 69
	Night	41	Not in use 10pm – 6am
	Morning shoulder (6am – 7am)	55	BG + 5 = 59

1. Periods are as defined by the NSW EPA Noise Policy for Industry. Day is 7am – 6pm Monday to Friday and 8am – 6pm Saturday, Sunday and Public Holidays; Evening is 6pm – 10pm daily; Night is 10pm – 7am Monday to Friday and 10pm-8am Saturday, Sunday and Public Holidays. Morning shoulder is 6am – 7am

Based on the above, with the proposed 1.5m high screen to the perimeter of the rooftop courts, training activities on the roof combined with sports internally in the sports hall would be capable of complying with background + 5dB during the early morning shoulder and game play (including with spectators would comply during the day and evening (7am – 10pm) and we would not anticipate any amenity issues at the nearest residential receivers.

Further, with the proposed 1.5m high acoustic screen to the edges most affected by road traffic noise, the traffic noise would be reduced by approximately 7dB, and so more comfortable for conversing, or receiving instructions.

7.3.3 General services plant and equipment

Mechanical plant associated with the development has the potential to impact on nearby noise sensitive properties. In order to carry out a quantitative assessment of mechanical equipment, a complete specification of equipment is required. At this stage of the development appropriate detail for mechanical plant is not typically available. A qualitative assessment has therefore been carried out and in-principle noise management measures outlined:

- Acoustic assessment of mechanical services equipment should be undertaken during the detail design phase of the development to ensure that the cumulative noise of all equipment does not exceed the applicable noise criteria. Development Consent Conditions typically require detailed assessment of mechanical plant and equipment prior to issue of the Construction Certificate.
- Noise control treatment can affect the operation of the mechanical services system. An acoustic engineer should be consulted during the initial design phase of mechanical services system to reduce potential redesign of the mechanical system.

Mechanical plant noise emission can be controlled by appropriate mechanical system design and implementation of common engineering methods, which may include:

- procurement of 'quiet' plant
- strategic positioning of plant away from sensitive neighbouring premises to maximise intervening acoustic shielding between the plant and sensitive neighbouring premises
- commercially available acoustic attenuators for air discharge and air intakes of plant
- acoustically lined and lagged ductwork
- acoustic barriers between plant and sensitive neighbouring premises
- partial or complete acoustic enclosures over plant.

The specification and location of mechanical plant should be confirmed prior to installation on site, and

Fans shall be mounted on vibration isolators and balanced in accordance with Australian Standard 2625 '*Rotating and Reciprocating Machinery – Mechanical Vibration*'.

The project mechanical engineers have provided indications of plant requirements for each of the new buildings. An in-principle assessment of services noise emissions has been conducted for the detailed Stage 1, whilst Concept Proposal is higher level (the finer detail is future work).

Preliminary advice from Steensen Varming is that new electrical substations are required for the proposed buildings at Sevington (detailed Stage 1) and Concordia (Concept Proposal). Centenary Hall (Concept Proposal) has access to two existing substations which appear to have sufficient spare capacity and so an additional substation is not anticipated to be required for Centenary Hall.

7.3.4 Detailed Stage 1 - In principle treatment of services plant and equipment

For the detailed Stage 1 works Sevington building has the following key plant:

- Carpark supply and exhaust ventilation fans. These will require intake and discharge side silencers
- Air handling units x 2 located Level 4 (south east corner), with fresh air intake and relief louvres in the façade;
- Booster pumps and hot water tanks on Level 4 (the pumps should be placed in an enclosed plant room)
- On floor air handling units in dedicated plant rooms on Level 1
- In ceiling fan coil units in teaching, office, reception and function spaces, with connection to fresh air path (typically high level to façade)
- 2x 550kW air cooled "heat pumps" on the roof – it is anticipated that these will require solid acoustic screening in the order of 500mm taller than the unit (to be confirmed in Detailed Design, and that these would run from 5am until 10pm (i.e. 1hour prior to opening, and switching off when the building closes in the evening).

Subject to coordination with the project services engineers during the Detailed Design phase, compliance with the nominated NPfI goals is achievable. Careful treatment of air intake paths and penetrations in the building shell will be required to ensure ongoing compliance with the project internal noise levels for aircraft noise.

7.3.5 Concept Proposal comments on treatment of services plant and equipment

Given the Concept Proposal only applies to building envelopes for these buildings, the following is provided "for information" and to act as a prompt for further assessment in future detailed assessment.

Centenary Hall and College Lane are proposed to have the following key plant:

- Roof mounted heat pumps on the roof of Centenary Hall. If height allows, it may be preferable to place these on the new building, where the proposed concrete roof would be an acoustically preferable substrate (to the metal roof of Centenary Hall). Further, the new build section is a little taller, which would make acoustic screens around roof mounted plant more efficient. Regardless, careful coordination with the mechanical services consultant will be required to determine acoustic treatments for compliance with the nominated NPfI goals.
- Pumps currently mounted on the roof should be placed into a plant room within the building to limit noise egress to neighbours.
- Air handling unit proposed to be located on the roof – with treatments on the intakes and exhaust, we anticipate that the air handling unit can comply with the nominated NPfI goals to neighbours, and internal noise goals.

Concordia is proposed to have the following key plant:

- Carpark exhaust with fresh air makeup via the carpark exit driveway. Given the proximity to neighbouring residential receivers, we anticipate that an alternative fresh air intake path will be

required. Looking at the existing concept design, it appears there could be some alternative fresh air intake locations which could be suitable (subject to detailed design).

- A plant deck with 2x500kW heat pumps is proposed on the Western half of the roof. It is likely that pumps would need an enclosure or relocation (to an internal room). This plant will require acoustic screens and possibly discharge attenuators, to reduce noise emissions to neighbours.

7.3.6 Noise from use of the bell and PA system

The school is existing and the bell and PA system existing. Amendment/extension will be required to accommodate the proposed development. Speakers for the bell and PA system shall be positioned to face into the site and not toward neighbouring receivers.

7.3.7 Noise from vehicles being driven on the site

7.3.7.1 Detailed Stage 1 Works

In respect of Sevington, we predict the noise from vehicles entering/exiting the carpark to be in the order of 45dB(A)$L_{eq(15min)}$ at the residential receivers opposite on Stanmore Road, which is compliant with the night time NPfI noise trigger level. Given the peak usage is 7:15am – 8:15am and 3:30pm – 4:30pm i.e. during the Day time period, noise from vehicles being driven on the site is a relatively small contribution to the cumulative noise emissions.

Whilst noise emissions from the use of the temporary carpark would be marginally greater than the ultimate parking in the future Sevington basement, noise emissions from its use are predicted to comply with the NPfI trigger levels at neighbouring receivers, without additional treatment.

7.3.8 Concept Proposal

For Concordia, the Cavendish driveway (currently two way but will be amended to entry only through the proposed works) passes between two residential dwellings through a corridor approximately 4m wide and then past the rear of additional residential dwellings. If feasible, an awning should be added outside the vehicle entry for the maximum possible extent, to increase the acoustic attenuation due to distance and shielding for the residential receivers who overlook the driveway and carpark opening. The underside of the awning and an extent of the carpark inside the doorway should be lined with absorptive material (subject to confirmation at detailed design stage).

The exit driveway is partially subterranean and partially covered. A residential receiver dwelling is immediately adjacent to the driveway. If feasible, the driveway should be enclosed or alternatively, at-receiver treatments may be negotiated with the neighbouring residential dwelling, to provide upgraded glazing and alternative ventilation (in lieu of enclosure of the driveway).

8 Internal sound insulation

The National Construction Code / Building Code of Australia does not define acoustic separation requirements for schools.

Internal acoustic separation requirements and reverberation times shall be drawn from the NSW Department of Education's Educational Facilities Standards and Guidelines (at the discretion of the school given EFSG compliance is not mandatory for independent schools) and from previous projects. The internal acoustic design will be undertaken in the Detailed Design phase.

9 Construction noise and vibration assessment

Construction activities associated with the proposed development will likely result in increased noise levels during construction hours. The works undertaken in the various stages of excavation and construction is likely to consist of a mixture of both high and low noise activities.

Potential impacts of the construction on surrounding areas and the public realm with respect to noise and vibration should be addressed in the future planning and development stages through a detailed Construction Noise and Vibration Management Plan (CNVMP) for each Stage.

The CNVMP identifies potentially noisy activities, their impacts on surrounding receivers, and outlines management strategies to control the impacts of noise and vibration during the excavation and civil works, structure construction, building fit out and landscaping.

9.1 Environmental Protection Authority's Construction Noise Guidelines

The Environmental Protection Authority (EPA) released its Interim Construction Noise Guideline (ICNG) in 2009. This document is being referred to as EPA's standard policy for assessing construction noise on new projects.

The key components of the ICNG that can be incorporated into this assessment include:

1. Use of LAeq as the descriptor for measuring and assessing construction noise.

In recent years NSW noise policies including EPA's NSW Industrial Noise Policy (INP) and the NSW Environmental Criteria for Road Traffic Noise (ECRTN) have moved to the primary use of LAeq over any other descriptor. As an energy average, LAeq provides ease of use when measuring or calculating noise levels since a full statistical analysis is not required as when using, for example, the LA10 descriptor.

Consistent with the latest guideline (ICNG) the use of LAeq as the key descriptor for measuring and assessing construction noise may follow a 'best practice' approach.

2. Application of feasible and reasonable noise mitigation measures

As stated in the ICNG, a noise mitigation measure is feasible if it is capable of being put into practice, and is practical to build given the project constraints.

Selecting reasonable mitigation measures from those that are feasible involves making a judgement to determine whether the overall noise benefit outweighs the overall social, economic and environmental effects, including the cost of the measure.

3. Quantitative and qualitative assessment

The ICNG provides two methods for assessment of construction noise, being either a quantitative or a qualitative assessment.

A quantitative assessment is recommended for major construction projects of significant duration, and involves the measurement and prediction of noise levels, and assessment against set criteria.

A qualitative assessment is recommended for small projects with a short-term duration where works are not likely to affect an individual or sensitive land use for more than three weeks in total. It focuses on minimising noise disturbance through the implementation of feasible and reasonable work practices, and community notification.

Given the significant scale of the construction works proposed for this Project, a quantitative assessment is carried out herein, consistent with the ICNG's requirements.

4. Management Levels

Residences

Table 9-1 below (reproduced from Table 2 of the ICNG) sets out the noise management levels and how they are to be applied. The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 9-1: Noise at residences using quantitative assessment

Time of Day	Management Level $L_{Aeq\ (15\ min)}$*	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Time of Day	Management Level $L_{Aeq\ (15\ min)}$*	How to Apply
Outside recommended standard hours	Noise affected RBL + 5dB(A)	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Table 9-2: Noise Affected Noise Management Levels - Standard Construction Hours

Receiver	RBL, L_{A90} Day (7am - 6pm)	Noise Management Level, $L_{Aeq(15min)}$
Stanmore Road residences	60	RBL + 10 = 70
Cavendish Road residences	40	RBL + 10 = 50
College Lane residences	44	RBL + 10 = 54

Sensitive Land Use

Table 9-3 below (reproduced from Table 2 of the ICNG) sets out the noise management levels for various sensitive land use developments.

Table 9-3: Noise at other sensitive land uses using quantitative assessment

Land use	Management level, LAeq (15 min) – applies when land use is being utilised
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas	External noise level 65 dB(A)
Passive recreation areas	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the 'maximum' internal levels in AS2107 for specific uses.

The only Church proximate to the works is the Chapel on the site. The ICNG recommends an internal noise level of 45dB(A) when the Church is in use. For particularly sensitive services, the school can schedule respite periods with the building contractor, as it is likely that the ICNG internal noise level will be exceeded during the construction works (given the distance between).

9.2 Construction source noise levels

A detailed assessment of construction noise will need to be undertaken at the conclusion of the detailed design phase when there is more certainty on the equipment and methodologies that will be used to construct the building. However, this section presents a preliminary assessment of noise emissions from the construction stage.

Table 9-4 Typical construction equipment & sound power levels, dB(A) re 1pW

Plant item	Plant description	Sound power levels
Demolition, Excavation and Piling		
1.	Concrete saw	120*
2.	Excavator with hammer	120*
3.	Excavator with bucket	108
4.	Piling drilling rig	111
5.	Truck – cement mixer	108
6.	Concrete pump	102
7.	Concrete vibrator	100
8.	Bobcat	102
9.	Dump Truck	108
Construction		
10.	Powered hand tools	110*
11.	Delivery trucks	106
12.	Truck – cement mixer	108
13.	Cherry picker	102
14.	Concrete pump	105
15.	Concrete vibrator	100
16.	Tower Crane (Diesel)	105
17.	Air compressor - silenced	95

*Inclusive of 5dB(A) penalty for tonality/impulsiveness.

9.3 Predicted Noise Levels

Noise levels at any receiver location resulting from construction works would depend on the location of the receiver with respect to the area of construction, shielding from intervening topography and structures, and the type and duration of construction being undertaken. Furthermore, noise levels at receivers would vary significantly over the total construction program due to the transient nature and large range of plant and equipment that could be used.

Table 9-5 and following present noise levels likely to be experienced at the nearby affected receivers based on the construction activities and plant and equipment associated with the proposed site. Levels

are presented when the plant is located on both the far side of the site and the near side of the site (relative to the receiver)

Noise levels were calculated taking into consideration the distance between the construction works and the receiver locations but intervening structures have not been included in this preliminary study.

9.3.1 Stage 1 works – Sevington Building

Predicted noise levels and assessment with reference to noise emission criteria is presented below.

Table 9-5 Predicted $L_{Aeq(15min)}$ Sevington Building Construction - noise levels for typical construction plant, Standard construction hours, Receivers opposite on Stanmore Road

Plant item	Plant description	Noise Management Level, $L_{Aeq(15min)}$	Predicted Construction Noise Levels, $L_{Aeq(15min)}$; Far side – Near Side
Demolition, Excavation and Piling			
1.	Concrete saw	70	74-84
2.	Excavator with hammer	70	74-84
3.	Excavator with bucket	70	62-72
4.	Piling drilling rig	70	65-75
5.	Truck – cement mixer	70	62-72
6.	Concrete pump	70	56-66
7.	Concrete vibrator	70	54-64
8.	Bobcat	70	56-66
9.	Dump Truck	70	62-72
Construction			
10.	Powered hand tools	70	64-74
11.	Delivery trucks	70	60-70
12.	Truck – cement mixer	70	62-72
13.	Cherry picker	70	56-66
14.	Concrete pump	70	59-69
15.	Concrete vibrator	70	54-64
16.	Tower Crane (Diesel)	70	59-69
17.	Air compressor - silenced	70	49-59

The predictions above show that for the majority of plant items, noise emissions to receivers will comply with the Noise Management Level when equipment is working on the far side of the works zone (approximately 80m away). Concrete saw and excavator with hammer working on the near side (25m from receiver) would result in the receivers being Highly Affected. On that basis, in accordance with the Interim Construction Noise Guideline, the builder should apply feasible and reasonable work practices to reduce the construction noise to the receivers. In addition, the detailed construction noise management plan (prepared after approval, with input from the building contractor on their methodologies, schedules, and equipment) should consider consultation with the Highly Affected

receivers to determine less sensitive periods for noisy works and the consideration of respite periods (without that resulting in unreasonable extension of the construction period).

9.3.2 Concept Proposal works

Predicted noise levels and assessment with reference to noise emission criteria is presented below. These predictions are for information only, and subject to review at detailed design stage.

Table 9-6 Predicted $L_{Aeq(15min)}$ Concordia Building Construction - noise levels for typical construction plant, Standard construction hours, Receivers adjacent on Cavendish Street

Plant item	Plant description	Noise Management Level, $L_{Aeq(15min)}$	Predicted Construction Noise Levels, $L_{Aeq(15min)}$; Far side – Near Side
Demolition, Excavation and Piling			
1.	Concrete saw	50	74-102
2.	Excavator with hammer	50	74-102
3.	Excavator with bucket	50	62-90
4.	Piling drilling rig	50	65-93
5.	Truck – cement mixer	50	62-90
6.	Concrete pump	50	56-84
7.	Concrete vibrator	50	54-82
8.	Bobcat	50	56-84
9.	Dump Truck	50	62-90
Construction			
10.	Powered hand tools	50	64-92
11.	Delivery trucks	50	60-88
12.	Truck – cement mixer	50	62-90
13.	Cherry picker	50	56-84
14.	Concrete pump	50	59-87
15.	Concrete vibrator	50	54-82
16.	Tower Crane (Diesel)	50	59-87
17.	Air compressor - silenced	50	49-77

The predictions above show that for essentially all plant items, noise emissions to receivers will exceed with the Noise Management Level even when equipment is working on the far side of the works zone (approximately 80m away). Most noise sources when working on the near side (3m from receiver) would result in the receivers being Highly Affected. On that basis, in accordance with the Interim Construction Noise Guideline, the builder should apply feasible and reasonable work practices to reduce the construction noise to the receivers. In addition, the detailed construction noise management plan (prepared after approval, with input from the building contractor on their methodologies, schedules, and equipment) should consider consultation with the Highly Affected receivers to determine less sensitive periods for noisy works and the consideration of respite periods (without that resulting in unreasonable extension of the construction period).

Table 9-7 Predicted $L_{Aeq(15min)}$ Centenary Hall and GLA Building Construction - noise levels for typical construction plant, Standard construction hours, Receivers on College Lane

Plant item	Plant description	Noise Management Level, $L_{Aeq(15min)}$	Predicted Construction Noise Levels, $L_{Aeq(15min)}$; Far side – Near Side
Demolition, Excavation and Piling			
1.	Concrete saw	54	76-89
2.	Excavator with hammer	54	76-89
3.	Excavator with bucket	54	64-77
4.	Piling drilling rig	54	67-80
5.	Truck – cement mixer	54	64-77
6.	Concrete pump	54	58-71
7.	Concrete vibrator	54	56-69
8.	Bobcat	54	58-71
9.	Dump Truck	54	64-77
Construction			
10.	Powered hand tools	54	66-79
11.	Delivery trucks	54	62-75
12.	Truck – cement mixer	54	64-77
13.	Cherry picker	54	58-71
14.	Concrete pump	54	61-74
15.	Concrete vibrator	54	56-69
16.	Tower Crane (Diesel)	54	61-74
17.	Air compressor - silenced	54	51-64

The predictions above show that for essentially all plant items, noise emissions to receivers will exceed with the Noise Management Level even when equipment is working on the far side of the works zone (approximately 60m away). The noisier sources when working on the near side (14m from receiver) would result in the receivers being Highly Affected. On that basis, in accordance with the Interim Construction Noise Guideline, the builder should apply feasible and reasonable work practices to reduce the construction noise to the receivers. In addition, the detailed construction noise management plan (prepared after approval, with input from the building contractor on their methodologies, schedules, and equipment) should consider consultation with the Highly Affected receivers to determine less sensitive periods for noisy works and the consideration of respite periods (without that resulting in unreasonable extension of the construction period).

9.3.3 General construction noise management measures

The following general noise management measures are recommended for all receiver locations (and can be applied to both detailed Stage 1 works and Concept Proposal):

- Use less noisy plant and equipment, where feasible and reasonable.
- Plant and equipment must be properly maintained.

- Strategically position plant on site to reduce the emission of noise to the surrounding neighbourhood and to site personnel where feasible and reasonable.
- Avoid any unnecessary noise when carrying out manual operations and when operating plant.
- Any equipment not in use for extended periods during construction work must be switched off.
- Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be limited/avoided where possible.
- The offset distance between noisy plant and adjacent sensitive receivers is to be maximised where practicable.
- Plant used intermittently to be throttled down or shut down when not in use where practicable.
- Noise-emitting plant to be directed away from sensitive receivers where possible.
- Staging of construction works so as to erect solid external walls first and utilising them to provide noise shielding to the noise sensitive receivers. However, the structural integrity of the external walls should be investigated prior to implementing this measure and should be prioritised over the noise benefits.
- In addition to the noise mitigation measures outlined above, a management procedure will need to be put in place to deal with noise complaints that may arise from construction activities. Each complaint will need to be investigated and appropriate noise amelioration measures put in place to mitigate future occurrences, where the noise in question is in excess of allowable limits.
- Good relations with people living and working in the vicinity of a construction site should be established at the beginning of a project and be maintained throughout the project, as this is of paramount importance. Keeping people informed of progress and taking complaints seriously and dealing with them expeditiously is critical. The person selected to liaise with the community must be adequately trained and experienced in such matters.

9.4 Construction Vibration Objectives

Construction vibration is associated with three main types of impact:

- disturbance to building occupants;
- potential damage to buildings; and
- potential damage to sensitive equipment in a building.

Generally, if disturbance to building occupants is controlled, there is limited potential for structural damage to buildings.

Vibration amplitude may be measured as displacement, velocity, or acceleration.

- Displacement (x) measurement is the distance or amplitude displaced from a resting position. The International System of Units (SI unit) for distance is the metre (m), although common industrial standards include mm.
- Velocity ($v=\Delta x/\Delta t$) is the rate of change of displacement with respect to change in time. The SI unit for velocity is metres per second (m/s), although common industrial standards include mm/s. The Peak Particle Velocity (PPV) is the greatest instantaneous particle velocity during a given time interval. If measurements are made in 3-axis (x, y, and z) then the resultant PPV is the vector sum (i.e. the square root of the summed squares of the maximum velocities) regardless of when in the time history those occur.
- Acceleration ($a=\Delta v/\Delta t$) is the rate of change of velocity with respect to change in time. The SI unit for acceleration is metres per second squared (m/s2). Construction vibration goals are summarised below.

Construction vibration goals are summarised below.

A detailed construction vibration management plan shall be prepared toward the conclusion of the detailed design phase with input from the building contractor, so that it can take into account the proposed construction methodologies and equipment.

9.5 Disturbance to Buildings Occupants

Assessment of potential disturbance from vibration on human occupants of buildings is made in accordance with the DECC '*Assessing Vibration; a technical guideline*' (DECC, 2006). The guideline provides criteria which are based on the British Standard BS 6472-1992 '*Evaluation of human exposure to vibration in buildings (1-80Hz)*'. Sources of vibration are defined as either 'Continuous', 'Impulsive' or 'Intermittent'. Table 9-8 provides definitions and examples of each type of vibration.

Table 9-8: Types of vibration

Type of vibration	Definition	Examples
Continuous vibration	Continues uninterrupted for a defined period (usually throughout the day-time and/or night-time)	Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).
Impulsive vibration	A rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). It can also consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short, typically less than 2 seconds	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading.

Type of vibration	Definition	Examples
Intermittent vibration	Can be defined as interrupted periods of continuous or repeated periods of impulsive vibration that varies significantly in magnitude	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer, this would be assessed against impulsive vibration criteria.

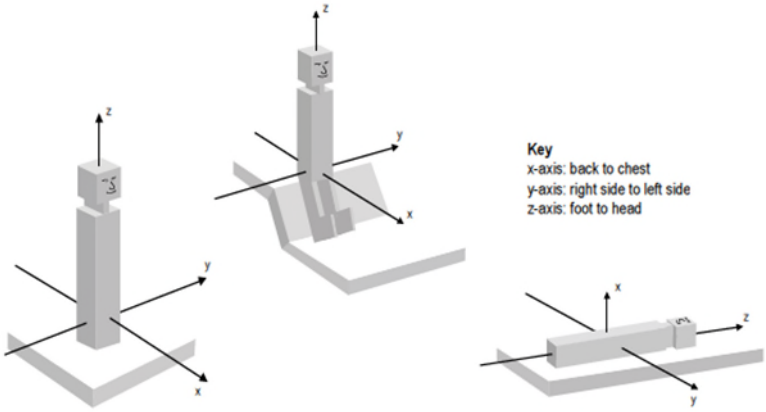
Source: Assessing Vibration; a technical guideline, Department of Environment & Climate Change, 2006

The vibration criteria are defined as a single weighted root mean square (rms) acceleration source level in each orthogonal axis. Section 2.3 of the guideline states:

> *'Evidence from research suggests that there are summation effects for vibrations at different frequencies. Therefore, for evaluation of vibration in relation to annoyance and comfort, overall weighted rms acceleration values of the vibration in each orthogonal axis are preferred (BS 6472).'*

When applying the criteria, it is important to note that the three directional axes are referenced to the human body, i.e. x-axis (back to chest), y-axis (right side to left side) or z-axis (foot to head). Vibration may enter the body along different orthogonal axes and affect it in different ways. Therefore, application of the criteria requires consideration of the position of the people being assessed, as illustrated in Figure 4. For example, vibration measured in the horizontal plane is compared with x- and y-axis criteria if the concern is for people in an upright position, or with the y- and z- axis criteria if the concern is for people in the lateral position.

Figure 4: Orthogonal axes for human exposure to vibration



The preferred and maximum values for continuous and impulsive vibration are defined in Table 2.2 of the guideline and are reproduced in Table 9-9.

Table 9-9: Preferred and maximum levels for human comfort

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Critical areas[2]	Day- or night-time	0.005	0.0036	0.010	0.0072

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day- or night-time	0.020	0.014	0.040	0.028
Workshops	Day- or night-time	0.04	0.029	0.080	0.058
Impulsive vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Critical areas[2]	Day- or night-time	0.005	0.0036	0.010	0.0072
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day- or night-time	0.64	0.46	1.28	0.92
Workshops	Day- or night-time	0.64	0.46	1.28	0.92

Notes:
7. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am
8. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specify above. Stipulation of such criteria is outside the scope of their policy and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472-1992

The acceptable vibration dose values (VDV) for intermittent vibration are defined in Table 2.4 of the guideline and are reproduced in Table 9-10

Table 9-10: Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes:
1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous of impulsive criteria for critical areas.
Source: BS 6472-1992

9.6 Building Structural Damage

Potential structural damage of buildings as a result of vibration is typically managed by ensuring vibration induced into the structure does not exceed certain limits and standards, such as British Standard 7385 Part 2 and German Standard DIN4150-3. Currently there is no existing Australian Standard for assessment of structural building damage caused by vibration energy.

It is noted that vibration levels required to cause minor cosmetic damage are typically 10 x higher than levels that will cause disturbance to building occupants. Many building occupants assume that building

damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

Within British Standard 7385 Part 1: 1990, different levels of structural damage are defined:

- *Cosmetic - The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition the formation of hairline cracks in mortar joints of brick/concrete block construction.*
- *Minor - The formation of large cracks or loosening of plaster or drywall surfaces, or cracks through bricks/concrete blocks.*
- *Major - Damage to structural elements of the building, cracks in supporting columns, loosening of joints, splaying of masonry cracks, etc.*

The vibration limits in Table 1 of British Standard 7385 Part 2 (1993) are for the protection against cosmetic damage, however guidance on limits for minor and major damage is provided in Section 7.4.2 of the Standard:

> *7.4.2 Guide values for transient vibration relating to cosmetic damage*
>
> *Limits for transient vibration, above which cosmetic damage could occur are given numerically in Table 1 and graphically in Figure 1. In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for the building types corresponding to line 2 are reduced. Below a frequency of 4 Hz, where a high displacement is associated with a relatively low peak component particle velocity value a maximum displacement of 0.6 mm (zero to peak) should be used.*
>
> *Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 1, and major damage to a building structure may occur at values greater than four times the tabulated values.*

Within DIN4150-3, damage is defined as "*any permanent consequence of an action that reduces the serviceability of a structure or one of its components"* (p.4). The Standard also outlines:

> *"For buildings as in lines 2 and 3 of Tables 1, 4 or B.1, the serviceability is considered to have been reduced if, for example*
>
> - *cracks form in plastered or rendered surfaces of walls;*
> - *existing cracks in a structure are enlarged;*
> - *partitions become detached from load-bearing walls or floor slabs.*
>
> *These effects are deemed 'minor damage. " (DIN4150.3:2016, p.6)*

While the DIN Standard defines the above damage as 'minor', based on the definitions provided in BS7385, the DIN standard is considered to deal with cosmetic issues rather than major structural failures.

9.6.1.1 British Standard

British Standard 7385: Part 2 '*Evaluation and measurement of vibration in buildings*', can be used as a guide to assess the likelihood of building damage from ground vibration. BS7385 suggests levels at which 'cosmetic', 'minor' and 'major' categories of damage might occur.

The cosmetic damage levels set by BS 7385 are considered 'safe limits' up to which no damage due to vibration effects has been observed for certain particular building types. Damage comprises minor non-structural effects such as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks and separation of partitions or intermediate walls from load bearing walls. 'Minor' damage is considered possible at vibration magnitudes which are twice those given and 'major' damage to a building structure may occur at levels greater than four times those values.

BS7385 is based on peak particle velocity and specifies damage criteria for frequencies within the range 4Hz to 250Hz, being the range usually encountered in buildings. At frequencies below 4Hz, a maximum displacement value is recommended. The values set in the Standard relate to transient vibrations and to low-rise buildings. Continuous vibration can give rise to dynamic magnifications due to resonances and may need to be reduced by up to 50%. Table 9-11 sets out the BS7385 criteria for cosmetic, minor and major damage.

Regarding heritage buildings, British Standard 7385 Part 2 (1993) notes that "*a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive*" (p.5).

Table 9-11: BS 7385 structural damage criteria

Group	Type of structure	Damage level	Peak component particle velocity, mm/s		
			4Hz to 15Hz	15Hz to 40Hz	40Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	Cosmetic	50		
		Minor*	100		
		Major*	200		
2	Un-reinforced or light framed structures Residential or light commercial type buildings	Cosmetic	15 to 20	20 to 50	50
		Minor*	30 to 40	40 to 100	100
		Major*	60 to 80	80 to 200	200

Notes: Peak Component Particle Velocity is the maximum Peak particle velocity in any one direction (x, y, z) as measured by a tri-axial vibration transducer.

* Minor and major damage criteria established based on British Standard 7385 Part 2 (1993) Section 7.4.2

9.6.1.2 German Standard

German Standard DIN 4150 - Part 3 (2016) '*Vibration in buildings - Effects on Structures*' (DIN 4150-3:2016), also provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration and are generally recognised to be conservative.

DIN 4150-3:2016 presents the recommended maximum limits over a range of frequencies (Hz), measured at the foundations, in the plane of the uppermost floor of a building or structure or vertically on floor slabs. The vibration limits at the foundations increase as the frequency content of the vibration increases. The criteria are presented in Table 9-12.

Table 9-12: DIN 4150-3:2016 structural damage criteria

Group	Type of structure	Vibration velocity, mm/s				
		At foundation in all directions at frequency of			Plane of floor uppermost storey in horizontal direction	Floor slabs, vertical direction
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that because of their particular sensitivity to vibration, cannot be classified under Groups 1 and 2 and are of great intrinsic value (eg listed buildings)	3	3 to 8	8 to 10	8	20

9.6.2 Damage to vibration sensitive equipment

Some high technology manufacturing facilities, hospitals and laboratories utilise equipment that is highly sensitive and susceptible to vibration, for example scanning electron microscopes and micro-electronic manufacturing facilities. In addition, buildings housing sensitive computer or telecommunications equipment may require assessment against stricter criteria than those nominated for building damage.

Given that the adjacent premises are dwelling houses, or the school it is highly unlikely any would contain vibration sensitive equipment.

9.6.3 Damage to buried services

Section 5.3 of DIN 4150-3:2016 also sets out guideline values for vibration velocity to be used when evaluating the effects of vibration on buried pipework. These values, which apply at the wall of the pipe, are reproduced and presented in Table 9-13 below.

Table 9-13: DIN 4150-3:2016 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on buried pipework

Line	Pipe Material	Guideline values for vibration velocity measured at the pipe, mm/s
1	Steel, welded	100
2	Vitrified clay, concrete, reinforced concrete, prestressed concrete, metal (with or without flange)	80
3	Masonry, plastics	50

Note: For gas and water supply pipes within 2 m of buildings, the levels given in Table 9-12 should be applied. Consideration must also be given to pipe junctions with the building structure as potential significant changes in mechanical loads on the pipe must be considered.

For long-term vibration the guideline levels presented in Table 9-13 should be halved.

Recommended vibration goals for electrical cables and telecommunication services such as fibre optic cables range from between 50 mm/s and 100 mm/s. It is noted however that although the cables may sustain these vibration levels, the services they are connected to, such as transformers and switch blocks, may not. It is recommended that should such equipment be encountered during the construction process an individual vibration assessment should be carried out. This may include a specific CNVIS addressing impact on the utility and consultation with the utility provider to confirm specific vibration requirements.

9.7 Construction vibration assessment

The vibration generated from construction works will vary depending on the level and type of activity carried out at each site during each activity.

Potential vibration generated at receivers for this project will be dependent on separation distances, the intervening soil and rock strata, dominant frequencies of vibration and the receiver building's construction and structure. The recommended minimum working distances for vibration intensive plant are presented in Table 9-14, however these should be verified with site measurements

Table 9-14 Recommended minimum working distances for vibration intensive equipment

Plant item	Minimum working distance, m			
	Cosmetic damage			Human disturbance
	Commercial and industrial buildings[1]	Dwellings and similar structures[1]	Sensitive structures (e.g. heritage)[1]	Residences Day[2]
Pneumatic Hammer	5-10	10	20	10

Plant item	Minimum working distance, m			
	Cosmetic damage			Human disturbance
	Commercial and industrial buildings[1]	Dwellings and similar structures[1]	Sensitive structures (e.g. heritage) [1]	Residences Day[2]
Bored Piling	5	5	10	10

Notes: 1. Criteria referenced from DIN 4150 Structural Damage - Safe Limits for Short-term Building Vibration.
2. Daytime is 7 am to 10 pm;

Site specific buffer distances for vibration significant plant items must be measured on site where plant and equipment is likely to operate close to or within the minimum working distances for cosmetic damage.

Unlike noise, vibration from construction activities is difficult to predict due to many variables from site to site, for example soil type and conditions; sub surface rock; building types and foundations; and actual plant on site. The data relied upon in this assessment (tabulated above) is taken from a database of vibration levels measured at various sites or obtained from other sources (eg. BS5228-2:2009). They are not specific to this project as final vibration levels are dependent on many factors including the actual plant used, its operation and the intervening geology between the activity and the receiver.

In respect of detailed Stage 1 works, the heritage wall and other school assets are within the safe working distances and so on site measurements will be required prior to/at the commencement of work to determine the site specific vibration impacts. Further, a detailed construction vibration management plan will need to be prepared as part of the detailed design phase, once more detail is known of the particular equipment to be used on site. It is likely that vibration monitoring will be required during excavation and the construction of the building structure (would not be required during fitout).

10 Conclusion

Renzo Tonin & Associates have undertaken attended and unattended noise measurements at the Newington College, Stanmore.

In respect of detailed Stage 1 works:

- Existing environmental noise impacts from road traffic noise on Stanmore Road and aircraft noise can comply with the requirements of the SEPP (Transport & Infrastructure) 2021, ISEPP Guideline 2008 and AS2021:2015 with the treatments outlined in this assessment (subject to design review prior to construction).
- Noise emission goals from the use of services plant and equipment and vehicles being driven on site have been set in accordance with the NSW EPA NPfI. Compliance with those goals to existing residential receivers is achievable (subject to design review and coordination prior to construction).
- Criteria have been set for the management of normal noise emissions from use of the school, in particular for use of the Sevington Courts building. Mitigation measures have been incorporated into the design for compliance with the screening noise criteria to surrounding receivers.
- Criteria have been set for the management of construction noise and vibration and a high level assessment of the construction noise and vibration has been undertaken for Stage 1 works.
- The development is not likely to result in an increase in traffic noise to existing residential receivers.

In respect of Concept Proposal works:

- Existing environmental noise impacts from road traffic noise on Stanmore Road and aircraft noise can comply with the requirements of the SEPP (Transport & Infrastructure) 2021, ISEPP Guideline 2008 and AS2021:2015. Indicative façade constructions have been provided to assist with spatial/cost planning, but detailed treatments will be outlined in subsequent work.
- Noise emission goals from the use of services plant and equipment and vehicles being driven on site have been set in accordance with the NSW EPA NPfI. Compliance with those goals to existing residential receivers generally achievable, but some at-receiver treatments may be necessary to achieve the best outcomes (e.g. for vehicle noise from use of Concordia carpark).
- Criteria have been set for the management of construction noise and vibration and a high level assessment of the construction noise has been undertaken for Concept Proposal works.
- The development is not likely to result in an increase in traffic noise to existing residential receivers.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:

threshold of hearing	0 dB	The faintest sound we can hear
	10 dB	Human breathing
almost silent	20 dB	
	30 dB	Quiet bedroom or in a quiet national park location
generally quiet	40 dB	Library
	50 dB	Typical office space or ambience in the city at night
moderately loud	60 dB	CBD mall at lunch time
	70 dB	The sound of a car passing on the street
loud	80 dB	Loud music played at home
	90 dB	The sound of a truck passing on the street
very loud	100 dB	Indoor rock band concert
	110 dB	Operating a chainsaw or jackhammer
extremely loud	120 dB	Jet plane take-off at 100m away
threshold of pain	130 dB	
	140 dB	Military jet take-off at 25m away

dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Results of noise surveys

Refer to Figure 2 for measurement locations.

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Background & Ambient Noise Monitoring Results - NSW 'Noise Policy for Industry', 2017

Periods with insufficient results excluded	L_{A90} Background Noise Levels[4]			L_{Aeq} Ambient Noise Levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-30-April-2025	-	-	-	-	-	-
Thursday-01-May-2025	44	-	-	66	-	-
Friday-02-May-2025	43	41	37	67	67	56
Saturday-03-May-2025	36	39	34	63	59	52
Sunday-04-May-2025	37	38	33	57	59	47
Monday-05-May-2025	40	39	34	55	55	46
Tuesday-06-May-2025	40	40	34	56	58	50
Wednesday-07-May-2025	40	40	32	56	59	53
Thursday-08-May-2025	42	38	32	65	65	53
Friday-09-May-2025	-	-	-	-	-	-
Representative Weekday[5]	**41**	**40**	**34**	**63**	**63**	**53**
Representative Weekend[5]	**37**	**38**	**34**	**61**	**59**	**50**
Representative Week[5]	**40**	**39**	**34**	**63**	**62**	**52**

Notes:

1. Day is 7:00am to 6:00pm on all days except Sundays and Public Holidays when it is 8:00am to 6:00pm 2. Evening is 6:00pm to 10:00pm 3. Night is the remaining periods 4. Assessment Background Level (ABL) for individual days 5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq} 6. Leq is calculated in the free field. 2.5dB is subtracted from results if logger is placed at façade 7. Number in brackets represents the measured (actual) RBL value, which is below the minimum policy value of 30 dB(A) during the evening or night period or 35 dB(A) during the day period.

Newington College Art Gallery

Road / Rail Noise Monitoring Results (at one metre from façade)

Periods with insufficient results excluded	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
Date	**Day[1]**	**Night[2]**	**Day - Up[4]**	**Day - Low[3]**	**Night - Up[4]**	**Night - Low[3]**
Wednesday-30-April-2025	-	65	-	-	61	40
Thursday-01-May-2025	68	63	70	67	67	46
Friday-02-May-2025	69	59	71	67	64	41
Saturday-03-May-2025	65	54	67	56	59	39
Sunday-04-May-2025	60	50	63	53	55	40
Monday-05-May-2025	58	49	61	52	54	39
Tuesday-06-May-2025	59	53	61	50	57	39
Wednesday-07-May-2025	59	56	62	51	59	37
Thursday-08-May-2025	67	56	69	65	62	38
Friday-09-May-2025	-	-	-	-	-	-
Representative Weekday[6]	**66**	**60**	**65**	**58**	**61**	**39**
Representative Weekend[6]	**63**	**53**	**65**	**55**	**57**	**39**
Representative Week[6]	**65**	**59**	**65**	**55**	**59**	**39**

Notes:

1. Day is 7:00am to 10:00pm 2. Night is 10:00pm to 7:00am 3. Lower 10th percentile $L_{Aeq\ 1hr}$

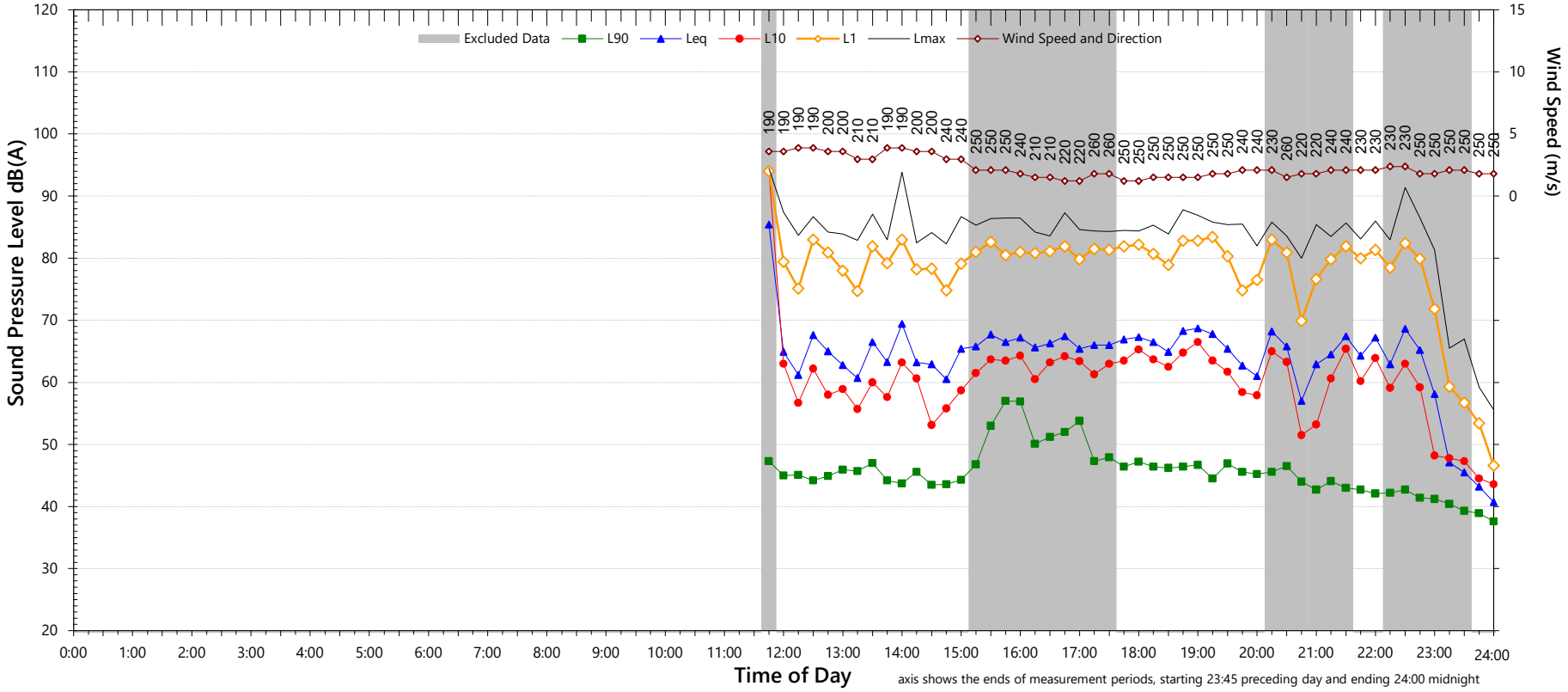
4. Upper 10th percentile $L_{Aeq\ 1hr}$ 5. Values are calculated at the facade. 2.5dB is added to results if logger is placed in the free field

6. Logarithmic average for L_{Aeq}, Median of daily L_{Aeq} for $L_{Aeq\ 1hr}$

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Wednesday, 30 April 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		-	-	-
L_{Aeq}	#N/A	-	-	-

Night Time Maximum Noise Levels			**(see note 7)**
L_{AFMax} (Range)	68	to	89
L_{AFMax} - L_{Aeq} (Range)	17	to	30

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	65
$L_{Aeq\ 1hr}$ upper 10 percentile	-	61
$L_{Aeq\ 1hr}$ lower 10 percentile	-	40

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

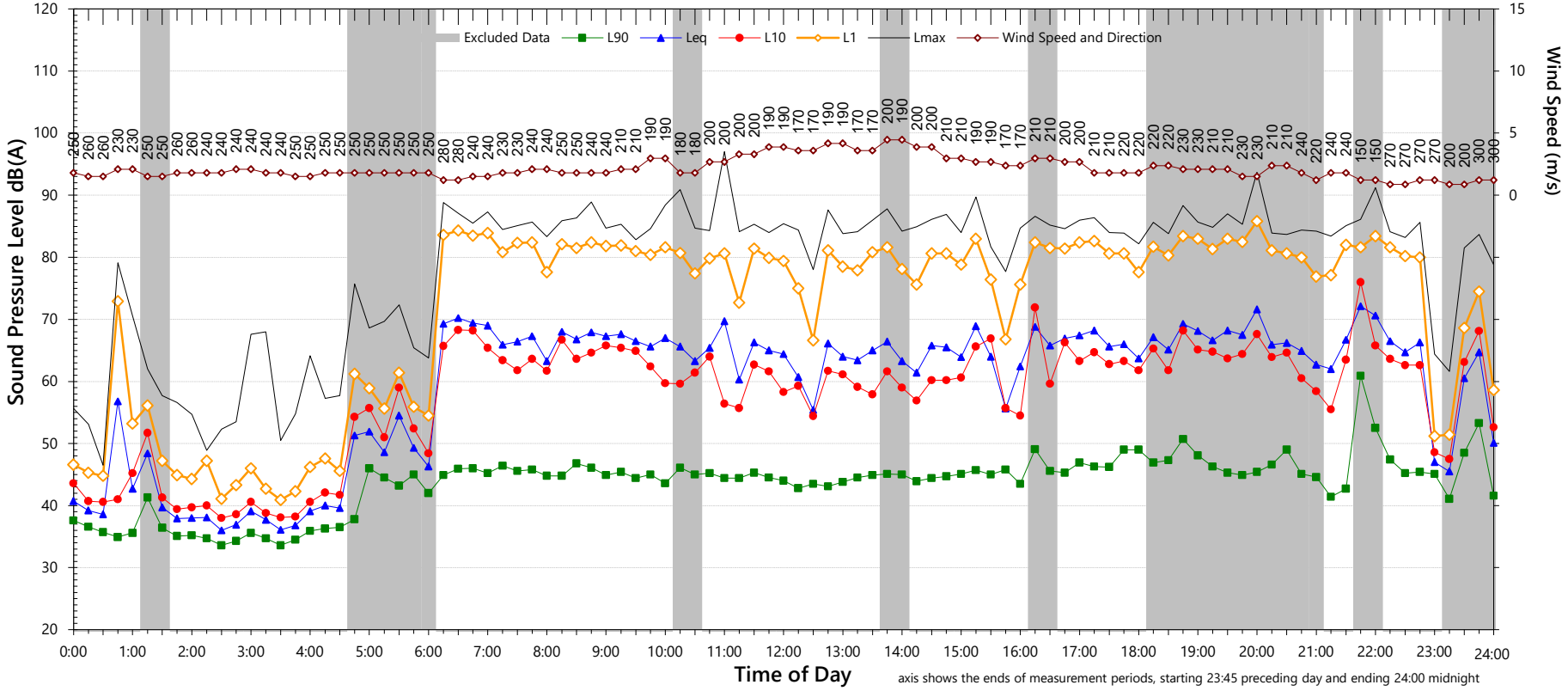
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Thursday, 1 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		44	-	-
L_{Aeq}	#N/A	66	-	-

Night Time Maximum Noise Levels			**(see note 7)**
L_{AFMax} (Range)	67	to	88
L_{AFMax} - L_{Aeq} (Range)	19	to	25

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	68	63
$L_{Aeq\ 1hr}$ upper 10 percentile	70	67
$L_{Aeq\ 1hr}$ lower 10 percentile	67	46

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

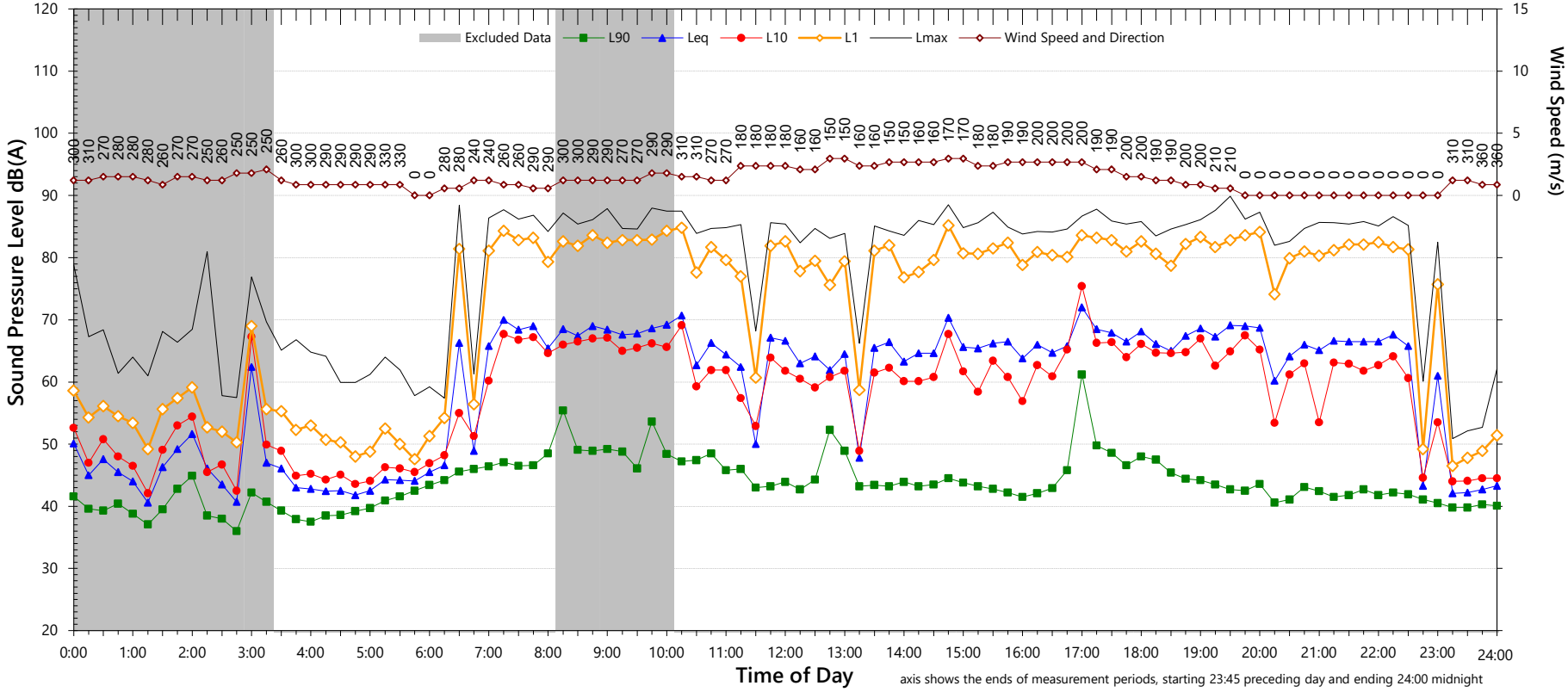
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Friday, 2 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		43	41	37
L_{Aeq}	#N/A	67	67	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	90
L_{AFMax} - L_{Aeq} (Range)	19	to	30

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	69	59
$L_{Aeq\ 1hr}$ upper 10 percentile	71	64
$L_{Aeq\ 1hr}$ lower 10 percentile	67	41

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

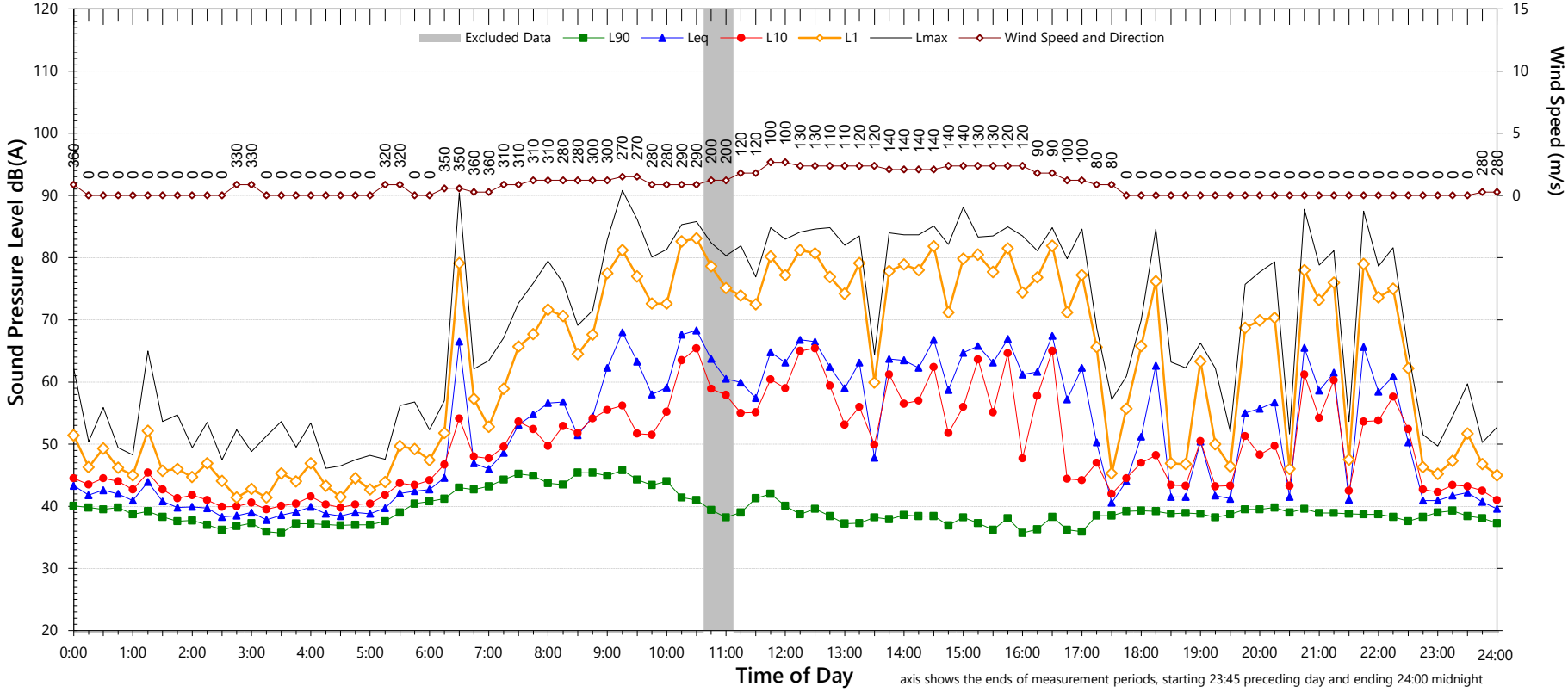
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Saturday, 3 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		36	39	34
L_{Aeq}	#N/A	63	59	52

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	77	to	86
L_{AFMax} - L_{Aeq} (Range)	16	to	27

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	65	54
$L_{Aeq\ 1hr}$ upper 10 percentile	67	59
$L_{Aeq\ 1hr}$ lower 10 percentile	56	39

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

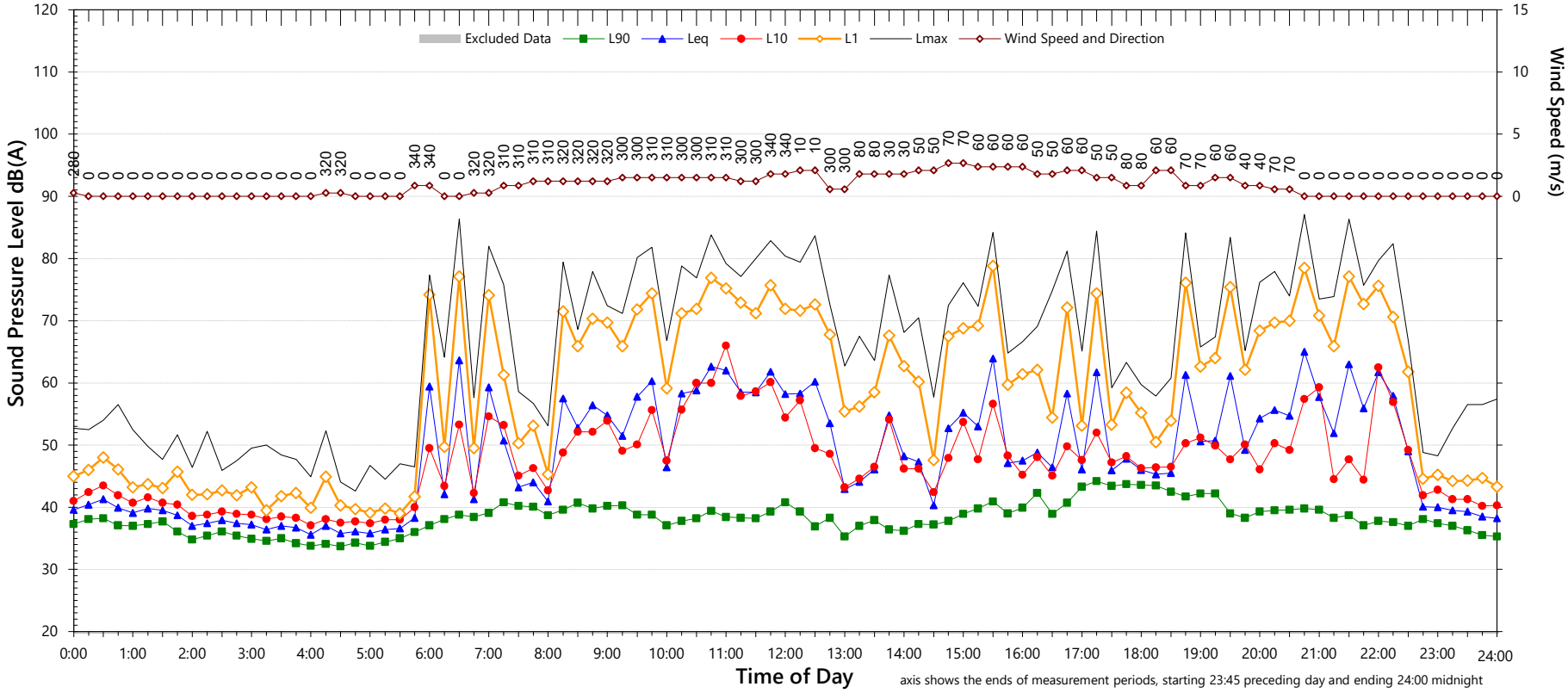
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Sunday, 4 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day**[2]	**Evening**[3]	**Night**[4 5]
L_{A90} ABL		37	38	33
L_{Aeq}	#N/A	57	59	47

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	67	to	82
L_{AFMax} - L_{Aeq} (Range)	16	to	30

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night**[5]
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	60	50
$L_{Aeq\ 1hr}$ upper 10 percentile	63	55
$L_{Aeq\ 1hr}$ lower 10 percentile	53	40

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

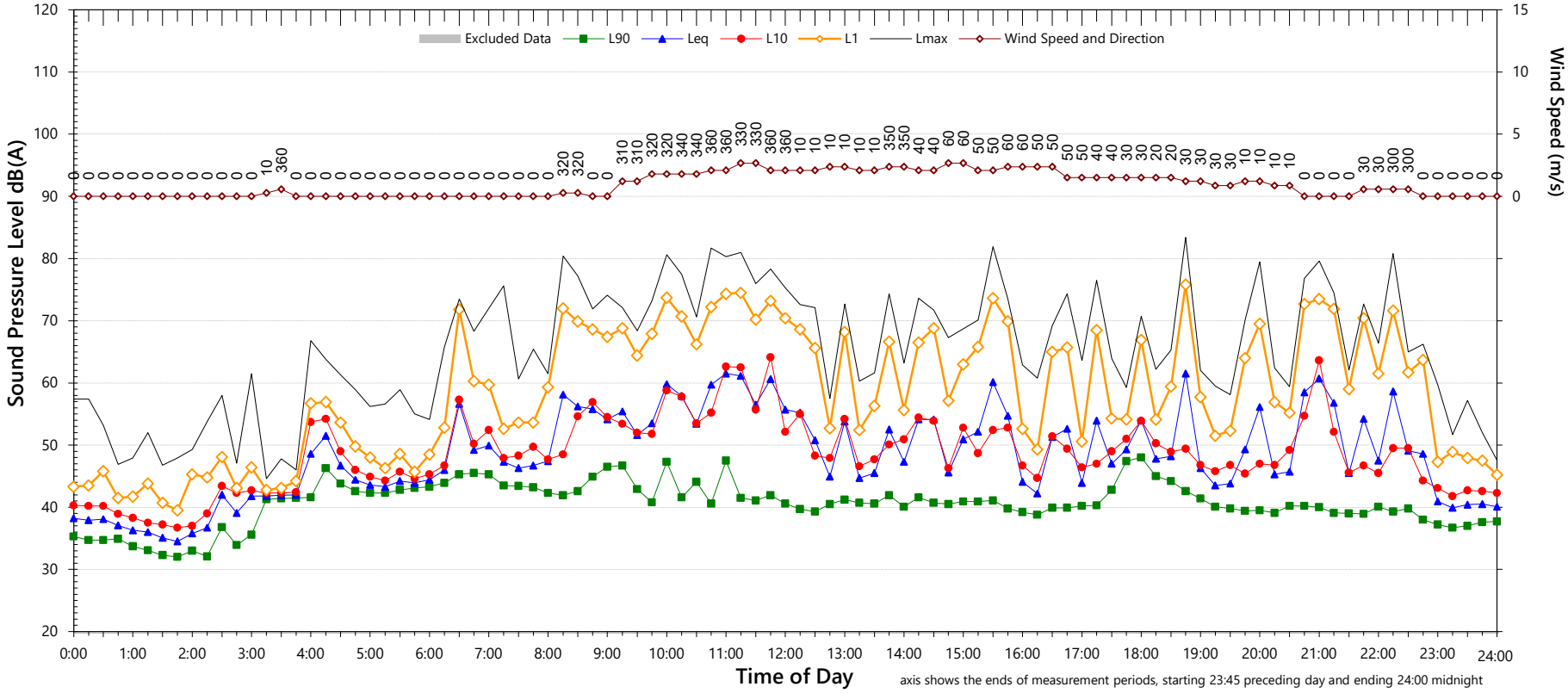
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Monday, 5 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		40	39	34
L_{Aeq}	#N/A	55	55	46

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	70	to	81
L_{AFMax} - L_{Aeq} (Range)	17	to	27

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	58	49
$L_{Aeq\ 1hr}$ upper 10 percentile	61	54
$L_{Aeq\ 1hr}$ lower 10 percentile	52	39

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

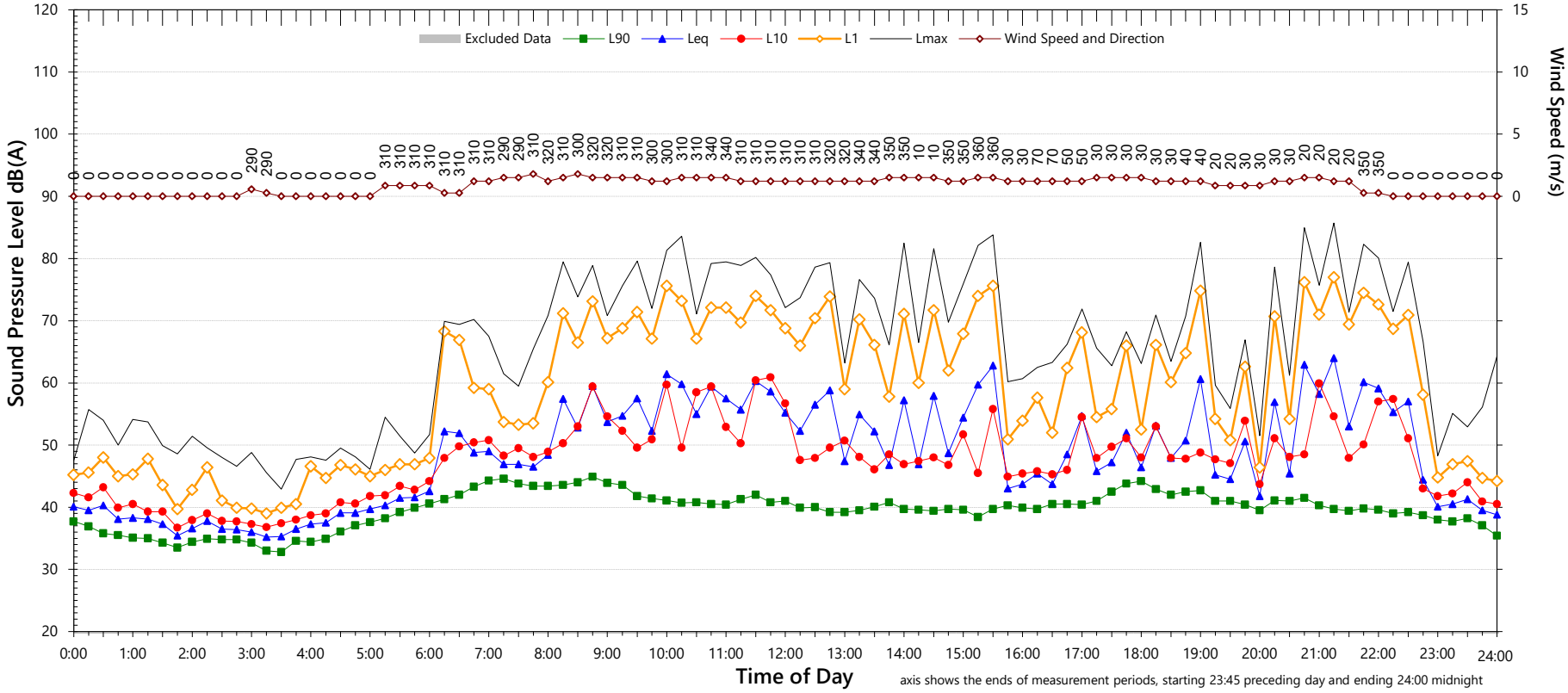
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Tuesday, 6 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		40	40	34
L_{Aeq}	#N/A	56	58	50

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	66	to	85
L_{AFMax} - L_{Aeq} (Range)	18	to	27

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	59	53
$L_{Aeq\ 1hr}$ upper 10 percentile	61	57
$L_{Aeq\ 1hr}$ lower 10 percentile	50	39

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

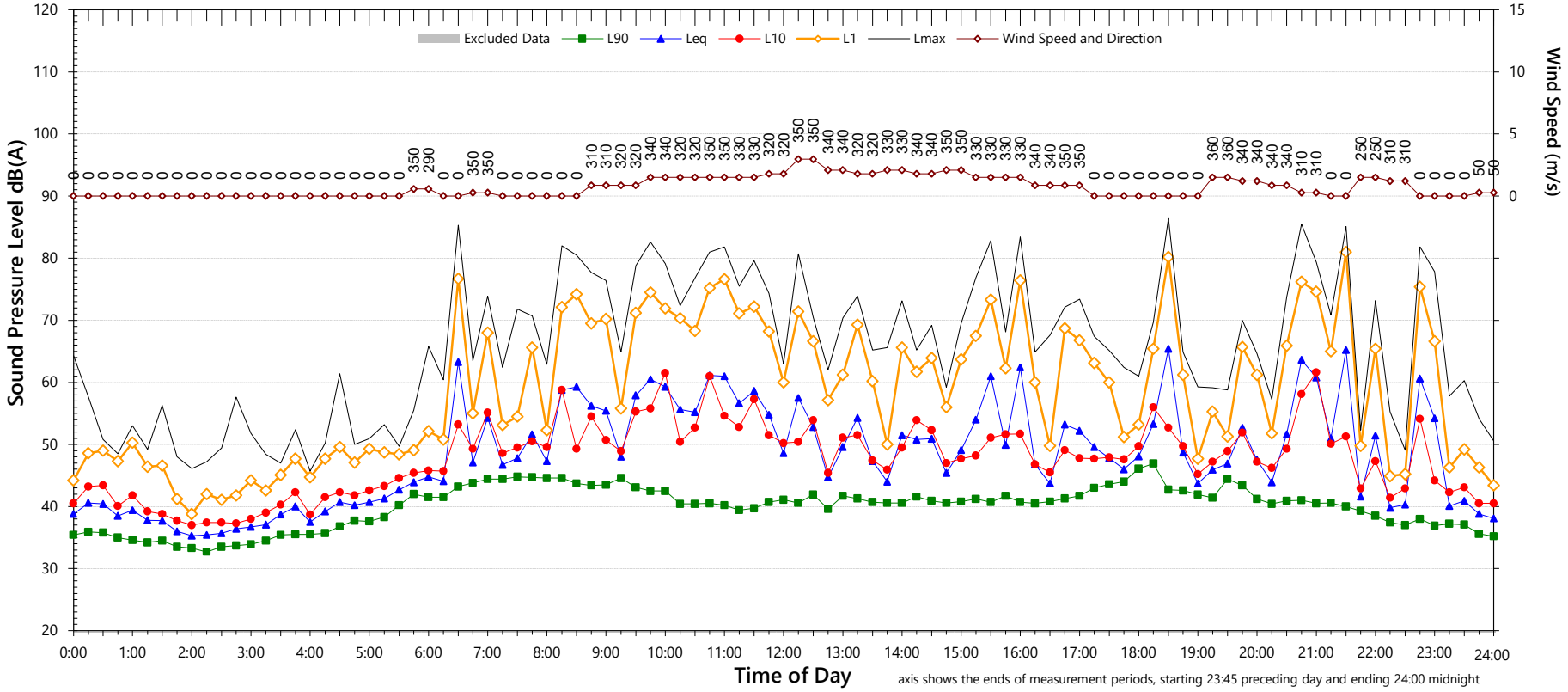
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Wednesday, 7 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day**[2]	**Evening**[3]	**Night**[4 5]
L_{A90} ABL		40	40	32
L_{Aeq}	#N/A	56	59	53

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	82	to	91
L_{AFMax} - L_{Aeq} (Range)	17	to	29

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night**[5]
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	59	56
$L_{Aeq\ 1hr}$ upper 10 percentile	62	59
$L_{Aeq\ 1hr}$ lower 10 percentile	51	37

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

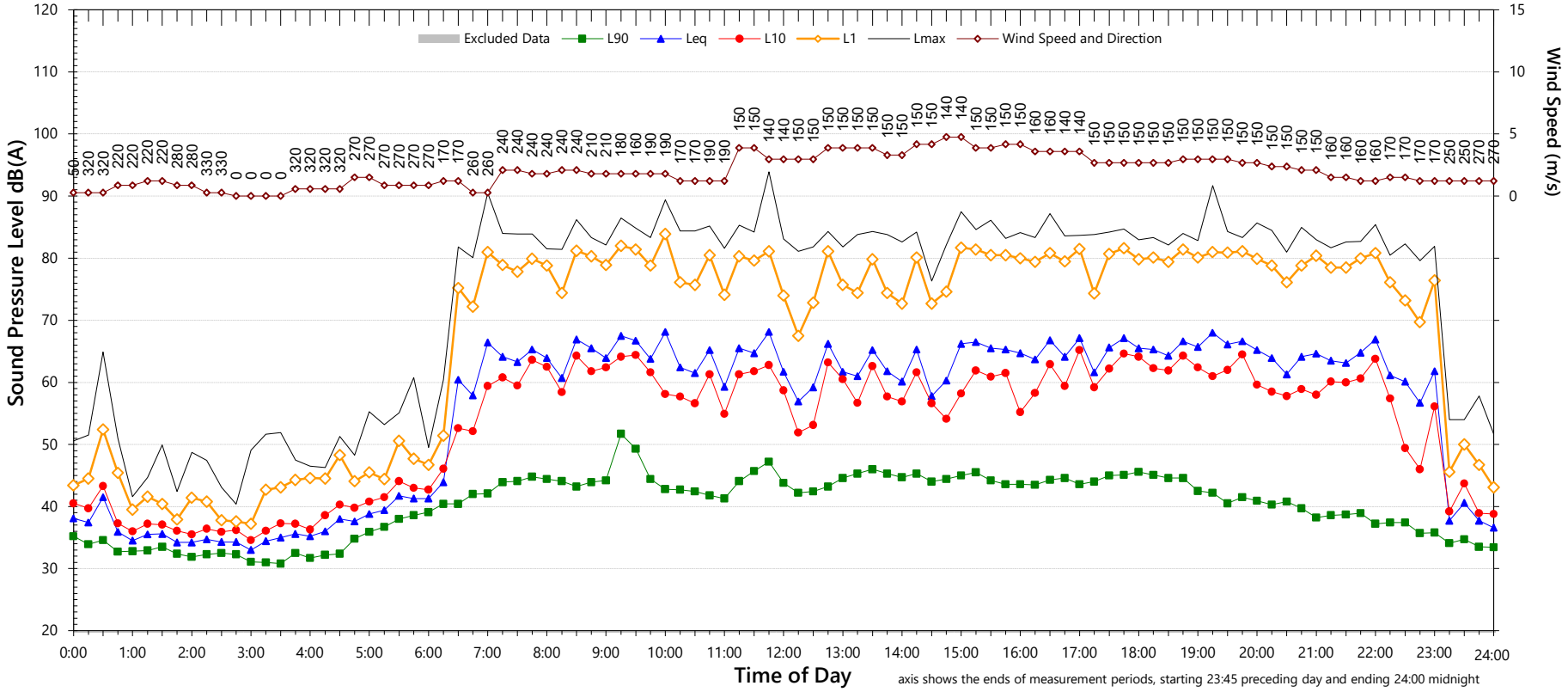
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Thursday, 8 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		42	38	32
L_{Aeq}	#N/A	65	65	53

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	82	to	88
L_{AFMax} - L_{Aeq} (Range)	15	to	29

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	67	56
$L_{Aeq\ 1hr}$ upper 10 percentile	69	62
$L_{Aeq\ 1hr}$ lower 10 percentile	65	38

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

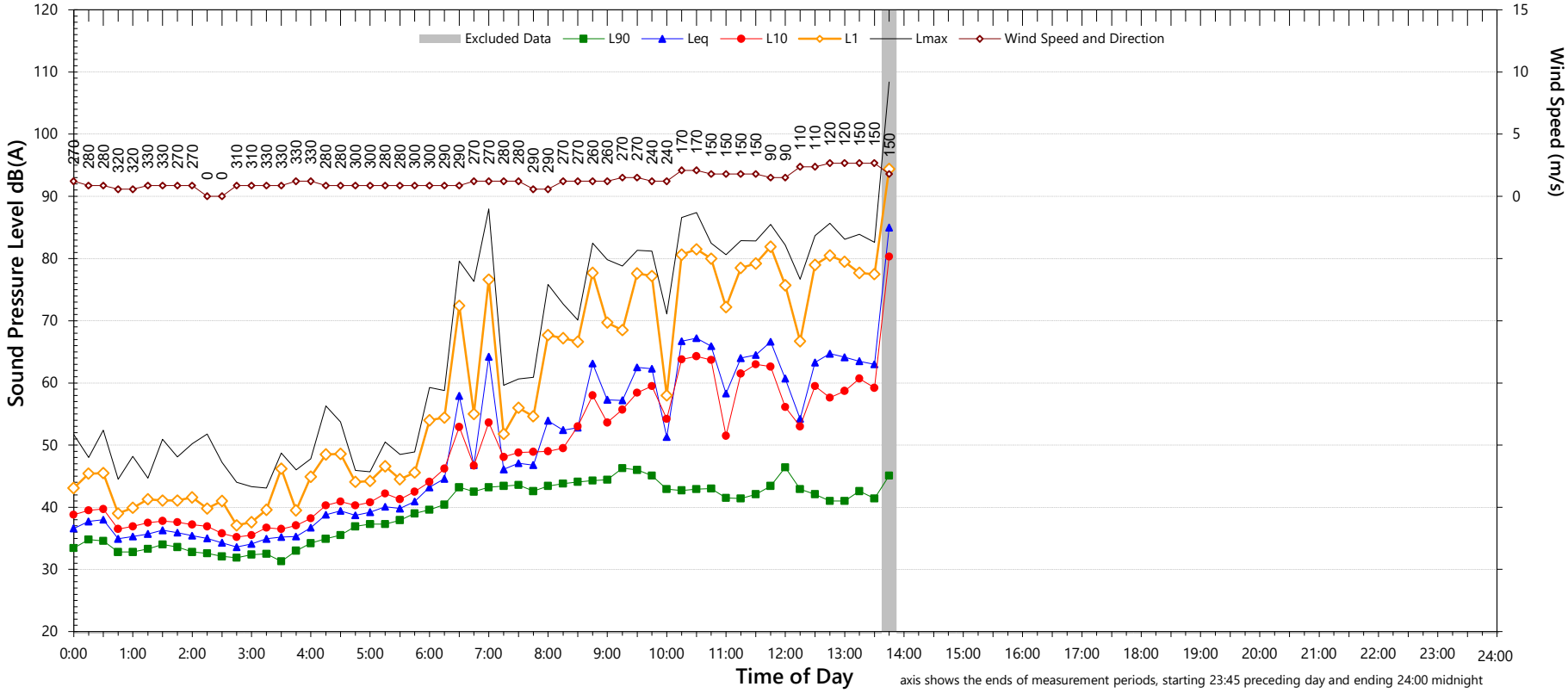
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College Art Gallery - Back of Concordia

Friday, 9 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		-	-	-
L_{Aeq}	#N/A	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	-	to	-
L_{AFMax} - L_{Aeq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	-
$L_{Aeq\ 1hr}$ upper 10 percentile	-	-
$L_{Aeq\ 1hr}$ lower 10 percentile	-	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

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The Newington College

Background & Ambient Noise Monitoring Results - NSW 'Noise Policy for Industry', 2017

Periods with insufficient results excluded	L_{A90} Background Noise Levels[4]			L_{Aeq} Ambient Noise Levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-30-April-2025	-	-	-	-	-	-
Thursday-01-May-2025	62	-	-	73	-	-
Friday-02-May-2025	62	64	47	74	74	70
Saturday-03-May-2025	60	61	45	71	71	68
Sunday-04-May-2025	59	61	38	71	71	68
Monday-05-May-2025	59	57	38	71	70	68
Tuesday-06-May-2025	59	58	39	70	71	69
Wednesday-07-May-2025	59	58	41	70	70	68
Thursday-08-May-2025	60	59	42	71	71	68
Friday-09-May-2025	-	-	-	-	-	-
Representative Weekday[5]	**60**	**58**	**41**	**72**	**71**	**69**
Representative Weekend[5]	**60**	**61**	**41**	**71**	**71**	**68**
Representative Week[5]	**60**	**59**	**41**	**72**	**71**	**68**

Notes:

1. Day is 7:00am to 6:00pm on all days except Sundays and Public Holidays when it is 8:00am to 6:00pm 2. Evening is 6:00pm to 10:00pm 3. Night is the remaining periods 4. Assessment Background Level (ABL) for individual days 5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq} 6. Leq is calculated in the free field. 2.5dB is subtracted from results if logger is placed at façade 7. Number in brackets represents the measured (actual) RBL value, which is below the minimum policy value of 30 dB(A) during the evening or night period or 35 dB(A) during the day period.

The Newington College

Road / Rail Noise Monitoring Results (at one metre from façade)

Periods with insufficient results excluded	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
Date	**Day[1]**	**Night[2]**	**Day - Up[4]**	**Day - Low[3]**	**Night - Up[4]**	**Night - Low[3]**
Wednesday-30-April-2025	-	73	-	-	74	68
Thursday-01-May-2025	75	75	77	74	77	70
Friday-02-May-2025	76	73	77	75	75	70
Saturday-03-May-2025	74	71	75	73	73	68
Sunday-04-May-2025	73	71	74	72	73	66
Monday-05-May-2025	73	70	74	72	73	65
Tuesday-06-May-2025	73	71	73	71	75	66
Wednesday-07-May-2025	72	70	73	72	72	65
Thursday-08-May-2025	74	70	75	72	72	65
Friday-09-May-2025	-	-	-	-	-	-
Representative Weekday[6]	**74**	**72**	**74**	**72**	**74**	**66**
Representative Weekend[6]	**74**	**71**	**74**	**72**	**73**	**67**
Representative Week[6]	**74**	**72**	**74**	**72**	**73**	**66**

Notes:

1. Day is 7:00am to 10:00pm 2. Night is 10:00pm to 7:00am 3. Lower 10th percentile $L_{Aeq\ 1hr}$

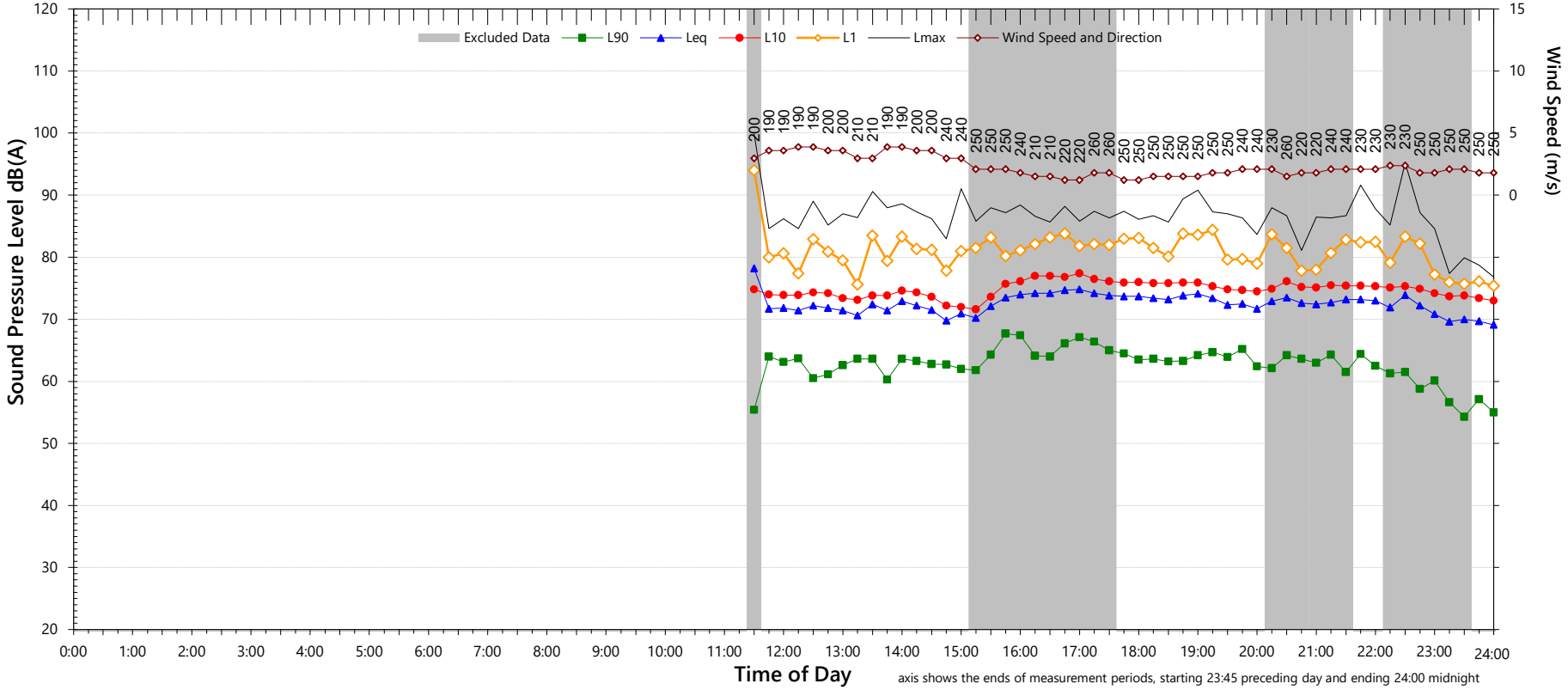
4. Upper 10th percentile $L_{Aeq\ 1hr}$ 5. Values are calculated at the facade. 2.5dB is added to results if logger is placed in the free field

6. Logarithmic average for L_{Aeq}, Median of daily L_{Aeq} for $L_{Aeq\ 1hr}$

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Wednesday, 30 April 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		-	-	-
L_{Aeq}	#N/A	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	81	to	92
L_{AFMax} - L_{Aeq} (Range)	15	to	17

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	73
$L_{Aeq\ 1hr}$ upper 10 percentile	-	74
$L_{Aeq\ 1hr}$ lower 10 percentile	-	68

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

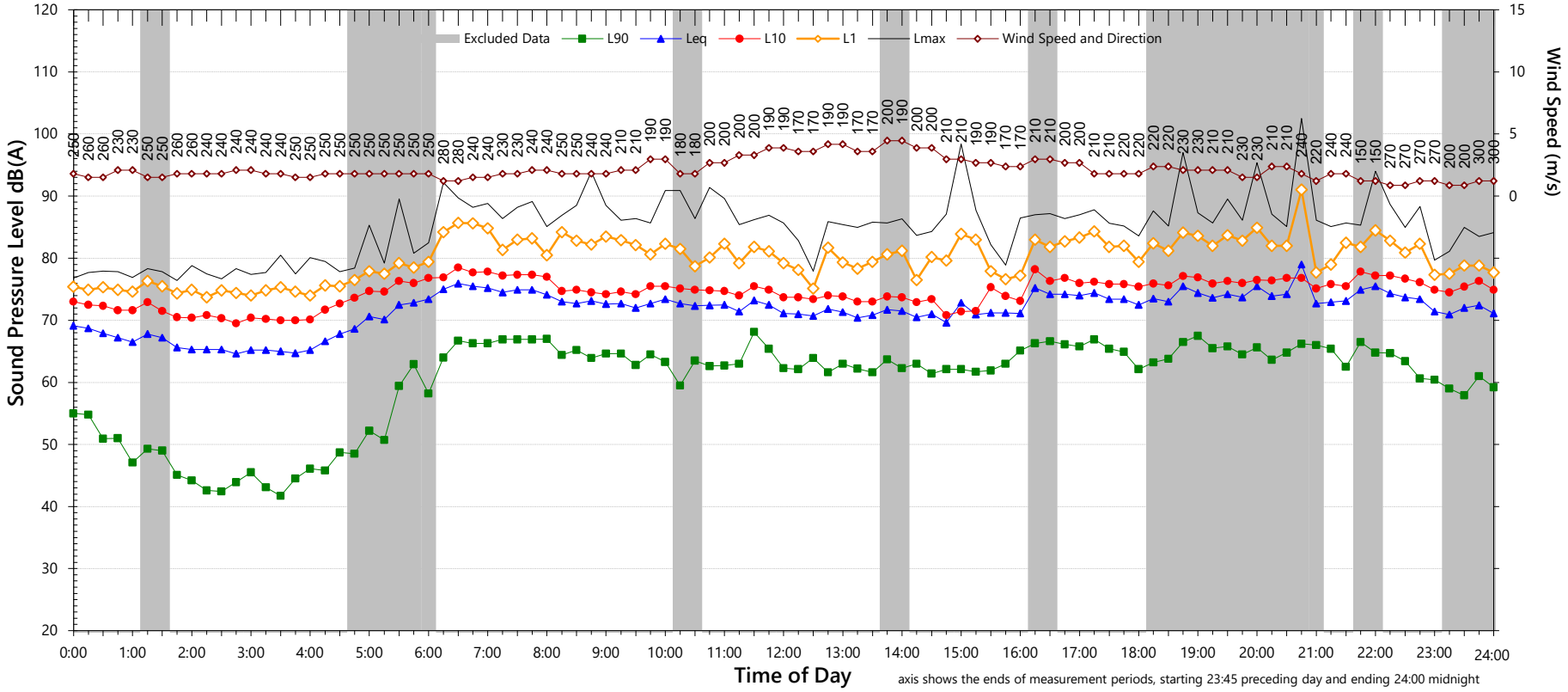
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Thursday, 1 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		62	-	-
L_{Aeq}	#N/A	73	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	88	to	96
L_{AFMax} - L_{Aeq} (Range)	15	to	20

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	75	75
$L_{Aeq\ 1hr}$ upper 10 percentile	77	77
$L_{Aeq\ 1hr}$ lower 10 percentile	74	70

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

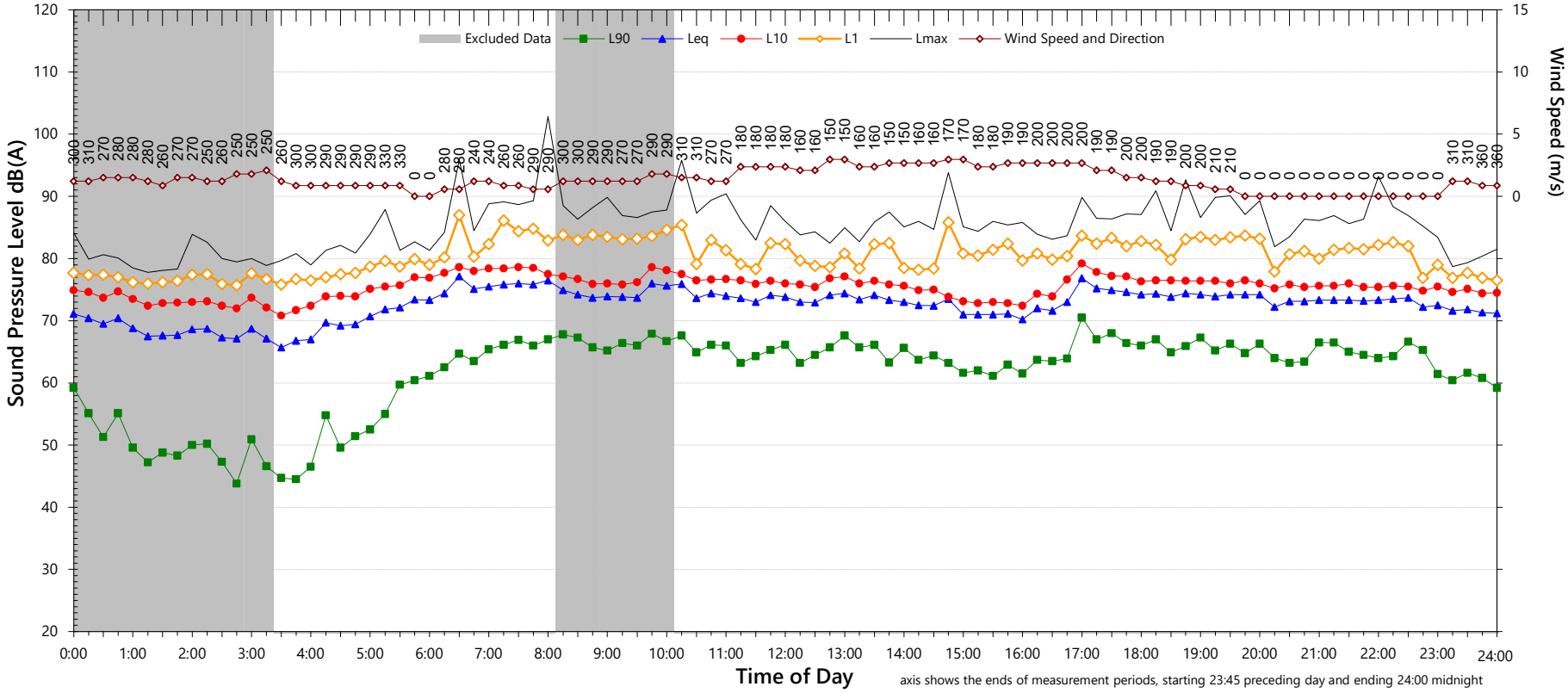
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Friday, 2 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		62	64	47
L_{Aeq}	#N/A	74	74	70

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	83	to	104
L_{AFMax} - L_{Aeq} (Range)	15	to	32

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	76	73
$L_{Aeq\ 1hr}$ upper 10 percentile	77	75
$L_{Aeq\ 1hr}$ lower 10 percentile	75	70

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

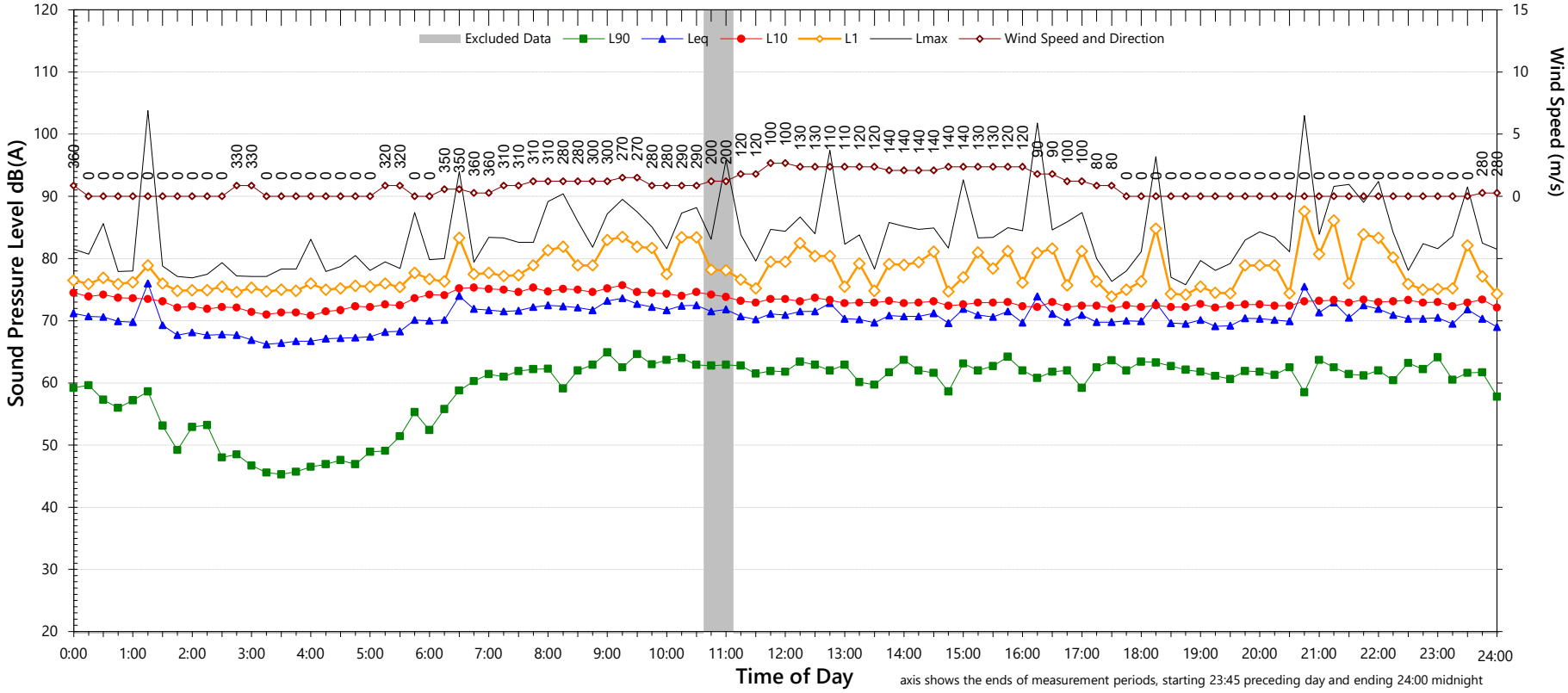
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Saturday, 3 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day**[2]	**Evening**[3]	**Night**[4 5]
L_{A90} ABL		60	61	45
L_{Aeq}	#N/A	71	71	68

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night**[5]
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	74	71
$L_{Aeq\ 1hr}$ upper 10 percentile	75	73
$L_{Aeq\ 1hr}$ lower 10 percentile	73	68

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	90	to	92
L_{AFMax} - L_{Aeq} (Range)	21	to	21

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

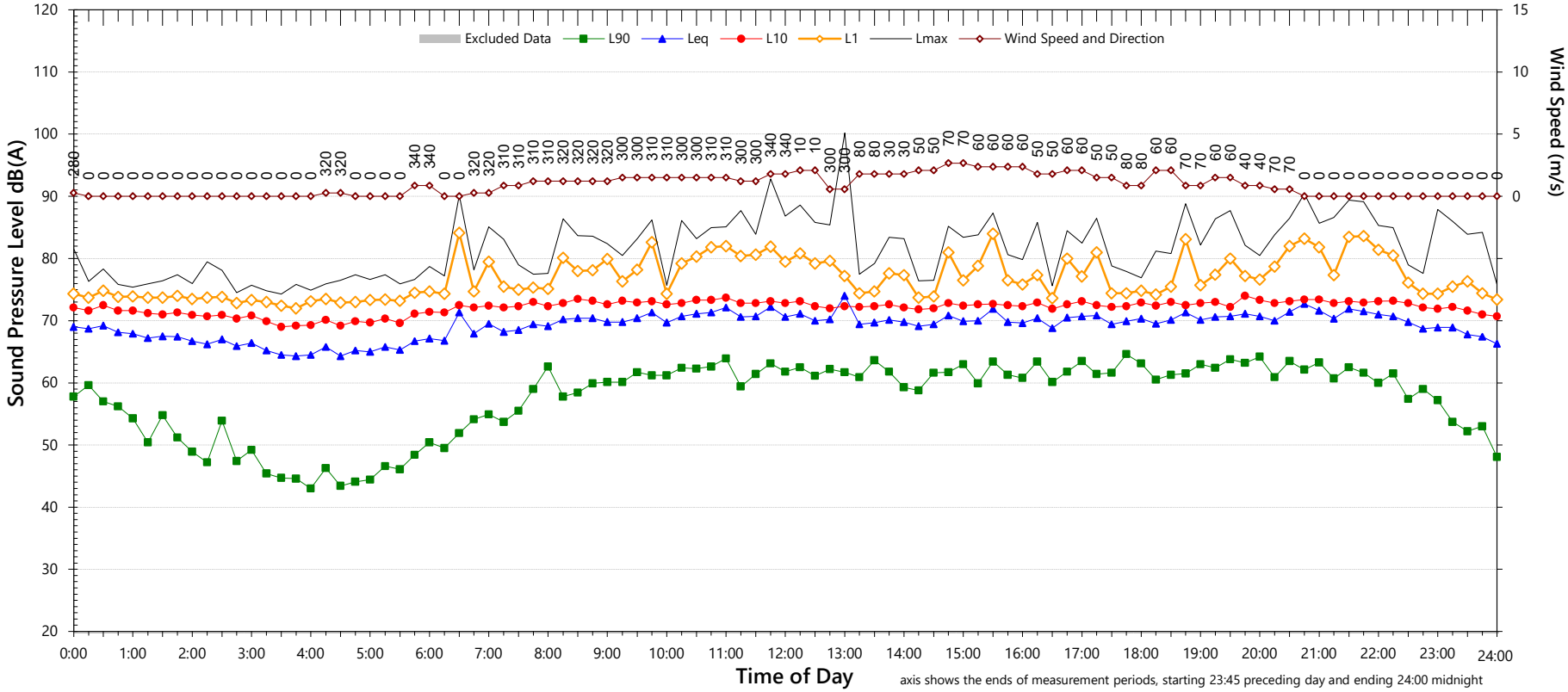
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Sunday, 4 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		59	61	38
L_{Aeq}	#N/A	71	71	68

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	82	to	89
L_{AFMax} - L_{Aeq} (Range)	18	to	24

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	73	71
$L_{Aeq\ 1hr}$ upper 10 percentile	74	73
$L_{Aeq\ 1hr}$ lower 10 percentile	72	66

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

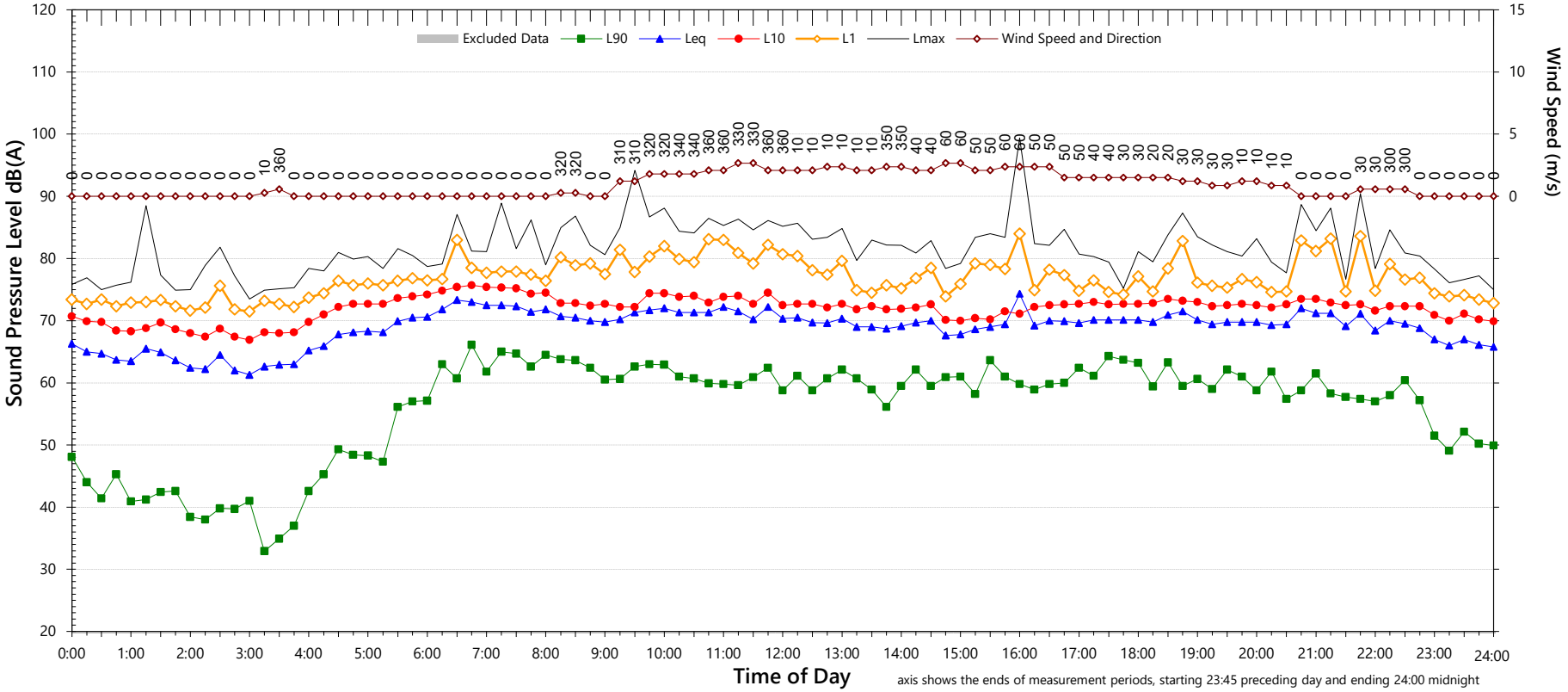
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Monday, 5 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		59	57	38
L_{Aeq}	#N/A	71	70	68

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	79	to	90
L_{AFMax} - L_{Aeq} (Range)	15	to	26

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	73	70
$L_{Aeq\ 1hr}$ upper 10 percentile	74	73
$L_{Aeq\ 1hr}$ lower 10 percentile	72	65

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

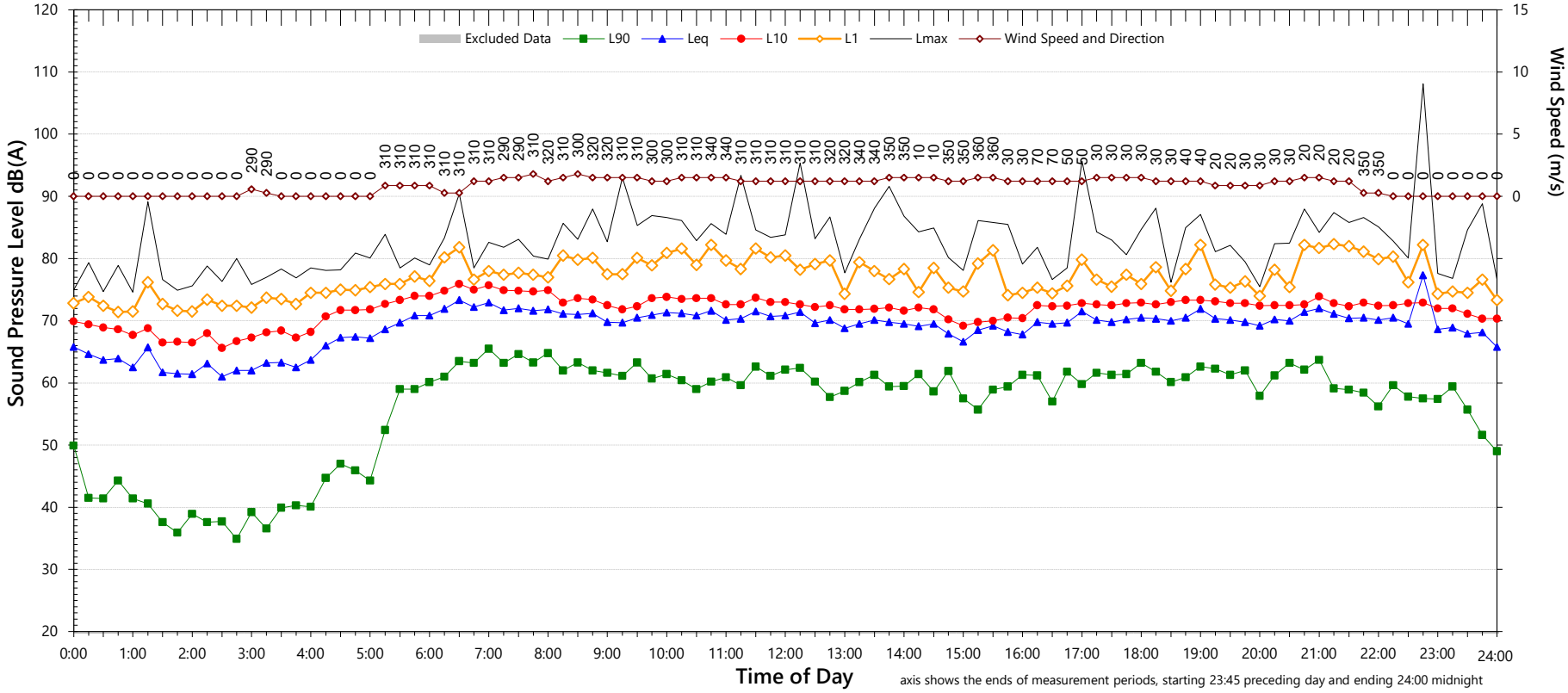
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Tuesday, 6 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		59	58	39
L_{Aeq}	#N/A	70	71	69

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	80	to	108
L_{AFMax} - L_{Aeq} (Range)	15	to	35

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	73	71
$L_{Aeq\ 1hr}$ upper 10 percentile	73	75
$L_{Aeq\ 1hr}$ lower 10 percentile	71	66

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

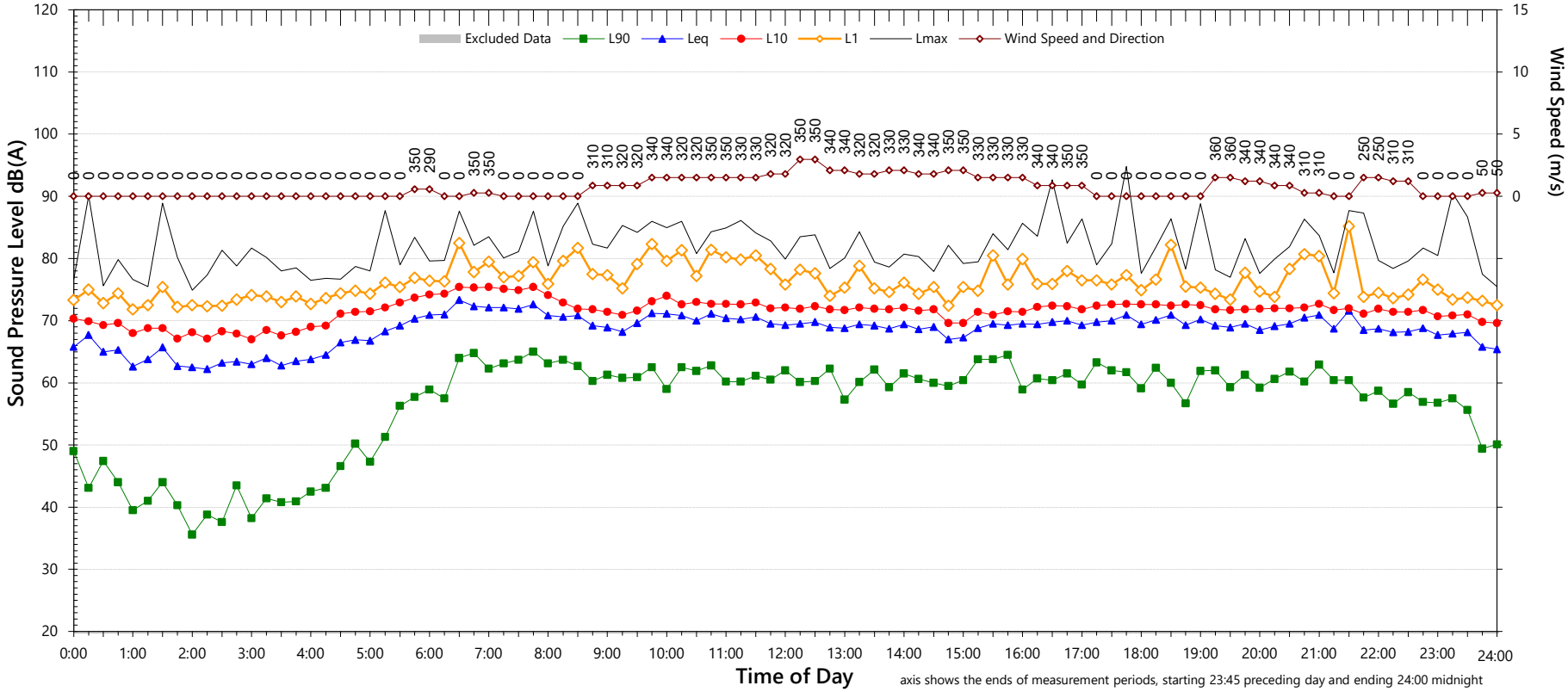
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Wednesday, 7 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		59	58	41
L_{Aeq}	#N/A	70	70	68

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	80	to	105
L_{AFMax} - L_{Aeq} (Range)	17	to	36

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	72	70
$L_{Aeq\ 1hr}$ upper 10 percentile	73	72
$L_{Aeq\ 1hr}$ lower 10 percentile	72	65

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

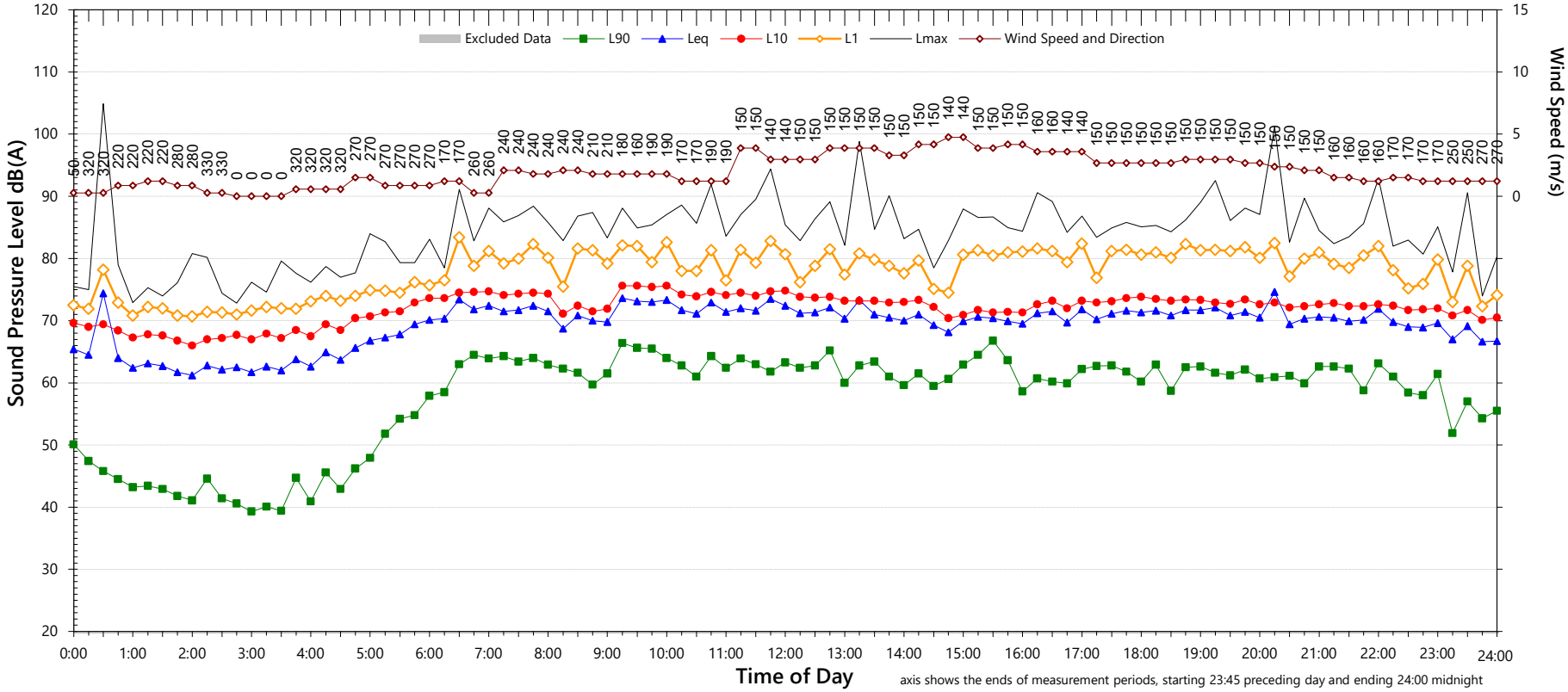
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Thursday, 8 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL		60	59	42
L_{Aeq}	#N/A	71	71	68

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	80	to	91
L_{AFMax} - L_{Aeq} (Range)	16	to	23

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	74	70
$L_{Aeq\ 1hr}$ upper 10 percentile	75	72
$L_{Aeq\ 1hr}$ lower 10 percentile	72	65

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

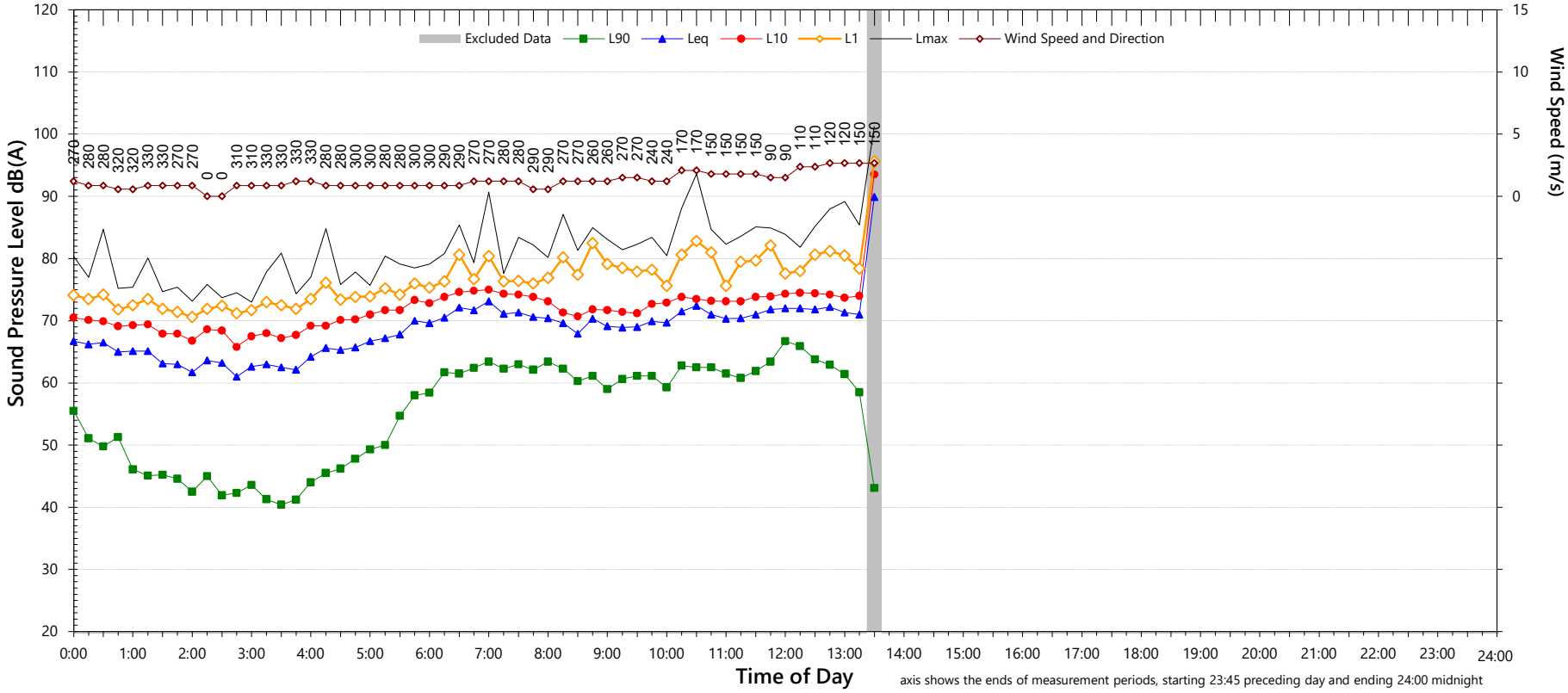
#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

The Newington College - Concordia College facing Stanmore roac

Friday, 9 May 2025



NSW Noise Policy for Industry (Free Field)				
Descriptor		**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL		-	-	-
L_{Aeq}	#N/A	-	-	-

Night Time Maximum Noise Levels			**(see note 7)**
L_{AFMax} (Range)	-	to	-
L_{AFMax} - L_{Aeq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)	#N/A	
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	-
$L_{Aeq\ 1hr}$ upper 10 percentile	-	-
$L_{Aeq\ 1hr}$ lower 10 percentile	-	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.

#N/A

7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

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Newington College, Stanmore

Background & Ambient Noise Monitoring Results - NSW 'Noise Policy for Industry', 2017

Periods with insufficient results excluded	L_{A90} Background Noise Levels[4]			L_{Aeq} Ambient Noise Levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Friday-28-November-2025	-	43	33	-	60	56
Saturday-29-November-2025	-	43	33	-	63	59
Sunday-30-November-2025	-	-	32	-	-	57
Monday-01-December-2025	42	40	33	61	60	59
Tuesday-02-December-2025	44	40	32	65	65	56
Wednesday-03-December-2025	42	42	32	62	61	55
Thursday-04-December-2025	42	45	35	61	59	55
Friday-05-December-2025	-	-	-	-	-	-
Representative Weekday[5]	**42**	**42**	**33**	**62**	**62**	**56**
Representative Weekend[5]	**-**	**43**	**33**	**-**	**63**	**58**
Representative Week[5]	**42**	**42**	**33**	**62**	**62**	**57**

Notes:

1. Day is 7:00am to 6:00pm on all days except Sundays and Public Holidays when it is 8:00am to 6:00pm 2. Evening is 6:00pm to 10:00pm

3. Night is the remaining periods 4. Assessment Background Level (ABL) for individual days 5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq} 6. Leq is calculated in the free field. 2.5dB is subtracted from results if logger is placed at façade 7. Number in brackets represents the measured (actual) RBL value, which is below the minimum policy value of 30 dB(A) during the evening or night period or 35 dB(A) during the day period.

Newington College, Stanmore

Road / Rail Noise Monitoring Results (at one metre from façade)

Periods with insufficient results excluded	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
Date	**Day[1]**	**Night[2]**	**Day - Up[4]**	**Day - Low[5]**	**Night - Up[4]**	**Night - Low[5]**
Friday-28-November-2025	-	58	-	-	60	40
Saturday-29-November-2025	64	60	67	50	65	40
Sunday-30-November-2025	65	59	67	60	64	39
Monday-01-December-2025	63	61	66	57	66	41
Tuesday-02-December-2025	67	59	69	64	64	38
Wednesday-03-December-2025	64	58	67	61	61	39
Thursday-04-December-2025	63	57	65	58	63	41
Friday-05-December-2025	-	-	-	-	-	-
Representative Weekday[3]	**64**	**58**	**66**	**60**	**63**	**40**
Representative Weekend[3]	**65**	**60**	**67**	**55**	**64**	**39**
Representative Week[3]	**64**	**59**	**67**	**59**	**64**	**40**

Notes:

1. Day is 7:00am to 10:00pm 2. Night is 10:00pm to 7:00am 3. Median of daily L_{Aeq}

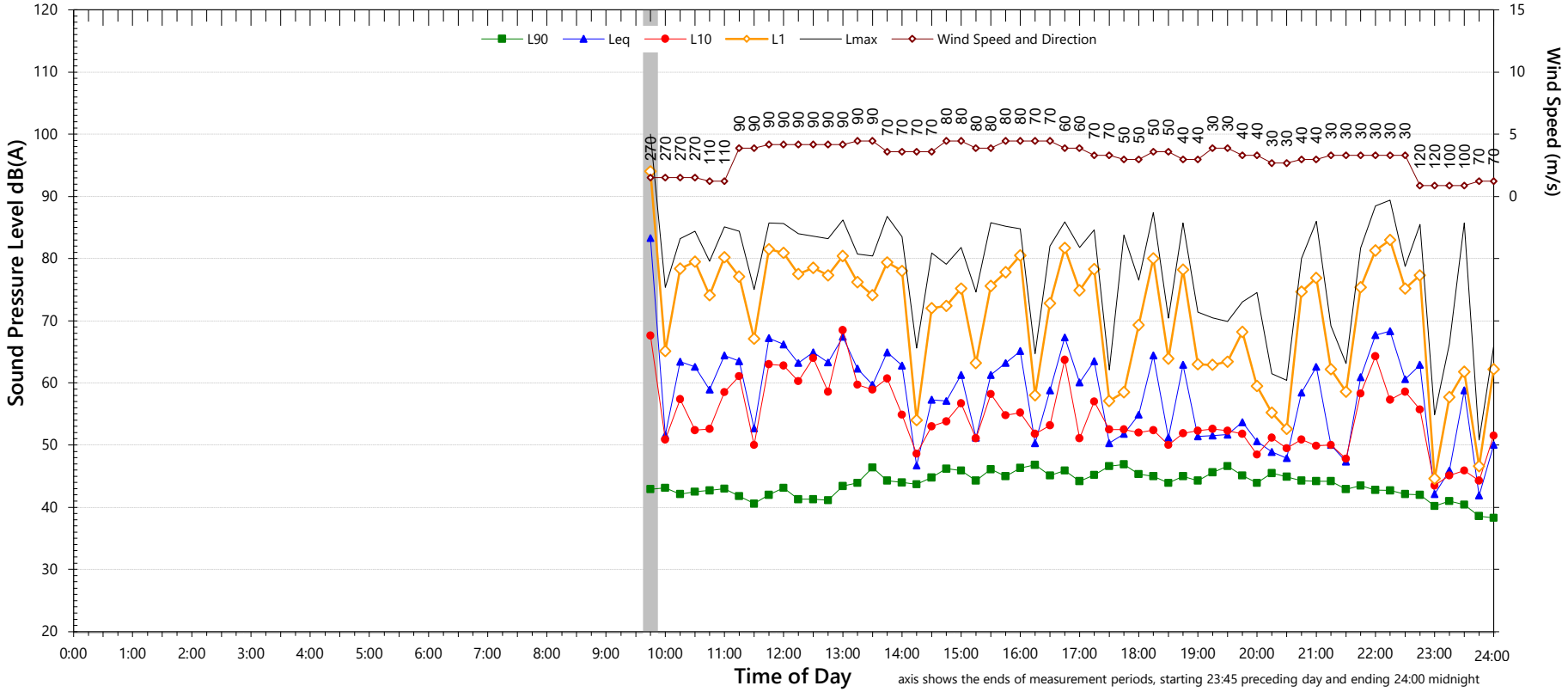
4. Upper 10th percentile $L_{Aeq\ 1hr}$ 5. Lower 10th percentile $L_{Aeq\ 1hr}$

6. Values are calculated at the facade. 2.5dB is added to results if logger is placed in the free field

Unattended Noise Monitoring Results

Newington College, Stanmore

Friday, 28 November 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	43	33
L_{Aeq}	-	60	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	89
L_{AFMax} - L_{Aeq} (Range)	18	to	32

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	58
$L_{Aeq\ 1hr}$ upper 10 percentile	-	60
$L_{Aeq\ 1hr}$ lower 10 percentile	-	40

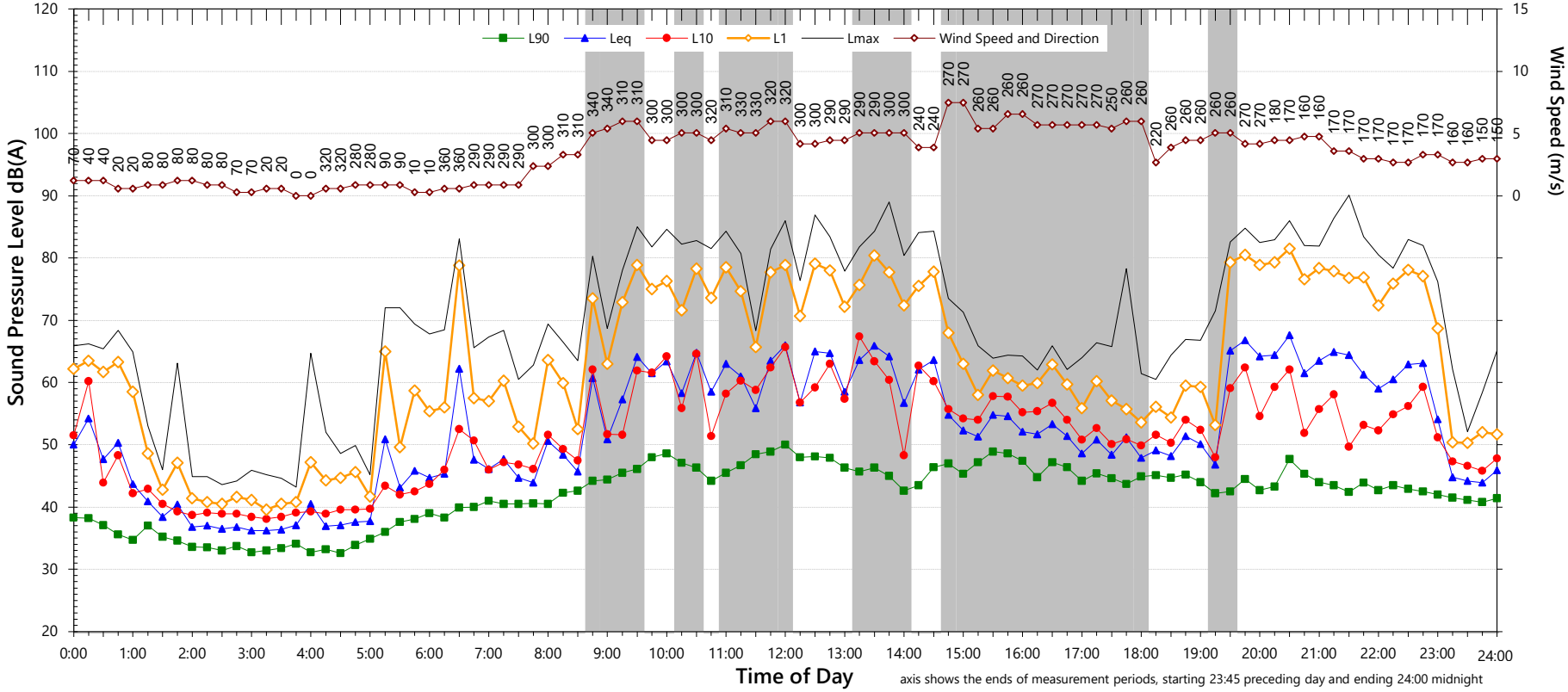
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Saturday, 29 November 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	43	33
L_{Aeq}	-	63	59

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	64	60
$L_{Aeq\ 1hr}$ upper 10 percentile	67	65
$L_{Aeq\ 1hr}$ lower 10 percentile	50	40

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	84
L_{AFMax} - L_{Aeq} (Range)	18	to	28

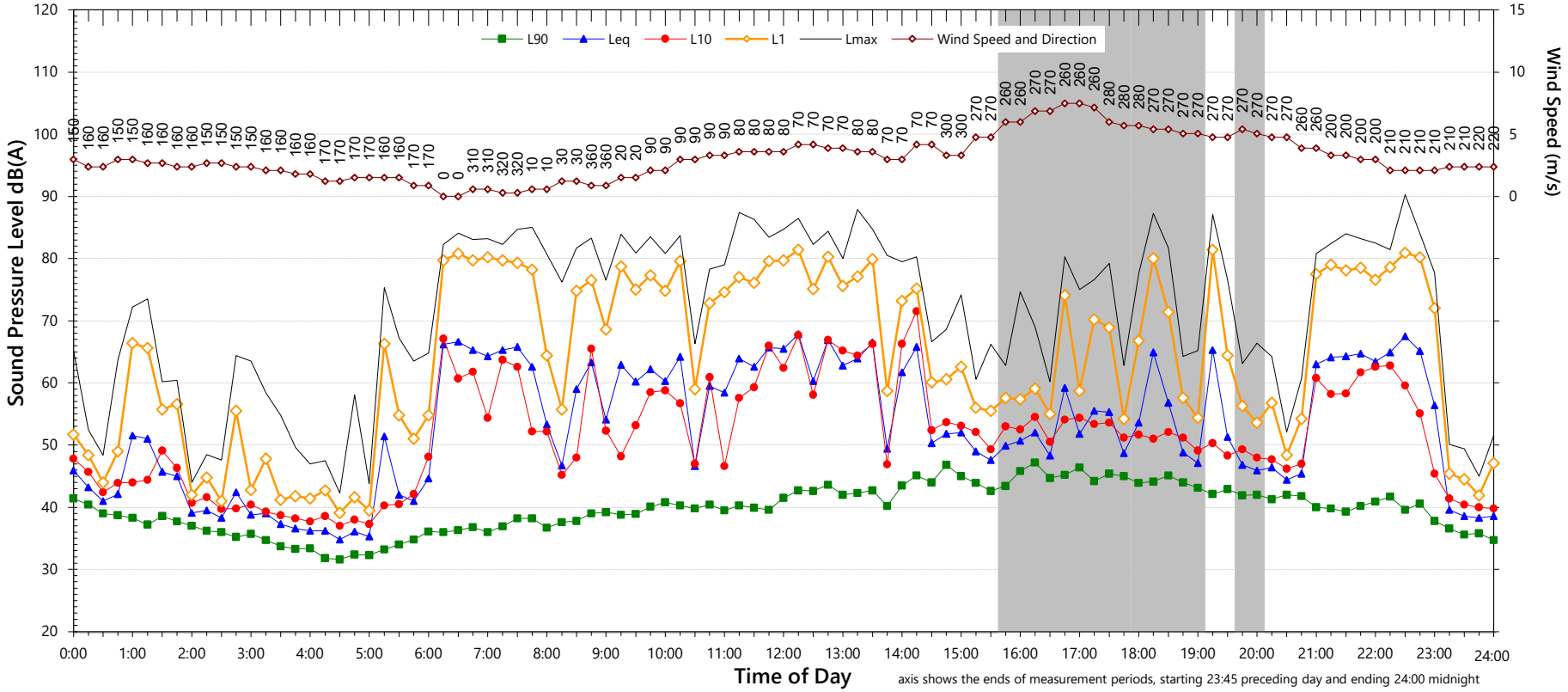
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Sunday, 30 November 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	-	32
L_{Aeq}	-	-	57

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	72	to	90
L_{AFMax} - L_{Aeq} (Range)	18	to	30

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	65	59
$L_{Aeq\ 1hr}$ upper 10 percentile	67	64
$L_{Aeq\ 1hr}$ lower 10 percentile	60	39

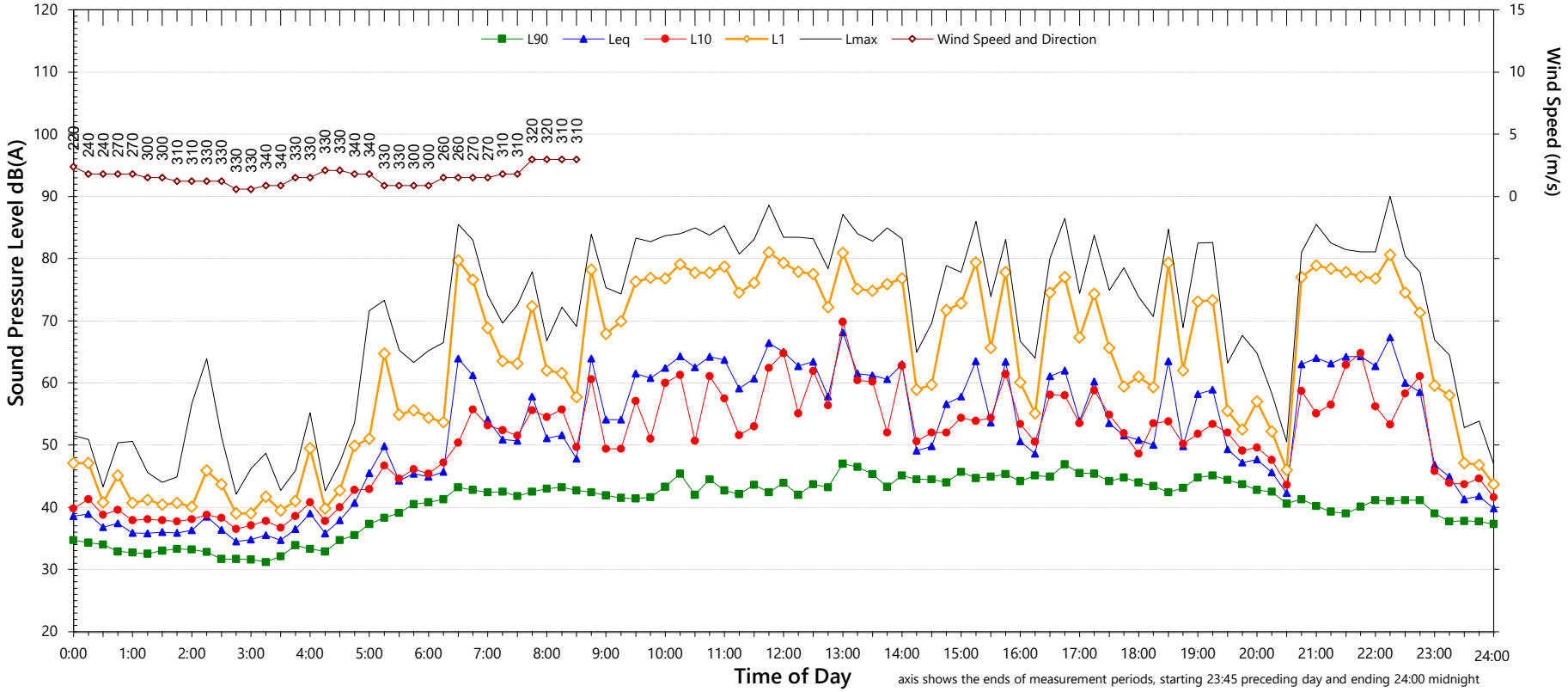
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Monday, 1 December 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	42	40	33
L_{Aeq}	61	60	59

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	63	61
$L_{Aeq\ 1hr}$ upper 10 percentile	66	66
$L_{Aeq\ 1hr}$ lower 10 percentile	57	41

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	71	to	90
L_{AFMax} - L_{Aeq} (Range)	17	to	27

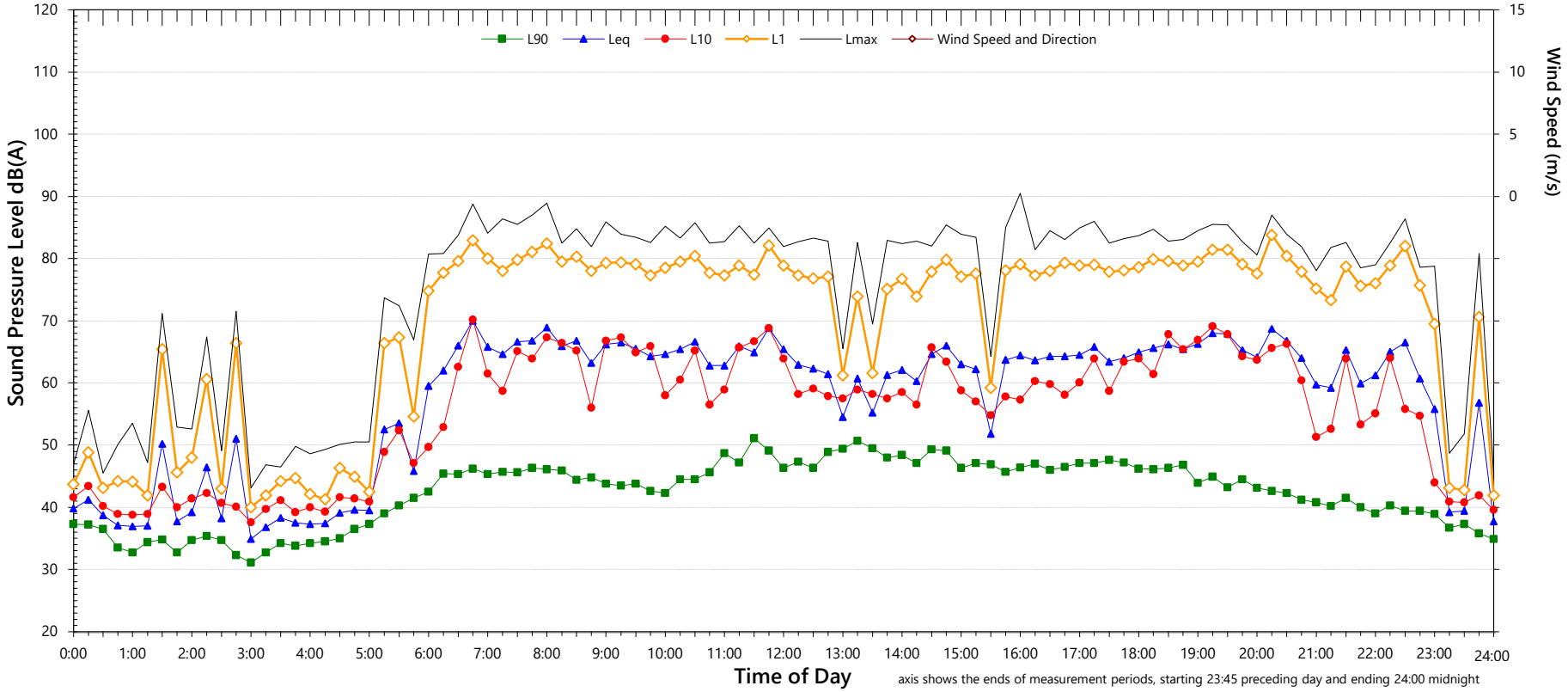
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Tuesday, 2 December 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	44	40	32
L_{Aeq}	65	65	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	76	to	86
L_{AFMax} - L_{Aeq} (Range)	15	to	30

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	67	59
$L_{Aeq\ 1hr}$ upper 10 percentile	69	64
$L_{Aeq\ 1hr}$ lower 10 percentile	64	38

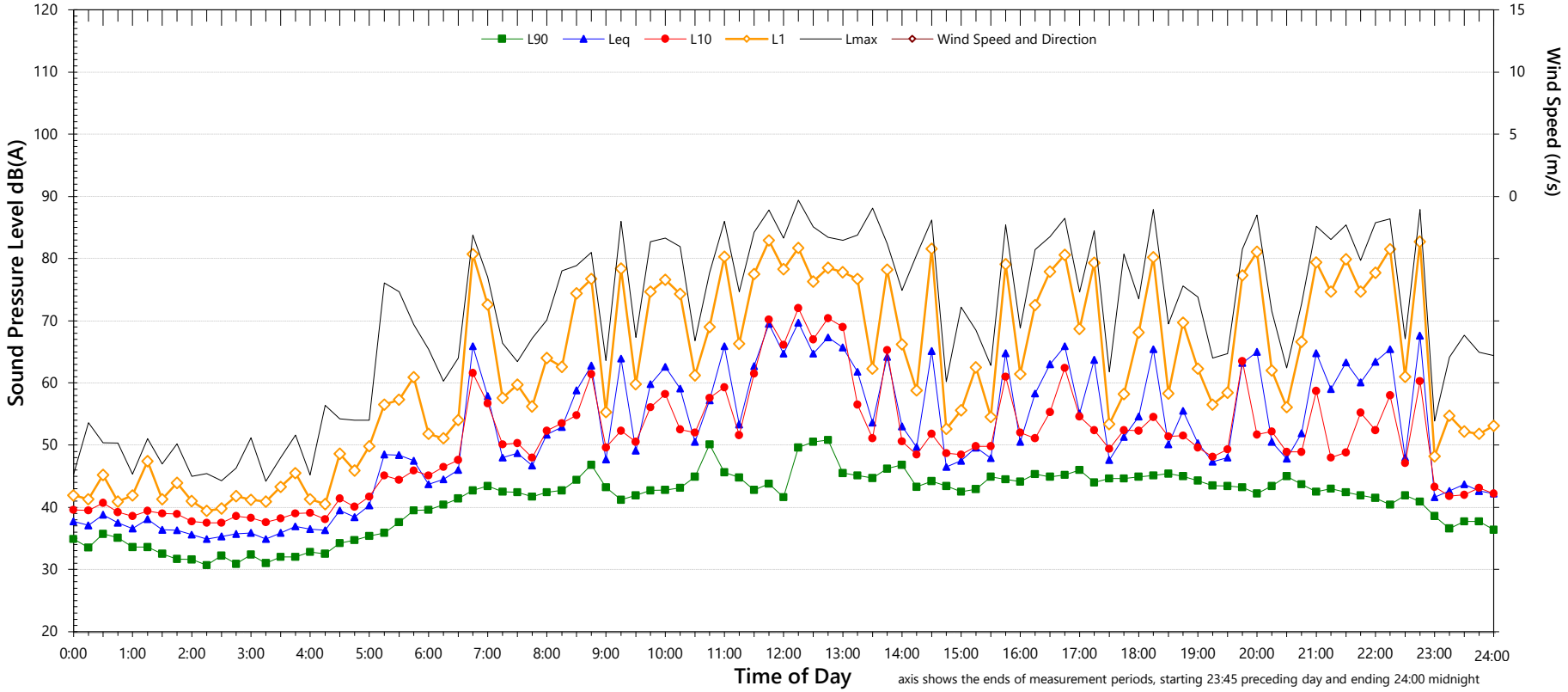
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Wednesday, 3 December 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	42	42	32
L_{Aeq}	62	61	55

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	64	58
$L_{Aeq\ 1hr}$ upper 10 percentile	67	61
$L_{Aeq\ 1hr}$ lower 10 percentile	61	39

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	88
L_{AFMax} - L_{Aeq} (Range)	24	to	30

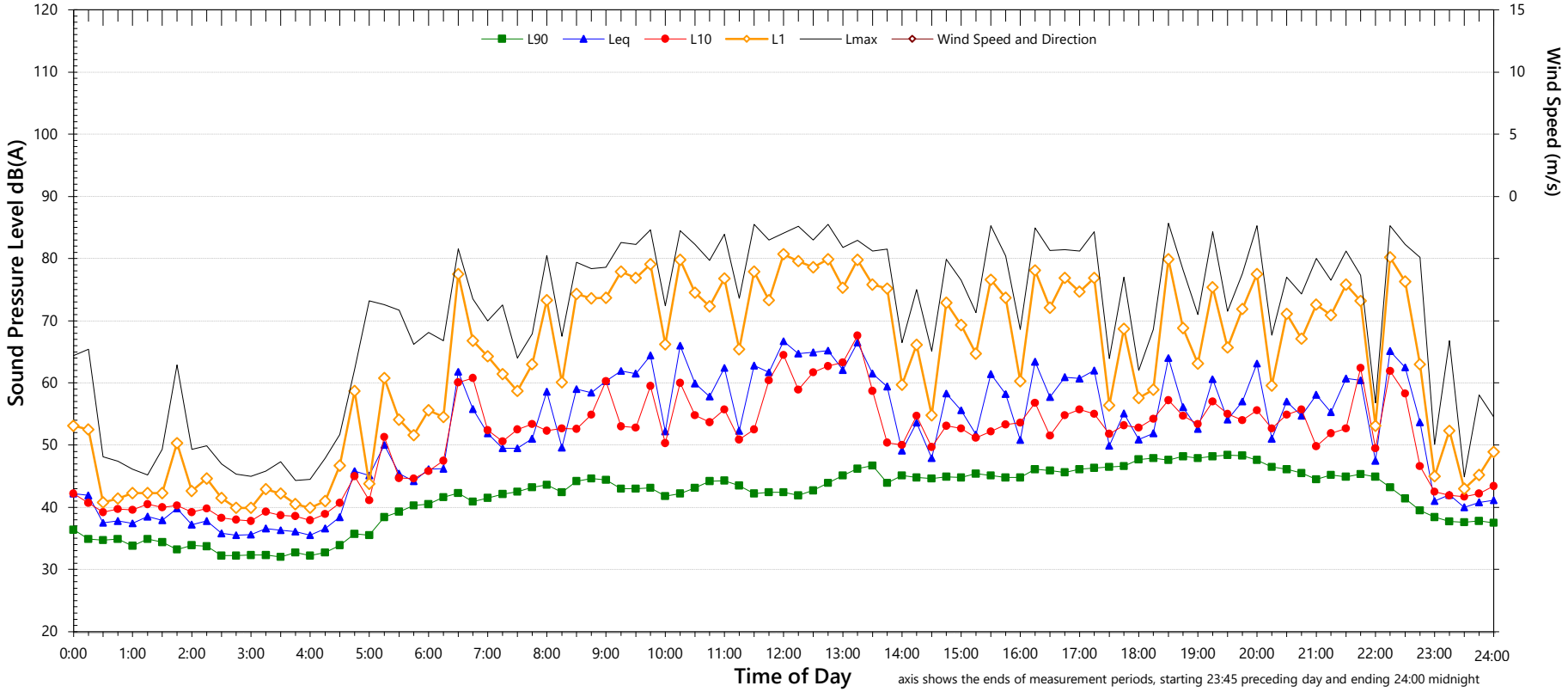
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Thursday, 4 December 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	42	45	35
L_{Aeq}	61	59	55

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	63	57
$L_{Aeq\ 1hr}$ upper 10 percentile	65	63
$L_{Aeq\ 1hr}$ lower 10 percentile	58	41

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	87
L_{AFMax} - L_{Aeq} (Range)	21	to	30

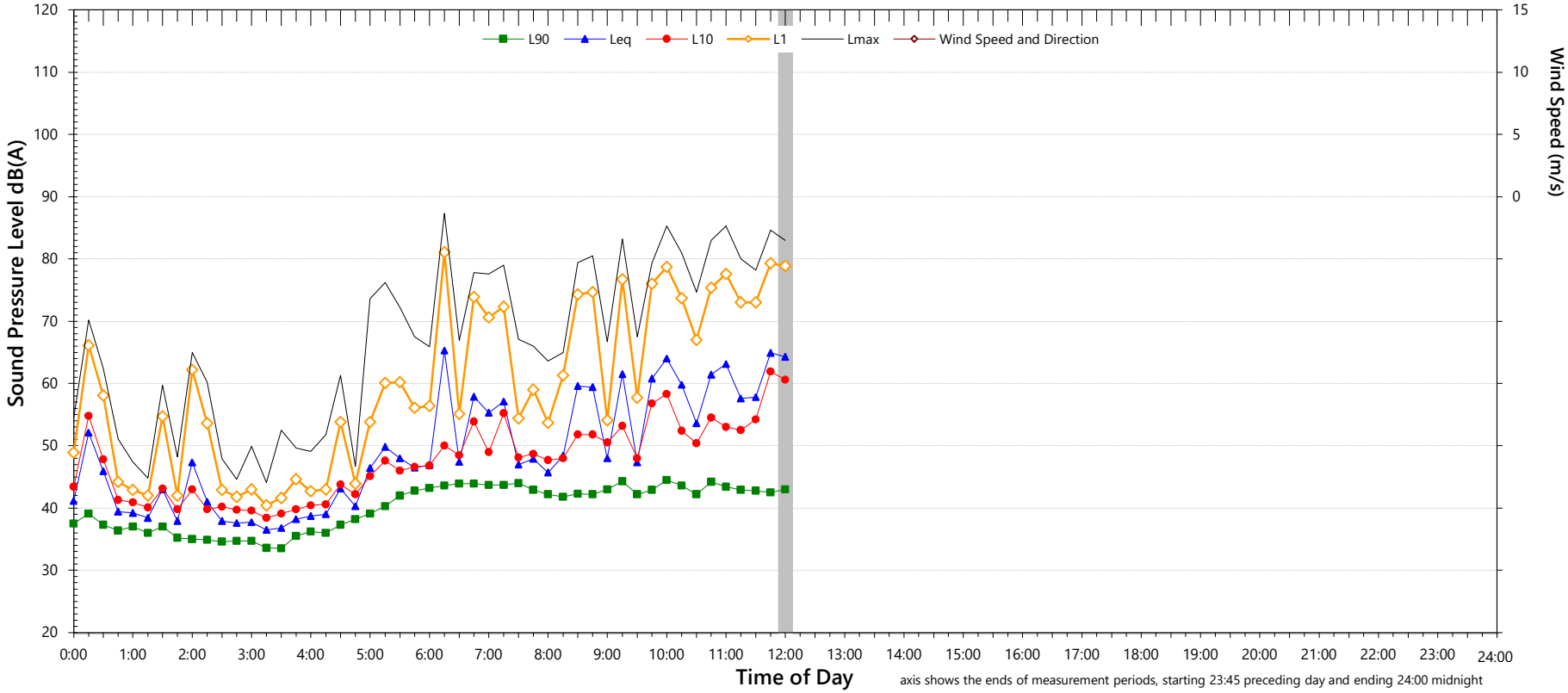
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

Newington College, Stanmore

Friday, 5 December 2025



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	-	-
L_{Aeq}	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	-	to	-
L_{AFMax} - L_{Aeq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	-
$L_{Aeq\ 1hr}$ upper 10 percentile	-	-
$L_{Aeq\ 1hr}$ lower 10 percentile	-	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)