RODNEY STEVENS ACOUSTICS
Acoustic Consultants

REPORT 200135R1

Revision 1

Noise Impact Assessment
Additions and Alterations to Existing School
1A Harris Road, Five Dock NSW 2046

PREPARED FOR:
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14 August 2020

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Noise Impact Assessment

Additions and Alterations to Existing School

1A Harris Road, Five Dock NSW 2046

PREPARED BY:

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DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
200135R1	Revision 0	4 May 2020	Thomas Carney	Desmond Raymond	Rodney Stevens
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TABLE OF CONTENTS

1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (here forth referred to as RSA) has been engaged by Rosebank College to prepare a noise impact assessment for the proposed additions and alterations to Rosebank College, 1A Harris Road, Five Dock NSW 2046.

This report details the results of an ambient noise survey and establishes the noise criteria for operational noise for the development.

Council has requested additional information in their consideration of this proposal and this has been included in this version of the report.

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix A.

2 PROPOSED DEVELOPMENT

2.1 Development Site

The additions and alterations are proposed to the existing school located at 1A Harris Road, Five Dock NSW. The development site is bounded by commercial receivers to the north, south, east and west and residential receivers to the east.

Figure 2-1 shows an aerial image of the site area and the surrounding environment. Architectural plans for the additions and alterations are shown in Appendix D.

Figure 2-1 Site Location

Image Courtesy of Google Maps © 2020

2.2 Proposed Development

The proposed additions and alterations involve the demolition of some existing buildings on site and the construction of ground floor parking, two levels of General Learning Areas (GLA) totalling 12 adaptable rooms and recreational areas for the students.

3 BASELINE NOISE SURVEY

3.1 Unattended Noise Monitoring

In order to characterise the existing acoustical environment of the area unattended noise monitoring was conducted between the dates of Tuesday 21st April and Tuesday 28th April 2020 at the logging location shown in Figure 2-1.

Logger locations were selected with consideration to other noise sources which may influence readings, security issues for noise monitoring equipment and gaining permission for access from residents and landowners.

Instrumentation for the survey comprised of two RION NL-42 environmental noise loggers (serial numbers 572542 and 572559) fitted with microphone windshields. Calibration of the logger was checked prior to and following measurements. Drift in calibration did not exceed ±0.5 dB(A). All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Measured data has been filtered to remove data measured during adverse weather conditions upon consultation with historical weather reports provided by the Bureau of Meteorology (BOM).

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1}, L_{A10}, L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary for definitions in Appendix A). Detailed results at the monitoring location are presented in graphical format in Appendix B. The graphs show measured values of L_{A1}, L_{A10}, L_{A90} and L_{Aeq} for each 15-minute monitoring period

3.2 Data Processing

3.2.1 Noise Emission (*Noise Policy for Industry*)

In order to assess noise emission from the proposed additions and alterations, the data obtained from the noise logger has been processed in accordance with the procedures contained in the NSW Environmental Protection Authority's (EPA) *Noise Policy for Industry* (NPfI, 2017) to establish representative noise levels that can be expected in the vicinity of the site. The monitored baseline noise levels are detailed in Table 3-1.

Table 3-1 Measured Baseline Noise Levels Corresponding to Defined NPfI Periods

Location	Measurement Descriptor	Measured Noise Level – dB(A) re 20 µPa		
		Daytime 7 am - 6 pm	Evening 6 pm – 10 pm	Night-time 10 pm – 7 am
Harris Road logger	L_{Aeq}	62	59	57
	RBL (Background)	50	46	40

Notes: All values expressed as dB(A) and rounded to nearest 1 dB(A);

L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

L_{A90} Noise level present for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

3.3 Noise Intrusion (State Environmental Planning Policy (Infrastructure) 2007)

To assess noise intrusion into the proposed additions and alterations, the data obtained from the loggers has been processed to establish representative ambient noise levels at the facades most exposed to Parramatta Road.

The time periods used for this assessment are as defined in the *State Environmental Planning Policy (Infrastructure) 2007* and the *Development near Rail Corridors and Busy Roads Interim Guideline*. Results are presented below in Table 3-2.

Table 3-2 Traffic Noise Levels Corresponding to Defined SEPP 2007 Periods

Location	Period	External Noise Levels dB(A)
Approximately 10m from Parramatta Road	Day Time 7:00 am - 10:00 pm	$L_{Aeq(15hour)}$ 66
	Night Time 10:00 pm - 7:00 am	$L_{Aeq(9hour)}$ 65

4 NOISE GUIDELINES AND CRITERIA

4.1 AS 2107:2016

Australian Standard AS 2107-2016 *Recommended Design Sound Levels and Reverberation Times for Building Interiors, Table 1* (replicated here in Table 4-1) states:

Table 4-1 Recommended Design Sound Levels For Different Areas of Occupancy in Buildings

Building Areas	Design Sound Level (L_{Aeq}) Range
Teaching Spaces	35-45
Office Areas	40-45

4.2 Operational Noise Project Trigger Noise Levels

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the EPA. The EPA oversees the Noise Policy for Industry (NPfI) October 2017 which provides a framework and process for deriving project trigger noise level. The NPfI project noise levels for industrial noise sources have two (2) components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity for particular land uses for residents and sensitive receivers in other land uses.

4.2.1 Intrusiveness Noise Levels

For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness noise level essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dB(A) above the measured Rated Background Level (RBL), over any 15 minute period.

4.2.2 Amenity Noise Levels

The amenity noise level is based on land use and associated activities (and their sensitivity to noise emission). The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. The noise levels relate only to other industrial-type noise sources and do not include road, rail or community noise. The existing noise level from industry is measured.

If it approaches the project trigger noise level value, then noise levels from new industrial-type noise sources, (including air-conditioning mechanical plant) need to be designed so that the cumulative effect does not produce total noise levels that would significantly exceed the project trigger noise level.

4.2.3 Area Classification

The NPfI characterises the “Urban” noise environment as an area with an acoustical environment that:

- is dominated by ‘urban hum’ or industrial source noise,
- where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources
- has through-traffic with characteristically heavy and continuous traffic flows during peak periods
- is near commercial districts or industrial districts
- has any combination of the above.

The area surrounding the proposed development falls under the “Urban” area classification.

4.2.4 Project Specific Trigger Noise Levels

Having defined the area type, the processed results of the attended noise monitoring have been used to determine project specific project trigger noise levels. The intrusive and amenity project trigger noise levels for nearby residential premises are presented in Table 4-2. These project trigger noise levels are nominated for the purpose of assessing potential noise impacts from the proposed development.

Table 4-2 Operational Project Trigger Noise Levels

Receiver	Time of Day	ANL [1] $L_{Aeq(15min)}$	Measured		Project Trigger Noise Levels	
			RBL [2] $L_{A90(15min)}$	Existing $L_{Aeq(Period)}$	Intrusive $L_{Aeq(15min)}$	Amenity $L_{Aeq(15min)}$
Residential	Day	60	50	62	**55**	63
	Evening	50	46	59	**51**	53
	Night	45	40	47	**45**	48

Note 1: ANL = “Amenity Noise Level” for residences in Urban Areas.

Note 2: RBL = “Rating Background Level”.

5 NOISE IMPACT ASSESSMENT – EXTERNAL NOISE INTRUSION

5.1 Traffic Noise Assessment

In order to ascertain the existing traffic noise levels from Parramatta and Harris Roads, the measured noise logger data was processed in accordance to the NSW Department of Planning and Infrastructure's "*Development near Rail Corridors and Busy Roads - Interim Guideline"* assessment time periods as shown in Table 3-2.

The required noise reduction via the building façade for each respective floor for each time period will be compared to determine the appropriate design criteria levels.

It is typically accepted that an open window (fractionally open to meet ventilation requirements) results in an attenuation of external noise by 10 dB. This reduction has been used to predict the room noise level in the window open condition.

5.2 Recommended Noise Control Treatment

In order to comply with AS 2107:2016 criteria, the following minimum glazing is recommended for the proposed development.

Table 5-1 Minimum Acoustic Rating (R_w) Required for Glazing Elements

Area	Window	Glazed Door/Door
Learning Areas	Rw 34	Rw 34
Office Areas/Common Areas	Rw 32	Rw 32

A glazing thickness guideline is presented in Appendix E for further reference

6 NOISE IMPACT ASSESSMENT – IMPACT OF PROPOSED DEVELOPMENT

6.1 Proposed Use

6.1.1 GLA

The proposal is to build 12 General Learning Area (GLA) classroom at the existing school. The proposed classrooms will cater for up to 24-26 children per room. As this is a learning environment, usually there are few people talking at one time, with the teacher generally instructing the class on the lesson and perhaps one or two children responding at one time. The noise impact of this to surrounding sensitive receivers is minimal. Notwithstanding this, the predicted noise level of a teacher and student(s) talking in a classroom is considered to be **65 dB(A)** at one metre from the source, per room.

6.1.2 Open Court Area

Two multi use courts are proposed on the roof of part of the development. The courts are proposed to be for school use only and will be utilised by students before, during and after school lessons. It is envisaged that the courts could be used by students between 8:00 am and 9:00 am before school, during physical education (PE) classes during school hours, at recess (20 mins) and lunch (40 mins) and for after school training on some days between 3:00 pm and 4:30 pm. The courts are proposed to only be used on school days. During PE lessons, a maximum of 20 children would be using the courts, during other time periods, 40-50 children could be utilising the space. The predicted noise level of 50 students with a raised voice using the courts is considered to be **91 dB(A)** at one metre from the source.

6.2 Noise Emissions

Calculations of the noise levels from the operation of the classroom and courts have been carried out using the data referenced in Section 6.1 and 6.2. Calculations take into account factors such as distance, shielding from buildings and barriers.

The following figure presents the proposed development and all sensitive receivers.

Figure 6-1 Sensitive Receiver Location

6.2.1 Predicted Noise Levels – GLA

Predictive resultant noise levels have been calculated for the proposed GLA classrooms. Noise emissions at the nearest sensitive receivers are presented in Table 6-1. The predicted noise calculations take into account the following:

- Heights of receivers are assumed to be 1.5 meters above respective level;
- Noise levels are as shown in Section 6.1 (worst case scenario).

Resulting noise levels have been calculated to the most affected point on the boundary of the affected receivers

Table 6-1 Predicted Noise Levels At Sensitive Receivers – General Learning Areas

Receiver	Period	Calculated Noise Level L_{Aeq} – dB(A)	Criteria	Compliance
R1	Day	35	55	Y
C1	When in use	<20	65	Y
C2	When in use	45	65	Y
C3	When in use	40	65	Y

It should be noted that the dominant noise source in the vicinity of the site is Parramatta Road and this will most likely mask any potential noise from the proposed additions and alterations at most of the nearby sensitive receivers.

6.2.2 Predicted Noise Levels – Courts

Predictive resultant noise levels have been calculated for the proposed courts. Noise emissions at the nearest sensitive receivers are presented in Table 6-2. The predicted noise calculations take into account the following:

- Heights of sources is 1.2 metres;
- 50 children using the courts;
- Heights of receivers are assumed to be 1.5 meters above respective level;
- Noise levels are as shown in Section 6.2 (worst case scenario).

Resulting noise levels have been calculated to the most affected point on the boundary of the affected receivers

Table 6-2 Predicted Noise Levels At Sensitive Receivers – Courts

Receiver	Period	Calculated Noise Level L_{Aeq} – dB(A)	Criteria	Compliance
R1	Day	48	55	Y
C1	When in use	<20	65	Y
C2	When in use	36	65	Y
C3	When in use	48	65	Y

6.3 Mechanical Plant Noise Assessment

Mechanical ventilation will be installed at the proposed additions and alterations at the school, the operation of such mechanical plant must be in accordance with the relevant regulations such as the Building Code of Australia (BCA Vol.1, Part 4.5 *Ventilation of rooms*) and AS1668.2-2002 *The use of ventilation and air conditioning in buildings* will be required.

A specific mechanical plant selection has not been supplied at this stage. It is anticipated that the building will be serviced by typical mechanical ventilation/air conditioning equipment.

It is likely that the criteria set out in Table 4-2 may be met through the use of conventional noise control methods (e.g. selection of equipment on the basis of quiet operation and, where necessary, providing enclosures, localised barriers, silencers and lined ductwork).

An appropriately qualified acoustic consultant should review the mechanical plant associated with the development at the detailed design stage when final plant selections have been made.

7 DISCUSSION

Council made comment regarding the removal of part of the brick boundary fence on the corner of Parramatta and Harris Roads and any potential impact it could have on the amenity of neighbouring sensitive receivers. As this area is near foyer and recreational space and separate from any teaching spaces, noise impact to surrounding receivers would be minimal. Any recreation activity would be limited to short periods of the day (before and after school and during recess and lunch). Due to the proximity and noise from Parramatta Road (measured at 62 dB(A) during the daytime), any noise from the school through this opening will be masked by road noise to all sensitive receivers, some of these receivers will also be shielded by the proposed new development. Notwithstanding this, the potential noise impact to the nearest residential receiver (R1) is considered to be **less than 30 dB(A).**

8 CONCLUSION

A noise impact assessment has been conducted in relation to the operation of the proposed additions and alterations at Rosebank College located at 1A Harris Road, Five Dock NSW 2046.

This assessment has been conducted and appropriate noise emission criteria have been established in accordance with City of Canada Bay Council's requirements.

This report shows that under the most conservative operating scenarios and the implementation of the recommendations, the proposed development will achieve the established acoustic criteria at neighbouring residences. It is therefore recommended that development approval be granted on the basis of acoustics.

Approved:-

Rodney O. Stevens.

Rodney Stevens

Manager/Principal

Appendix A – Acoustic Terminology

A-weighted sound pressure	The human ear is not equally sensitive to sound at different frequencies. People are more sensitive to sound in the range of 1 to 4 kHz (1000 – 4000 vibrations per second) and less sensitive to lower and higher frequency sound. During noise measurement an electronic '*A-weighting*' frequency filter is applied to the measured sound level *dB(A)* to account for these sensitivities. Other frequency weightings (B, C and D) are less commonly used. Sound measured without a filter is denoted as linear weighted dB(linear).
Ambient noise	The total noise in a given situation, inclusive of all noise source contributions in the near and far field.
Community annoyance	Includes noise annoyance due to: ▪ character of the noise (e.g. sound pressure level, tonality, impulsiveness, low-frequency content) ▪ character of the environment (e.g. very quiet suburban, suburban, urban, near industry) ▪ miscellaneous circumstances (e.g. noise avoidance possibilities, cognitive noise, unpleasant associations) ▪ human activity being interrupted (e.g. sleep, communicating, reading, working, listening to radio/TV, recreation).
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.
Cumulative noise level	The total level of noise from all sources.
Extraneous noise	Noise resulting from activities that are not typical to the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors: ▪ Noise mitigation benefits (amount of noise reduction provided, number of people protected). ▪ Cost of mitigation (cost of mitigation versus benefit provided). ▪ Community views (aesthetic impacts and community wishes). ▪ Noise levels for affected land uses (existing and future levels, and changes in noise levels).
Impulsiveness	Impulsive noise is noise with a high peak of short duration or a sequence of these peaks. Impulsive noise is also considered annoying.

Low frequency Noise containing major components in the low-frequency range (20 to 250 Hz) of the frequency spectrum.

Noise criteria The general set of non-mandatory noise levels for protecting against intrusive noise (for example, background noise plus 5 dB) and loss of amenity (e.g. noise levels for various land use).

Noise level (goal) A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day.

Noise limits Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.

Performance-based goals Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.

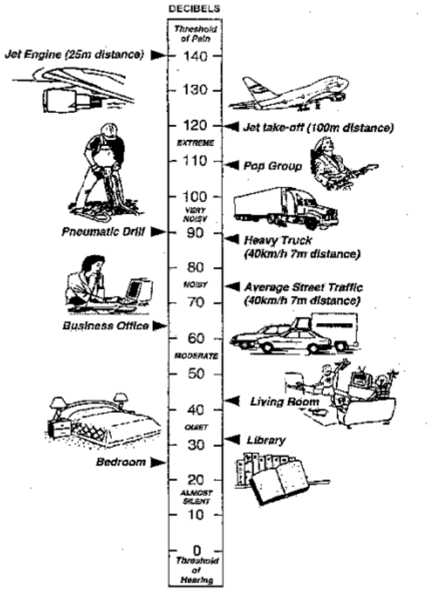
Rating Background Level (RBL) The rating background level is the overall single figure background level representing each day, evening and night time period. The rating background level is the 10th percentile min L_{A90} noise level measured over all day, evening and night time monitoring periods.

Receptor The noise-sensitive land use at which noise from a development can be heard.

Sleep disturbance Awakenings and disturbance of sleep stages.

Sound and decibels (dB) Sound (or noise) is caused by minute changes in atmospheric pressure that are detected by the human ear. The ratio between the quietest noise audible and that which should cause permanent hearing damage is a million times the change in sound pressure. To simplify this range the sound pressures are logarithmically converted to decibels from a reference level of 2 x 10-5 Pa.

The picture below indicates typical noise levels from common noise sources.



dB is the abbreviation for decibel – a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

Sound power Level (SWL)

The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in *dB(A)*.

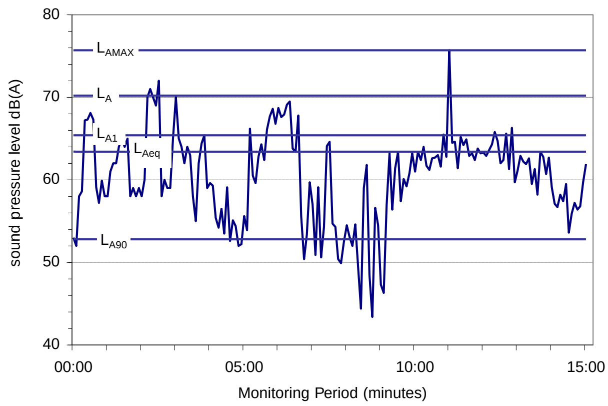
Sound Pressure Level (SPL)

The level of noise, usually expressed as SPL in *dB(A)*, as measured by a standard sound level meter with a pressure microphone. The sound pressure level in *dB(A)* gives a close indication of the subjective loudness of the noise.

Statistic noise levels

Noise levels varying over time (e.g. community noise, traffic noise, construction noise) are described in terms of the statistical exceedance level.

A hypothetical example of A weighted noise levels over a 15 minute measurement period is indicated in the following figure:



Key descriptors:

L_{Amax} Maximum recorded noise level.

L_{A1} The noise level exceeded for 1% of the 15 minute interval.

L_{A10} Noise level present for 10% of the 15 minute interval. Commonly referred to the average maximum noise level.

L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

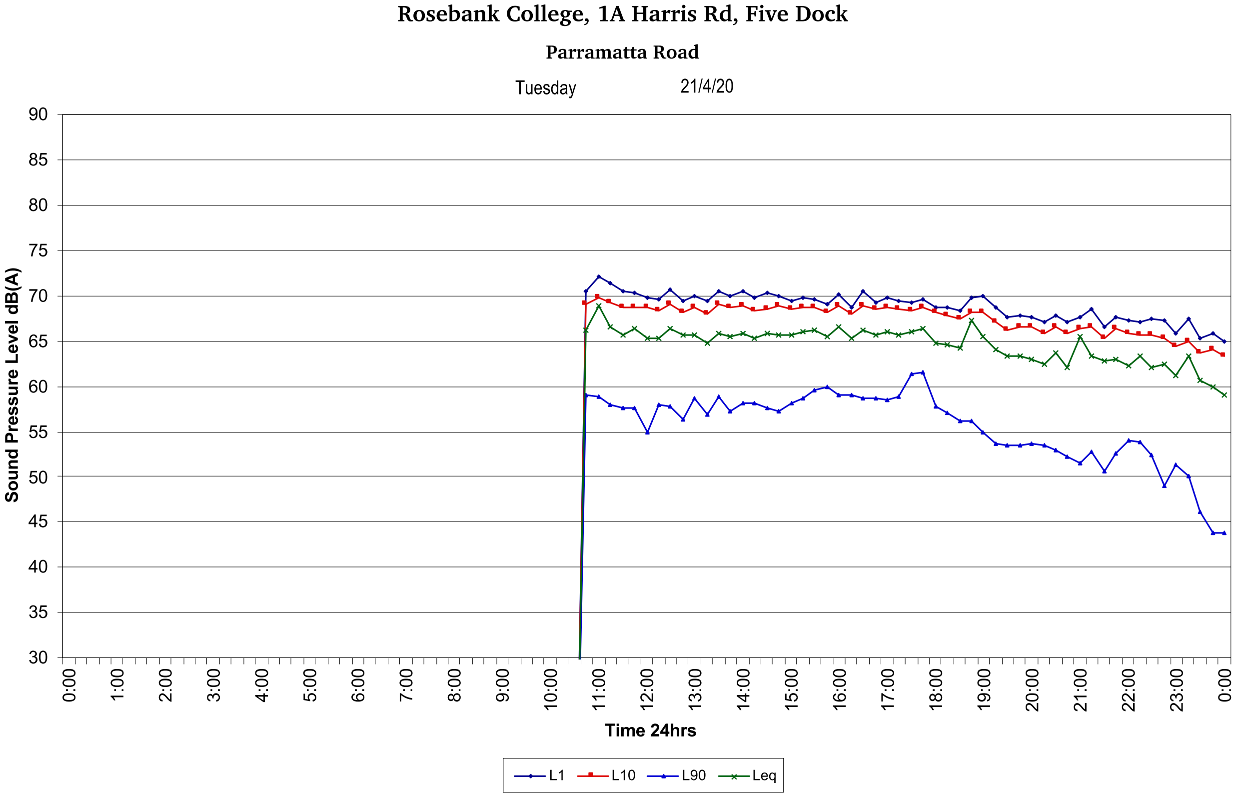
L_{A90} Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

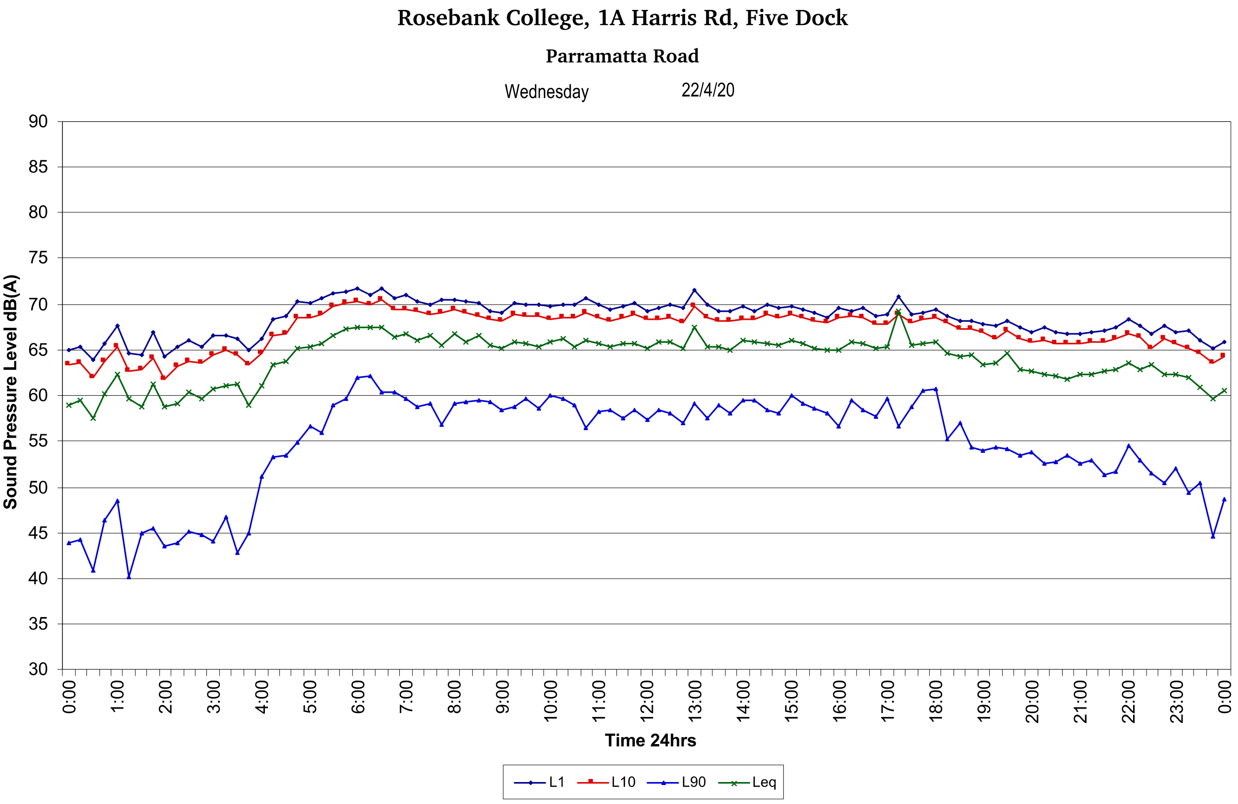
Threshold The lowest sound pressure level that produces a detectable response (in an instrument/person).

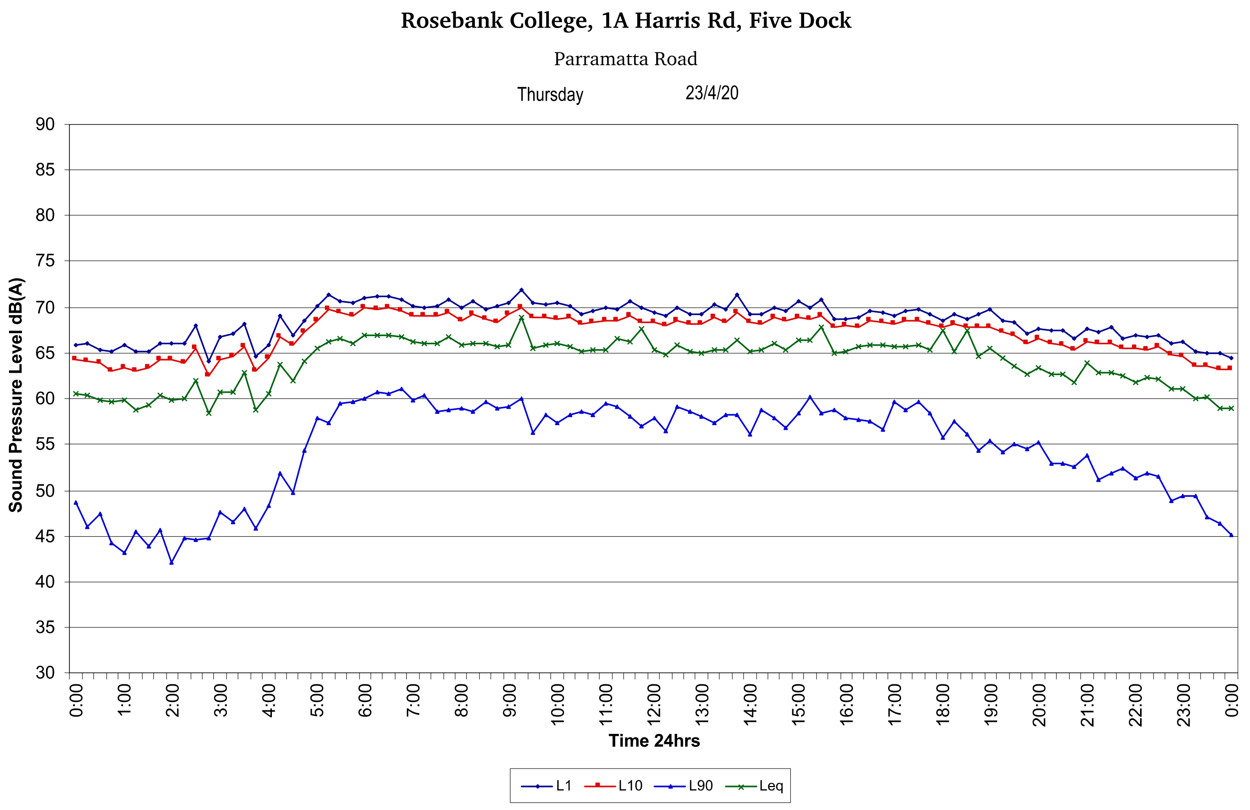
Tonality Tonal noise contains one or more prominent tones (and characterised by a distinct frequency components) and is considered more annoying. A 2 to 5 dB(A) penalty is typically applied to noise sources with tonal characteristics

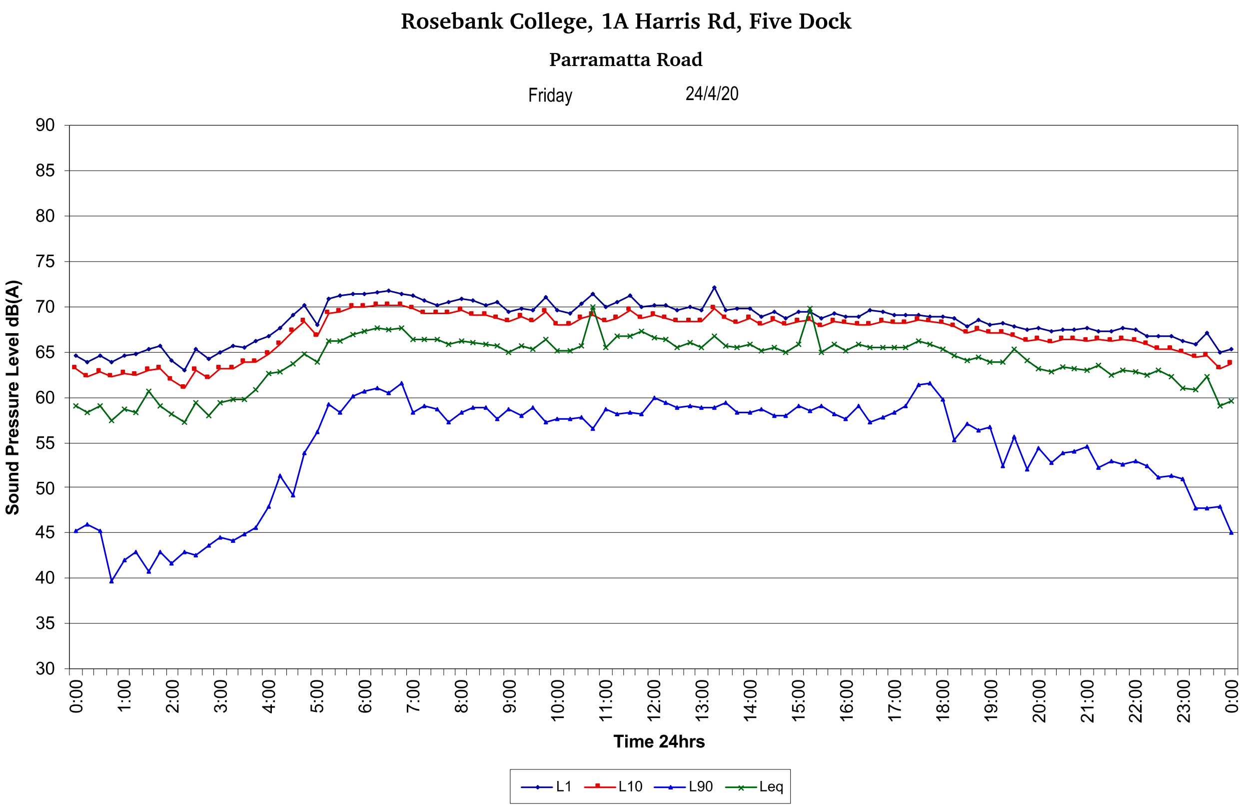
Appendix B – Logger Graphs

Parramatta Road Logger Data





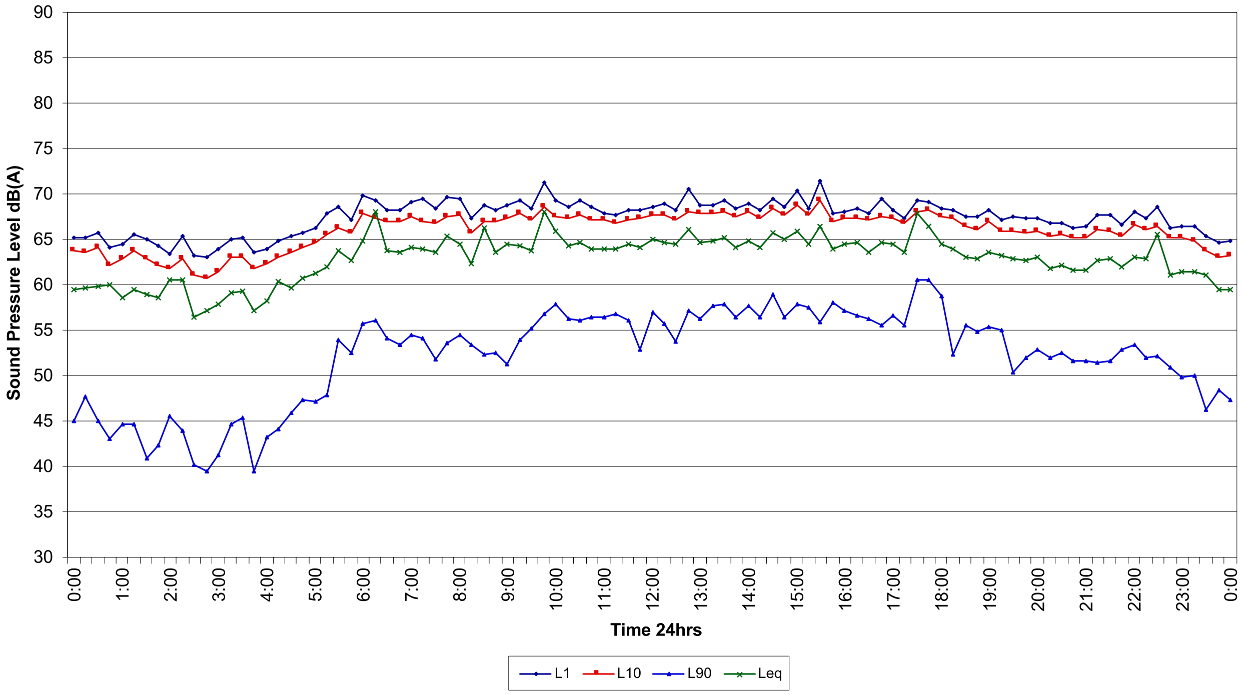

Rosebank College, 1A Harris Rd, Five Dock
Parramatta Road
Thursday 23/4/20
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


Rosebank College, 1A Harris Rd, Five Dock
Parramatta Road
Friday 24/4/20
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq

Rosebank College, 1A Harris Rd, Five Dock

Parramatta Road

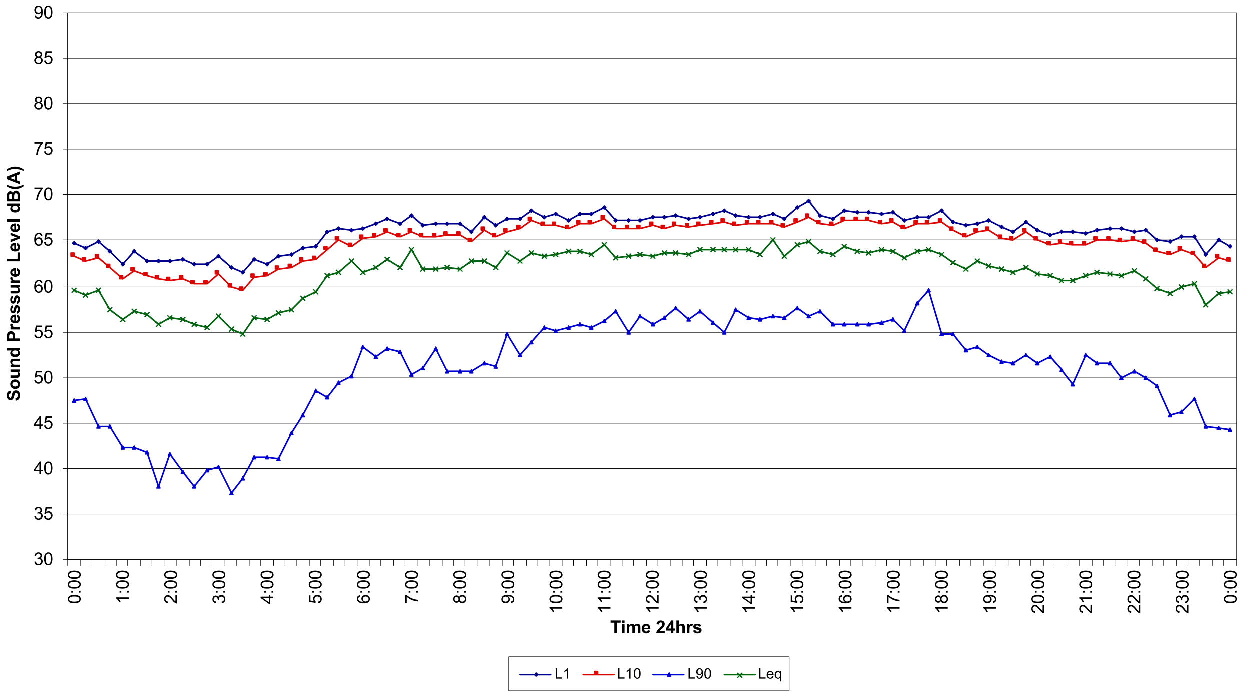
Saturday 25/4/20



Rosebank College, 1A Harris Rd, Five Dock

Parramatta Road

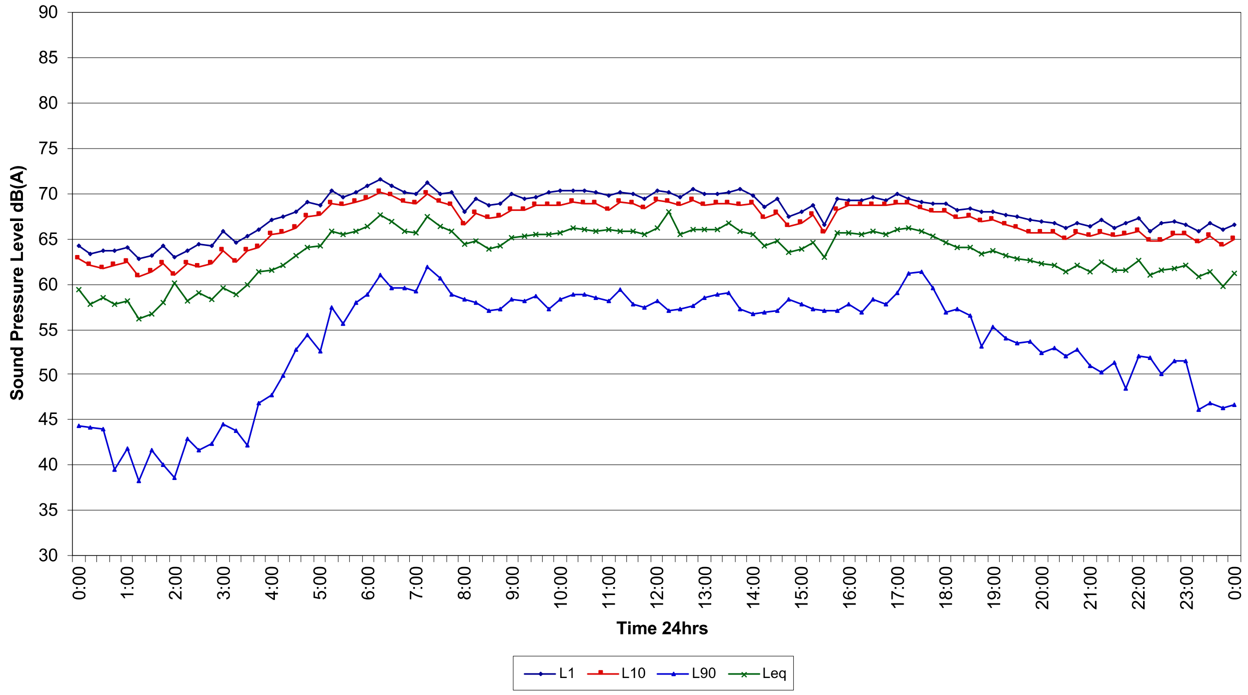
Sunday 26/4/20



Rosebank College, 1A Harris Rd, Five Dock

Parramatta Road

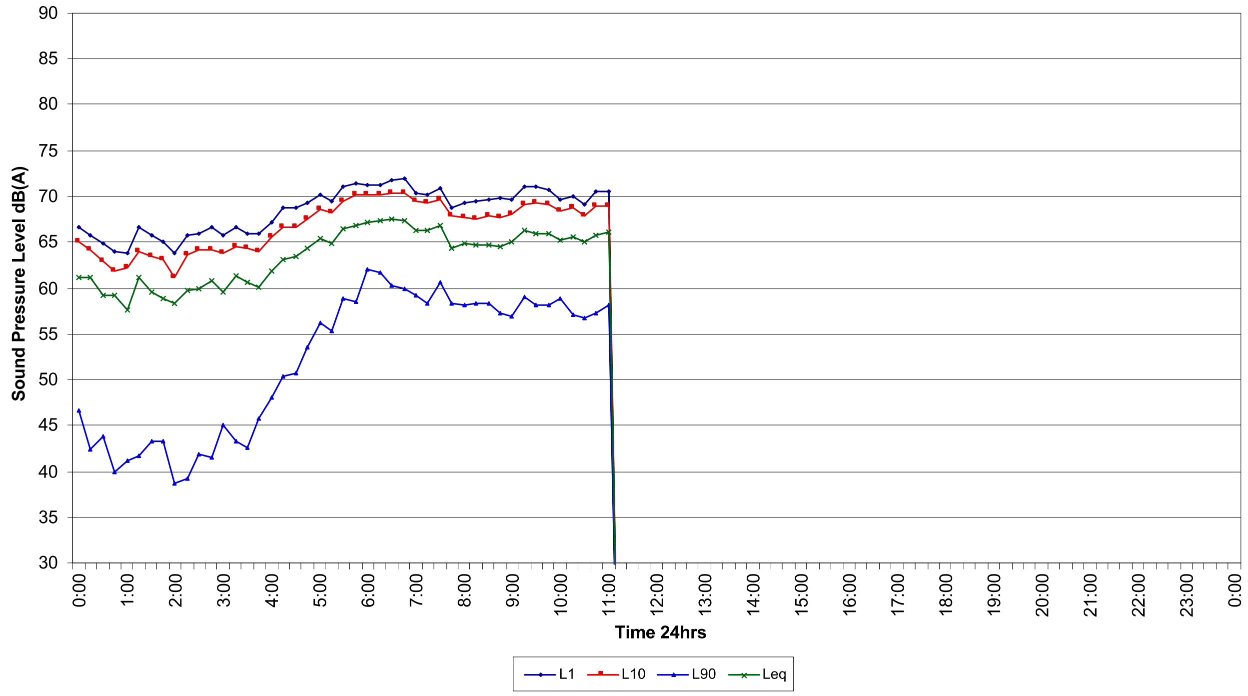
Monday 27/4/20



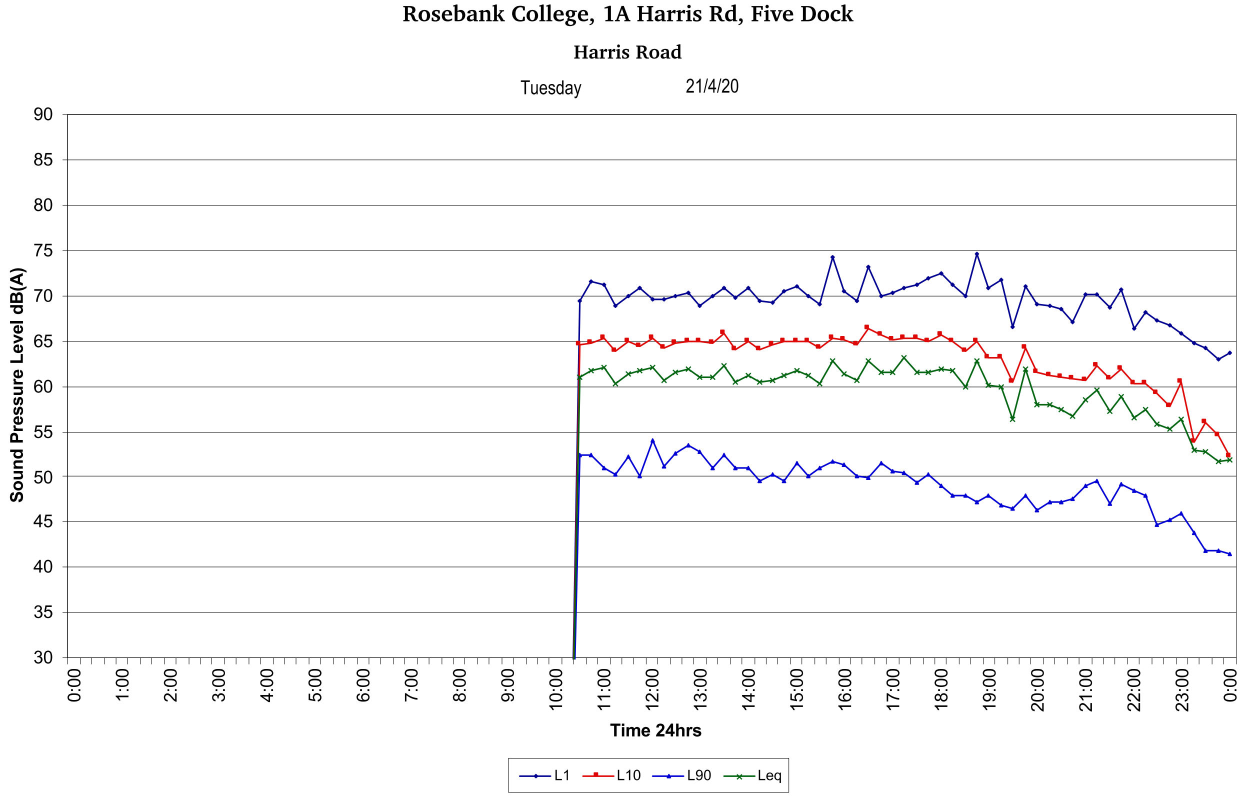
Rosebank College, 1A Harris Rd, Five Dock

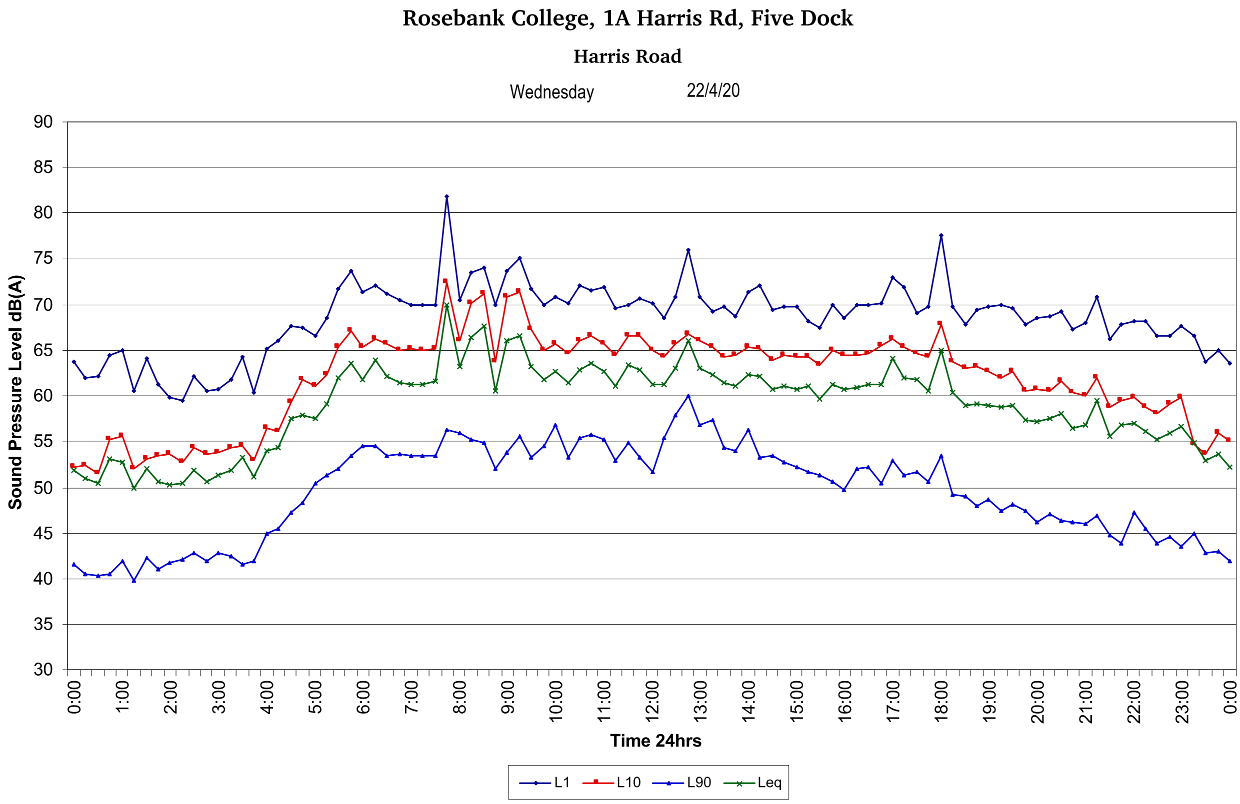
Parramatta Road

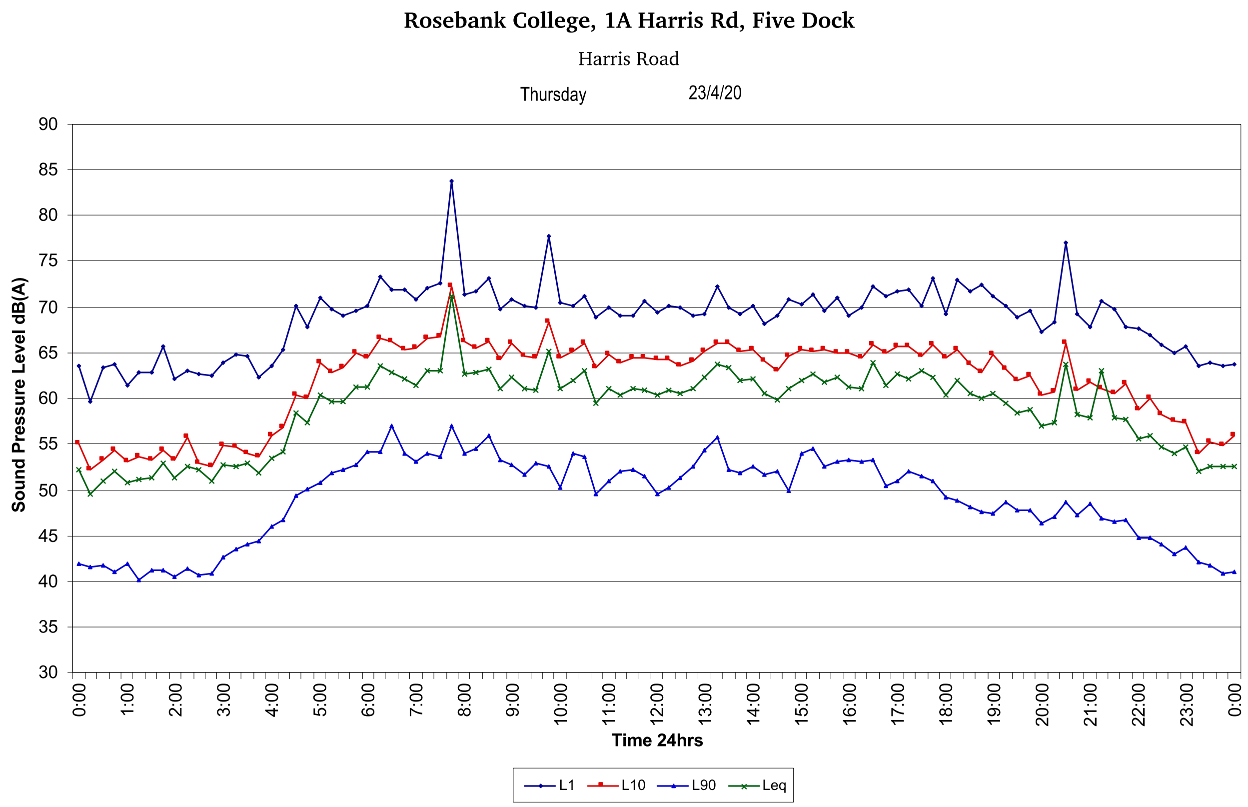
Tuesday 28/4/20



Harris Road Logger Data






Rosebank College, 1A Harris Rd, Five Dock
Harris Road
Thursday 23/4/20
Sound Pressure Level dB(A)
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Time 24hrs
L1
L10
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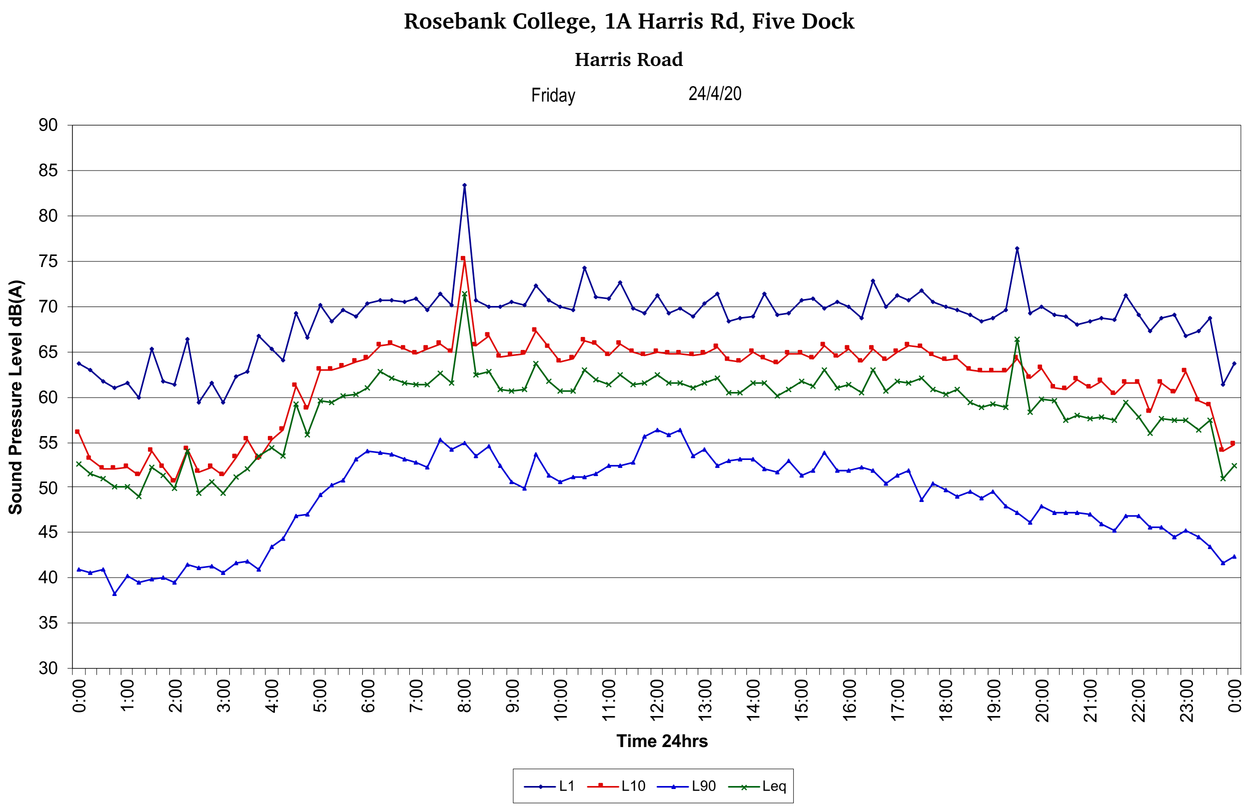
Leq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L1
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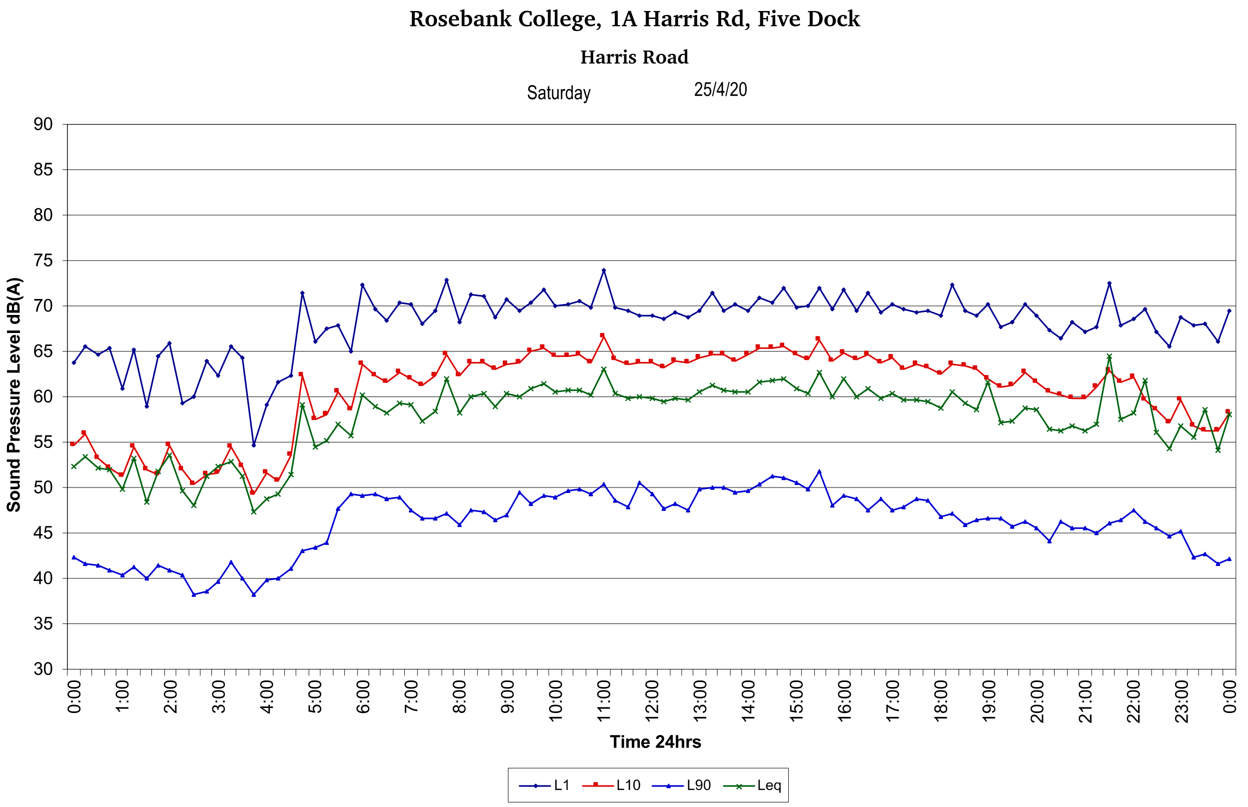
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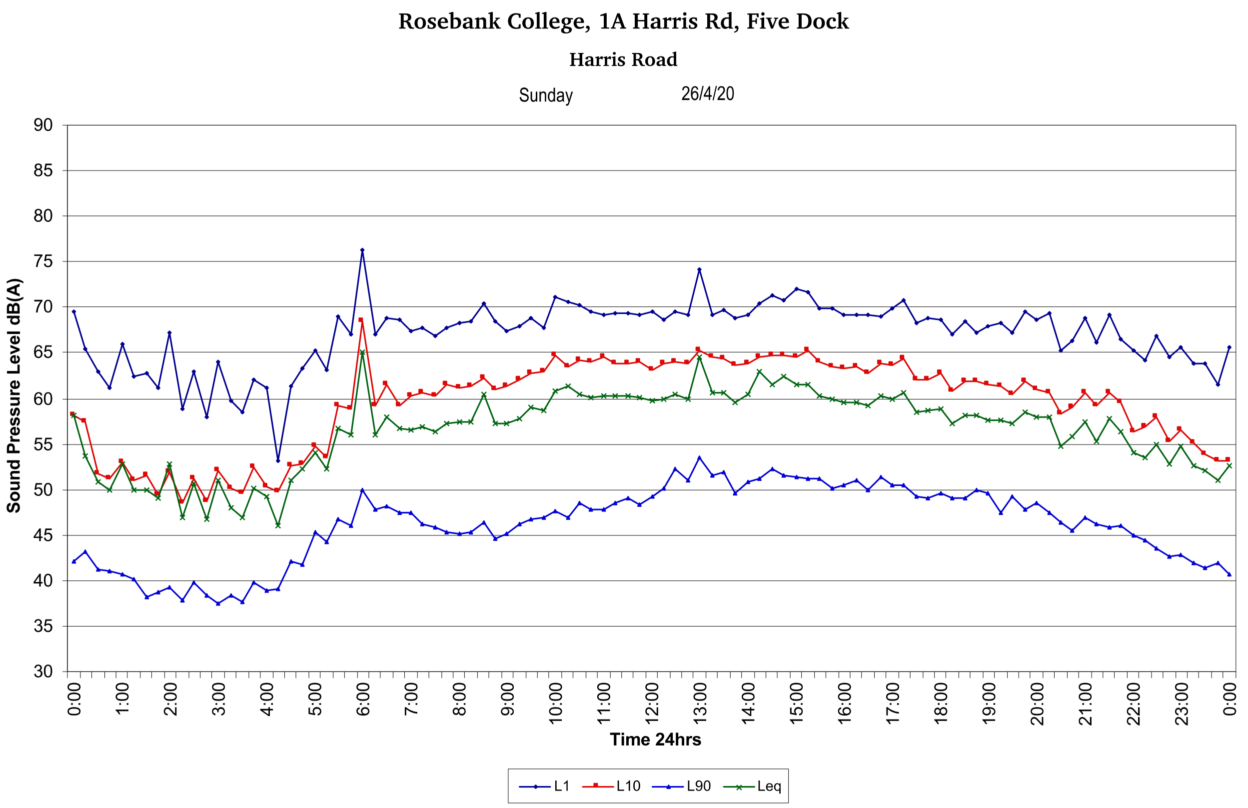
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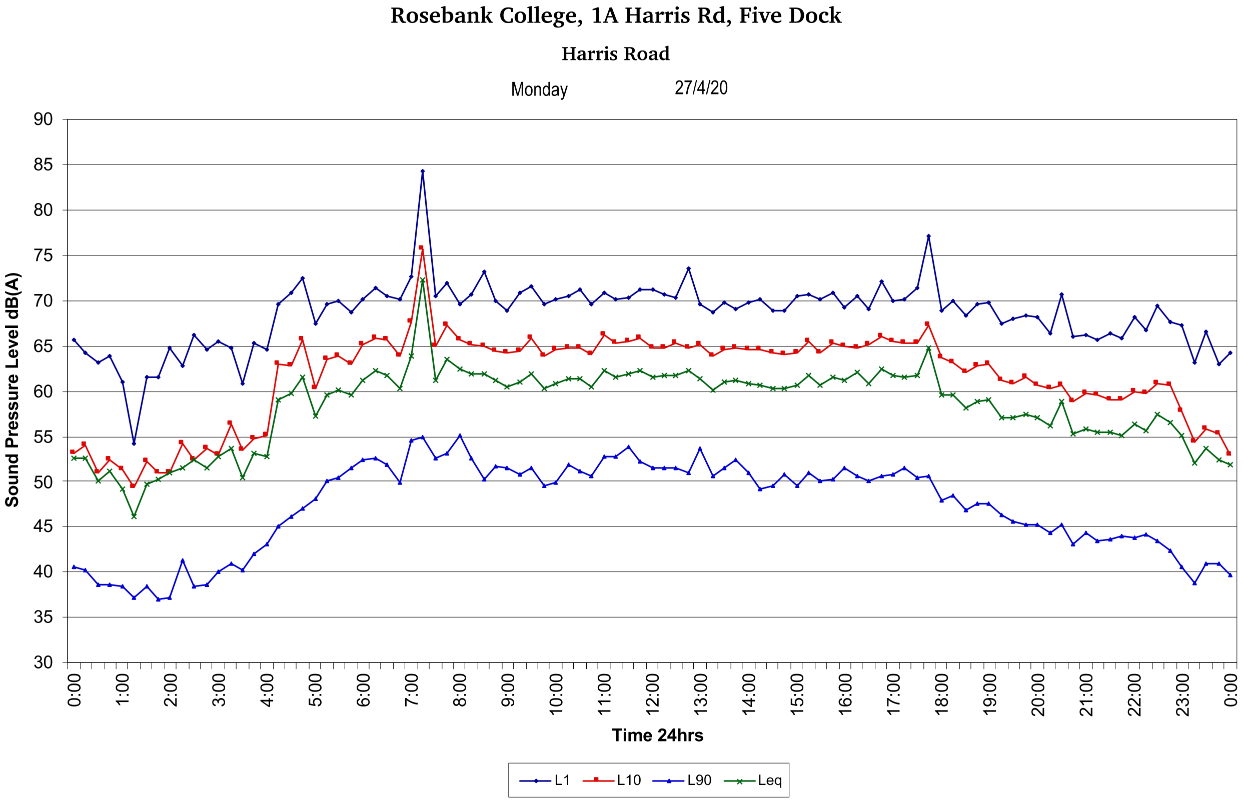
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27/4/20
Sound Pressure Level dB(A)
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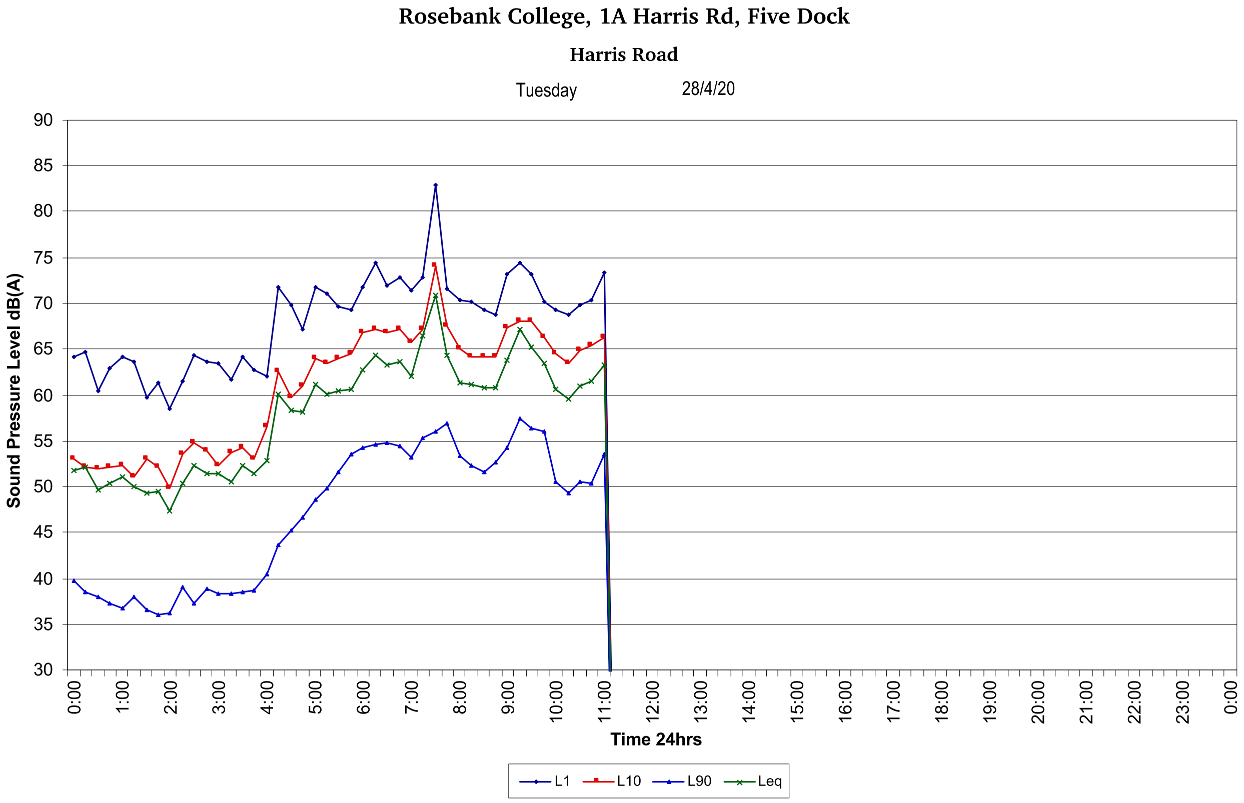
Rosebank College, 1A Harris Rd, Five Dock
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L1
L10
L90
Leq

Appendix C – Calibration Certificate

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
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Sound Level Meter
IEC 61672-3.2013

Calibration Certificate

Calibration Number C19414

Client Details Rodney Stevens Acoustics Pty Ltd
1 Majura Close
St Ives Chase NSW 2075

Equipment Tested/ Model Number : Rion NL-42EX
Instrument Serial Number : 00572559
Microphone Serial Number : 170395
Pre-amplifier Serial Number : 72897

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24°C	**Ambient Temperature :**	24.2°C
Relative Humidity :	42.9%	**Relative Humidity :**	42.1%
Barometric Pressure :	99.94kPa	**Barometric Pressure :**	99.9kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 11 Jul 2019
Secondary Check: Eloise Burrows
Report Issue Date : 15 Jul 2019

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.15dB*	*Temperature*	*±0.2°C*
12.5kHz	*±0.21dB*	*Relative Humidity*	*±2.4%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.12dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA
WORLD RECOGNISED ACCREDITATION

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Sound Level Meter

IEC 61672-3.2013

Calibration Certificate

Calibration Number C19390

Client Details Rodney Stevens Acoustics Pty Ltd
1 Majura Close
St Ives Chase NSW 2075

Equipment Tested/ Model Number : Rion NL-42EX
Instrument Serial Number : 00572542
Microphone Serial Number : 170370
Pre-amplifier Serial Number : 72880

Pre-Test Atmospheric Conditions
Ambient Temperature : 23.7°C
Relative Humidity : 38.9%
Barometric Pressure : 101.88kPa

Post-Test Atmospheric Conditions
Ambient Temperature : 23.8°C
Relative Humidity : 38.9%
Barometric Pressure : 101.88kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 3 Jul 2019
Secondary Check: Eloise Burrows
Report Issue Date : 8 Jul 2019

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.15dB*	*Temperature*	*±0.2°C*
12.5kHz	*±0.2dB*	*Relative Humidity*	*±2.4%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.11dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report

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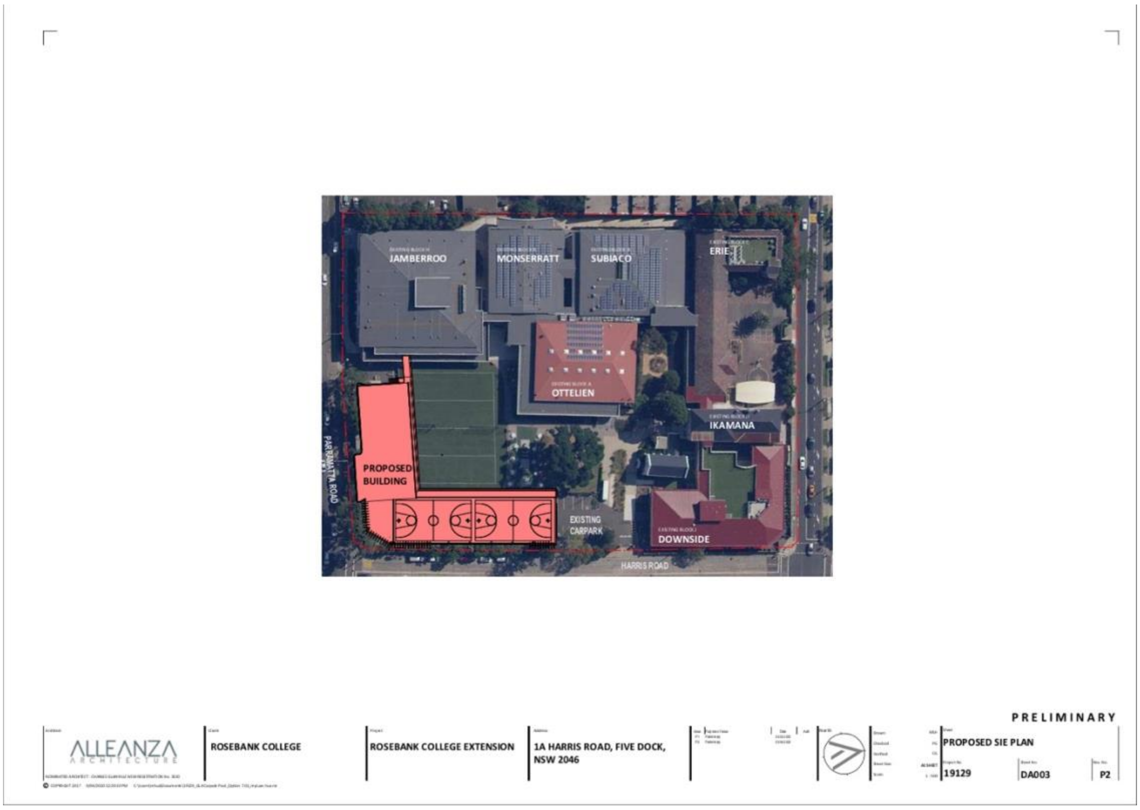
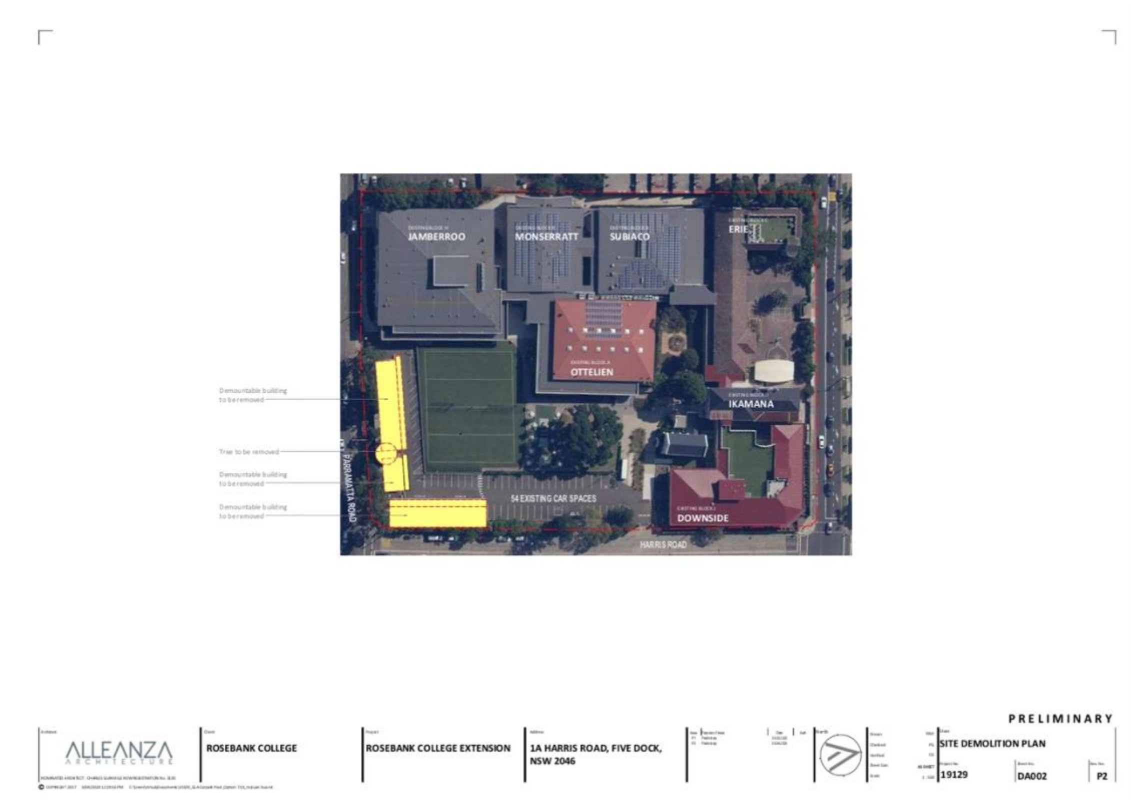
Appendix D – Architectural Plans

Site Plan



Demolition Plan



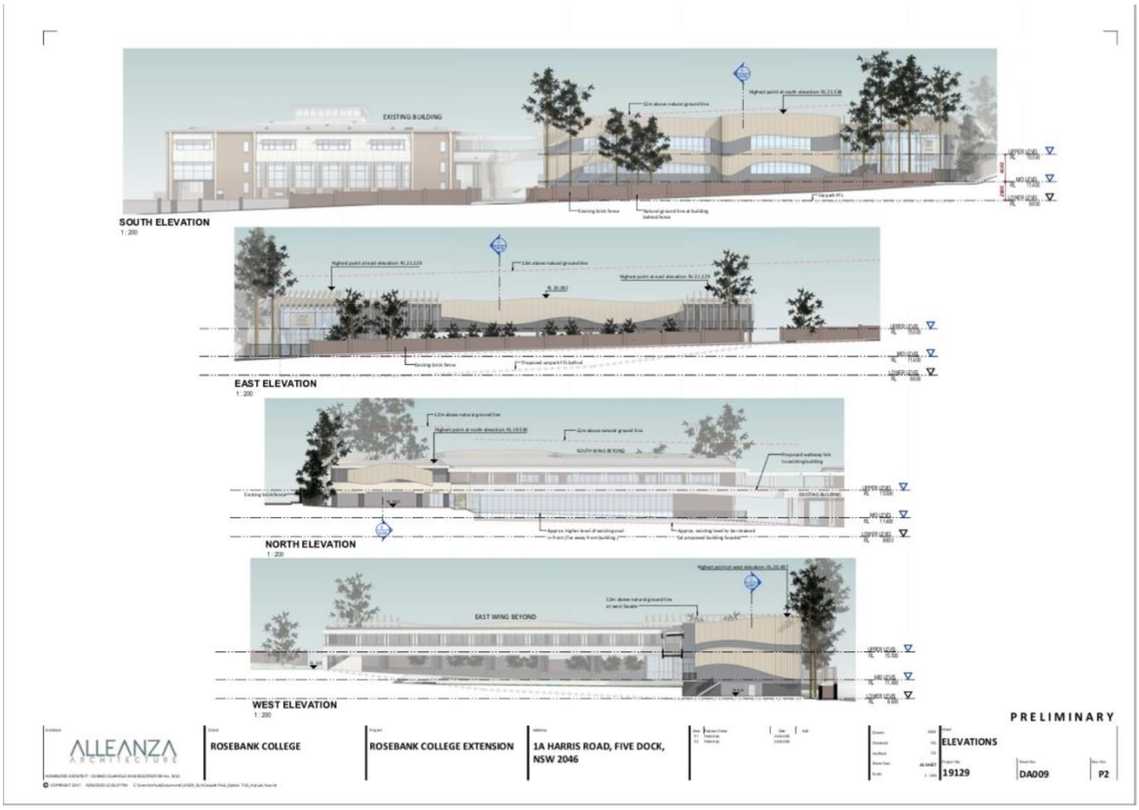
Lower Floor Plan

Middle Floor Plan

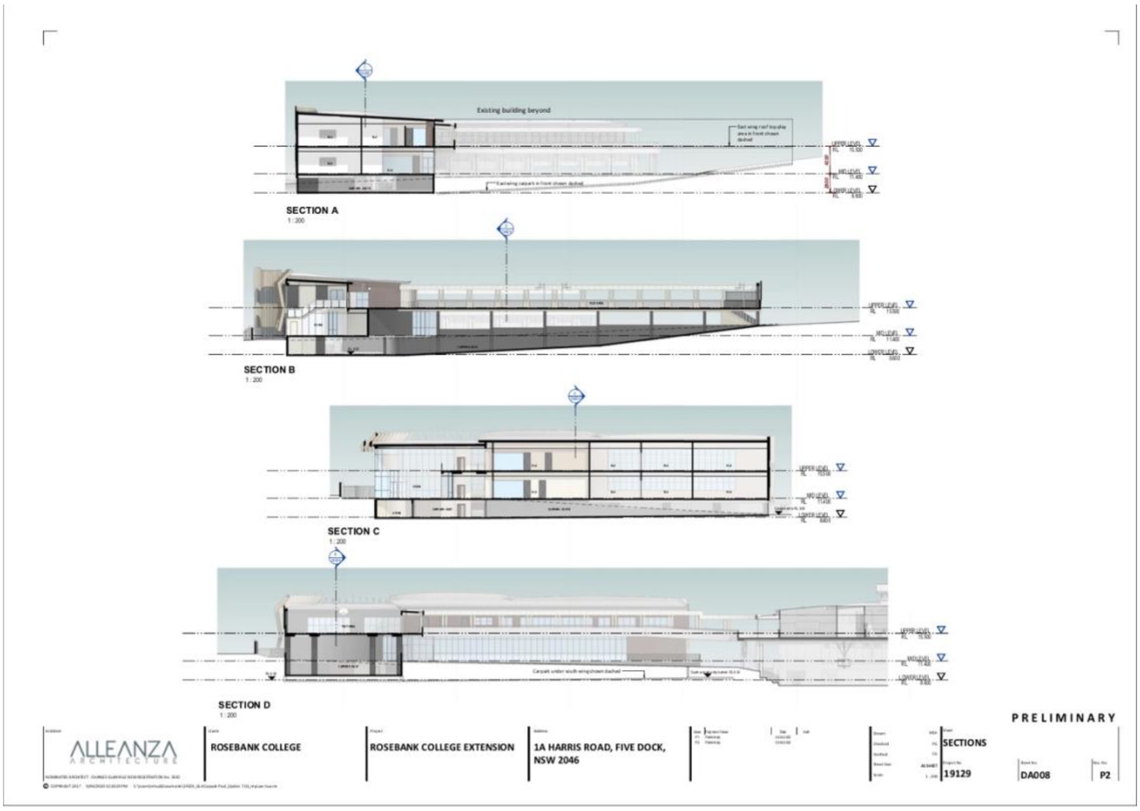
Upper Floor Plan

Roof Plan

Elevations



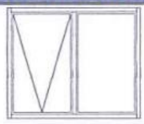
Sections



Appendix E – Glazing Guideline

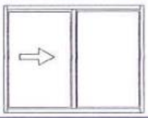
A table showing typical glass thicknesses and their Rw Values is provided in Appendix E. Please note that these table must be used as a GUIDE only, please note that the R_w rating is required for the complete glazing and frame assembly. The minimum glazing thicknesses will not necessarily meet the required R_w rating without an appropriate frame system. It will be therefore necessary to provide a window glass and frame system having a laboratory tested acoustic performance meeting the requirements in

Aluminium Awning Window



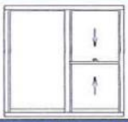
Glass	4mm Float	6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals	Standard	Qlon	Qlon	Qlon
STC	28	33	34	34
RW	29	33	33	34

Aluminium Sliding Window



Glass	4mm Float	6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals	Standard	Fin	Fin	Fin
STC	23	24	25	25
RW	22	24	25	25

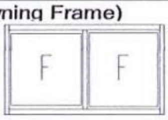
AluminiumDouble Hung



Glass	5mm Float	6.38 Laminated		
Seals	Standard	Fin		
STC	24	27		
RW	24	26		

AluminiumFixed Window

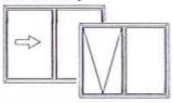
(Awning Frame)



Glass	4mm Float	6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals	-	-	-	-
STC	28	32	33	34
RW	28	33	33	33

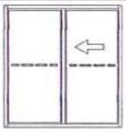
Secondary Glazing - Sound Barrier Window

(AAW/ASW)



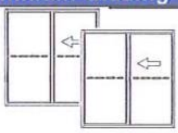
Glass		6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals		Qlon	Qlon	Qlon
STC		44	45	46
RW		44	45	45

Aluminium Sliding Door



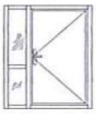
Glass	4mm Toughened	6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals	standard	Fin	Fin	Fin
STC	22	30	33	33
RW	21	29	33	33

Aluminium Glazing - Sound Barrier Door



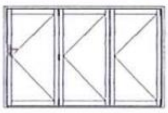
Glass		6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals		Fin	Fin	Fin
STC		44	45	46
RW		44	44	45

Aluminium Hinged Door*



Glass		6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals		Qlon	Qlon	Qlon
STC		29	30	30
RW		29	30	30

Aluminium Bifold Door*



Glass		6.38 Laminated	8.38 Laminated	10.38 Laminated
Seals		Qlon	Qlon	Qlon
STC		25	29	29
RW		27	29	29