

Attachment A12

Acoustic Report

242-258 Young Street, Waterloo

School Redevelopment – Environmental Noise Impact
Assessment Brief for Planning Proposal

Prepared for: Sustainable Development Group (SDG)

Project No: SYD2464
Date: 18 December 2023
Revision: 04



Project: 242-258 Young Street, Waterloo
Location: 242-258 Young Street
 Waterloo NSW 2017
Prepared by: ADP Consulting Pty Ltd
 Level 6, 33 Erskine Street
 Sydney NSW 2000
Project No: SYD2464
Revision: 04
Date: 18 December 2023

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisation & QA	Signature
01	28/11/23	DRAFT – Issue for comments	EC	Eleni Chrysafis				
02	11/12/23	Issue	EC	Eleni Chrysafis	AG	Ann-Katrin Glanzner	EC	Eleni Chrysafis
03	15/12/23	Issue	EC	Eleni Chrysafis	AG	Ann-Katrin Glanzner	EC	Eleni Chrysafis
04	18/12/23	Issue	EC	Eleni Chrysafis	AG	Ann-Katrin Glanzner	EC	Eleni Chrysafis

Project Team

Client / Principal Sustainable Development Group (SDG)
Architect Sustainable Development Group (SDG)
Urban Planning Ethos Urban



Contents

1. Introduction	4
1.1 Document purpose.....	4
1.2 Referenced drawings, codes and standards	5
1.3 Project Summary	5
1.4 Site Location and Context.....	6
2. Acoustic Environment	8
3. Noise Intrusion Criteria	9
3.1 City of Sydney Development Control Plan (DCP) 2012.....	9
3.2 State Environmental Planning Policy (Transport and Infrastructure) 2021	9
3.3 Development Near Rail Corridors and Busy Roads – Interim Guideline	10
3.4 Australian/ New Zealand Standard AS/NZS 2107:2016 – Recommended Design Sound Levels and Reverberation Times for Building Interiors	11
3.5 Fire mode noise conditions.....	12
3.6 Internal vibration requirements	12
3.7 Department of Environment, Climate Change and Water NSW -Road Noise Policy (RNP), 2011	13
4. Noise Emission Criteria.....	14
4.1 City of Sydney Council Development Control Plan (DCP) 2012	14
4.2 NSW Noise Policy for Industry (NPfI)	14
4.3 Department of Environment, Climate Change and Water NSW -Road Noise Policy (RNP), 2011	15
5. Next Steps	16
5.1 Noise Intrusion Assessment.....	16
5.2 Noise Emission Assessment	16
5.3 Other Acoustic Considerations	19
6. Summary.....	21

Appendices

Appendix A Glossary of acoustic terms	22
---	----

Figures

Figure 1 Aerial photo of project site and nearest noise sensitive receivers (resourced from SIX Maps).....	7
--	---

Tables

Table 1	Noise criteria – Interim Guideline	10
Table 2	Ground-borne noise criteria	10
Table 3	Internal design sound pressure levels acoustic criteria AS/NZS 2107:2016	11
Table 4	Fire mode maximum internal sound pressure levels, dB(A)	12
Table 5	Vibration limits	12
Table 6	Criteria for traffic noise generated by new development	13
Table 7	Noise emission criteria – Residential receivers.....	14
Table 8	Amenity noise levels for noise sensitive receivers other than residential.....	14
Table 9	Criteria for traffic noise generated by new development	15

1. Introduction

This acoustic report is submitted to the Council of the City of Sydney (Council) to support a request for a Planning Proposal relating to land at 242-258 Young Street, Waterloo. The Planning Justification Report prepared by Ethos Urban outlines the proposed amendments to the Sydney Local Environmental Plan (Sydney LEP) 2012.

The proposed amendments are seeking principally to facilitate the delivery of a new independent K-12 vertical school, catering for approximately 800 students. The amendments sought to the Sydney LEP 2012 will encourage and facilitate the redevelopment of the site by allowing for:

- > an increased maximum Floor Space Ratio (FSR), and
- > an increased maximum Building Height.

Supporting the amendments to the Sydney LEP 2012 is an amendment to the Sydney DCP 2012 which includes site-specific controls. For assessment purposes, the Planning Proposal is supported by a concept scheme prepared by Plus Architecture that facilitates the following:

- > A new 6 storey vertical school consisting of:
 - 45 GLS, 13 specialist / classrooms.
 - A multi-purpose hall / auditorium.
 - A library.
 - A canteen.
 - Administration, lobby, and circulation spaces.
 - An active green roof.
 - A basement including 60 car parking spaces and end-of-trip facilities.
- > The incorporation of the existing film school within the new vertical school building.
- > A total of approximately 13,543m² of gross floor area which equates to a floor space ratio of 2.94:1. The gross floor area comprises approximately:
 - 10,608m² education floor area
 - 2,935m² commercial (film school) floor area
- > Outdoor spaces totalling approximately 4,978m².

1.1 Document purpose

ADP Consulting has been retained by Sustainable Development Group (SDG) to provide a preliminary environmental noise impact assessment for a proposed Educational Facility and Film School redevelopment located at 248-258 Young Street, Waterloo in support of a planning proposal.

This report presents acoustic objectives for the proposed development regarding:

- > Potential noise impacts to the proposed development.
- > Noise associated with the operation of the proposed development, which possesses the risk of affecting the amenity of the surrounding receivers.

1.2 Referenced drawings, codes and standards

The following drawings, conditions guidelines, standards, regulatory requirements, and other project-specific information has been referenced in preparing this report:

- > Draft Operational management plan dated 9 November 2023, Revision 1 and prepared by Bruce Litchfield – Amina Project Management.
- > General Floor Plans with job number 20621 provided by Plus Architecture.
- > Council of the City of Sydney Development Control Plan (DCP) 2012.
- > Association of Australasian Acoustical Consultants' (AAAC) Guideline for Educational Facilities, version 2.0, dated September 2018 (GEF).
- > Education Facilities Standards & Guidelines – NSW Department of Education.
- > AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors (AS/NZS 2107).
- > NSW EPA's Noise Policy for Industry, dated October 2017 (NPfI).
- > Department of Environment & Climate Change NSW - Interim Construction Noise Guideline.

1.3 Project Summary

The proposed mixed-use development will be located at 248-258 Young Street, Waterloo and will be comprised of an educational primary and secondary facility and a Film School.

The proposed educational development will spread over (6) levels including the following areas:

- > A carpark with 52 parking spots.
- > Outdoor play areas on Basement Level 1, Ground Floor and Levels 4 to 6.
- > Primary Student Classrooms from Ground Floor to Level 2.
- > Secondary School Classrooms from Level 2 to Level 4.
- > A multi-purpose Hall with 462 seats from Ground to Level 1.
- > Administration rooms on Ground Floor and Level 2.
- > Loading Bay on Ground Floor.
- > Libraries from Level 1 to 3.
- > Passive outdoor areas on Levels 1 to 3.
- > Specialist Teaching rooms on Levels 2 to 4.
- > A Basketball Court from Level 5 to 6.
- > Other amenities across all levels, such as kitchen, storage areas and staff rooms.

The proposed Film School development will also cover (6) levels, and will comprise the following areas:

- > Film School Lobby and Café on Ground Floor Level.
- > Kids Spaces/ Rehearsal and Breakout Room on Level 1.
- > Teaching rooms, Admin, Amenities and Equipment Hire on Level 2.
- > Black Box Theatre, props room, green room, storage, and Carpentry Workshop on Level 3.
- > Film School circulation, outdoors space, Cinema and Sound Stage on Level 4.
- > Audio and editing studios, labs and other amenities on Level 5.

1.4 Site Location and Context

The site is situated on the traditional land of the Gadigal people of the Eora nation, located at 242-258 Young Street, Waterloo within the City of Sydney Local Government Area (LGA). The site is prominently positioned at the junction of Hunter Street, Young Street and Powell Street. It is located 4km south of the Sydney CBD within the Green Square Urban Renewal Area.

The site comprises three lots which are legally described as Lot 1 in DP84655 and Lots A and B in DP 161650. The site's area is 4,611m² and is triangular in shape, bounded by Hunter Street to the west, Young Street to the east and Powell Street to the south. The site has street frontage dimensions of 118m along Hunter Street, 137m along Young Street and 4.3m along Powell Street. The topography of the site generally falls in an east to west direction.

The site is currently occupied by a 2-storey office building and film school. The southern tip of the site is a grass lawn area. The demolition of the existing buildings on site is proposed.

The subject development site lies on a Mixed-use (MU1) Zone, based on the NSW Planning web Portal Spatial Viewer. The site is bounded by the following noise sources:

- Approximately 45m to the north by McEvoy Street, a road that carries high volumes of traffic flow, and is specified in NSW SEPP Map number 12D as a road that carries an Annual Average Daily Traffic volume of more than 20,000 vehicles.
- Directly to the east by Young Street, a road that carries medium to low volumes of traffic flow.
- Directly to the south by Powell Street, a road that carries medium to low volumes of traffic flow.
- Directly to the west by Hunter Street, a road that carries medium to low volumes of traffic flow.

Noise impacts to the proposed development from the above noise sources should be assessed to ensure the amenity of the future occupants.

Our site analysis has noted the following nearest most affected noise sensitive receivers to the proposed development:

- Receiver 1 (R1) – An existing 4-storey mixed-use development attached to the north, at 10-20 McEvoy Street.
- Receiver 2 (R2) – An existing 4-storey mixed-use development to the west, opposite Hunter Street.
- Receiver 3 (R3) – A 7-storey residential apartment development on top of a podium, located at 3 Hunter Street.
- Receiver 4 (R4) – A 5-storey mixed-use development to the south-west, located at 11 Hunter Street.
- Receiver 5 (R5) – Single-storey commercial receivers to the south-west, opposite Powell Street.
- Receiver 6 (R6) – A 5-storey residential apartment building on top of a podium, located to the south-west of the site, opposite Powell Street, at 834-836 Elizabeth Street.
- Receiver 7 (R7) – Existing 4-storey residential apartment buildings to the south, opposite Powell Street, at 4 Powell Street.
- Receiver 8 (R8) – an existing 7-storey mixed-use development to the south, opposite Powell Street, at 2-24 Powell Street.
- Receiver 9 (R9) – A passive recreation park area to the south, opposite Powell Street.
- Receiver 10 (R10) – A commercial receiver (Café) to the south, opposite Powell Street.
- Receiver 11 (R11) – A 5-storey commercial receiver to the south-east, opposite Powell Street.
- Receiver 12 (R12) – Existing single-storey commercial tenancies to the east, opposite Young Street.

- Receiver 13 (R13) – Existing commercial tenancies to the east, opposite Young Street, at 923-935 Bourke Street, Waterloo. Based on information provided to ADP Consulting, the site has a planning proposal approved for changes to enable a mixed-use development on the site that includes residential, commercial, and retail uses, with a below ground supermarket.
- Receiver 14 (R14) – A multi-level mixed-use development, approximately 150m to the east of the project site.
- Receivers 15 & 16 (R15 & R16) – Based on information provided to ADP Consulting, new mixed-use development is proposed to the north of the site, opposite McEvoy Street. The Danks Street South residential masterplan proposal includes multiple residential buildings, retail, open space, and a central building of 20 levels.

Refer to Figure 1 for an aerial photo of the project site and nearest noise sensitive receivers.

Figure 1 Aerial photo of project site and nearest noise sensitive receivers (resourced from SIX Maps)



2. Acoustic Environment

The acoustic environment around the subject development site and surrounding receivers is dominated by urban hum, industrial source noise, and road traffic noise with continuous traffic flows during peak periods. Background noise has not been measured at this stage. The average background noise is expected to be raised in the near future from the operation of the proposed future Woolworths and neighbourhood centre development.

Long-term noise monitoring and attending measurements will be conducted at DA Stage to evaluate the acoustic environment around the proposed development. Monitored noise levels will be utilised as a basis to setup noise emission criteria at all nearest noise sensitive receivers and to evaluate noise impacts to the proposed development.

3. Noise Intrusion Criteria

3.1 City of Sydney Development Control Plan (DCP) 2012

Section 4.2.5.3 of City of Sydney Council DCP provides the following controls regarding development near busy roads.

4.2.5.3 Development on busy roads and active frontages

The following provisions apply to, sensitive uses on sites that are to have an active frontage as shown on the Active frontages map, or sites with a frontage to a busy road that carries more than 20,000 vehicles a day. Sensitive uses include:

- buildings for residential use (including mixed use buildings);
- places of public worship;
- hospitals; and
- educational establishments or childcare centres

Noise and air quality mitigation measures are required for new developments along road corridors carrying more than 20,000 Annual Average Daily Traffic. A copy of the 'Traffic volume maps on noise assessment for buildings on land adjacent to busy roads' can be accessed on the Roads and Maritime Services website www.rta.nsw.gov.au. These provisions also provide a design solution to achieve acceptable amenity for residential uses that may be affected by noise from busy roads and active uses. Applicants proposing development on busy roads should also refer to **State Environment Planning Policy (Infrastructure) 2007** and the **NSW Government's Development near Rail Corridors and Busy Roads – Interim Guidelines** which includes design guidelines and requirements to manage the impacts from road and rail noise and vibration.

3.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

Clause 2.119 of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP), specifies indoor noise level requirements for non-road developments that are for residential use. The following are stated:

(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 childcare facility.*

3.3 Development Near Rail Corridors and Busy Roads – Interim Guideline

Section 3.6 of the Development Near Rail Corridors and Busy Roads – Interim Guideline provides Airborne Noise and Ground Borne Noise criteria for residential and non-residential buildings. These are presented below.

3.3.1 Airborne noise

Table 1 Noise criteria – Interim Guideline

Type of occupancy	Recommended Max Level, dBA
Educational Institutions	40

The Interim Guideline does not provide criteria for commercial development.

3.3.2 Ground borne noise

In addition to the above, Section 3.6.2 of the NSW Department of Planning’s Development Near Rail Corridors and Busy Road – Interim Guideline’ outlines the following with regards to the assessment of ground-borne noise.

3.6.2 Ground borne noise

“Where buildings are constructed over or adjacent to land over tunnels, ground-borne noise may be present without the normal masking effect of airborne noise. In such cases, residential buildings should be designed so that the 95th percentile of train pass-bys complies with a ground-borne L_{Amax} noise limit of 40dBA (daytime) or 35dBA (night-time) measured using the “slow” response time setting on a sound level meter”.

The table below presents a summary of the ground-borne noise criteria for the proposed development.

Table 2 Ground-borne noise criteria

Type of Occupancy	Structure Borne Noise Criteria Noise Level, dB(A) $L_{Max, slow}$
Educational	40
Commercial	40

3.4 Australian/ New Zealand Standard AS/NZS 2107:2016 – Recommended Design Sound Levels and Reverberation Times for Building Interiors

Australian/ New Zealand Standard AS/NZS 2107:2016 recommends the following internal noise levels within habitable spaces based on their use. The table below presents the noise levels for the proposed development.

Table 3 Internal design sound pressure levels acoustic criteria AS/NZS 2107:2016

Space/ Activity	Design Sound Level, ($L_{Aeq, t}$) dB(A) range
Teaching spaces	< 45
Music practice rooms	40 – 45
Admin offices	35 – 40
Open Plan teaching spaces – Primary	35 – 45
Open Plan teaching spaces - Secondary	35 – 45
Music Studios	30 – 35
Office areas	40 – 45
Staff common rooms	40 – 45
Sports hall	< 50
Libraries – reading areas	40 – 45
Cinemas	30 – 35
Engineering workshops – Teaching	< 45
Engineering – non-teaching	< 60
Film or television studios	25 – 30
Music recording studios	20 - 25
Sound stage	20 – 25
Voice over booth	25 – 30
Toilets, change, showers	< 55

3.5 Fire mode noise conditions

Some building systems only operate in fire mode and during periodic testing, so they do not add to background noise under typical conditions. According to AS/NZS 1668.1:2015, these systems are subject to noise limits relating not to occupant comfort but rather to occupant distress and the intelligibility of emergency commands. Hence, the 65 dB(A) limit supports the audibility of fire alarms (min. 75 dB(A) at bed heads as per AS1670.1).

Table 4 Fire mode maximum internal sound pressure levels, dB(A)

Area type	Maximum SPL, L_{Aeq} , dB(A)
Occupied Area	65
Fire-isolated exit (e.g. fire stair)	80

3.6 Internal vibration requirements

Vibration is the oscillation of an object, structure, or surface at frequencies typically below 20 Hz, which is inaudible but instead can be “felt”. **Structure-borne sound** means oscillation at frequencies higher than 20Hz, resulting in audible noise, which is transmitted through rigid building elements and radiated by surfaces.

Human response to building vibration is a complex phenomenon. There is great variability in the vibration tolerance of humans, and as a result, human comfort criteria cannot robustly be defined and quantified. Acceptable values of human exposure to vibration depend on human activity and the character of the vibration, and they are further influenced by individual attitudes, expectations, and perceptibility.

Limits for vibration of the building structure potentially affecting human comfort have been derived from AS 2670.2 and BS 6472, both of which are referenced and discussed practically in the AVTG. These standards propose maximum vibration levels in terms of baseline curves and multiplication factors. For the purpose of minimising the disturbing perceptibility of vibration within the occupied areas of this development, Table 5 specifies appropriate limits for floor vibration in a simplified form.

Table 5 Vibration limits

Type of occupancy	Time	Continuous vibration limits:	Impulsive vibration limits:	Intermittent vibration limits:
		r.m.s. acceleration (m/s ²) Preferred / maximum	r.m.s. acceleration (m/s ²) Preferred / maximum	Vibration Dose Value VDV (m/s ^{1.75}) Preferred / maximum
Offices / teaching spaces	Day or night	0.020 / 0.040	0.640 / 1.280	0.40 / 0.80

3.7 Department of Environment, Climate Change and Water NSW - Road Noise Policy (RNP), 2011

NSW Road Noise Policy provides criteria for land use developments with the potential to create additional traffic on public streets. Noise levels generated by traffic associated with the proposed development should not exceed the noise levels set out in the table below.

Table 6 Criteria for traffic noise generated by new development

Road type	Time of day	Permissible noise generation
Sub-arterial roads	Day (7:00am - 10:00pm)	60 dB(A) _{Leq(15h)} (external)
	Night (10:00pm - 7:00am)	55 B(A) _{Leq(9h)} (external)

4. Noise Emission Criteria

4.1 City of Sydney Council Development Control Plan (DCP) 2012

City of Sydney Council does not include specific criteria for noise emissions from Educational or Commercial development.

4.2 NSW Noise Policy for Industry (NPfI)

Noise Policy for Industry provides a method of calculating noise trigger levels which are not to be exceeded at the boundary of any residential noise sensitive receiver. These are derived by choosing the most stringent of the Amenity and Intrusiveness criteria (refer to Table 7). Amenity noise levels are presented in Table 2.2 of the NPfI and Intrusiveness noise levels are calculated by monitoring noise levels at the boundaries of the most affected receivers over a one week period and adding 5dB.

Residential receivers are considered as urban receivers.

Table 7 Noise emission criteria – Residential receivers

Noise Source	Time of operation	Recommended amenity (urban residential receivers), dB L _{Aeq, 15min}	Intrusiveness criteria, L _{Aeq, 15min} (Background+5dB)	Project trigger levels, L _{Aeq, 15min} (urban receivers)
Operation of proposed development	Day (7am to 6pm)	58	(TBD)*	(TBD)**
	Evening (6pm to 10pm)	48	(TBD)*	(TBD)**
	Night (10pm to 7am)	43	(TBD)*	(TBD)**

*Long-term noise monitoring is required to determine the project intrusiveness criteria.

**Project trigger levels are the project noise emission criteria. Project trigger levels are the lowest levels between the recommended amenity L_{Aeq, 15min} and the intrusiveness criteria L_{Aeq, 15min}.

NPfI also provides amenity noise levels for noise sensitive receivers other than residential.

Table 8 Amenity noise levels for noise sensitive receivers other than residential

Noise Source	Receiver	Time of operation	Recommended Amenity
Operation of proposed development	Passive recreation receivers	When in use	50
	Commercial receivers	When in use	65

Noise trigger levels will be calculated at DA Stage based on the long-term noise monitoring which will be conducted at the site as described in Section 2.

4.3 Department of Environment, Climate Change and Water NSW - Road Noise Policy (RNP), 2011

NSW Road Noise Policy provides criteria for land use developments with the potential to create additional traffic on public streets. Noise levels generated by traffic associated with the proposed development should not exceed the noise levels set out in the table below.

Table 9 Criteria for traffic noise generated by new development

Road type	Type of project/ land use	Time of day	Permissible noise generation
Sub-arterial	Existing residences affected by additional traffic generated by land use developments	Day (7:00am - 10:00pm)	60 dB(A) _{Leq(15h) (external)}
		Night (10:00pm - 7:00am)	55 dB(A) _{Leq(9h) (external)}

If existing noise levels exceed those in the table above, Section 3.4 of the Road Noise Policy is applicable, which requires noise impacts are reduced through feasible and reasonable measures. However, in determining what is feasible/reasonable, the Policy notes that an increase of less than 2dB(A) is a minor impact and would be barely perceptible.

Typically for a raise of 3dB, the current traffic on the surrounding roads will have to be doubled. A detailed noise emission assessment from vehicles associated with the proposed development driving on public streets, will be conducted at DA Stage, once the traffic report is available.

5. Next Steps

5.1 Noise Intrusion Assessment

Noise impacts to the proposed development will be assessed based on the long-term noise logging and attended noise measurements as described in Section 2 to ensure compliance with internal noise level criteria as presented in Section 3. Treatment recommendations will be provided at DA stage to the following elements:

- > Minimum Glazing requirements.
- > External wall construction.
- > Roof/ ceiling construction.

Architectural plans and proposed construction materials will be reviewed in preparing this.

5.2 Noise Emission Assessment

A detailed noise emission assessment will be conducted at DA Stage to ensure compliance with the noise emission criteria as presented in Section 4.

Noise emissions that will be assessed are associated with the operation of the proposed development.

- > Vehicular movements associated with the use of the development.
- > Passenger vehicle and bus drop off/ pick-ups.
- > Children using outdoor active and passive areas.
- > Children using indoor areas.
- > Noise from activities in the Basketball court.
- > Noise emissions from special events.
- > Noise emissions from specialised areas, such as the carpentry room.

We believe that noise emission criteria can be satisfied by incorporating appropriate acoustic treatments and management controls.

5.2.1 Operation Information

The Draft Operational Management Plan prepared by Amina Project Management provide the following information regarding the operation of the proposed development.

- > The total capacity of the proposed educational development will be 800 students.
- > The hours of operation will be between 7:30am to 5:30pm.
- > Bus drop-off and pick up will occur on Hunter Street.
- > Vehicle drop off/ pick up will occur on Young Street.
- > All drop off/ pick up will be conducted during day-time period (7am – 6pm).
- > There are currently no information regarding:
 - Maximum number of students allowed in passive and active outdoor areas at the same time.
 - If special events are proposed to take place in the school.
 - Proposed activities that will take place in the Multi-purpose Hall.

- If formal recess and lunches will take place in the outdoor areas.
- Information regarding the maximum capacity and hours of operation of the Film School.
- If any loudspeakers are proposed to be installed outdoors.
- Other areas proposed to use sound reinforcement system.
- Proposed hours of operation of the Café.
- A traffic report is currently not available.
- Mechanical plans are not available at this stage.

5.2.2 Assessment – Items

Based on the above information, the following will be assessed at DA Stage:

Basement Level 01

- > Outdoor play area.

Ground Floor Level

- > Outdoor play areas.
- > Multipurpose Hall.
- > Loading dock, driveway and drop off/ pickups on Hunter Street and Young Street.
- > Café.

Level 1

- > Breakout room.
- > Rehearsal rooms.
- > Passive outdoor areas.

Level 2

- > Specialist areas.
- > Passive outdoor areas.

Level 3

- > Passive outdoor areas.
- > Black Box Theatre.
- > Carpentry room.
- > Specialist areas.

Level 4

- > Outdoor space.
- > Canteen.
- > Specialist areas.
- > Sound Stage.
- > Cinema.

Level 5

- > Outdoor space.
- > Basketball Court.

Level 6

- > Outdoor space.
- > Mechanical equipment on roof.

All levels

- > Noise breaking from all classrooms.

5.2.3 Information required for Noise Emission Assessment

Information required for a detailed noise emission assessment is listed below.

Outdoor areas, Multi-purpose Hall, Break-out room, Café, teaching rooms, Basketball Court, Theatre

- > Noise emissions will be calculated at all nearest noise sensitive receivers based on the maximum number of children using these spaces at any one-time, maximum capacities, proposed activities and hours of operation.

Loading dock, driveway, drop off and pick up, raise of traffic on public roads

- > Noise emissions will be calculated at all nearest noise sensitive receivers based on the information provided in the traffic report.

Mechanical equipment

- > Noise emissions will be calculated at all nearest noise sensitive receivers after reviewing the mechanical drawings and proposed mechanical plant selections.

Specialist areas, Carpentry room

- > Noise emissions will be calculated at all nearest noise sensitive receivers based on the proposed activities, hours of operation and equipment acoustic data.

5.2.4 Typical acoustic treatments

Noise emissions will be calculated at all nearest noise sensitive receivers based on the information described in Section 5.2.3.

Typical acoustic treatments include:

- > Mechanical noise
 - Selection of quieter units with the capability of reduced duty and noise output if required.
 - Installation of acoustic barriers or acoustic louvres.
- > Outdoor areas
 - Management of number of students allowed outdoors at any one time.
 - Maximum allowable noise level from reinforced sound systems.
 - Barriers (if required).
 - Absorptive materials on areas such as walls and under soffits.
- > Café
 - Maximum number of people allowed outdoors (if outdoor sitting is proposed).
 - Hours of operation.
 - Maximum allowable noise level from reinforced sound systems.
- > Specialist areas, carpentry room, rehearsal rooms
 - Allowable hours of operation.

- Quieter equipment where possible.
- Treatment of room envelope to ensure a high transmission loss value of all elements where noise can escape from.
- Highly acoustic absorptive materials on room surfaces.
- > Traffic noise, drop-offs/ pick-ups, loading dock
 - Management of peak 1-hour movements.
 - Barriers, if required.

> Basketball Court

A Basketball Court is proposed to be located on Level 05 of the proposed development (RL +41,100).

The basketball court is proposed to have walls around its perimeter, and open roof. A detailed noise emission assessment should be undertaken at DA Stage. Potential noise issues are associated with noise breaking from the open rooftop to the upper levels of the proposed 20-level mixed-use development to the north. Typical acoustic treatments and management controls for the basketball court include:

- Management of maximum capacity and hours of operation.
- Treatment of Basketball Court floor.
- Wall construction recommendations for the walls surrounding the court.
- If required, construction of awnings or roof with skylights.

5.3 Other Acoustic Considerations

5.3.1 Pedestrian traffic noise

The Council has requested a noise emission assessment from pedestrian traffic. We believe that any pedestrian traffic will be masked by the existing vehicular traffic noise, therefore, we do not expect pedestrian noise to adversely affect the amenity of the surrounding receivers. In addition to this, current vehicular and pedestrian traffic is expected to be raised in the future as part of the proposed Woolworths and neighbourhood centre development. A detailed pedestrian traffic noise assessment will be conducted as part of the DA report.

5.3.2 Construction Noise

As part of the DA Stage, a Construction Noise & Vibration Management Plan (CNVMP) will most likely be required. Noise emissions will be assessed for each proposed construction stage based on the proposed equipment used in each stage and duration and a management report will be prepared in accordance with the NSW Interim Construction Noise Guideline.

In the CNVMP we will:

- > Identify sensitive land uses with the potential to be affected by noise from the construction.
- > Predict noise emissions from equipment associated with each stage of construction based on the proposed hours of construction.
- > Determine noise management levels at all receivers based on the long-term noise monitoring (described in Section 2).
- > Determine ground-born noise criteria for each receiver located in the proximity of the construction site.
- > Predict noise levels at all receivers and predict if there will be any exceedances.

- > Recommend best practice approach principles and specific noise control measures to be used during the demolition / construction period to ensure that the noise objectives are achieved where feasible and reasonably practicable, including timetabling of proposed activities.
- > Recommend community action initiatives such as prior notification for particularly noisy activities and the provision of a contact telephone number for people affected by demolition / construction noise to ask questions or complain.
- > Outline an action plan detailing how complaints, if received, will be dealt with.
- > Determine if vibration monitoring will be needed at specific areas to ensure vibration criteria are met during construction and prevent structural damage of other buildings.

6. Summary

A preliminary environmental noise impact assessment for a proposed educational facility and Film School redevelopment located at 248-258 Young Street, Waterloo in support of a planning proposal has been completed.

This report presents acoustic objectives for the proposed development in regard to potential noise impacts to the proposed development and noise associated with the operation of the proposed development which possesses the risk of affecting the amenity of the surrounding receivers.

A site analysis and nearest noise sensitive receivers was presented in Section 3. Noise intrusion criteria were provided in Section 3 as well as noise emission criteria in Section 4. Next steps for conducting a noise assessment suitable for the Development Application stage were described in Section 5.

ADP Consulting believe there are no site conditions, statutory or other requirements that would preclude this development from complying with the criteria defined in this report.

The design criteria and acoustic treatment concepts in this report demonstrate the pathways by which these shall be addressed by ADP Consulting and the project team through further analysis, recommendations, and coordination as the design progresses.

Appendix A

Glossary of acoustic terms

Air-borne sound

The sound emitted directly from a source into the surrounding air, such as speech, television or music.

Ambient sound

Of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources, near and far. This is normally taken to be the L_{Aeq} value.

Background noise level

The average of the lowest levels of the noise levels measured in an affected area in the absence of noise from occupants and from unwanted external ambient noise sources. Usually the L_{A90} value represents the background noise level.

dB(A)

Unit of acoustic measurement weighted to approximate the sensitivity of human hearing to sound frequency.

Decibel scale

The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. Therefore, a 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. It is generally accepted that a 10 dB increase in the sound pressure level corresponds to a perceived doubling in loudness.

Examples of decibel levels of common sounds are as follows:

- > 0 dB(A) Threshold of human hearing
- > 30 dB(A) A quiet country park
- > 40 dB(A) Whisper in a library
- > 50 dB(A) Open office space
- > 70 dB(A) Inside a car on a freeway
- > 80 dB(A) Outboard motor
- > 90 dB(A) Heavy truck pass-by
- > 100 dB(A) Jackhammer / Subway train
- > 110 dB(A) Rock Concert
- > 115 dB(A) Limit of sound permitted in industry
- > 120 dB(A) 747 take off at 250 metres

Frequency

The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high-pitched sound and a low frequency to a low-pitched sound.

L_{90} , L_{10} , etc

A statistical measurement giving the sound pressure level which is exceeded for the given percentile of a measurement period (i.e. L_{90} is the level which is exceeded for 90 percent of a measurement period). L_{90} is commonly referred to as a basis for measuring the background sound level.

$L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

L_{Amax}

The maximum sound pressure level measured over the measurement period.

 L_{Amin}

The minimum sound pressure level measured over the measurement period.

Day

Referred to as the period between 7am and 6pm for Monday to Saturday and 8am to 6pm for Sundays and Public Holidays.

Evening

Referred to as the period between 6pm and 10pm for Monday to Sunday and Public Holidays.

Night

Referred to as the period between 10pm and 7am for Monday to Saturday and 10pm to 8am for Sundays and Public Holidays.

Assessment background level (ABL)

The overall background noise level on each day, evening and night periods for each day of the noise monitoring.

Rating background level (RBL)

The overall background level on each day, evening and night periods for the entire length of noise monitoring.

Reverberation

The persistence, after emission by the source has stopped, of a sound field in an enclosure.

Sound isolation

A reference to the degree of acoustical separation between two spaces. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term 'sound isolation' does not specify any grade or performance quality and requires the units to be specified for any contractual condition.

Sound pressure level, L_p , dB of a sound

A measurement obtained directly obtained using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the R.M.S. sound pressure to the reference sound pressure of 20 micro Pascal



Creating great environments with great people

Melbourne

Level 11, 60 Albert Road
South Melbourne VIC 3205
t. 03 9521 1195

Sydney

Level 6, 33 Erskine Street
Sydney NSW 2000
t. 02 8203 5447

Brisbane

Ground Floor, 102 Adelaide Street
Brisbane QLD 4000
t. 07 3088 4022

adpconsulting.com.au