Queensland Government

Yeronga Community Centre
Acoustics Report
Development Application

31 January 2022 **Ref: 301401462**

PREPARED FOR:

Mr John Marshall
Department of State Development, Infrastructure, Local Government and Planning

PREPARED BY:

Monica Saralertsophon

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
0	20/01/22	Issue for comments	MS	MLL
1	31/1/2022	Draft report	MS	MLL

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2022/1264

Date: 10 June 2022

Queensland Government

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1. Introduction

Stantec Australia Pty Ltd (Stantec) have been engaged by Economic Development Queensland (EDQ)to undertake a noise impact assessment for the development application stage (DA) of the proposed Yeronga Community Centre (YCC).

The development is occurring within the Yeronga Priority Development Area (PDA) and is subject to the proposed Parkside Yeronga master plan (the proposed master plan). The project site address is 70 Park Road (Lot 3 on SP300888), Yeronga QLD 4104 and is within the Brisbane City Council (BCC).

This acoustic services report:

- Defines the understanding of the existing site and proposed uses of the building,
- Defines the locations of the noise sensitive receptors.
- Establishes criteria pertinent to the following acoustic parameters:
    - External noise intrusion / internal noise levels;
    - Environmental noise emissions;
- Provides design recommendations for the abovementioned parameters based on the applicable design guidelines discussed in this report.

A glossary of terms used in this report is provided in **Appendix A**.

The recommendations made in this report are specific to the building design at the date of issue of this report. The building design is subject to change during the following stages. Where this occurs, the assumptions made to inform the recommendations in the report may no longer be valid; therefore, further advice should be sought to ensure that the acoustic outcomes presented in this report are achieved.

The performance of products referred to in this report are made to meet the acoustic requirements only. It does not consider other aspects, including but not limited to thermal, wind, impact, structural, mechanical, national construction code, security and fire requirements. Relevant discipline reports, drawings and specifications should be referred to for conformance.

This report relates to this specific project and must not be applied to any other project without prior consultation with Stantec. Designs and conditions can vary between projects causing significant variations in acoustic performance and relevant subsequent advice to one project may not apply to another.

This report shall not be relied upon as providing any warranties or guarantees of construction quality regarding acoustics.

2. Referenced Documentation

The following documents detailed in **Table 1** are relevant to the project and are referred to throughout this report.

Table 1 Applicable Regulations, Policies, Standards and Guidelines referenced in this report

Title	Abbreviation
State Development Assessment Provisions Version 2.6 (effective 7 February 2020 from Department of Infrastructure, Local Government and Planning)	SDAP
Australian Standard AS 1055.1-1997 Acoustics – Description and measurement of environmental noise	AS 1055
International Standards Organization 9613-2:1996 Attenuation of sound during propagation outdoors – Part 2: General method of calculation	ISO 9613
Yeronga Priority Development Area - Development Scheme published by the Department of State Development, Manufacturing, Infrastructure and Planning August 2019	YDS
Community Plus_Yeronga Community Centre_Service Delivery Functional Assessment_290819	Room data sheet (RDS)

2.1 Study Inputs

Acoustic assessment and the preparation of this report have been conducted based on the following received documentation detail in Table 2**.**

Table 2 Received documentation

Date Received	Details	Revision / Date Prepared	Prepared by	Format
10/01/2022	Yeronga Community Centre Concept Design Report: • 211215_21010_YCC Concept Design Report_Rev D_Compresed	Concept Design Report	Archipelago	Pdf
10/01/2022	Yeronga Community Centre - Application Brief • 7200255 - Yeronga Community Centre - Application Brief - v2 10.11.21	DRAFT Development Application Brief 10 November 2021 Version 3	Ethos Urban	Pdf
27/01/2022	Service Delivery Functional Assessment • Community Plus_Yeronga Community Centre_Service Delivery Functional Assessment_290819	Room data sheet ..	Department of State Development, Infrastructure, Local Government and Planning	Excel spreadsheet

3. Project Details

3.1 Site Description

3.1.1 Project Location

The project site is located at 70 Park Rd (Lot 3 on SP300888[1]), Yeronga QLD 4104 and is within the Brisbane City Council (BCC). The site is exposed to noise emissions from rail transportation lines carrying passenger and freight situated to the north of the site. The railway line is a primary passenger connection route between Gold Coast, Logan and Brisbane council regions.

The project site has been shown in context with existing surrounding developments and noise monitoring locations (conducted by Stantec and discussed in **Section 4.1**) in **Figure 1.**

Figure 1 Project site and noise monitoring location

Note: Drawings supplied by Archipelago for Yeronga Commercial Building, Draft Concept Design, dated 25 October 2021. Mark up by Stantec

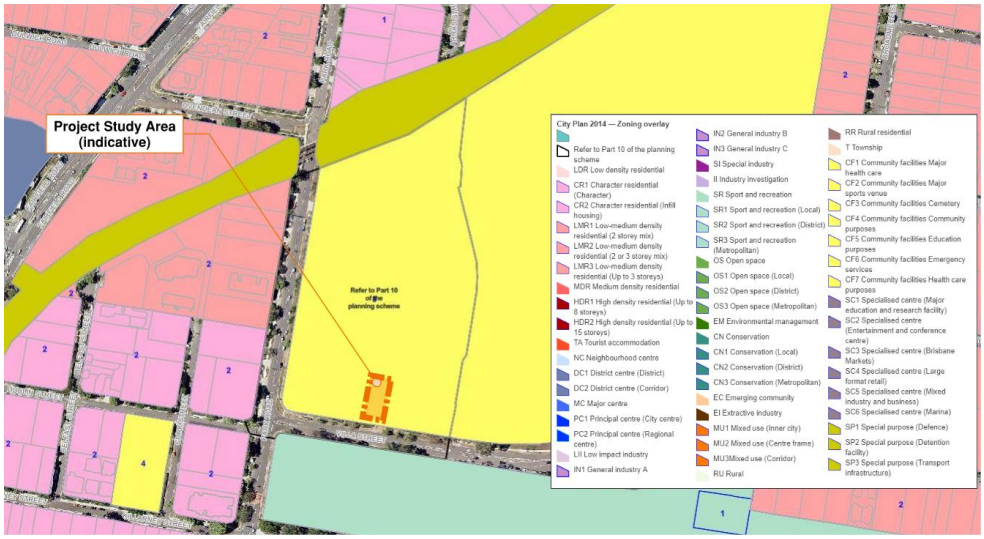
[1] This will change to Lot 11 on SP300888 once the reconfiguring a lot, subject to the current PDA development application (DEV2021/1221), has been provided.

3.1.2 Surrounding Land Uses / Zoning

The Brisbane City Council City Plan 2014 Interactive Mapping (online) was accessed and reviewed on the 6 December 2021 to determine site information, as well as existing and proposed land-uses of the areas surrounding the site (see **Figure 2**). The following was identified:

- The project site is:
  - situated within Yeronga Priority Development Area (PDA) – Development Scheme and Dutton Park-Fairfield neighbourhood plan zone;
  - currently zoned CF5 Community facilities (Education purposes) by the BCC City Plan;
- Existing land uses surrounding the project site generally consist of the following zoning;
  - LMR2 Low-medium density residential (2 or 3 storey mix);
  - CR2 Character (Infill housing);
  - CF5 Community facilities (Education purposes);
  - SP3 Special purpose (Transport infrastructure)
  - SR1 Sport and recreation (Local);
  - SR2 Sport and recreation (District);
- The nearest noise sensitive receptors to the project site (outside of the Yeronga PDA) are located at:
  - Future residential uses for the Yeronga PDA contemplated under the Yeronga Masterplan Submission (north, east)
  - 25 – 51 Park Rd, Yeronga 4104; and
  - 31 Dublin St, Yeronga 4104.
- The project site is not located within;
  - State designated noise corridor - rail network
  - Aircraft Noise Exposure Forecast (ANEF) contours; and
  - State designated noise corridor – state-controlled road.

Figure 2 Land use / zoning surrounding the project site



Source: Brisbane City Council City Plan 2014 Interactive Mapping (online – City Plan Zone 2014 Zone overlay, accessed 19/01/2022)

3.2 Project Description

Based on the architectural documentation received (refer to Table 2) the project will consist of two (2) storey building including carpark on the lower ground floor. The services plant areas are proposed on the lower ground floor and roof level of the building.

An indicative floor plan of the proposed building is presented in **Figure 3**.

Figure 3 Indicative section view

Lower ground **Upper ground**

3.2.1 The Proposed Operation

The general hours of operation of the Centre and maximum capacity are summarized below in **Table 3**.

Table 3 House of operation

Space	House of use	Capacity
Reception / Waiting area	8:00 am - 5:00 pm	8
Carpark	6:00 am - 11:00 pm	26 (14 staff and 12 visitors)
Kitchen		12
Outside area		100

3.3 Acoustic Issues and Future Design Considerations

The following items are to be considered for the project:

- The proposed site is in close proximity to potentially sensitive receivers (future Retire Australia residents along South Road), along East Road (proposed future Lot 7)) and the adjacent future residential sites on proposed future Lots 10 and 21 as contemplated in the current Yeronga Masterplan PDA application (EDQ ref: DEV2021/1221).

  The approximate nearest horizontal distance from the project boundary to the residential boundary to the north and east are 16 m, and 3.5 m respectively. Noise emissions from any mechanical plant or operational activities proposed for the project will need to comply with the criteria outlined by the BCC City Plan (where applicable), EPA 1994 and EPP 2019.
- The proposed development site is potentially exposed to rail and road traffic noise. The building envelope design is to provide adequate sound insulation from the external sources, such that resultant acoustic amenity (indoor noise levels) is suitable for the proposed use.

4. Existing Acoustic Condition

4.1 Noise Survey

4.1.1 Unattended Noise Measurement Method

To quantify the existing noise environment on site, an unattended noise monitoring (noise logging) was conducted from Friday 23rd April 2021 to Friday 30th April 2021 (inclusive). The location of the noise monitoring location has been shown in **Appendix B**.

Noise measurements were conducted following guidance from Australian Standard AS 1055:2018 – *Acoustics – Description and measurement of environmental noise*, and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response; and
- 15-minute, 1 minute and 1 second intervals.

The sound level meter was calibrated before and after the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS 1055:2018. Complete details and full measured results, refer to the details presented in **Appendix B**.

4.1.2 Noise Survey Results

A summary of relevant of the average unattended noise levels recorded at each measurement location from Friday 23rd April 2021 to Friday 30th April 2021 (inclusive) presented in **Table 4**. For further details and full measured results, refer to **Appendix B**.

Table 4 Summary of relevant noise descriptors used to determine noise limits and inform acoustic assessment

Time period	Equivalent Continuous Noise Level, $L_{eq(period)}$ dB(A)	Rating Background Level, RBL dB(A)	Background Noise Level, $L_{90\ (period)}$ dB(A)	Equivalent Continuous Noise Level, $L_{eq(1hr)}$ dB(A)	Maximum noise levels L_{Max} dB(A)
Day [1)]	62	45	45	64	89
Evening [1)]	61	45	49	62	85
Night [1)]	58	35	38	63	87
NOTES: Day – 7am-6pm | Evening – 6pm-10am | Night – 10pm-7am					

5. Acoustic Criteria

5.1 Yeronga PDA – Development Scheme

Acoustic Requirements

The Yeronga Priority Development Area – Development Scheme (Yeronga PDA DS) prepared by the Economic Development Queensland (EDQ) outlines a single requirement regarding noise intrusion on the site within ***Section 2.5.6 Community safety and development constraints***:

The siting, design, construction and operation of development supports community safety and gives appropriate consideration to development constraints by:

3. avoiding, to the greatest extent practicable, then managing or mitigating significant adverse impacts:
    *b. from noise emissions on sensitive uses [41], including those from transport noise corridors (in this section, note 41 of the scheme states "***for guidance on acoustic amenity, refer to the Brisbane City Plan Centre or mixed-use code***"), and*
    c. on the environment.

Relationship with Brisbane City Plan 2014

Schedule 6 of the Planning Regulation 2017 (Planning Regulation) prohibits Brisbane City Plan 2014 from making PDA-related development assessable under the Planning Act. However, schedule 2 adopts definitions from Brisbane City Plan 2014 and the development scheme calls up various other parts of the Brisbane City Plan 2014 as guidance.

Under section 71 of the ED Act, if there is a conflict between the development scheme and a planning instrument, or assessment benchmarks prescribed by regulation under the Planning Act or another Act for the Planning Act, the development scheme prevails to the extent of any inconsistency.

5.2 Environmental Noise Emissions

5.2.1 Brisbane City Council – City Plan 2014

The Brisbane City Council – City Plan 2014 (version 21, effective as of 28th May 2021) requires developments to be designed to maintain the expected level of amenity for the area where they are constructed.

In accordance with Section 3b of the Yeronga PDA DS, guidance on acoustic amenity shall be sought from the Brisbane City Plan when assessing noise emissions from the project site to external sensitive uses, specifically, the centre or mixed-use code. A summary of the acoustic-related performance and acceptable outcomes defined under the 9.3.5 Community facilities code have been provided in **Table 5**.

Table 5 Performance outcomes and acceptable outcomes (BCC City Plan, Table 9.3.5.3.A)

Performance outcomes	Acceptable outcomes
PO2 **Development ensures that noise generated does not exceed the noise (planning) criteria in Table 9.3.5.3.B and night-time noise criteria in Table 9.3.5.3.C at a sensitive zone or sensitive use.** **Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.** **Note—Where the development involves an activity regulated by the Entertainment Venues and Events Local Law, the operating noise levels and requirements may be specified on a permit or approval issued under that law.**	**AO2.1** Development: a. does not involve amplified music entertainment; • is conducted wholly within an enclosed building and does not involve external activity, dining or entertainment areas; • provides a 2m high acoustic fence along any boundary with land in a residential zone; • ensures mechanical plant or equipment is acoustically screened from adjoining sensitive uses. Note—Mechanical plant includes generators, motors, compressors and pumps such as air-conditioning, refrigeration or coldroom motors. **AO2.2** Development does not generate noise that is clearly audible and creates a disturbance within a dwelling or its associated balcony or patio.

Noise (planning) criteria

The applicable noise planning criteria from the *Community facilities code* (Table 9.3.5.3.B) has been reproduced in **Table 6**.

Table 6 Noise (planning) criteria (Table 9.3.5.3.B, City Plan 2014)

Criteria Location	Intrusive Noise Criteria	Acoustic Amenity Criteria		
	Day, evening and night $L_{Aeq,adj,T}$ are not greater than the RBL plus the value in this column for the relevant criteria location, where T equals: • day – 11hr • evening – 4hr • night – 9hr	Day, evening and night LAeq,adj,T are not greater than the values in the columns below for the relevant criteria location, where T equals: • day – 11hr • evening – 4hr • night – 9hr		
		Day	**Evening**	**Night**
Low, Low–medium density residential zone boundary	3 dB(A)	55 dB(A)	45 dB(A)	40 dB(A)
Medium density residential zone boundary	3 dB(A)	55 dB(A)	50 dB(A)	45 dB(A)
High density residential zone boundary	3 dB(A)	55 dB(A)	50 dB(A)	50 dB(A)
Character residential zone boundary	3 dB(A)	50 dB(A)	45 dB(A)	40 dB(A)

Criteria Location	Intrusive Noise Criteria	Acoustic Amenity Criteria		
At a sensitive use in the mixed-use zone	5 dB(A)	60 dB(A)	55 dB(A)	50 dB(A)

Notes:

- $L_{Aeq,adj,T}$: The adjusted A-weighted equivalent continuous sound pressure level of the development during the time period T, where T is an 11-hour day (7am–6pm), 4-hour evening (6pm–10pm) and 9-hour night (10pm–7am), determined in accordance with the methodology in the Noise impact assessment planning scheme policy.
- RBL: Rating background level determined in accordance with the methodology in the Noise impact assessment planning scheme policy.
- dB(A): A-weighted decibels

Night-time noise criteria

The relevant night-time noise criteria outlined by *Table 9.3.5.3.C* of the City Plan 2014 has been reproduced in

Table 7.

Table 7 Night-time noise criteria (Table 9.3.3.3.H, City Plan 2014)

Criteria location	Where the existing $L_{Aeq,9hr}$ night at the criteria location is:	Average of the highest 15 single L_{Amax} events over a given night (10pm–7am) period is not greater than the following values at the relevant criteria location	The absolute highest single L_{Amax} event over a given night (10pm–7am) period is not greater than the following values at the relevant criteria location
Low-medium density residential zone boundary	< 45 dB(A)	50 dB(A)	55 dB(A)
Medium density residential zone	45 to 60 dB(A)	LAeq,9hr night + 5 dB(A)	LAeq,9hr night + 10 dB(A)
Character residential zone boundary	> 60 dB(A)	65 dB(A)	70 dB(A)
Emerging community zone			
Mixed use zone	Not applicable	65 dB(A)	70 dB(A)

Notes:

- L_{Amax}: The A-weighted maximum sound pressure level determined in accordance with the methodology in the Noise impact assessment planning scheme policy.
- $L_{Aeq,9hr}$: The A-weighted equivalent continuous sound pressure level of the development during the night- time period 10pm to 7am, determined in accordance with the methodology in the Noise impact assessment planning scheme policy.
- Night: 10pm to 7am
- dB(A): A-weighted decibels

5.2.2 Queensland Environmental Protection Act 1994

The objective of the Queensland Environmental Protection Act 1994 (EPA 1994) is *"to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends."*

To uphold this intent, and of relevance to acoustic assessment for the project, the EPA 1994 defines a series of noise-related standards in Chapter 8, Part 3B Offences relating to noise standards. The following sections are considered applicable:

Section 440R Building work

(1) A person must not carry out building work in a way that makes an audible noise—
(a) on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or
(b) on any other day, at any time.
(2) The reference in subsection (1) to a person carrying out building work—
(a) includes a person carrying out building work under an owner-builder permit; and
(b) otherwise does not include a person carrying out building work at premises used by the person only for residential purposes.

Section 440V Refrigeration equipment

(1) This section applies to a person who is—
(a) an occupier of premises at or for which there is plant or equipment for refrigeration (refrigeration equipment); or

(b) an owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway.

(2) The person must not use, or permit the use of, the refrigeration equipment on any day—

(a) before 7a.m, if it makes a noise of more than 3dB(A) above the background level; or

(b) from 7a.m. to 10p.m, if it makes a noise of more than 5dB(A) above the background level; or

(c) after 10p.m, if it makes a noise of more than 3dB(A) above the background level.

(3) In this section—

*(2) **vehicle** includes a trailer.*

Section 440U Air-conditioning equipment

(1) This section applies to premises at or for which there is air-conditioning equipment.

(2) An occupier of the premises must not use, or permit the use of, the equipment on any day:

(a) before 7am, if it makes a noise of more than 3dB(A) above the background level [2]; or

(b) from 7am to 10pm, if it makes a noise of more than 5dB(A) above the background level; or

(c) after 10pm, if it makes a noise of more than 3dB(A) above the background level.

5.2.3 Environmental Protection (Noise) Policy 2019

The Queensland Environmental Protection (Noise) Policy 2019 (EPP 2019) identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment.

Schedule 1 Acoustic Quality Objectives

The acoustic quality objectives are stated in Section 7 of Schedule 1 of the EPP 2019. In accordance with EPP 2019, the acoustic quality objectives are stated for a defined type of noise sensitive use and specified period of the day (reproduced in **Table 8**). The environmental values which EPP 2019 aims to enhance or protect are also stated. It is intended that the acoustic quality objectives be progressively achieved as part of achieving the purpose of EPP 2019 over the long term.

Table 8 Acoustic quality objectives as defined in Schedule 1 of the EPP 2019

Sensitive Receptor	Time of Day	Acoustic Quality Objectives [1)] (measured at the receptor) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
Residence (for outdoors)	Daytime and evening	50	55	65	Health and wellbeing
Residence (for indoors)	Daytime and evening	35	40	45	Health and wellbeing
	Night-time	30	35	40	Health and wellbeing, in relation to the ability to sleep
	When open for business or when classes are being offered	35	—	—	Health and wellbeing
Library and educational institution (including a school, college and university) (for indoors)	Daytime and evening	50	55	65	Health and wellbeing

[2] *NOTE: According to the EPA 1994:*

- Background level means the background A-weighted sound pressure level under the prescribed standard measured as $L_{A90,T}$.
- $L_{A90,T}$ means the A-weighted sound pressure level obtained using time weighting 'F' that is exceeded for 90% of the measuring period (T).

Sensitive Receptor	Time of Day	Acoustic Quality Objectives [1] (measured at the receptor) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
School or playground (for outdoors)	When the children usually play outside	55	—	—	Health and wellbeing, and community amenity

Notes:

1) The $L_{Aeq,Adj,T}$ noise limits apply to all noise sources, whilst the $L_{A10,Adj,1hr}$ and $L_{A1,Adj,1hr}$ only apply to intermittent noise sources (i.e. excludes air conditioning).

6. Acoustic Assessments and Recommendations

6.1 Overview

The following sections outline the acoustic services design recommendations for the project. The recommendations nominated target compliance with the acoustic performance objectives outlined in **Section 5**.

Whilst the recommendations provided herein have generally considered standard construction types, review of the preferred construction methods outlined in this report shall be conducted and adopted. Any alternatives to the recommendations provided in this report should be submitted to the acoustic engineer for review.

6.2 Building Envelope Construction

6.2.1 General

As per the Priority Development Scheme or Brisbane City Council's – Community Facility Code, there is no specific requirement for sound insulation of the building for control of external noise.

In general, it will be the responsibility of the building designers following development approval to control external noise transmission into the building to meet the internal noise level targets specified in *AS/NZS 2107:2016 Acoustics — Recommended design sound levels and reverberation times for building interiors* or any sustainability requirements such as Green Star rating.

With the exception of the main community room which can be of multi-purpose use, the building envelope construction is required to adequately reduce noise intrusion into the building and noise emission will be review and updated as the design progresses.

The building envelope recommendations for the Main Community Room is provided in the following section.

6.3 Environmental Noise Emissions

6.3.1 Main Community Room

As the Main Community Room is proposed to be open for hire by the public, the noise emissions from activities occurring within the Main Community Room (MCR) can contribute to the acoustic environment at noise sensitive receivers, as well as other space within the project site. Therefore, a preliminary assessment of noise emissions from the MCR against the relevant noise limits outlined in **Section 5** (i.e. the most stringent being $L_{Aeq,adj,1hr}$ 50 dB(A) indoor during daytime and evening within adjacent residential premises.

Typical Source Noise Levels

Given the size of the room, it is assumed that the MCR will likely cater for a variety of activities, including;

- Music and performance; and/or
- Assembly / presentations.

With reference to the above, music performances, and large congregations typically exhibit the greatest noise levels. Typical noise levels associated with the above (inclusive of reverberant room effects) are provided in **Table 9**.

Table 9 Typical noise levels associated hall activities and music performances

Source	Linear Octave Band Reverberant Sound Pressure Level (L_{eq}, dB)							Total Sound Pressure Level – L_{eq} dB(A)
	63 Hz	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	
Rock Band [1)]	97	97	98	93	90	89	87	97
Brass Band [2)]	85	91	95	97	98	92	82	101
Crowd noise [3)]	80	77	72	69	63	60	55	71
Talking [3)]	63	61	71	80	64	80	73	83

Notes:

1) Noise levels based on 5-piece band generally consisting of amplified guitars (electric and bass), drums and vocalist/s.
2) Noise levels based on 30-piece brass ensemble.
3) Noise levels based on typical basketball game.
4) Noise levels based on several hundred students within a multi-purpose hall.

Preliminary Recommendation

Building envelop construction

Based on the anticipated use of the Main Community Room, acoustically rated building envelope would be required to reduce noise emission from the space when sources similar to **Table 9** are used within the space.

It is recommended that the roof, wall, glazing, and door design and selections are reviewed once the specific use of the space is finalised in the subsequent design stage.

Preliminary finding regarding the required constructions are as follows in **Table 13**:

Table 10 Preliminary construction recommendations to meet external noise limits

	Building Element	Preliminary Advice Regarding Construction
Rock Band	Roof / Ceiling	• 1 layer of 0.6 mm metal sheet (0.55mm) + 1 layer of 4mm Fibre Cement • Minimum 100mm cavity + solid Joist + 60 mm insulation of 10kg/m^3 density • 2 layers of 13 mm CSR Gyprock 13 mm Soundchek plasterboard
	External Walls	Double brick construction (minimum 20 mm cavity)
	Glazing	10.5 mm VLam Hush

	Building Element	Preliminary Advice Regarding Construction
Brass Band	Roof / Ceiling	• 1 layer of 0.6 mm metal sheet (0.55mm) + 1 layer of 4mm Fibre Cement • Minimum 100mm cavity + solid Joist + 60 mm insulation of 10kg/m^3 density • 2 layers of 13 mm CSR Gyprock 13 mm Soundchek plasterboard
	External Walls	Double brick construction (minimum 20 mm cavity)
	Glazing	10.5 mm VLam Hush
Crowd noise	Roof / Ceiling	• 1 layer of 0.6 mm Custom Orb (0.55mm) • Minimum 100mm cavity + solid Joist + 60 mm insulation of 10kg/m^3 density • 1 layer of 10 mm Plasterboard
	External Walls	• weatherboard cladding • wall wrap + 70mm steel studs at 600mm maximum centres + 60 mm insulation of 10kg/m^3 density • 1 layer of 10 mm Plasterboard
	Glazing	6 mm Single glazed
Students Talking	Roof / Ceiling	• 1 layer of 0.6 mm Custom Orb (0.55mm) • Minimum 100mm cavity + solid Joist + 60 mm insulation of 10kg/m^3 density • 1 layer of 10 mm Plasterboard
	External Walls	• weatherboard cladding • wall wrap + 70mm steel studs at 600mm maximum centres + 60 mm insulation of 10kg/m^3 density • 1 layer of 10 mm Plasterboard
	Glazing	6 mm Single glazed

Operational management

In addition to the noise control provided by the recommended building construction the following is recommended:

- an operational noise management plan for the operation of hired spaces within the Community Centre.
- restriction of hours of use in the hired spaces to functions relating to music (amplified or unamplified) and any amplification system within the Community Centre to 10:00 pm.

6.3.2 Mechanical Services

Noise emissions from the proposed development are required to comply with all environmental noise limits at the nearest noise sensitive receivers outlined in **Section 3.1.2** of this report.

The key noise source items requiring acoustic assessment are any new external noise emitting services plant (e.g. outdoor condensers, exhaust fans, roof-mounted plant etc.) proposed for the project which can influence noise levels at the nearest noise sensitive receivers identified, site boundaries, as well as adjacent buildings within the site.

Whilst it is unlikely that extensive acoustic treatments will be required for compliance with environmental noise limits, costing provisions shall be made for the following:

- Noise barriers or acoustic louvres;
- Acoustic attenuators;
- In-duct linings; and / or
- Quiet equipment selections of selections with custom silencer / attenuation options.

6.3.3 Carpark Noise Emissions

It is anticipated that noise emissions from these areas will generally occur during operating hours (daytime and evening hours i.e., between 7 am – 10.30 pm). Since noise emissions from vehicle sources is considered intermittent, the most stringent noise limits applicable are the acoustic quality objectives outlined by EPP 2019 for residential premises (i.e., $L_{eq,adj,1hr}$ 50 dB(A)).

The proposed carpark is in close proximity to the future residences on the eastern boundary (approximately 3.5 m). The following design considerations are recommended:

- A solid, monolithic barrier along the carpark boundary is recommended with minimum surface mass of 11 kg/m^2 is recommended along the east boundary of the carpark to minimise the impact from the carpark operation.
- Carpark surface finishes such as concrete brush finish or trowelled finish are recommended to minimise tyre squeal. Polished floor finish should be avoided.

6.3.4 Operational management and External Operations

In addition to the noise control provided by the recommended barrier the following is recommended:

- The building includes an outdoor space which is connected to the plaza. This area has significant separation distance to nearby noise sensitive receptors or is completely screened by the intervening building. For these outdoor areas, the noise emissions are expected to be reasonable for gatherings and typical community events between 7am and 10pm. The exception may be apart from uses such as outdoor musical performance or amplified activities such as a large-gatherings with public address.
- A management plan will need to be developed for the management of this and also be implemented for the carpark to ensure that carpark is cleared, and groups do not gather following events in the centre. The development of the management plan would include some acoustic testing to determine the limits for music which can be checked by staff depending on the arranges of noise sources (speaker locations).

6.4 General Recommendations

6.4.1 Noise Management Plan

One of the most effective measures that should be implemented in conjunction with engineering noise controls is a Noise Management Plan (NMP). The NMP should be incorporated with in the Centre's overall management plan.

An example of management measures for consideration are:

- Centre's operating hours should be made publicly available to public (in the event of a compliant).
- A contact phone number for the Centre should be made available to neighbours (and public) to facilitate communication and to resolve any neighbourhood issues that may arise due to operation of the Centre.
- Staff and visitors should be informed of the importance of noise minimisation when entering the site and leaving site during sensitive hours (i.e. between 7:00 am – 8:00 am and 10:00 pm onwards).
- Staff should be inducted on measures to minimise noise within the centre and complaint handling procedure.
- Minimise / limit the use of excessively loud noise within the hired spaces.

7. Conclusion

Stantec Australia Pty Ltd have been engaged by EDQ to undertake acoustic assessment for the proposed Yeronga Community Centre located at 70 Park Road (Lot 3 on SP300888), Yeronga QLD 4104.

This acoustic report has:

- outlined the acoustic services scope of works for the project;
- established relevant acoustic criteria in accordance with current Legislation, Regulations, Council Policies, Australian Standards and Design Guidelines;
- identified key acoustic issues that are to be addressed by the project during subsequent design stages
- detailed acoustic assessments undertaken for the project.

It is noted that the treatments and recommendations nominated in this acoustic report are preliminary only and are for coordination with the project team as the design progresses.

We trust that this report to be sufficient for your current requirements; however, should you have any queries, please do not hesitate to contact the undersigned on (07) 3029 5000.

Appendix A Glossary of Acoustic Terms

NOISE	
Acceptable Noise Level:	The acceptable LAeq noise level from industrial sources, recommended by the EPA (Table 2.1, INP). Note that this noise level refers to all industrial sources at the receiver location, and not only noise due to a specific project under consideration.
Adverse Weather:	Weather conditions that affect noise (wind and temperature inversions) that occur at a particular site for a significant period of time. The previous conditions are for wind occurring more than 30% of the time in any assessment period in any season and/or for temperature inversions occurring more than 30% of the nights in winter).
Acoustic Barrier:	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
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 Location	The position at which noise measurements are undertaken 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.
Decibel [dB]:	The units of sound pressure level.
dB(A):	A-weighted decibels. Noise measured using the A filter.
Extraneous Noise:	Noise resulting from activities that are not typical of the area. Atypical activities include construction, and traffic generated by holidays period and by special events such as concert or sporting events. Normal daily traffic is not considered to be extraneous.
Free Field:	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5m from any acoustic reflecting structures other than the ground
Frequency:	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz).
Impulsive Noise:	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:	Level that drops to the background noise level several times during the period of observation.
LAmax	The maximum A-weighted sound pressure level measured over a period.
LAmin	The minimum A-weighted sound pressure level measured over a period.
LA1	The A-weighted sound pressure level that is exceeded for 1% of the time for which the sound is measured.
LA10	The A-weighted sound pressure level that is exceeded for 10% of the time for which the sound is measured.
LA90	The A-weighted 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).
LAeq	The A-weighted “equivalent noise level” is the summation of noise events and integrated over a selected period of time.
LAeqT	The constant A-weighted sound which has the same energy as the fluctuating sound of the traffic, averaged over time T.

Reflection:	Sound wave changed in direction of propagation due to a solid object met on its path.
R-w:	The Sound Insulation Rating R-w is a measure of the noise reduction performance of the partition.
SEL:	Sound Exposure Level 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 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 Noise Monitoring Details

Unattended noise logging was conducted from Friday 23rd April 2021 to 30th April 2021 (inclusive) at the location shown in Figure 1 (coordinates in **Table 11**). This location was selected due to a high degree of exposure to the railway line.

Table 11 Noise monitoring coordinates

Monitor	Latitude	Longitude
001	-27.515506	153.020467

- The following instrumentation was used:

An NTi XL2 Class 1 sound level meter (S/N A2A-12892-E0), and Pulsar 105 Class 1 acoustic calibrator (S/N 72913). The instrument had a current calibration certificate by a certified National Association of Testing Authorities (NATA) acoustics laboratory at the time of measurements.

Noise measurements were conducted in accordance with Australian Standard AS 1055.1-1997 – *Acoustics – Description and measurement of environmental noise*, and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response;
- 15-minute, 1 minute and 1 second intervals.

The sound level meter was calibrated before and checked at the end of the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS1055.1-1997.

Audio was recorded during the measurements period and used for the purpose of identifying contributing noise sources.

Noise monitoring results

The raw sound level meter files were post-processed to determine relevant long-tern noise descriptors, some of which were used to determine the applicable noise limits.

Results and time trace plots of relevant noise descriptors are provided below (see **Table 12** and **Figure 4**).

Where data was not measured for a full period (i.e. at the start and end of measurement), the cells are shown dashed in the table. In addition, the noise descriptor averages are presented.

A summary of weather observations by the Bureau of Meteorology (BoM) during the monitoring period is presented in **Table 13**. Where adverse weather (e.g. rain, excessive wind) occurred within the monitoring period, the measured data has been excluded.

Table 12 Summary of measured noise levels (rounded)

Noise descriptor	Average	23-Apr-21	24-Apr-21	25-Apr-21	26-Apr-21	27-Apr-21	28-Apr-21	29-Apr-21
$L_{A10(18hr),6am-12am}$	61	—	61	60	60	62	62	62
$L_{Aeq,7am-6pm}$	62	—	61	60	60	63	64	63
$L_{Aeq,6pm-10pm}$	61	61	60	60	60	60	62	61
$L_{Aeq,10pm-7am}$	58	58	58	57	59	59	59	—
$RBL_{,7am-6pm}$	45	—	41	38	40	44	45	46
$RBL_{,6pm-10pm}$	45	43	43	42	47	43	44	43
$RBL_{,10pm-7am}$	35	33	33	32	35	35	34	—
$L_{A90,7am-6pm}$	45	—	43	41	43	47	48	49
$L_{A90,6pm-10pm}$	49	45	46	47	48	47	47	47
$L_{A90,10pm-7am}$	38	38	37	36	39	39	38	—

Figure 4 Time trace of relevant noise descriptors

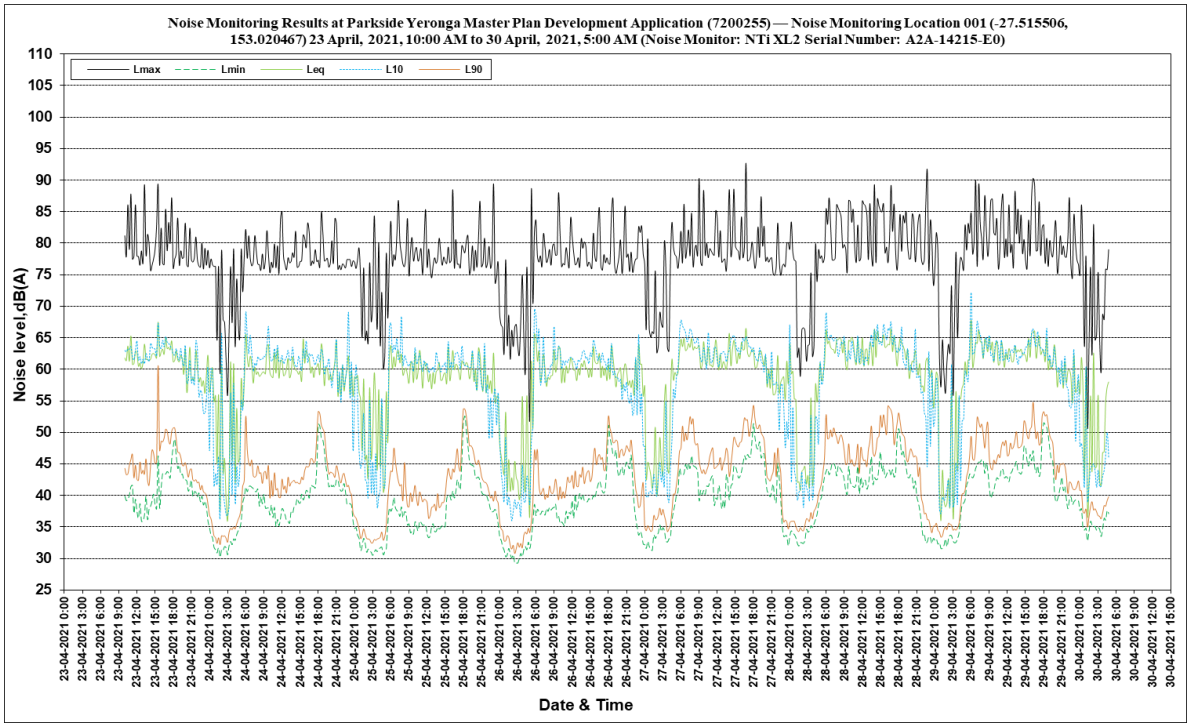


Table 13 Summary of BoM weather observations during unattended monitoring (monitored days highlighted)

Brisbane, Queensland
April 2021 Daily Weather Observations
Most observations from Brisbane City, but some from Brisbane Airport.

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	18.0	26.2	0		5.7	SSE	31	15:09	23.6	57	6	SSW	7	1020.9	23.4	68	7	SSW	4	1018.8
2	Fr	17.9	26.6	2.8		8.8	E	41	14:46	23.7	59	2	SSE	11	1022.5	24.1	53	7	ESE	17	1021.0
3	Sa	20.5	25.4	0		1.2	ESE	33	14:10	22.6	70	7	SSE	7	1021.6	22.5	80	7	ESE	9	1019.0
4	Su	19.6	22.5	8.4		0.0	ENE	20	13:58	20.7	92	8	WSW	2	1019.6	21.4	91	8	ESE	4	1016.4
5	Mo	20.1	23.3	9.4		0.0	SE	30	15:31	21.6	87	8	SSE	11	1016.4	23.0	87	8	SE	13	1013.3
6	Tu	20.9	24.3	45.4		0.9	E	37	05:21	22.1	94	8	S	6	1015.7	22.9	85	7	SSE	11	1013.1
7	We	19.6	27.5	20.6		6.5	SSE	30	11:07	22.4	86	7	SSW	9	1013.0	27.4	57	6	SE	13	1008.8
8	Th	19.2	28.1	0		10.2	S	26	09:51	24.7	63	7	S	11	1008.8	26.7	59	1	S	6	1005.7
9	Fr	18.3	30.6	0		10.6	WNW	19	14:24	23.9	63	0	WSW	4	1009.3	30.3	45	2	W	6	1004.6
10	Sa	17.7	33.0	0		10.9	W	28	13:41	24.2	61	1	WSW	4	1008.7	32.7	30	1	WSW	7	1004.7
11	Su	18.3	29.2	0		7.4	W	30	15:40	22.5	57	7	SW	4	1010.7	29.0	30	1	W	11	1008.3
12	Mo	13.2	24.6	0.2		10.0	SE	26	13:52	18.9	39	1	WSW	9	1018.0	23.6	49	1	ENE	9	1016.1
13	Tu	14.7	24.9	0		10.7	SE	20	10:55	21.4	52	1	SSW	6	1021.9	23.2	42	2	ESE	9	1018.9
14	We	13.6	26.3	0		10.8	NE	19	15:05	19.5	64	1	WSW	6	1020.7	25.4	47	1	NE	6	1016.7
15	Th	15.0	28.4	0		10.9	NE	19	14:25	20.6	69	0	WSW	6	1017.6	26.6	49	1	NNE	7	1014.0
16	Fr	17.1	30.5	0		10.0	E	28	16:05	22.5	63	1	SW	2	1017.6	27.5	52	3	ENE	9	1015.2
17	Sa	19.5	24.7	0		0.7	SE	26	00:32	21.2	67	8	SW	6	1019.6	23.6	68	7	E	6	1016.3
18	Su	15.0	24.9	24.6		8.5	ENE	19	16:40	19.5	63	2	SW	7	1018.6	23.8	49	2	SSE	7	1015.4
19	Mo	14.4	26.5	0.2		10.9	SSE	19	09:24	20.3	61	1	SW	6	1019.1	25.2	44	1	NNE	6	1015.7
20	Tu	14.6	27.6	0		10.7	NNE	19	16:43	20.3	69	0	WSW	6	1019.1	27.4	35	1	WNW	4	1014.4
21	We	14.5	30.1	0		10.9	W	31	15:59	22.4	62	0	WSW	6	1015.1	29.8	26	1	WSW	13	1010.3
22	Th	12.0	22.0	0		1.0	W	24	22:08	16.7	62	7	SSW	6	1016.6	21.1	40	7	W	6	1012.5
23	Fr	11.6	25.0	0		10.9	WSW	17	11:33	18.7	35	1	SSW	7	1018.8	24.6	29	1	N	2	1016.1
24	Sa	12.2	25.1	0		10.7	NE	17	14:27	18.3	60	1	SSW	6	1022.5	23.8	49	1	ENE	7	1019.3
25	Su	13.7	26.6	0		10.5	NE	17	14:59	19.8	70	1	SSW	4	1022.6	25.1	47	1	ENE	7	1019.2
26	Mo	15.0	24.8	0		9.7	ESE	20	20:55	20.2	70	1	SSW	6	1023.7	24.1	48	2	E	9	1020.8
27	Tu	16.0	25.8	0		7.8	ESE	24	15:45	20.7	66	3	SW	6	1025.6	23.6	52	1	E	9	1021.7
28	We	15.7	24.6	0		5.5	E	22	17:54	21.2	63	1	SSW	7	1024.2	22.6	58	7	SE	7	1021.3
29	Th	15.7	25.1	0.6		8.5	E	28	14:56	19.6	69	6	SSW	4	1023.4	22.3	60	6	ESE	15	1020.8
30	Fr	17.1	24.2	0		1.7	ESE	33	13:31	21.5	70	7	SE	9	1025.0	19.8	85	8	ESE	7	1023.8
Statistics for April 2021																					
Mean		16.4	26.3			7.4				21.2	65	3		6	1018.6	24.9	53	3		8	1015.4
Lowest		11.6	22.0			0.0				16.7	35	0	#	2	1008.7	19.8	26	1	N	2	1004.6
Highest		20.9	33.0	45.4		10.9	E	41		24.7	94	8	#	11	1025.6	32.7	91	8	ESE	17	1023.8
Total				112.2		222.6															

Temperature, humidity, wind, pressure and rainfall observations are from Brisbane (station 040913). Cloud, evaporation and sunshine observations are from Brisbane Aero (station 040842)
Brisbane Airport is located about 12 kilometres north east of the Brisbane City site, and closer to the coast. The evaporation, sunshine and cloud values should be used as a guide only.

IDCJDW4019.202104 Prepared at 13:01 UTC on 5 Sep 2021

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Level 3
52 Merivale Street
South Brisbane QLD 4101
Tel +61 7 3811 4500

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Connect with us

stantec.com/australia