JGL - Parkside Yeronga

Acoustics Report

Development Application

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2022/1331

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PREPARED FOR:

Mr Bill Bennett
JGL Management Pty Ltd

PREPARED BY:

Monica Saralertsophon

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
001	16/08/2022	Issue for submission	MS	MLL

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1. Introduction

Stantec Australia Pty Ltd (Stantec) have been engaged by JGL Management Pty Ltd (JGL) to undertake a noise impact assessment for the development application stage (DA) of the proposed residential development, Parkside Yeronga project. The project site is located at 70 Park Rd (Lot 3 on SP300888), Yeronga QLD 4104 and is within the Brisbane City Council (BCC).

The primary purpose of conducting acoustic assessment has been to determine noise impacts on the completed project from surrounding major transport corridors and, subsequently, determine appropriate treatments which endeavour to continuously protect the acoustic amenity of prospective occupants.

This acoustic services report:

- Defines understanding of the existing site and proposed uses of the buildings, as well as the acoustic quality standards for the project;
- Establishes criteria pertinent to the following acoustic parameters:
    - External noise intrusion / internal noise levels;
    - Environmental noise emissions;
- Provides design recommendations for the abovementioned parameters for various spaces based on the applicable design guidelines discussed in this report;

Each of the acoustical aspects identified have been addressed in this report and recommendations are made to provide a consistent acoustical outcome for the project.

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

2.1 Regulations, Policies, Standards and Guidelines

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
Queensland Development Code Mandatory Part 4.4 – *Buildings in a Transport Noise Corridor* Version 1.1 (published 17 August 2015 from Department of Housing and Public Works)	QDC MP4.4
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

2.2 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
24/06/2022	Architectural Drawings Package: • *220623 DA Issue*	DA Issue / 23/06/2022	Arkhefield	pdf
10/05/2022	Approval conditions: • S89(1)(a) *Approval* of PDA development application	DEV2021/1221 03/05/2022	Department of State Development, Infrastructure, Local Government and Planning	pdf

3. Project Details

3.1 Approval Conditions DEV2021/1221

A review of the approval condition (DEV2021/1221, dated 3 May 2022) indicate no additional acoustic design requirements for the proposed development. As the project site is located within the transport noise corridor, a mandatory design requirement stipulated within Queensland Development Code MP 4.4 – *Buildings in a Transport Noise Corridor* is applicable to the project.

Furthermore, the approval conditions have stated a requirement for Construction Noise Management Plan for the project prior to commencing construction work. This item is outside of scope of works of this report and will not be discussed further.

3.2 Site Description

3.2.1 Project Location

The project site is located at 70 Park Road (Lot 3 on SP300888), Yeronga QLD 4104 and is within the Brisbane City Council (BCC). The site is exposed to noise emissions from passenger and freight rail transportation lines 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 the rail line existing surrounding developments and noise monitoring locations (conducted by Stantec and discussed in **Section 5**) in **Figure 1**.

Figure 1: Project site and noise monitoring location

Source: Nearmap (image dated 13/07/2022, accessed 08/08/2022)

3.2.2 Surrounding Land Uses / Zoning

The Brisbane City Council City Plan 2014 Interactive Mapping (online) was accessed and reviewed on the 22nd June 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 receivers to the project site (outside of the Yeronga PDA) are located at:

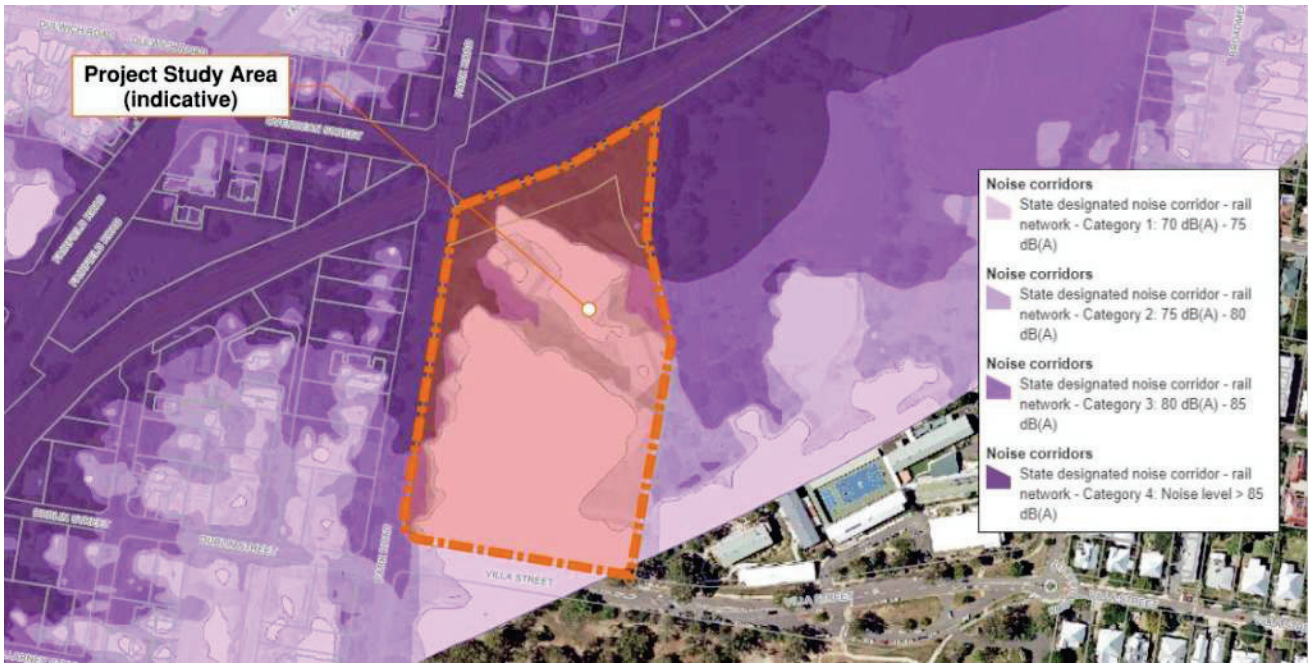
- 25 Oakwood St, Yeronga 4104;
- 25 – 51 Park Rd, Yeronga 4104; and
- 31 Dublin St, Yeronga 4104.

- The project site is located within;
  - State designated noise corridor - rail network up to Category 4: > 85 dB(A) L_{Max} (see **Figure 3**).
- The project site is not located within;
  - 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 08/08/2022)

Figure 3: Transport noise corridor overlay



Source: Brisbane City Council City Plan 2014 Interactive Mapping (online – State designated noise corridor - rail network overlay, accessed 08/08/2022)

In addition, the development will be located at approximately 80 metres from the nearest railway track. This is greater than the 25m distance required in SDAP State Code 2 for the assessment of rail induced vibration; therefore, this acoustic element is not considered further.

Figure 4: Areas within 25m of State transport corridor

Source: Development Assessment Mapping System, access 08/08/2022 overlay with Precinct plan, drawing no. 100-01 A, dated 09/08/2022, prepared by Arkhefield | Annotated by Stantec

3.3 Project Description

Based on the architectural documentation received (refer to **Table 2**) the project will consist of four (4) residential dwelling precincts with private outdoor area and individually off-street allocated parking.

Detail of each precinct are as follows:

Precinct 1:

- Lot 21 – 12 dwellings;
- Lot 22 – 5 dwellings;

Precinct 2:

- Lot 6 – 6 dwellings; and

Precinct 1:

- Lot 10 – 14 dwellings.

The layout of the proposed residential dwelling precincts is presented in **Figure 5**.

Figure 5: Precinct site plan

Source: Precinct plan, drawing no. 100-01 A, dated 09/08/2022, prepared by Arkhefield.

3.3.1 Proposed Building Construction

Based on the received architectural drawing (**Table 2**), the proposed external building construction for the individual dwellings are presented in **Table 3**.

Table 3: Proposed external building construction

Construction Type	Assumed Construction
Weatherboard	Weatherboard layer, vapor barrier, timber studs, cavity insulation to meet the required thermal insulation performance and plasterboard on the interior.
Blockwork	Blockwork, air gap, vapor barrier, timber studs, insulation to meet the required thermal insulation performance and plasterboard on the interior.
Fiber Cement panel	Fiber Cement layer, vapor barrier, timber studs, cavity insulation to meet the required thermal insulation performance and plasterboard on the interior.
Feature Colorbond cladding	Not a critical façade element (i.e. awning cladding)

4. Acoustic Issues and Future Design Considerations

The following items are to be considered for the project:

The proposed development will be in close proximity to the railway line connecting the Gold Coast and Brisbane regions, as well as road traffic noise. Noise impacts are to be assessed in accordance with Queensland Development Code Mandatory Part 4.4 Consideration shall be given towards construction of the building envelope during the design stages of the project, such that resultant indoor noise levels are sufficiently designed for, and which maintain a high degree of occupant amenity.

Lots 10, 21 and 22 may benefit from the additional shielding provide by future buildings of the masterplan (e.g. Retire Australia and Brisbane Housing Company). As a conservative approach, the rail noise impact assessment within this report has excluded the future buildings from noise modelling. Once they are approved and designs are known, an additional assessment of the rail noise impact may be conducted to determine any reduction in acoustic performance requirements of the dwellings.

The proposed development to the east boundary is in close proximity to car parking areas associated with Yeronga State High School (25 Oakwood Street). Whilst only moderate use of this carpark is expected, noise impacts on the future development shall be considered.

The external noise sensitive receivers located within close proximity to the proposed development at:

- Residential: 25 – 51 Park Road and 31 Dublin Street, Yeronga 4104; and
- School: 25 Oakwood Street; and
- Active recreation area: Honour Avenue Playground.

Noise emissions from any mechanical plant or operational activities proposed for the project will need to comply with the criteria outlined by the Yeronga PDA, BCC City Plan (where applicable), EPA 1994 and EPP 2019.

5. Site Noise Surveys

5.1 Unattended Noise Measurement Method

To quantify the existing noise environment on site and degree of exposure to noise associated with rail transport, 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 **Figure 1** with approximate setback from the centre of the nearest track of 21 m.

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**.

5.2 Site Averaged Noise Levels

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

Equivalent Continuous Noise Level, L_{eq} dB(A)			Rating Background Level, RBL dB(A)			Background Noise Level, $L_{90,T}$ dB(A)			$L_{10,18hr}$ dB(A)
Day [1)]	**Evening** [1)]	**Night** [1)]	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	
62	61	58	45	45	35	45	49	38	61

NOTES:

1) Day – 7am-6pm | Evening – 6pm-10am | Night – 10pm-7am

5.3 Railway Noise Levels

In addition to establishing the general acoustic profile at the project site, the purpose of unattended noise monitoring was to quantify noise levels associated with rail transport service. According to the Queensland Rail Code of Practice – Railway Noise Management;

> *"The Single Event Maximum Level provides a way to account for the potential disturbance based on peak maximum levels. Typically, on rail lines through urban areas, the Single Event Maximum Level is determined from highest 15 peak maximum levels over a 24-hour period."*

The measured data and captured audio files (described by **Appendix B**) was processed and analysed for each 24-hour period. A summary of the worst-case 15 peak maximum levels over a 24-hour period, which were measured on the Saturday 24th April 2021, as well as the calculated single event maximum noise level have been provided in **Table 5**.

Table 5: Calculation of single event maximum noise level (SEM) 24-hour period (measured Saturday 24th April 2021)

Time	Train Type	Measurement Distance (m)	Measured Level L_{max} dB(A)
12:03:58	Passenger Train 1	24	85
18:35:13	Passenger Train 2		84.8
20:51:10	Passenger Train 3		83.9
11:51:43	Passenger Train 4		83.8
16:21:32	Passenger Train 5		83.2
21:04:10	Passenger Train 6		83.1
9:43:50	Passenger Train 7		82
9:44:45	Freight Train 1		81.9
14:21:03	Passenger Train 8		81.9
18:45:36	Passenger Train 9		81.8
16:35:05	Passenger Train 10		81.7
15:41:40	Passenger Train 11		81.3
14:21:04	Passenger Train 8		81.1
18:39:23	Freight Train 2		80.2
21:09:02	Freight Train 3		80
Single event maximum noise level (SEM)			**82.4**
$L_{eq,24hour}$ dB(A)			**59.8**

6. Acoustic Criteria

6.1 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.

6.2 Environmental Noise Emissions

6.2.1 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 9.3.3 Centre or mixed-use code have been provided in **Table 6**.

Table 6: Performance outcomes and acceptable outcomes (BCC City Plan, Table 9.3.3.3.A)

Performance outcomes	Acceptable outcomes
PO1 Development: a. has hours of operation which are controlled so that the use does not detrimentally impact on the amenity of adjoining residents; b. does not result in noise emissions that exceed the noise (planning) criteria in Table 9.3.3.3.F, low frequency noise criteria in Table 9.3.3.3.G and night-time noise criteria in Table 9.3.3.3.H in a sensitive zone or a nearby sensitive use, except music noise where located in a Special entertainment precinct identified in a neighbourhood plan. 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.	**AO1.1** Development: a. for accommodation activities, dwelling unit or emergency services has unlimited hours of operation; b. for a club, if licensed, bar, function facility, hotel or nightclub entertainment facility does not generate noise which is clearly audible and detectable, or impacts on the amenity of a resident, in a dwelling or other sensitive use; Note—Development for a club, if licensed, bar, function facility, hotel or nightclub entertainment facility is not expected to achieve this outcome. c. for any other use: i. where in the Principal centre zone or Major centre zone has unlimited hours of operation;

Performance outcomes	Acceptable outcomes
	ii. where in the District centre zone, Neighbourhood centre zone or Mixed use zone: A. has hours of operation, including for deliveries, which are limited to 6am to 10pm; or B. does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use; iii. where in any other zone: A. has hours of operation, including for deliveries, which are limited to 6am to 8pm; or B. does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use.
	AO1.2 Development ensures mechanical plant or equipment is acoustically screened from an adjoining sensitive use. Note—Mechanical plant includes generators, motors, compressors and pumps e.g. air-conditioning, refrigeration or cold room motors

Noise (planning) criteria

The applicable noise planning criteria from the *centre or mixed-use zone code* (Table 9.3.3.3.F) has been reproduced in **Table 7**.

Table 7: Noise (planning) criteria (Table 9.3.3.3.F, 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 $L_{Aeq,adj,T}$ 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–medium density residential zone boundary	3 dB(A)	55 dB(A)	45 dB(A)	40 dB(A)
Character residential zone boundary	3 dB(A)	55 dB(A)	45 dB(A)	40 dB(A)
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

Low frequency noise criteria

Low frequency noise emissions from the proposed development shall comply with the acoustic performance criteria outlined in **Table 8**.

Table 8: Low frequency noise criteria (Table 9.3.3.3.G, City Plan 2014)

Criteria location	Day (7am-6pm) $L_{Ceq,adj,11hr}$ is not greater than the following values at the relevant criteria location	Evening (6pm-10pm) $L_{Ceq,adj,4hr}$ is not greater than the following values at the relevant criteria location	Night (10pm-7am) $L_{Ceq,adj,9hr}$ is not greater than the following values at the relevant criteria location
Low-medium density residential zone boundary Character residential zone boundary	65 dB(C)	65 dB(C)	60 dB(C)
At a sensitive use in the mixed-use zone	75 dB(C)	75 dB(C)	70 dB(C)

Notes:

- $L_{Ceq,adj,T}$: The adjusted C-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.
- dB(C): C-weighted decibels

Night-time noise criteria

The relevant night-time noise criteria outlined by *Table 9.3.3.3.H* of the City Plan 2014 has been reproduced in **Table 9**.

Table 9: 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 Character residential zone boundary	< 45 dB(A)	50 dB(A)	55 dB(A)
	45 to 60 dB(A)	$L_{Aeq,9hr\ night}$ + 5 dB(A)	$L_{Aeq,9hr\ night}$ + 10 dB(A)
	> 60 dB(A)	65 dB(A)	70 dB(A)
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

6.2.2 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 [1]; 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.

6.2.3 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 10**). 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 10: Acoustic quality objectives as defined in Schedule 1 of the EPP 2019

Sensitive Receiver	Time of Day	Acoustic Quality Objectives [1)] (measured at the receiver) 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

[1] *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 Receiver	Time of Day	Acoustic Quality Objectives [1] (measured at the receiver) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
library and educational institution (including a school, college and university) (for indoors)	when open for business or when classes are being offered	35	—	—	health and wellbeing
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).

6.3 External Noise Intrusion

6.3.1 Queensland Development Code Mandatory Part 4.4

The Queensland Development Code Part MP 4.4 - *'Buildings in a Transport Noise Corridor'* (QDC MP4.4, August 2015) specifies noise categories to ensure that habitable rooms of residential buildings are adequately protected from transport noise with an allowance for 10 year growth.

The purpose of the QDC MP4.4 is to ensure any habitable rooms of Class 1, 2, 3 and 4 buildings located in a transport noise corridor are designed and constructed to reduce transport noise and protect the occupants inside dwellings. QDC MP4.4 requires that each external facade of a habitable room be assigned a noise category, which is dependent upon the future noise exposure at the façade.

QDC MP4.4 applies at the time of Building Approval for buildings on the subject site. It is responsibility of the building certifier to assess the building design against the provisions of the QDC MP4.4 or an assessment undertake by a noise assessment which is specific to the building and its noise with surrounding buildings and screening. It must be prepared by a suitably qualified person.

The objective of the noise assessment is to clearly demonstrate that the noise category that is applicable to a particular part of or entire building, or site. The applicable criteria for determining the relevant noise category are reproduced in **Table 11** below.

Table 11: QDC MP 4.4 noise category levels

Noise Category	Single event maximum noise (L_{Amax}) for railway land [1]
Category 4	≥ 85 dB(A)
Category 3	80 – 84 dB(A)
Category 2	75 – 79 dB(A)
Category 1	70 - 74 dB(A)
Category 0	≤ 69 dB(A)

Notes:

1) measured at 1 m from the façade of the proposed building.

Acceptable solutions for the external envelope of each habitable room in a relevant residential building must comply with the nominated minimum acoustic rating for each building component specified in Schedule 1 of the QDC MP4.4 to achieve a minimum transport noise reduction level for the relevant noise category by either using:

a) using materials specified in Schedule 2 of the QDC MP4.4; or
b) using materials with manufacturer's specifications that, in combination, achieve the minimum R_w value for the relevant building component and applicable noise category.

7. Noise Impact Assessments

7.1 Rail Noise Impacts

7.1.1 Assessment Overview

This section presents details of calculations conducted to determine the potential rail transportation noise impacts onto the project.

To predict noise impacts, calculations were made using the recognised Nordic Rail Prediction Method (Kilde Rep.130) for passenger and freight rail noise, which is also recommended by TMR document *Attachment A - Railway Noise Assessment Report Structure and Specific Issues*. Calculations were assisted by a three-dimensional computer model (acoustic simulation model) of the site and proposed developments created within SoundPLAN 8.2 acoustic software.

The acoustic simulation model was created as a representation of the existing and future site, which incorporated the following inputs:

Calculation algorithms – SoundPLAN implementation of accepted noise prediction standards;

Terrain elevation – A 3D representation of the existing terrain and at completion of construction;

Ground surface corrections – Areas of soft (absorptive) and hard (reflective) ground;

Roads sources – The placement of each road source as a source line and the input of traffic flow parameter;

Buildings – Detailed implementation of the proposed building from drawings (i.e., layout, height, floors),

Surrounding buildings – relevant building footprints and heights of the adjacent buildings to the proposed site that may provide shielding; and

Sensitive receivers – Locations where the noise limits are to be assessed.

Refer to **Appendix C** for further details regarding the acoustic simulation model.

NOTE: Only the existing and approved surrounding buildings outside of the project site have been considered for the noise model. As a conservative approach, future buildings proposed as part of the Masterplan which have yet to be approved (e.g. Retire Australia and Brisbane Housing Company), have not been included in the assessment. Based on the location of the other proposed buildings within the masterplan, once completed, may provide additional shielding benefit to the project site.

Once the remaining buildings within the Masterplan have been approved and design confirmed, a reassessment of the rail noise impact to the proposed dwellings may be conducted to further streamline the acoustic requirements of the dwellings.

7.1.2 Model Verification of Accuracy

The acoustic simulation model is to be considered verified when the difference between the measured and predicted noise levels at the monitoring location is less than ± 2 dB. The SEM is calculated using the TMR guideline, the values in **Table 12** result.

Table 12: Rail traffic noise model verification

Location	Noise descriptor	Monitor location predicted noise level	Measured noise level	Difference
Monitoring Location	SEM	**82.5**	**82.4**	-0.1
	$L_{Aeq,24hr}$	**59.6**	**59.8**	+0.2

The acoustic simulation model has therefore been validated and any noise predictions have been made without corrections, other than those stated in this report, applied to the results.

7.1.3 Predicted Noise Levels – Maximum Noise Level Event (L_{Max})

The acoustic simulation model was used to predict the L_{Amax} noise levels from rail sources at 1 m from the façade of each sensitive use associated with a sole-occupancy dwelling. Based on the predicted levels, façade noise categories have been determined in accordance with QDC MP4.4 and provided as markups in **Appendix E** and noise contour maps presented in **Appendix F**.

7.1.4 MP4.4 Construction Requirements – Building Envelope

Noise modelling predictions showed that railway transportations noise levels will be between Category 0 and Category 3 of QDC MP4.4. We refer to the noise predictions and applicable categories in **Appendix E** and Schedule 1 of QDC MP4.4 for the minimum required R_w of building components (reproduced in **Table 13**).

Where a R_w rating applies to a window, this applies to the glass, frame and window seal system. An acoustic test certificate will be required from the window supplier for Category 2 glazing and higher. It is noted that in order to achieve the internal design sound levels, windows must remain closed.

Table 13: Minimum R_w required for the building component (reproduced from QDC MP4.4)

Noise Category	Minimum transport noise reduction required for habitable rooms, dB(A)	Component of building's external envelope	Minimum R_w required for each component
3	35	Glazing	38 (total area of glazing for a *habitable* room is greater than 1.8m^2)
			35 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33
2	30	Glazing	35 (total area of glazing for a *habitable* room is greater than 1.8m2)
			32 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
1	25	Glazing	27 (total area of glazing for a *habitable* room is greater than 1.8 m^2)
			24 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	35
		Roof	35
		Entry doors	28
0	No additional acoustic treatment required – standard building assessment provisions apply.		

7.1.5 Site-specific construction recommendation

Recommended construction of façade elements as specified in Schedule 2 of QDC MP4.4 are provided in **Appendix D.**

Based on the proposed construction of external building material, the following site-specific building envelope construction recommendations are provided in **Table 14**.

Other forms of construction may be applied, provided these meet the minimum R_w values required.

Table 14: Site specific construction recommendation

Building element	Noise Category	Minimum R_w per component	Example Construction Description	Source
Weatherboard	1	35	• Weatherboards or plank cladding externally, • minimum 90mm deep timber stud or 92mm metal stud, • standard plasterboard at least 13mm thick internally.	QDC [1)]
	2	41	• Cemintel sheet or weatherboard cladding • 19 to 35mm depth battens • 1 x 13mm Gyprock Fyrchek MR Plasterboard • 90 mm steel studs at 600mm maximum centres + 75 Gold Batts R1.5 • 1 x 10mm Gyprock Plus Plasterboard OR • Cemintel sheet or weatherboard cladding • 1 x 16mm Gyprock Fyrchek MR Plasterboard • 90 mm timber studs at 600mm maximum centres + 75 Gold Batts R1.5 • 1 x 10mm Gyprock Plus Plasterboard	CSR 5152 System OR CSR 5510 System [2)]
	3	47	• Cemintel sheet or weatherboard cladding • 19 to 35mm depth battens • 1 x 16mm Gyprock Fyrchek MR Plasterboard • 90 mm steel studs at 600mm maximum centres + 75 Gold Batts R1.5 • 1 x 16mm Gyprock Fyrchek MR Plasterboard OR • Cemintel sheet or weatherboard cladding • 1 x 16mm Gyprock Fyrchek MR Plasterboard • 90 mm timber studs at 600mm maximum centres + 75 Gold Batts R1.5 • 2 x 16mm Gyprock Fyrchek MR Plasterboard	CSR 5168 System OR CSR 5623 System [2)]
Blockwork	1	35	Concrete brickwork at least 110mm thick	QDC [1)]
	2	41	Concrete brickwork at least 110mm thick	QDC [1)]
	3	47	Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.	QDC [1)]
Fiber Cement	1	35	• Minimum 6mm thick fibre cement sheeting, • Minimum 90mm deep timber stud or 92mm metal stud, • standard plasterboard at least 13mm thick internally.	QDC [1)]

Building element	Noise Category	Minimum R_w per component	Example Construction Description	Source
	2	41	• Minimum 6mm thick fibre cement sheeting, • Minimum 90mm deep timber stud or 92mm metal stud with Fibreglass insulation (minimum density 11 kg/m^3), • standard plasterboard at least 13mm thick internally.	Insul [3]
	3	47	• Minimum 6mm thick fibre cement sheeting, • Minimum 90mm deep timber stud or 92mm metal stud with 50 mm thick acoustic insulation (minimum density 11 kg/m^3), • 2 x standard plasterboard at least 13mm thick internally.	Insul [3]
Roof	1	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity.	QDC [1]
	2	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3.	QDC [1]
	3	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3 or polyester insulation at least 50 mm thick with a density of at least 20 kg/m^3 in the cavity. OR Concrete suspended slab at least 100mm thick.	QDC [1]
Glass	1	24 / 27	Procured to a performance requirement with supporting laboratory test certificate.	-
	2	32 / 35		
	3	35 / 38		

Notes:

1) Construction description obtained from QDC MP4.4
2) Performance data obtained from CSR Gyprock The Red Book, Fire, Acoustic & Thermal Design Guide, May 2020
3) Calculated construction element based on predicted sound insulation performance using INSUL v9.0.8

7.2 Carpark Noise Impacts – Yeronga SHS

7.2.1 Assessment Overview

The project site is in relatively short proximity to three (3) areas of carpark associated with Yeronga State High School (YSHS). Noise emissions from the carparks have the potential to influence the general acoustic amenity of prospective occupants at the project site. The carpark is used only during school hours 7:00 am to 5:00 pm with occasional use until 10:00 pm. However, it is generally expected that the car park operating hours would be from 6:00 am to 10:00 pm, and not accessible outside these hours.

Noise emissions from vehicle movements associated with carparks are formed by a combination of successive noise events. The complexity of these noise events can be difficult to accurately simulate as individual noise sources (i.e., vehicle parking bay turnover rates, location of noise event due such as motion (acceleration, deceleration), idling points, ignition, door slams etc.).

For thorough assessment of carpark noise emissions, reference has been made to the technical research paper *"Prediction of parking area noise in Australian conditions"* from the Australian Acoustical Society Conference (Nicol and Johnson, 2011) and parking lot study *"Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and*

Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks" (Bavarian Landesamt für Umwelt, 2007, 6th edn, BAYLFU).

Correction factors described by Nicol and Johnson (in section *"Application of BAYLFU to Australian Conditions"*) were applied carpark noise emissions in the acoustic simulation model. A standard façade correction of + 2.5 dB was also applied to the results.

Refer to **Appendix C** for further details regarding the acoustic simulation model.

7.2.2 Predicted Noise Levels

The predicted noise level of a worst-case scenario of the carpark operation ($L_{Aeq(1hr)}$ and L_{Amax}) involving all 3 car parking areas in use simultaneously at the nominated turn-over rate (**Appendix C**) are presented in **Table 15**.

Table 15: Highest predicted noise levels resulting from Yeronga SHS carpark

Receiver [1)]	Highest Predicted Noise Levels, dB(A)	
	$L_{eq(1hr)}$	L_{max}
Precinct 3 Lot 10	50	76

NOTES:
1) Receiver as described in drawing set *220623 DA Issue*

The predicted noise levels are not considered overly significant and will be generally controlled by façade construction required by MP4.4.

7.3 Mechanical Plant Noise Emissions

7.3.1 Noise Source Locations

It is anticipated that mechanical services plant may be required for the individual dwelling. The outdoor units are assumed to be located at the building the units are servicing.

7.3.2 Assessment Inputs and Assumptions

Noise emissions from proposed or repurposed / relocated equipment selections are required to comply with the environmental noise limits outlined in **Section 6.2**, the most stringent of which is set by the EPP 2019 (i.e., $L_{eq,adj,1hr}$ 30 dB(A) indoors at a residential premises during the night-time).

Given the current stage of the project, location and type of mechanical services plant have not been proposed and, therefore, detailed calculations are to be conducted in a later stage of the project. In general, the noise emission of mechanical plant associated with the development should be controlled so that the operation of such plant does not adversely impact nearby sensitive receivers.

It is envisaged that the mechanical plant noise sources will be controllable by common engineering methods that may consist of:

Quiet equipment selections of selections

Judicious location of plant

Barriers

Silencers

The selected mechanical equipment should be reviewed and assessed for conformance with the established criteria at the subsequent design stage of the project when specific plant selection is known and appropriate noise control measures can be determined, noting that the cumulative noise emissions from all site noise sources should be considered when determining appropriate mitigation options.

8. Conclusion

Stantec Australia Pty Ltd (Stantec) have been engaged by Tait Morton & Johnston Pty Ltd (TMJ) to undertake acoustic assessment of potential noise impacts in support of the development application submission for the Lakewood Estate Wedding and Function Center project.

This acoustic services report has:

Established relevant design criteria in accordance with current Australian Standards, Design Guidelines, Regulations and Policies;

Identified potential acoustic-related issues to be addressed during the design stages of the project; and

Provided detailed design recommendations and advice pertinent to the project.

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.

Yours sincerely

Stantec Australia Pty Ltd

Monica Saralertsophon (Author)
Senior Acoustic Consultant for **Stantec (Brisbane)**

Michael Lanchester (Reviewer)
Acoustics Section Manager (QLD) for **Stantec (Brisbane)**

Appendix A Glossary of Acoustic Terms

TERM	DEFINITION
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).
Assessment Location	The position at which noise measurements are undertaken or estimated.
Assessment Period	The period in a day over which assessments are made.
Attenuation	A reduction in the magnitude of sound.
A-weighting	A frequency dependent filter applied to an instrument-measured noise. In its simplest form, the filter is designed to replicate the relative sensitivity to loudness perceived by the human ear.
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. 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 L_{A90} noise level.
Barrier	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
C_{tr}	A standard weighting curve which replicates low frequency noise, such as that from traffic. Often added to $D_{nT,w}$ or R_w to characterise airborne sound insulation performance.
dB	The abbreviation for decibel.
dB(A)	A-weighted sound level in decibels.
Decibels	The relative unit of measure for noise, which is a logarithmic ratio between the measured level and reference (threshold) level of 0 dB.
Dw	A single number value that represents a field measurement of the weighted level difference between two adjacent spaces separated by a partition. $D_w = L1 – L2$ where, L1 is the average sound pressure level in the source room; and L2 is the average sound pressure level in the receiver room.
Frequency	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz). Most noise sources typically comprise of a vast, and often complex, range of frequencies.
Frequency Response	This is a characteristic of a system which has a measured response resulting from a known applied input. In a mechanical structure, the frequency response function (FRF) is the spectrum of the vibration of a structure divided by the spectrum of the input force to the system. To measure the frequency response of a mechanical system, one must measure the spectra of both the input force to the system and the vibration response.
Intermittent Noise	Level that drops to the background noise level several times during the period of observation.
L_{A1}	The A-weighted sound pressure level exceeded for 1 % of the measurement time period.
L_{A10}	The A-weighted sound pressure level exceeded for 10 % of the measurement time period.
L_{A90}	The A-weighted sound pressure level exceeded for 90 % of the measurement time period. Typically represents the background noise level of an environment.
L_{Aeq}	The equivalent continuous sound pressure level in dB(A). It is often accompanied by an additional suffix “T”, which is indicative of the measurement time period. (e.g. $L_{Aeq,15min}$, symbolising the measurement is evaluated over 15-minutes).
L_{Amax}	The maximum A-weighted sound pressure level recorded over the measurement period.
Reflection	Sound wave changed in direction of propagation due to a solid object met on its path.
Reverberation	The persistence of a sound within a space, which will naturally decay over time. Most apparent once the source signal has ceased emitting. Reverberation may have effects on speech intelligibility if not adequately controlled. Reverberation time, represented in seconds, can vary depending on the volume and surface finishes of the space.
R_w	Weighted sound reduction index. A single number value which represents the airborne sound insulation performance of a partition or building element that has been determined under laboratory testing conditions.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.

TERM	DEFINITION
Sound Power Level	The total sound energy radiated by a source, expressed in Watts. The sound power level is ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Sound Pressure Level	The measured acoustic wave strength in a given environment and at a particular point of interest where the total sound level expressed is relative to a reference pressure, i.e. the threshold of human hearing. Sound pressure level is typically measured using a standard sound level meter with a microphone, expressed in decibels (dB).
Spectrum	The spectrum is the result of transforming a time domain signal to the frequency domain. Spectrum analysis is the procedure of doing the transformation, and it is most commonly done with an FFT analyser.

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 16**). This location was selected due to a high degree of exposure to the railway line.

Table 16: 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 17** and **Figure 6**). 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 18**. Where adverse weather (e.g. rain, excessive wind) occurred within the monitoring period, the measured data has been excluded.

Table 17: 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 6: Time trace of relevant noise descriptors

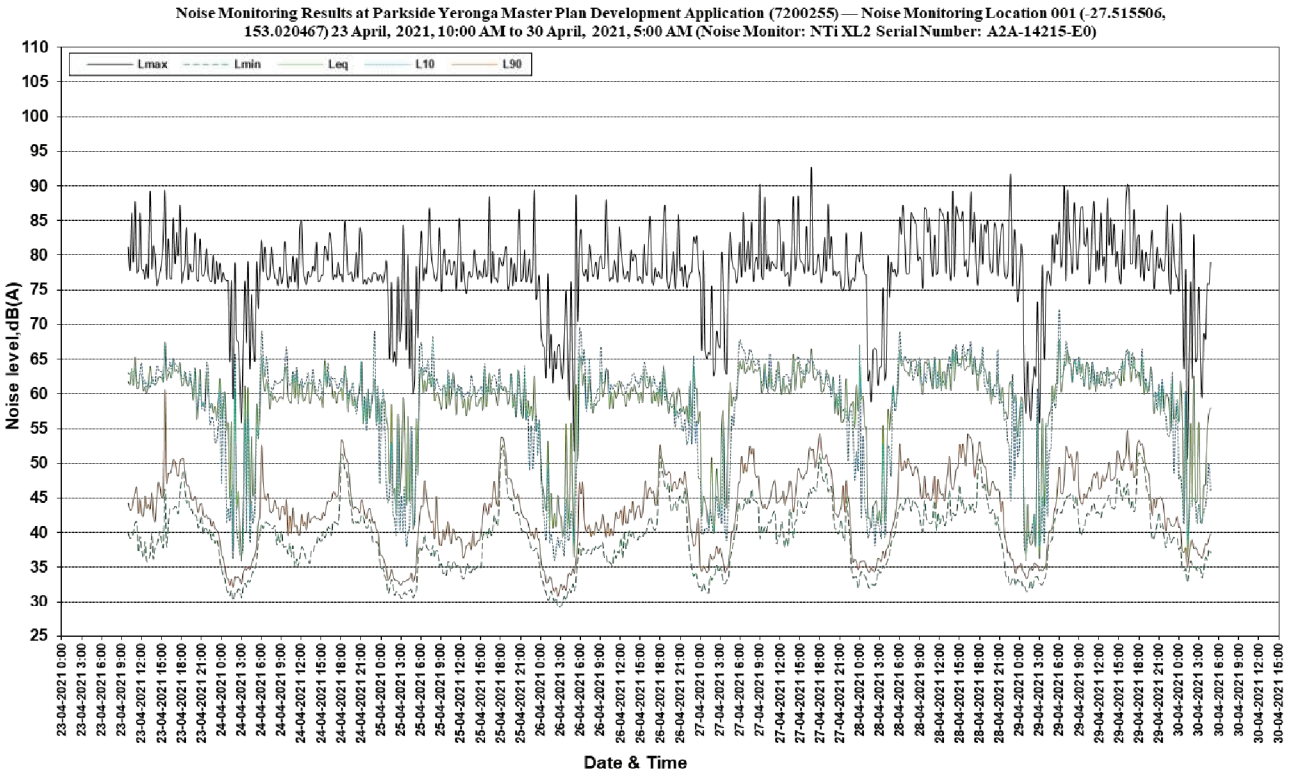


Table 18: Summary of BoM weather observations during unattended monitoring (monitored days highlighted)

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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Appendix C Noise Modelling Details

C.1 Rail Noise Model Inputs

A three-dimensional computer model of the study area was created within SoundPLAN 8.2 software. The following inputs were utilised in building the model:

- **Topography** – refer to **Table 19** below

Table 19: Topographical inputs for the development of the computer model

File	Description	Date received
210908 Existing Terrain.dxf	Existing terrain used by Civil designers	8th Sept 2021
210908 Proposed ROL Boundaries.dxf	Proposed Reconfiguration of Lot Boundaries	
210908 Proposed Terrain.dxf	Proposed finished terrain levels designed by Civil designers	
Nearmap Aerial Photography	Used to determine and location of existing buildings nearby to the site.	Photography date: 26th August 2021

- **Calculation algorithms** – Rail noise emissions were calculated using the SoundPLAN implementation of the Nordic Rail Prediction Method (Kilde Rep.130) used for both passenger and freight rail noise.
- **Ground surface corrections** – 20% ground absorption factor accounting for predominately compacted soil and concrete / asphalt surface types between source and receiver.
- **Rail traffic parameters** – Rail traffic parameters used are reproduced in **Table 20** and
- **Table** 21.

Table 20: Acoustic simulation model rail inputs and assumptions

Modelling element	Input / Assumption
Ground Elevation Geometry	Refer to
SoundPLAN Assessment Methodology	Rail Noise Impact: Kilde report 67/130
Rail Alignment	From aerial photography (aggregated to one line equidistant between all lines.)
Existing Rail Traffic Flow Data	Supplied by Queensland Rail for the lines Email from Tony.Bennett@qr.com.au Fri 2021/05/14 6:03 AM
Proposed (2026) Rail Traffic Flow Data	Sourced from: https://crossriverrail.qld.gov.au/resources/rfpc4/136_Technical-reports.pdf Table 9.2. Train volumes for the CRR Project Segment / Year 2026 / Year 2036 Freight Train Movements / Passenger Train Movements / Freight Train Movements / Passenger Train Movements Yeerongpilly - Park Road: 34, 488, 42, 577 *Up*: 244, 278 *Down*: 165, 195 *Dual Gauge*: 34, 79, 42, 104
Train Types and Parameters Used	See **Table 21**.

Table 21: Train types and parameters used in modelling

Train type	Number of trains (provided by QR)	Length per train, m	Speed (km/h)	Rail track height above the ground, m	ΔL_{eq}, dB	ΔL_{type} Engine, dB	ΔL_{type} Wagons, dB
Citytrain	255	150	60 est.	0.6	-9.2	-2.0	-2.0
Freight	16	540	30 est.	0.6	-8.0	-3.0	-3.0
Diesel Loco	16	37	30 est.	3.6	-8.0	1.0	1.0

ΔLeq: is the correction factor applied to the standard Kilde report $L_{Aeq,24hr}$ predicted noise level to correct for train length and expected noise levels adjusted / calibrated to unattended noise logging conducted by Stantec.

ΔLtype engine: is the correction factor applied to the standard Kilde report predicted L_{Amax} at 10 metres (engine = moving point source) adjusted / calibrated to unattended noise logging conducted by Stantec.

ΔLtype wagons: is the correction factor applied to the standard Kilde report predicted L_{Amax} at 10 metres (wagons = line source) adjusted / calibrated to unattended noise logging conducted by Stantec.

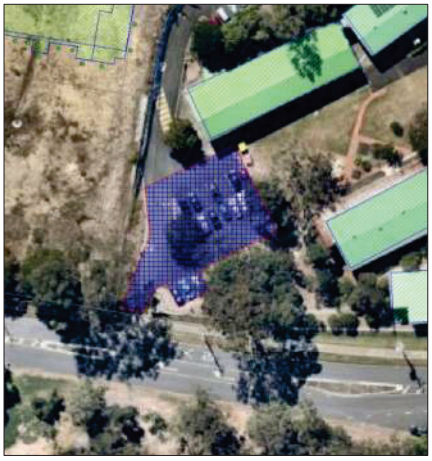
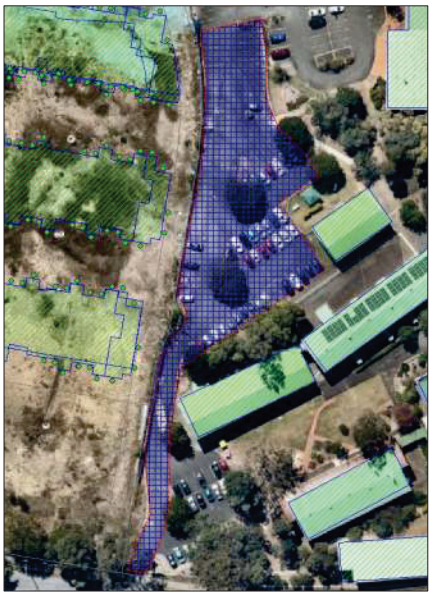
- **Sound reflections -** The number of reflections from barriers, buildings and the ground has been set to 3. Reflections from buildings to rail noise producing an increase in rail noise at the façade prediction point carry a +3 dB correction as required by Kilde Rep.130 for rail noise predictions.
- **Search radius** - The noise source search radius was setup at 5000m.

C.2 Carpark Noise Model Inputs

Where appropriate, inputs and modelling parameters outlined in above in Section C.1 have been implemented in addition to the following items described below:

- **Calculation algorithms** – Carpark noise emissions were calculated using the SoundPLAN implementation of the *"Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks"* (Bavarian Landesamt für Umwelt, 2007, 6th edn).
- **Road Surface** – Asphalt
- **Source Height** – Carpark simulation: Relative Level 0.8 m
- **Carpark Parameters** – carpark modelling parameters implemented are provided in **Table 22**.

Table 22: Acoustic simulation model carpark assumptions and inputs

Designation	Parameter	Model Input	Layout
Entrance	Est. number of spaces	18	
	Turnover rate	0.5 / hr	
	Parking lot type	Visitors and Staff	
	Vehicle noise level	Ref. L_w 67 dB(A)	
	Vehicle spectrum	Typical	
	L_{max} – Closing tail gate / boot lid	L_w 99.5 dB(A)	
	Passaging traffic	Integrated	
Main Parking Area	Est. number of spaces	75	
	Turnover rate	0.25 / hr	
	Parking lot type	Visitors and Staff	
	Vehicle noise level	Ref. L_w 67 dB(A)	
	Vehicle spectrum	Typical	
	L_{max} – Closing tail gate / boot lid	L_w 99.5 dB(A)	
	Passaging traffic	Integrated	

Designation	Parameter	Model Input	Layout
YSHS Sports Centre	Est. number of spaces	160	
	Turnover rate	0.1 / hr	
	Parking lot type	Visitors and Staff	
	Vehicle noise level	Ref. L_w 67 dB(A)	
	Vehicle spectrum	Typical	
	L_{max} – Closing tail gate / boot lid	L_w 99.5 dB(A)	
	Passaging traffic	Integrated	

Appendix D QDC MP4.4 Schedule 2 - Recommended Construction

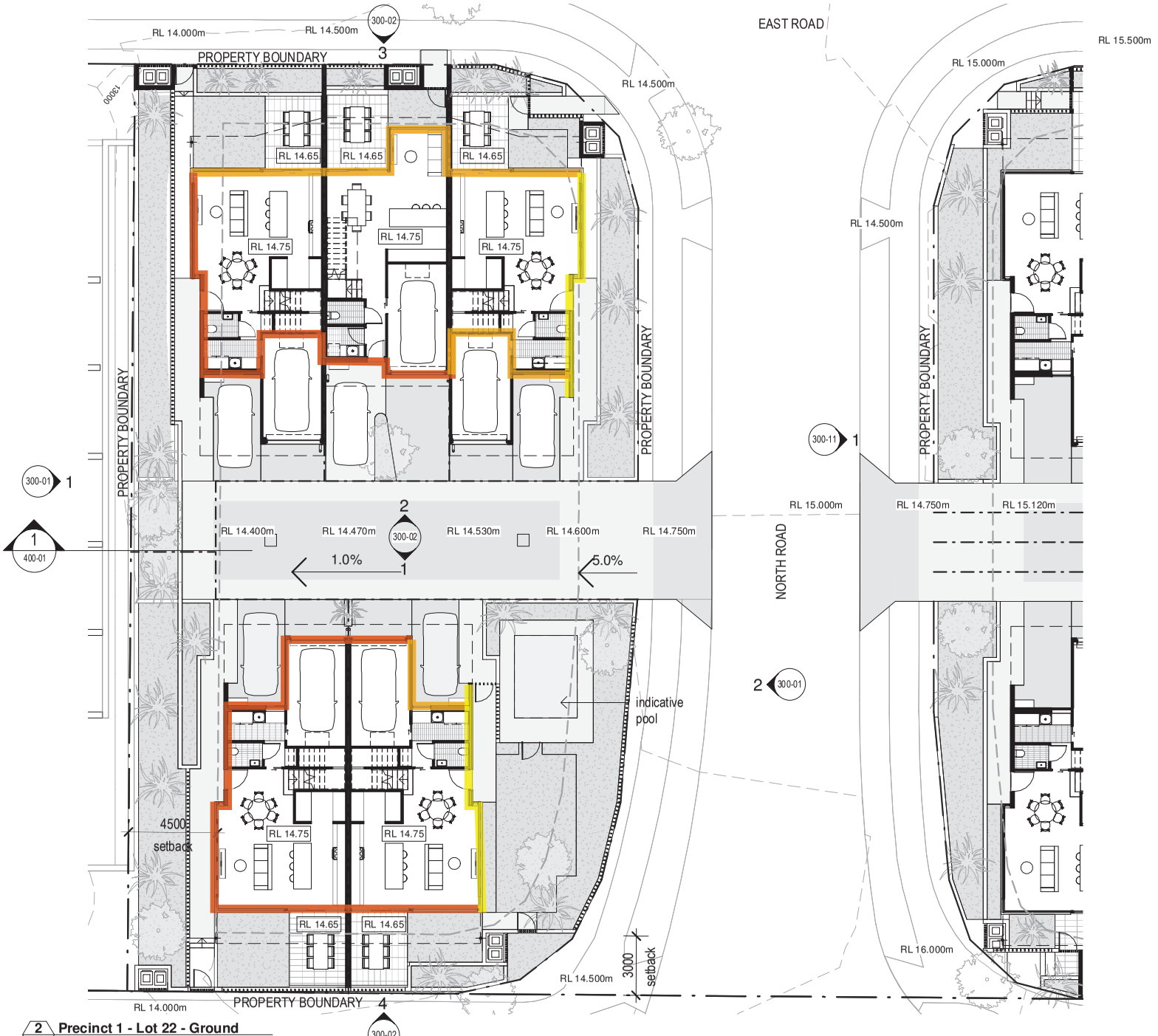
QDC MP4.4 Schedule 2 provides construction recommendations based on the required performance of façade elements. These are replicated in **Table 23** for reference.

Table 23: Construction recommendations (reproduced from QDC MP4.4)

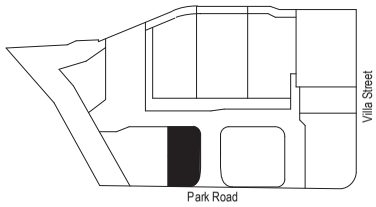
Component of building's external envelope	Minimum R_w	Component of building's external envelope
Glazing	38	Minimum 14.38 mm thick laminated glass, with full perimeter *acoustically rated seals*; OR Double glazing consisting of one pane of minimum 5 mm thick glass and one pane of minimum 6mm thick glass with at least 44 mm air gap, and full perimeter *acoustically rated seals*
	35	Minimum 10.38mm thick laminated glass, with full perimeter *acoustically rated seals*.
	32	Minimum 6.38mm thick laminated glass with full perimeter *acoustically rated seals*.
	27	Minimum 4mm thick glass with full perimeter *acoustically rated seals*
	24	Minimum 4mm thick glass with standard weather seals
External Walls	47	Two leaves of clay brick masonry at least 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) 50mm thick mineral insulation or 50mm thick glass wool insulation with a density of 11kg/m^3 or 50mm thick polyester insulation with a density of 20kg/m^3 in the cavity. OR Two leaves of clay brick masonry at last 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) at least 13mm thick cement render on each face OR Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) Mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m^3 positioned between studs; and (iii) One layer of plasterboard at least 13mm thick fixed to outside face of studs. OR Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.
External Walls (cont.)	41	Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves OR Single leaf of clay brick masonry at last 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m^3 positioned between studs; and (iii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Single leaf of brick masonry at least 110mm thick with at least 13mm thick render on each face OR Concrete brickwork at least 110mm thick OR In-situ concrete at least 100mm thick OR Precast concrete at least 100mm thick and without joints.

Component of building's external envelope	Minimum R_w	Component of building's external envelope
	35	Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.
Roof	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3 or polyester insulation at least 50 mm thick with a density of at least 20 kg/m^3 in the cavity. OR Concrete suspended slab at least 100mm thick.
	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3.
	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity.
Floors	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m^3 positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m^3 laid over entire floor, including tops of joists before flooring is laid; and (iv) secured to battens at least 75mm x 50mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.
Entry Doors	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45 mm thick; and/or (ii) acoustically laminated glass not less than 10.38 mm thick.
	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4kg/m^2; or (iv) Solid core timber door not less than 35mm thick fitted with full perimeter *acoustically rated seals*.

Appendix E Predicted Façade Noise Levels (L_{Amax}) and QDC MP4.4 Noise Categories



2 **Precinct 1 - Lot 22 - Ground**
1 : 200



EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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CLIENT: JGL Properties

PROJECT: Parkside Yeronga

DRAWING NAME: Precinct 1 - Lot 22 - Ground Level

DRAWING NO.: 200-01 F

SCALE As indicated
09.08.22
PROJECT NO. 3662

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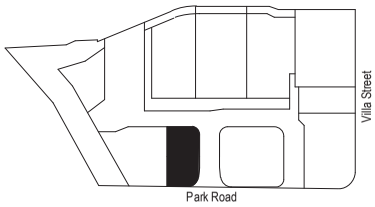

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

1 Precinct 1 - Lot 22 - L1
1 : 200

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

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JGL Properties	Parkside Yeronga	Precinct 1 - Lot 22 - Level 1	200-02 F	

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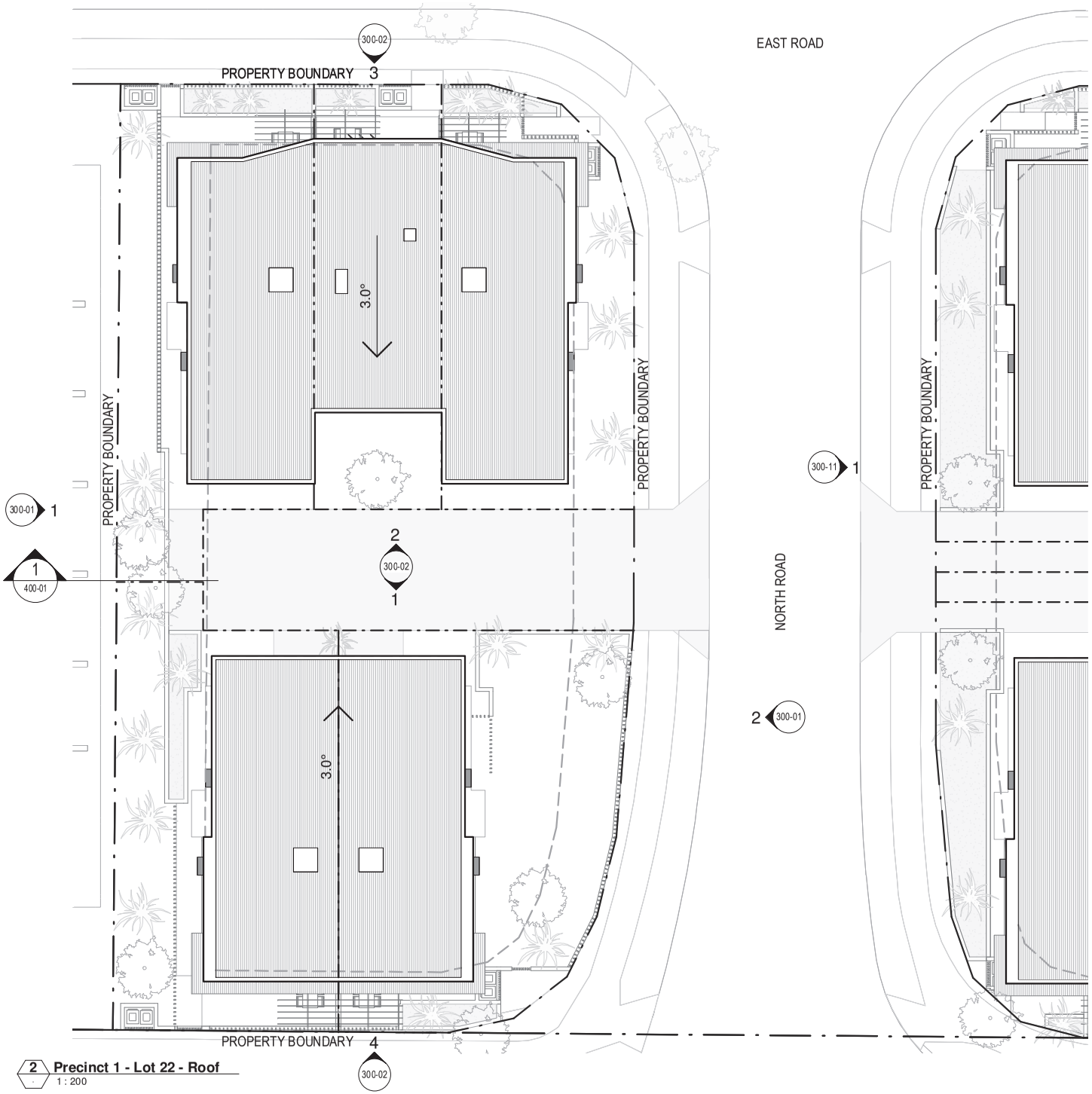

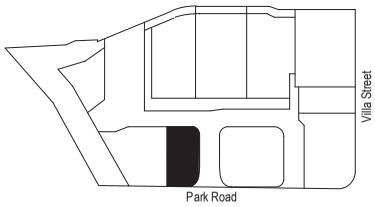

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

2 Precinct 1 - Lot 22 - Roof
1 : 200

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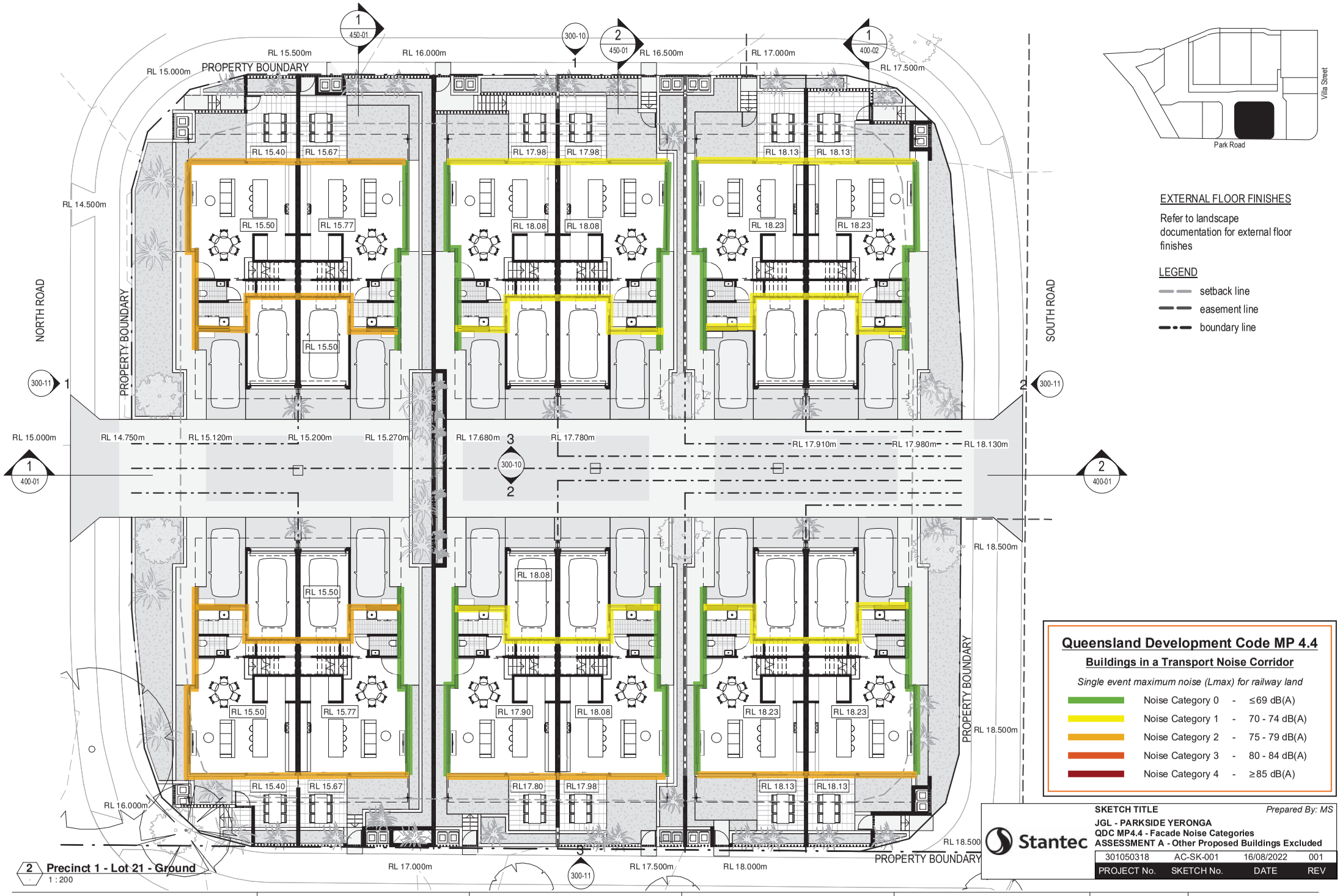
JGL Properties	Parkside Yeronga	Precinct 1 - Lot 22 - Roof	200-03 F	As indicated 09.08.22 PROJECT NO. 3662

9/08/2022 4:58:33 PM



EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 Precinct 1 - Lot 21 - Ground
1 : 200

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
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JGL Properties	Parkside Yeronga	Precinct 1 - Lot 21 - Ground Level	200-10 F	

9/08/2022 4:58:39 PM

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 Precinct 1 - Lot 21 - L1
1 : 200

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

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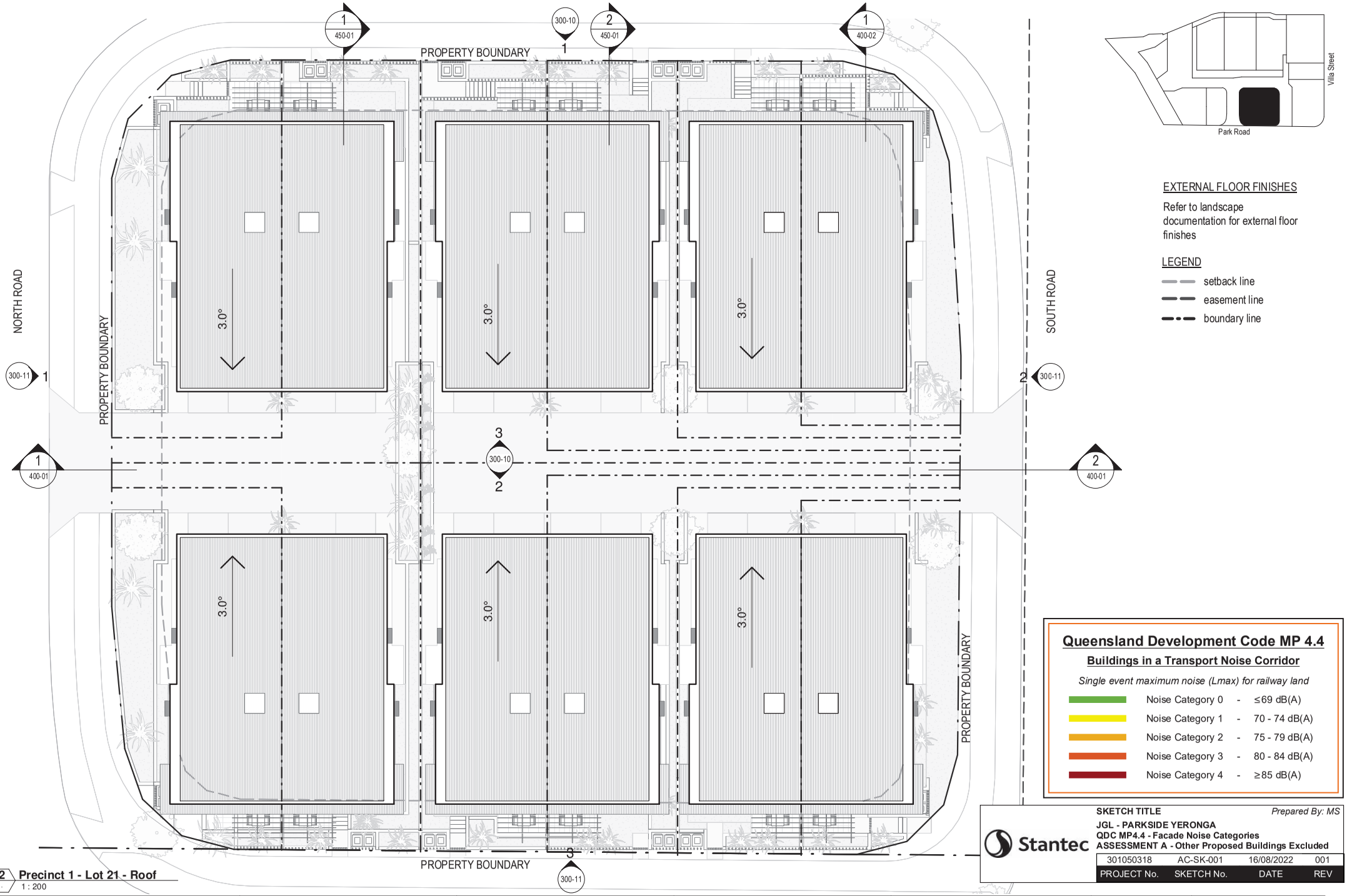
CLIENT	PROJECT	DRAWING NAME	DRAWING NO.	SCALE
JGL Properties	Parkside Yeronga	Precinct 1 - Lot 21 - Level 1	200-11 F	As indicated 09.08.22 PROJECT NO. 3662

9/08/2022 4:58:45 PM



EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
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2 Precinct 1 - Lot 21 - Roof
1 : 200

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CLIENT	PROJECT	DRAWING NAME	DRAWING NO.	SCALE As indicated 09.08.22 PROJECT NO. 3662
JGL Properties	Parkside Yeronga	Precinct 1 - Lot 21 - Roof	200-12 F	

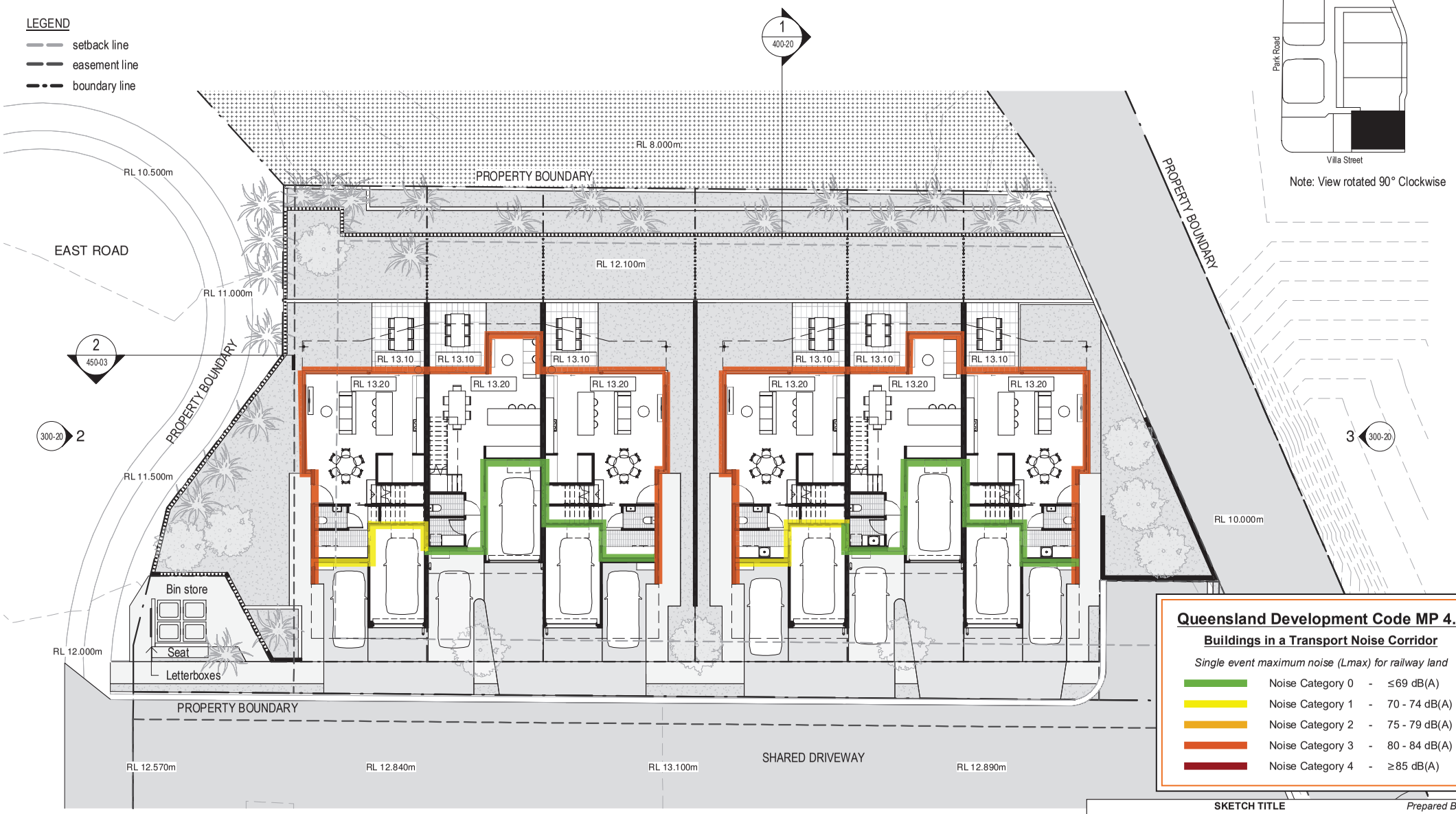
9/08/2022 4:58:49 PM

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line



Note: View rotated 90° Clockwise

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

1 **Precinct 2 - Ground**
1 : 200

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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CLIENT	PROJECT	DRAWING NAME	DRAWING NO.	SCALE As indicated 09.08.22 PROJECT NO. 3662
JGL Properties	Parkside Yeronga	Precinct 2 - Ground Level	200-20 G	

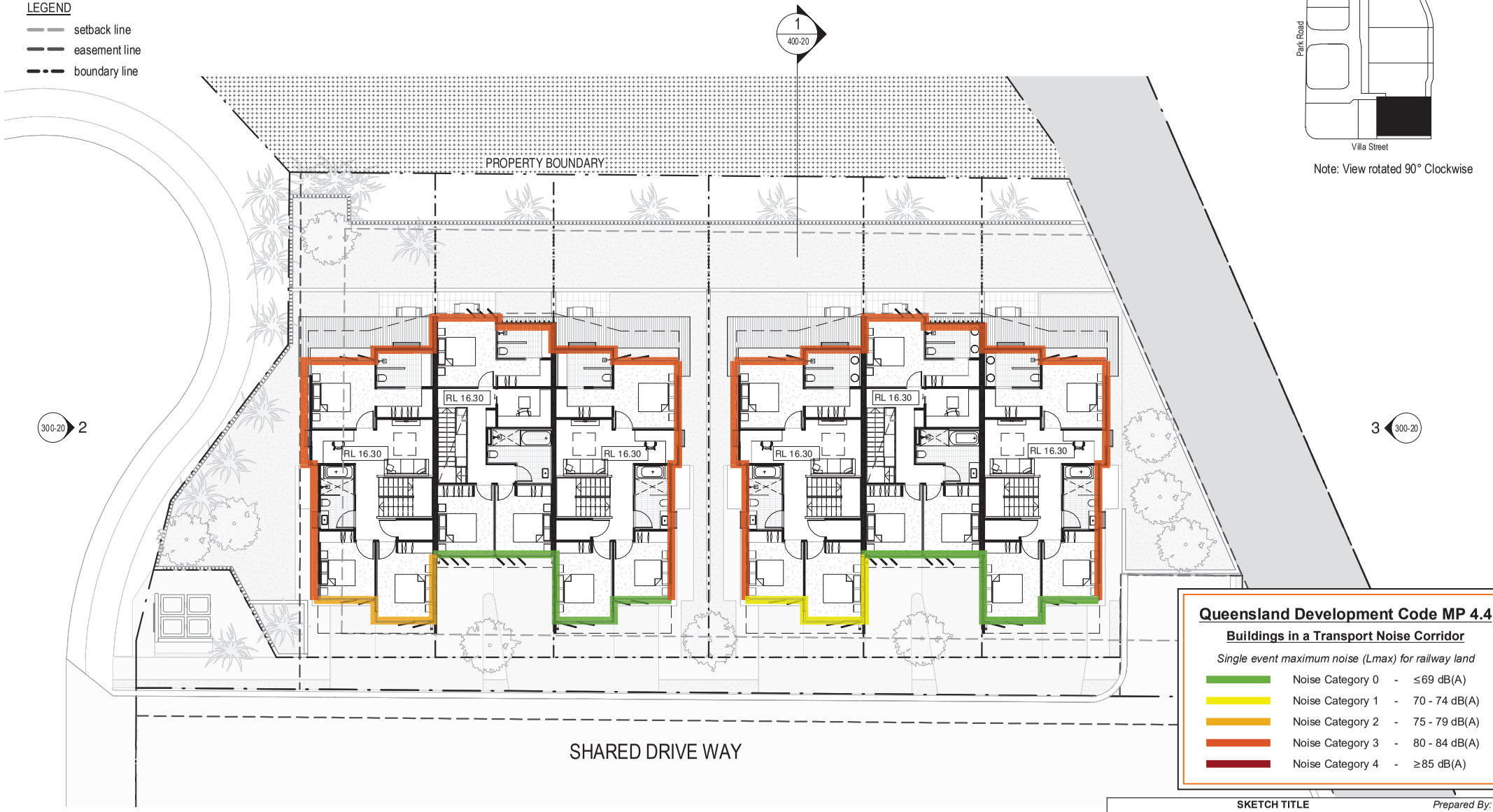
9/08/2022 4:58:53 PM

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line



Note: View rotated 90° Clockwise

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 **Precinct 2 - L1**
1 : 200

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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CLIENT	PROJECT	DRAWING NAME	DRAWING NO.	SCALE As indicated 09.08.22 PROJECT NO. 3662
JGL Properties	Parkside Yeronga	Precinct 2 - Level 1	200-21 F	

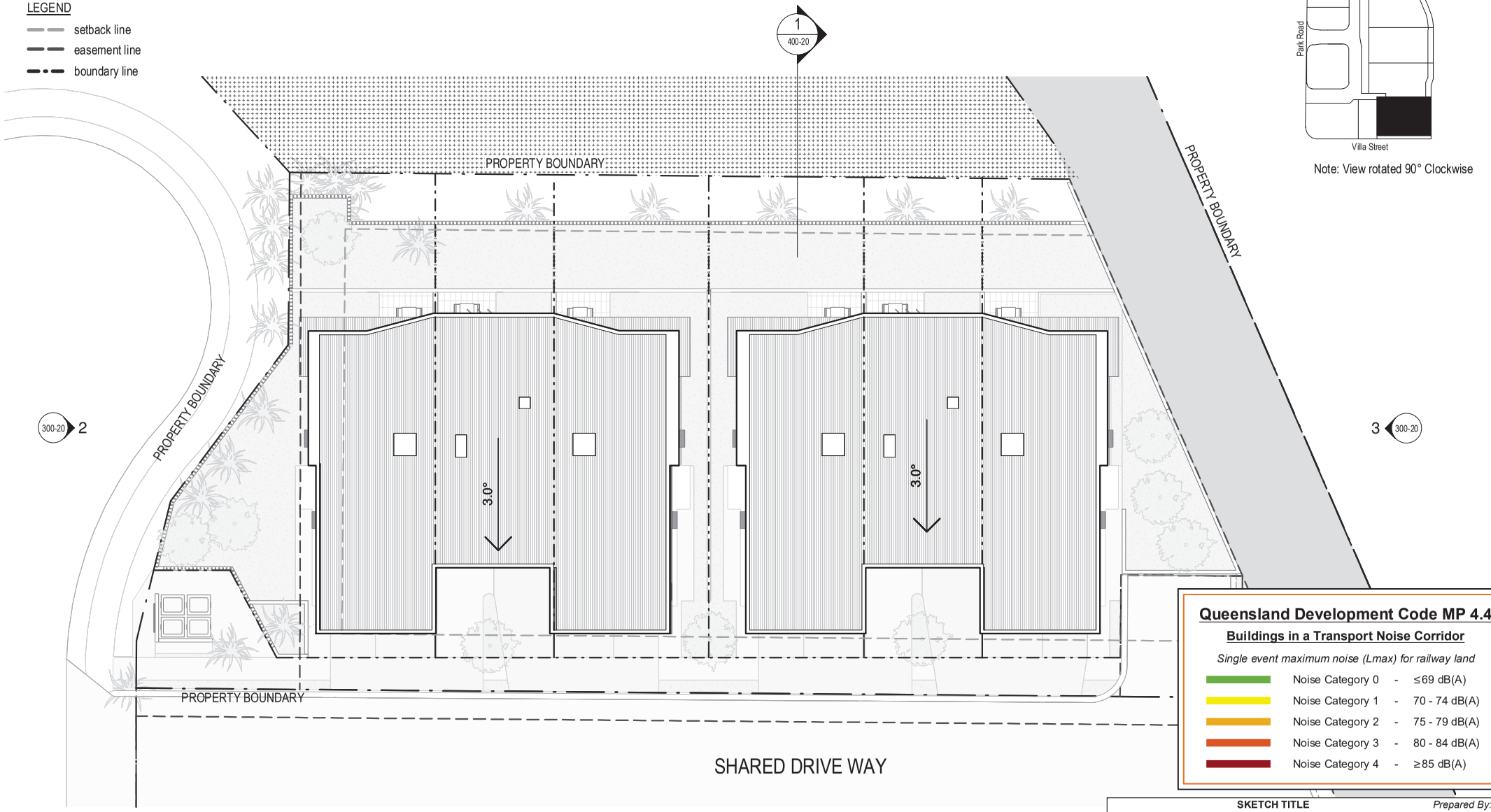
9/08/2022 4:58:56 PM

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line



Note: View rotated 90° Clockwise

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 **Precinct 2 - Roof**
1 : 200

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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CLIENT: JGL Properties

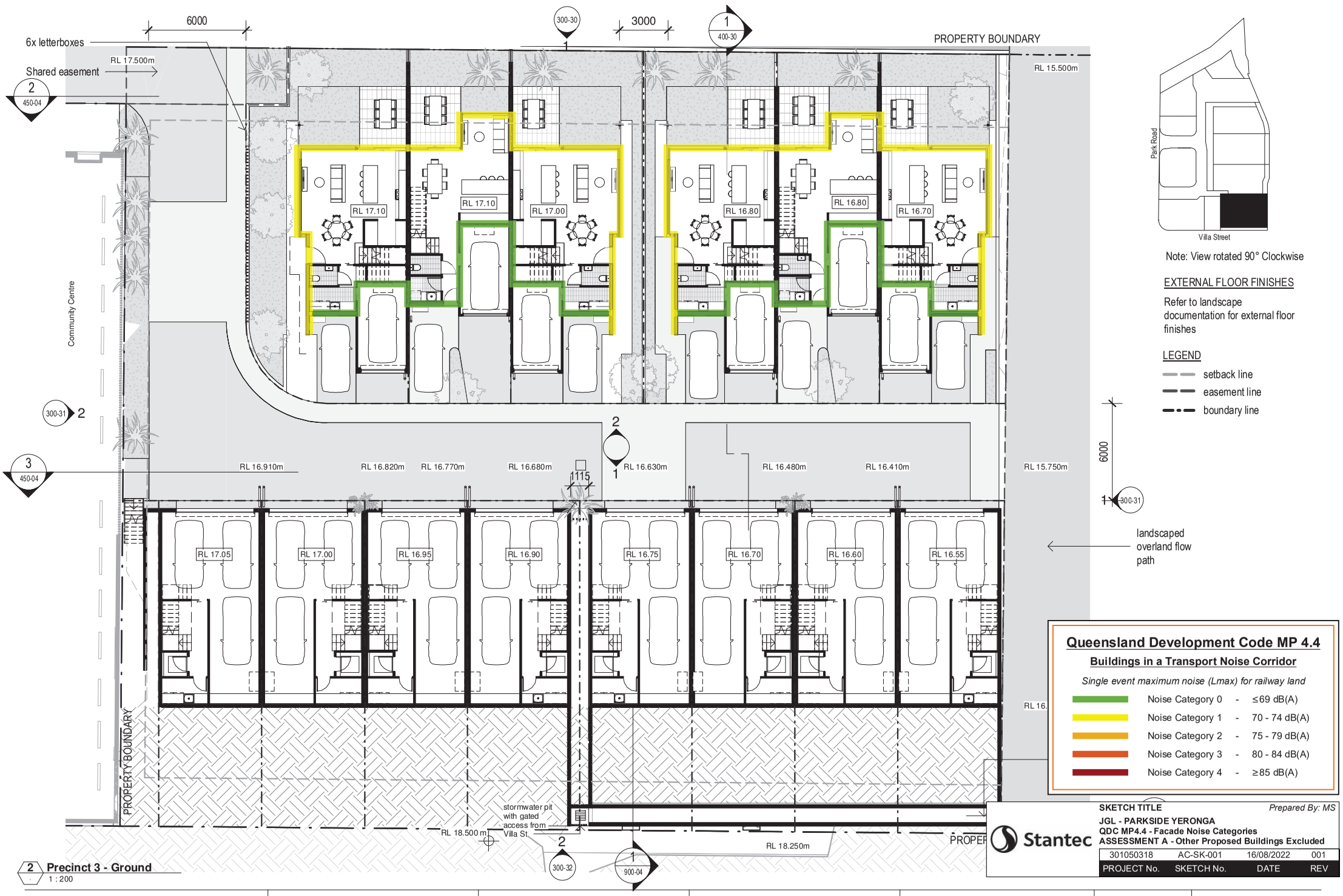
PROJECT: Parkside Yeronga

DRAWING NAME: Precinct 2 - Roof

DRAWING NO.: 200-22 F

SCALE As indicated
09.08.22
PROJECT NO. 3662

9/08/2022 4:58:58 PM



Note: View rotated 90° Clockwise

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 Precinct 3 - Ground
1 : 200

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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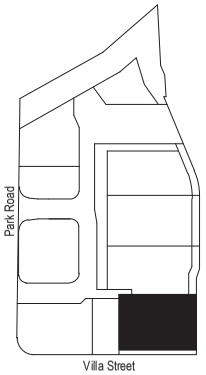
CLIENT: JGL Properties
PROJECT: Parkside Yeronga
DRAWING NAME: Precinct 3 - Ground Level
DRAWING NO.: 200-30 F
SCALE As indicated
09.08.22
PROJECT NO. 3662

9/08/2022 4:59:02 PM



Note: View rotated 90° Clockwise

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 Precinct 3 - L1
1 : 200

Stantec

SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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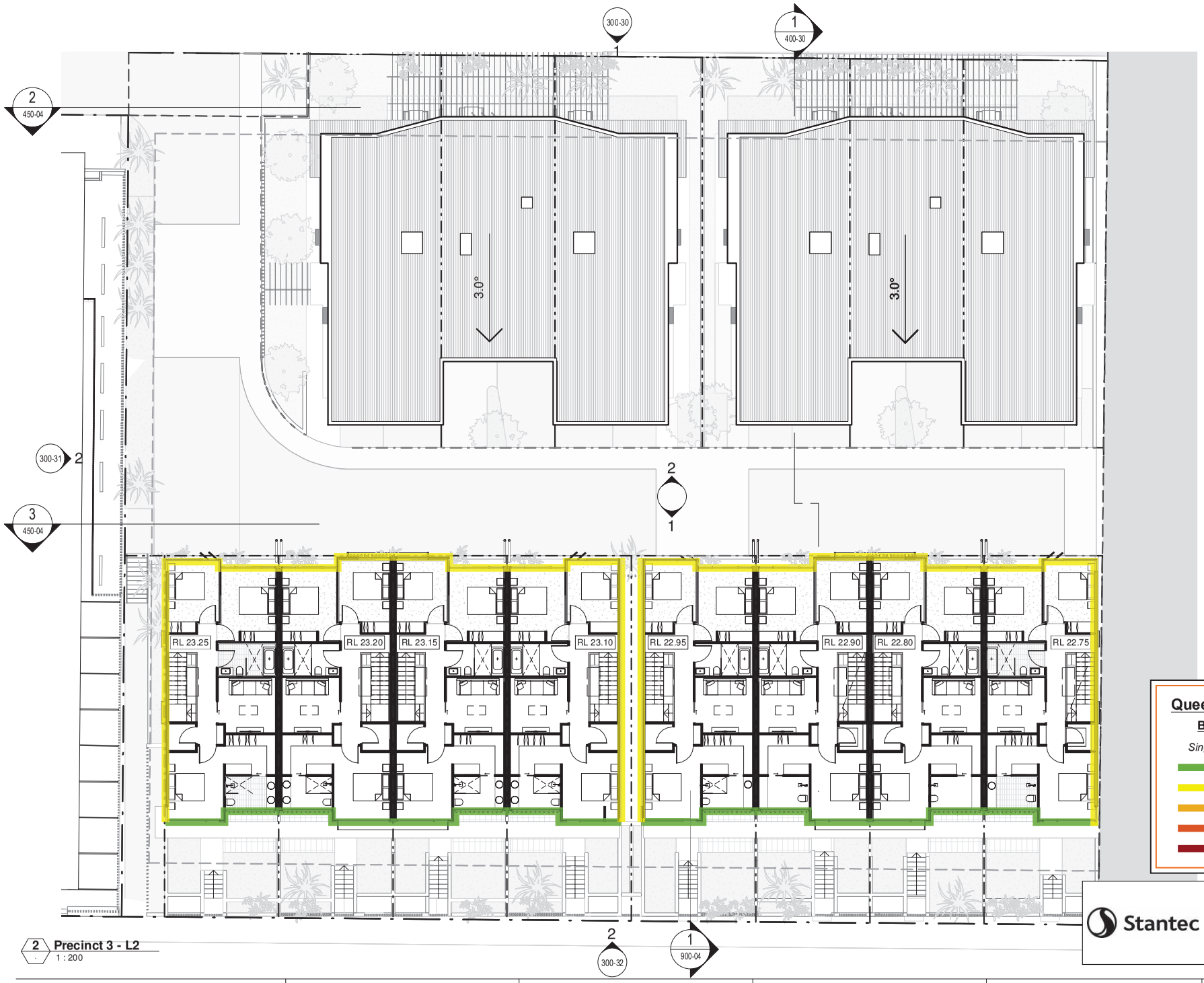
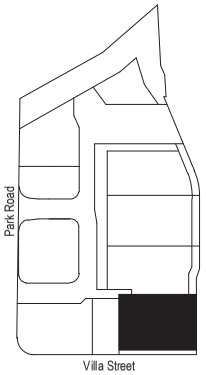
CLIENT: JGL Properties
PROJECT: Parkside Yeronga
DRAWING NAME: Precinct 3 - Level 1
DRAWING NO.: 200-31 G
SCALE As indicated
09.08.22
PROJECT NO. 3662

9/08/2022 4:59:17 PM





Note: View rotated 90° Clockwise

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

2 Precinct 3 - L2
1 : 200

Stantec

SKETCH TITLE — *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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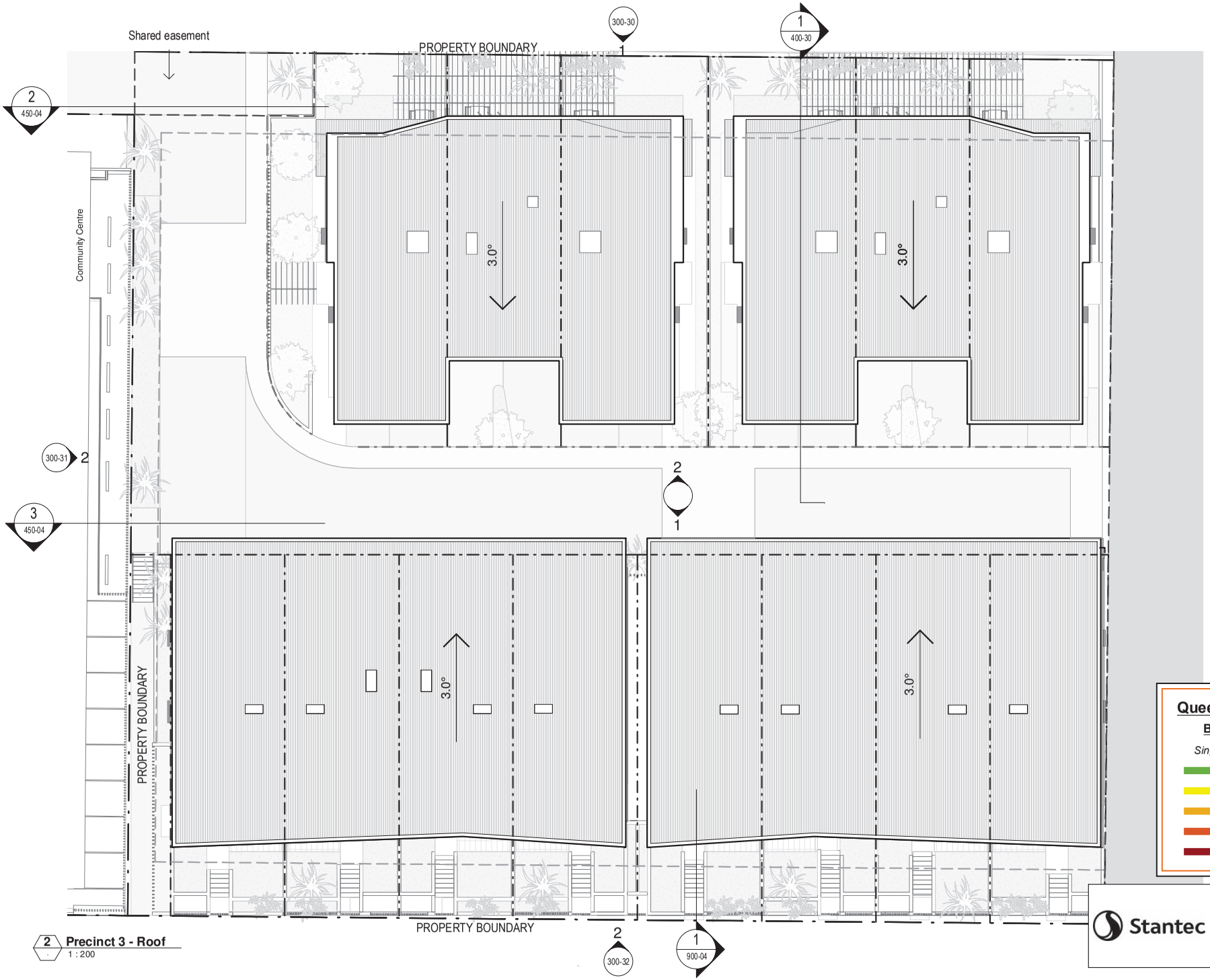
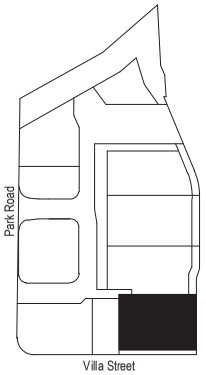
CLIENT: JGL Properties
PROJECT: Parkside Yeronga
DRAWING NAME: Precinct 3 - Level 2
DRAWING NO.: 200-32 F
SCALE As indicated
09.08.22
PROJECT NO. 3662

9/08/2022 4:59:30 PM



2 **Precinct 3 - Roof**
1 : 200



Note: View rotated 90° Clockwise

EXTERNAL FLOOR FINISHES

Refer to landscape documentation for external floor finishes

LEGEND

- setback line
- easement line
- boundary line

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (Lmax) for railway land

Noise Category 0	-	≤69 dB(A)
Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

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SKETCH TITLE *Prepared By: MS*

JGL - PARKSIDE YERONGA
QDC MP4.4 - Facade Noise Categories
ASSESSMENT A - Other Proposed Buildings Excluded

PROJECT No.	SKETCH No.	DATE	REV
301050318	AC-SK-001	16/08/2022	001

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CLIENT: JGL Properties

PROJECT: Parkside Yeronga

DRAWING NAME: Precinct 3 - Roof

DRAWING NO.: 200-33 F

SCALE As indicated
09.08.22
PROJECT NO. 3662

9/08/2022 4:59:39 PM

Appendix F Noise Contour Map ($L_{Amax\ façade}$)

Project: JGL Parkside Yeronga Development Application

Project-No. 301050318

Grid Noise Map (+2.5 dB facade corrected)
Future (2036) Rail Noise Predictions
Ground Floor, 1.5 m from finish floor

Predicted Noise Levels L_{max} dB(A)

	<=	70	Category 0
70	-	75	Category 1
75	-	80	Category 2
80	-	85	Category 3
	>	85	Category 4

Signs and symbols

- Building
- Wall
- Railway
- Bridge abutment
- Project Site

N

Scale

0 5 10 20 30 40 50 m

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C:\Users\msaralertsophon\Documents_SoundPlan Local Drive\301050318 - JGL Yeronga\22-08-15 301050318 - JGL - Parkside Yeronga\Z-2022-08-15 GNM MP4.4 1.5m.sgs

Project: JGL Parkside Yeronga Development Application

Project-No. 301050318

Grid Noise Map (+2.5 dB facade corrected)
Future (2036) Rail Noise Predictions
Level 1, 4.6 m from finish floor

Predicted Noise Levels L_{max} dB(A)

<= 70	Category 0
70 - 75	Category 1
75 - 80	Category 2
80 - 85	Category 3
> 85	Category 4

Signs and symbols

- Building
- Wall
- Railway
- Bridge abutment
- Project Site

N

Scale

0 5 10 20 30 40 50 m

Stantec

C:\Users\msaralertsophon\Documents_SoundPlan Local Drive\301050318 - JGL Yeronga\22-08-15 301050318 - JGL - Parkside Yeronga\Z-2022-08-15 GNM MP4.4 4.6m.sgs

Project: JGL Parkside Yeronga Development Application

Project-No. 301050318

Grid Noise Map (+2.5 dB facade corrected)
Future (2036) Rail Noise Predictions
Level 2, 7.7 m from finish floor

Predicted Noise Levels L_{max} dB(A)

	<=	70	Category 0
70	-	75	Category 1
75	-	80	Category 2
80	-	85	Category 3
	>	85	Category 4

Signs and symbols

- Building
- Wall
- Railway
- Bridge abutment
- Project Site

N

Scale

0 5 10 20 30 40 50 m

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C:\Users\msaralertsophon\Documents_SoundPlan Local Drive\301050318 - JGL Yeronga\22-08-15 301050318-1 - JGL - Parkside Yeronga\Z-2022-08-15 GNM MP4.4 7.7m.sgs

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

Stantec

Connect with us

stantec.com/australia