

50 Alexandria View, Mindarie Acoustics Report

11 August 2022

Ref: 301251070

PREPARED FOR: Edge Holdings No. 18 Pty Ltd

PREPARED BY: Ben Martis

Revision

| Revision | Date | Comment | Prepared By | Approved By |
|----------|------------|-------------------------|-------------|-------------|
| 001 | 09/06/2022 | Development Application | BEM | IK |
| 002 | 11/08/2022 | Development Application | BEM | IK |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Contents

| | |
|--|-----------|
| Executive Summary | 1 |
| 1. Introduction | 1 |
| 1.1 Overview | 1 |
| 1.2 Project Location | 1 |
| 2. Acoustic Criteria | 1 |
| 2.1 Environmental Protection (Noise) Regulations 1997 | 1 |
| 2.1.1 Influencing Factor for 40 Alexandria View | 1 |
| 2.1.2 Assigned Noise Levels for Nearest Sensitive Receiver | 2 |
| 2.1.3 Noise Character Adjustments | 3 |
| 2.1.4 Noise Emissions mechanical services | 3 |
| 2.2 Internal Noise Levels | 4 |
| 2.3 Reverberation Times | 4 |
| 2.4 Sound Transmissions and Insulation — National Construction Code 2019 | 5 |
| 2.5 Further Acoustic Considerations | 6 |
| 3. Noise Survey | 7 |
| 3.1 Overview | 7 |
| 3.2 Measurement Methodology | 7 |
| 3.2.1 Equipment Details | 7 |
| 3.3 Measurement Location | 7 |
| 3.4 Noise Measurement Summary | 8 |
| 4. Architectural Acoustics | 9 |
| 4.1 External Envelope | 9 |
| 4.1.1 External Wall | 9 |
| 4.1.2 External Glazing | 9 |
| 4.1.3 Roof Construction | 10 |
| 5. Waste Collection | 11 |
| 6. Mechanical Services Noise Emission | 12 |
| 7. Conclusion | 13 |
| Appendix A Glossary of Acoustic Terms | 14 |

Executive Summary

Stantec has been appointed by Edge Holdings No. 18 Pty Ltd to provide acoustic engineering services for the multi-storey residential development proposed on Lot 418, 50 Alexandria View, Mindarie WA.

In support of the Development Application, an acoustic assessment has been carried out in order to satisfy the requirements stated in the relevant policies and guidelines applicable to the project. This includes:

- *Western Australian Environmental Protection (Noise) Regulation 1997 (EPNR);*
- *Australian and New Zealand Standard AS/NZS 2107:2016 - Acoustics – Recommended design sound levels and reverberation times for building interiors (AS2107); and*
- National Construction Code 2019, Building Code of Australia (NCC 2019 Amendment 1).

The acoustic criteria derived from the aforementioned documentation forms the basis of acoustic design for the project and includes the following acoustic parameters:

- Airborne sound insulation and impact sound isolation between adjoining apartments;
- Internal noise levels resulting from noise intrusion from mechanical services and via the façade due to external sources; and
- Noise emissions from the proposed development to the nearest noise sensitive receivers.

Traffic Noise Intrusion

A traffic noise assessment has been carried out and the minimum recommended external façade construction has been provided in the form of glazing and wall configurations. The following is recommended:

- Glazed façade elements –
 - Living areas, minimum 6mm glass or Double-Glazing Unit 6mm glass, 12mm air gap, 6mm glass;
 - Bedrooms – minimum 6.38mm laminated glass or Double-Glazing Unit 6mm glass, 12mm air gap, 6mm glass;
- Solid façade elements – 110mm concrete panel or equivalent and approved.

Mechanical Services Noise Emissions

Mechanical services noise emissions are required to comply with the environmental noise regulations (EPNR).

This type of residential development is expected to use condenser units, carpark exhaust fans and pool plant. Mechanical plant selections will be reviewed during the design stages to ensure that compliance is maintained.

Waste Collection

Under the EPNR Regulation 14A, the assigned noise levels of Regulation 7 do not apply to waste collection (both domestic and commercial sources).

Generally, local councils cannot confirm collection times for residential waste collections. It is recommended that waste collection occurs during the hours 0700 – 1900 hr Monday to Saturday in accordance with the WA Department of Environmental Regulation's Draft Guide to Management of Noise from Waste Collection and Other Works (December 2014).



1. Introduction

1.1 Overview

This report presents the key acoustic considerations and criteria pertinent to the residential development proposed on Lot 418, 50 Alexandria View, Mindarie WA. The criteria will form the basis of the acoustic design for the following areas:

- Traffic noise impact on the development; and
- Noise emissions from the mechanical equipment servicing the building.

1.2 Project Location

The project site is located at the south end of the Mindarie marina, overlooking Claytons Beach. The nearest major road is Anchorage Drive approximately 300m from the site. The site is surrounded by “Urban” or “Marina” zoning, which contains both residential and commercial developments. Further south is parkland and to the east is residential zoning.

The local government area for the site is the City of Wanneroo. Figure 1 below shows the surrounding area of the project location.



Source: NearMaps

Figure 1: Site location and surrounding area



2. Acoustic Criteria

The acoustic criteria presented in this Development Application report are derived from the following documentation:

- Western Australian Environmental Protection (Noise) Regulation 1997 (EPNR);
- Australian and New Zealand Standard AS/NZS 2107:2016 - Acoustics – Recommended design sound levels and reverberation times for building interiors (AS2107); and
- National Construction Code 2019 Volume 1, Building Code of Australia Class 2, 3 and 9c Buildings (NCC 2019 Amendment 1).

2.1 Environmental Protection (Noise) Regulations 1997

Environmental noise impacts resulting from the noise emissions from the project are addressed through the Environmental Protection Act 1986, with the regulatory requirements detailed in the Environmental Protection (Noise) Regulations 1997 (EPNR).

The EPNR establishes the maximum permissible noise emission levels (assigned levels) to be received at all adjacent noise-sensitive premises during specific periods of the day as a result of the cumulative noise emissions from all sources proposed for the project site. Compliance to relevant noise limits outlined in the EPNR is compulsory.

The EPNR states noise emissions from any premises are considered not to *significantly contribute* to the noise at a receiver if the noise emissions are 5 dB or below the assigned levels.

In brief, the assigned levels are determined by considering of the amount of commercial and industrial zones, as well as main transport corridors and sporting venues surrounding the noise sensitive premises. The assigned levels apply at premises receiving the noise (noise sensitive receiver) and not to areas within the project site or lot. In addition, the Environmental Protection (Noise) Regulations 1997 identify the following in Schedule 3, clause 2A.

“If the land within either of the circles is categorised on the land use map as land in respect of which mixed uses are permitted, the use of that land that results in the highest influencing factor is to be used in the determination of the influencing factor.”

The nearest noise sensitive receivers have been considered as the residential properties surrounding the area, with the closest measurable noise sensitive receivers being located at 40 Alexandria View Mindarie WA.

For the purpose of determining the Influencing factor, the land zoning provided on the City of Wanneroo’s online mapping system (District Planning Scheme Number 2 and the Metropolitan Regional Scheme) have been used to ascertain land use.

Traffic data for roads surrounding the nearest noise sensitive receiver were obtained from Main Roads Western Australia (MRWA) on the 8th June 2022. The available traffic data has been presented in Table 1.

Table 1: Traffic count data (MRWA)

| Transport Corridors | EPNR Classification ¹⁾ | Average Daily Traffic Volumes | | | | | |
|-----------------------------------|-----------------------------------|-------------------------------|---------|---------|---------|---------|---------|
| | | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 |
| Anchorage Dr (West of Marmion Av) | Major Road | — | 15,964 | — | — | 16,748 | — |

1) As defined by the EPNR. Secondary roads have between 6,000-15,000 vehicles per day. Major roads have greater than 15,000 vehicles per day.

2.1.1 Influencing Factor for 40 Alexandria View

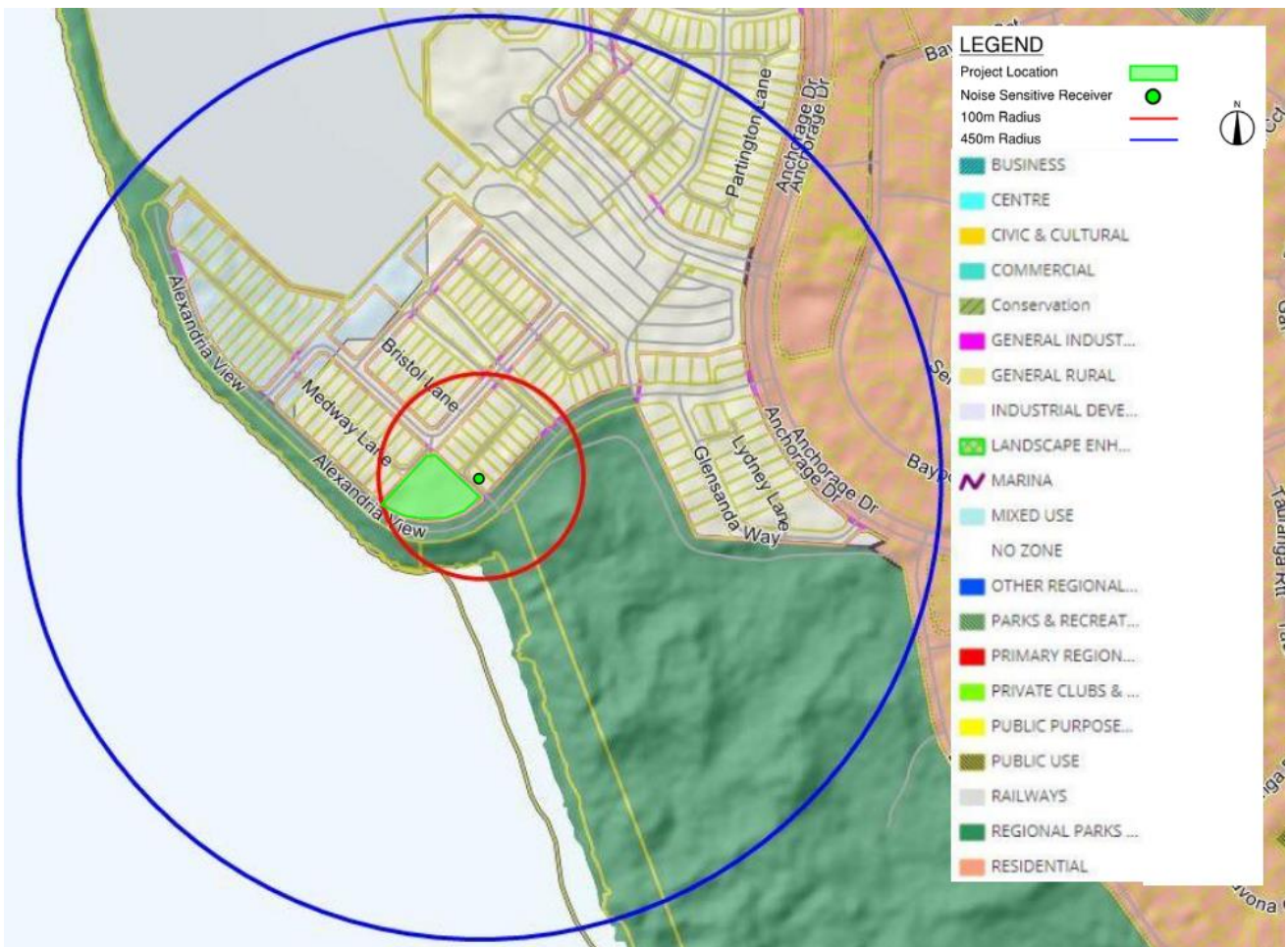
The influencing factor results from identifying major roads, commercial and industrial areas for all nearest noise sensitive receivers is 2 dB, as summarised in Table 2.



As the immediate surrounds of the site are zoned as “Urban” or “Marina” and include both residences and businesses, commercial use buildings were identified using satellite imagery and counted towards the influencing factor.

Table 2: Influencing factor (IF) noise sensitive 40 Alexandria View

| Noise Sensitive Premises | Commercial Zones | Industrial Zones | Transport Corridors | Influencing Factor |
|-----------------------------------|--|---------------------------|--|--------------------|
| 40 Alexandria View Mindarie WA | 0 % within a 100 m radius 2 % within a 450 m radius | 0 % within a 450 m radius | Anchorage Dr (major road) within 450m radius | 2 dB |



Source: City of Wanneroo online mapping system

Figure 2: Zoning map of areas surrounding 40 Alexandria View

2.1.2 Assigned Noise Levels for Nearest Sensitive Receiver

Table 3 summarizes the assigned levels at the nearest noise sensitive premises. It is required that all noise emissions from the development are below the assigned level for all defined periods of the day and at the lot boundary of the receiver or 15m from any associated building. It is noted that the EPNR assigned levels only apply at the premises receiving the noise only and not to noise within the site.



Table 3: Assigned levels for 40 Alexandria View

| Type of premises receiving noise | Time of day | Assigned Level (dB) | | |
|--|---|---------------------|-----------------|-------------------|
| | | L _{A10} | L _{A1} | L _{Amax} |
| Noise sensitive premises: Highly sensitive area | 0700 to 1900 hours Monday to Saturday | 47 | 57 | 67 |
| | 0900 to 1900 hours Sunday & public holidays | 42 | 52 | 67 |
| | 1900 to 2200 hours all days | 42 | 52 | 57 |
| | 2200 hours on any day to 0700 hours Monday to Saturday, and 0900 hours Sunday & public holidays | 37 | 47 | 57 |
| Noise sensitive premises: any area other than highly sensitive areas | All Hours | 60 | 75 | 80 |
| Commercial premises | All Hours | 60 | 75 | 80 |
| Industrial and utility premises | All Hours | 65 | 80 | 90 |

2.1.3 Noise Character Adjustments

Regulation 7 states that the noise character must be “free” of annoying characteristics, namely —

- Tonality, e.g. whining, droning;
- Modulation, e.g. like a siren; and
- Impulsiveness, e.g. banging, thumping.

Regulation 9 (1) establishes the methodology for determining noise characteristics. If these characteristics cannot be reasonably and practicably removed, a series of adjustments to the measured levels are required, indicated in Table 4.

Table 4: Noise character adjustment

| Adjustment where noise emission is not music these adjustments are cumulative to a maximum of 15 dB | | | Adjustment where noise emission is music | |
|---|-----------------------------|--------------------------------|--|--------------------------------|
| Where tonality is present | Where modulation is present | Where impulsiveness is present | Where impulsiveness is not present | Where impulsiveness is present |
| + 5 dB | + 5 dB | + 10 dB | + 10 dB | + 15 dB |

2.1.4 Noise Emissions mechanical services

At this stage no information has been on mechanical equipment. Typically, projects of this type involve noise emissions from mechanical services such as air conditioning units and condensers and exhaust fans.

It is important that noise emissions from the site do not present any form of tonality, modulation or impulsiveness (as defined by the EPNR).

Given that data from mechanical plant manufacturers is generally limited to broadband data or in 1/1 octave band value, it is not possible to objectively determine tonality, as it is described in the EPNR. 1/3 octave band data is required yet is typically unavailable.



Therefore, a +5 dB correction shall be conservatively assigned when assessing noise emissions from mechanical equipment. In summary, Noise emissions from mechanical equipment shall comply with L_{A10} 32 dB at the nearest noise sensitive receiver (40 Alexandria View Mindarie WA).

2.2 Internal Noise Levels

The internal noise level criteria detailed in this section are based on the recommendations provided in the Australian / New Zealand Standard AS/NZS 2107:2016 'Acoustics – Recommended design sound levels and reverberation times for building interiors' (AS 2107).

AS2107 provides recommended internal noise levels (defined as the equivalent continuous A-weighted sound pressure level — $L_{Aeq,t}$) for optimising the acoustic amenity in occupied spaces. The level of noise in an enclosed space typically consists of noise from building services and/or noise intrusion due to external sources (e.g. traffic). The relevant internal noise level criteria have been outlined in Table 5.

Table 5: Recommended internal noise levels from AS2107

| Type of occupancy/activity | Recommended design sound level, L_{eq} dB(A) |
|--|--|
| RESIDENTIAL BUILDINGS - Houses and apartments in suburban areas or near minor roads — | |
| Sleeping areas (night-time) | 30 – 35 |
| Living areas | 30 – 40 |
| Work areas | 35 – 40 |
| Common areas (e.g. foyer, lift lobby) | 45 – 50 |

The internal noise level criteria in AS2107 refer to the continuous equivalent (L_{Aeq}) levels for background noise. This document is a common reference for establishing satisfactory goals for quasi-static mechanical and external traffic noise ingress.

2.3 Reverberation Times

AS2107 provides recommended reverberation times for optimising the acoustic amenity in occupied spaces. The relevant reverberation times have been outlined in Table 6.

Table 6: Recommended reverberation times from AS2107

| Type of occupancy/activity | Recommended reverberation time (T), s |
|--|---------------------------------------|
| RESIDENTIAL BUILDINGS - Houses and apartments in suburban areas or near minor roads — | |
| Sleeping areas (night-time) | - |
| Living areas | - |
| Work (study) areas | - |
| Common areas (e.g. foyer, lift lobby) | See Note 1 |

1) Reverberation time should be minimised as far as practicable for noise control.



2.4 Sound Transmissions and Insulation — National Construction Code 2019

The acoustic requirements for inter-tenancy walls, floors etc. in residential buildings are outlined in the National Construction Code 2019 Volume 1, Building Code of Australia Class 2, 3 and 9c Buildings (NCC 2019 Amendment 1). The acoustic requirements outlined in NCC 2019 are summarised in Table 7.

Table 7: Sound insulation requirements in accordance with NCC 2019

| Construction | Condition | Deemed-to-Satisfy Requirements | Verification Requirements |
|-----------------|--|--|--------------------------------|
| Walls | <u>Airborne Sound Insulation</u> | | |
| | Between sole-occupancy units | Minimum $R_w + C_{tr}$ 50 | Minimum $D_{nT,w} + C_{tr}$ 45 |
| | Between a sole-occupancy unit and a plant room, lift shaft, stairway corridor, public corridor or the like | Minimum R_w 50 | Minimum $D_{nT,w}$ 45 |
| | <u>Impact Sound Insulation</u> | | |
| | Between a laundry, kitchen, bathroom or sanitary compartment in a sole-occupancy unit, and a habitable room in an adjoining unit | Discontinuous construction ¹⁾ | As deemed to satisfy |
| | Between a sole-occupancy unit and a plant room or lift shaft | Discontinuous construction ¹⁾ | As deemed to satisfy |
| Floors | <u>Airborne Sound Insulation</u> | | |
| | Between sole-occupancy units and between sole occupancy unit and lift shaft, stairway or public corridor | Minimum $R_w + C_{tr}$ 50 | Minimum $D_{nT,w} + C_{tr}$ 45 |
| | <u>Impact Sound Insulation</u> | | |
| | Between sole-occupancy units and between sole occupancy unit and lift shaft, stairway or public corridor | Maximum $L_{n,w}$ 62 | Maximum $L_{nT,w}$ 62 |
| Services | <u>Airborne Sound Insulation</u> | | |
| | Between a habitable room (other than a kitchen) in a sole-occupancy unit and a duct, soil, waste or water supply pipe duct (if the duct or pipe is located in a wall or floor cavity and serves or passes through more than one sole-occupancy unit) | Minimum $R_w + C_{tr}$ 40 | N/A |
| | Between a kitchen or non-habitable room in a sole-occupancy unit and a duct, soil, waste or water supply pipe duct (if the duct or pipe is located in a wall or floor cavity and serves or passes through more than one sole-occupancy unit) | Minimum $R_w + C_{tr}$ 25 | N/A |
| | If a storm water pipe passes through a sole-occupancy unit (habitable room other than kitchen) | Minimum $R_w + C_{tr}$ 40 | N/A |
| | If a storm water pipe passes through a sole-occupancy unit (kitchen or non-habitable room) | Minimum $R_w + C_{tr}$ 25 | N/A |

1) For the purposes of this Part, “discontinuous construction” means a wall having a minimum 20 mm cavity between two separate leaves.

2.5 Further Acoustic Considerations

The following should be considered in the acoustic design of the project:

- Acoustic separation performance of party walls and floors is typically addressed through NCC 2019, which provides the bare minimum requirements. Footfall noise is general a common source of complaints within apartments, in particular where harder floor finishes are used. The client may wish to consider a higher degree of acoustic separation and impact isolation;
- Where increased acoustic separation is preferred (for example, to address Element Objective 4.7 of *State Planning Policy 7.3 – Residential Design Codes Volume 2 – Apartments*), the Green Building Council of Australia (GBCA) Green Star performance criteria may be adopted. It is noted that to achieve the criteria, additional treatments, above what is typically recommended in NCC 2019, may be required and could incur additional cost to the project;
- An outdoor pool is proposed to be located on the Ground Floor with a carpark underneath. Acoustic isolation of the swimming pool will need to be considered, along with appropriate vibration isolation of any mechanical plant mountings. As a starting point, adequate spatial allowance shall be made for lateral restraints, typically 17mm thick swimming pool buffer pads;
- Gym floors (Ground Level) should incorporate a floor raised by 100 – 150mm in order to accommodate a typical vibration isolating sprung floor system;
- The fire pump room is located directly underneath an apartment. The slab over shall be at least 200mm thick concrete. Spatial allowance shall be made in the fire pump room for the manufacturer's Class 1 Attenuation Package and Super Critical Grade exhaust muffler;
- Noise emissions and vibration isolation of services and plant will need consideration. At these stages of the project equipment details are typically unavailable. However, detailed reviews of mechanical plant shall be conducted during design development stages of the project.



3. Noise Survey

3.1 Overview

Typically, the two main sources of noise considered in noise intrusion assessments are transportation (i.e. road, rail or aircraft noise) and mechanical services noise from within the same or adjoining developments.

Attended noise measurement was undertaken near the project site to ascertain the typical noise levels at the proposed development. This section provides discussion of the measurement methodology and summary of measured noise levels.

3.2 Measurement Methodology

3.2.1 Equipment Details

Measurements have been conducted using instrumentation equivalent to an integrating sound level meter equipped with one octave and one-third octave band filters, and an omni-directional condenser microphone. All instrumentation meets Type 1 specifications as per ANSI S1.4 and ANSI S1.43.

All sound level meters were calibrated by an authorised NATA (National Association of Testing Authorities) laboratory less than 2 years ago and have successfully passed all IEC 61672- 2019, IEC 61260-2019, DIN 45657-2005, and ISO/IEC 17025-2018 standards and specifications.

The time constant for the RMS detector were set to a slow response (1 sec) for all measurements. The sound level meter was calibrated before and after each measurement session using a Type 1 acoustic calibrator. The calibrator was also calibrated less than 2 years ago and is in compliance with AS IEC 60942-2004.

A complete schedule of equipment used during for acoustic measurements is provided in Table 8. A copy of calibration certificates for the relevant instrumentation may be provided upon request.

Table 8: Equipment and calibration details

| Manufacturer / Model | Serial Number |
|----------------------------------|---------------|
| Brüel & Kjær 4231 – Calibrator | 3005155 |
| Svantek 977C – Sound Level Meter | 98060 |

3.3 Measurement Location

Attended noise measurements were conducted to determine the general noise impacts from traffic utilising Anchorage drive, which is the main transport corridor affecting project noise levels. Measurement was undertaken during the peak morning traffic period of 7 – 9 AM weekdays as demonstrated by Main Roads WA hourly data.

The location of the noise measurement is indicated in Figure 3.





Source: NearMap

Figure 3: Noise measurement location

3.4 Noise Measurement Summary

The noise levels obtained from the attended noise measurements have been provided in Table 9.

Table 9: Attended Measured Noise Levels

| Date and Time | L _{eq, 15-min} dB(A) | 1/1 Octave Band Sound Pressure Levels (dB) | | | | | | | |
|------------------------------|----------------------------------|--|--------|--------|--------|-------|-------|-------|-------|
| | | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz |
| 09/06/2022 0824 – 0839 hr | 55 | 62 | 58 | 53 | 51 | 49 | 47 | 42 | 37 |

Field observations during the measurement period were that:

- Ocean noise (waves crashing) was clearly audible;
- Traffic noise from Anchorage Drive was clearly audible; and
- Intermittent local traffic was observed, mainly around the Claytons beach parking area.

Negligible rainfall was recorded during the measurement period, although it had recently rained. A south-easterly wind was noted at a ground speed of approximately 2 m/s and an ambient temperature of 12 degrees Celsius, recorded with a handheld anemometer (Kestrel 3000).



4. Architectural Acoustics

A noise intrusion assessment for the proposed residential tower was conducted based on the measured traffic noise levels in the area. The noise assessment takes into account future predicted traffic volumes (worst case doubling of traffic volume) and using on-site noise measurements. External wall and glazing have been provided according to the noise intrusion assessment results with the view of providing satisfactory internal noise levels that achieve the internal noise level criteria detailed in this report.

Roof configuration recommendations have also been provided based on rain noise intrusion assessment.

Calculations were undertaken following the methodology described in British Standard BS EN 12354:2000 and by utilizing the worst case (i.e. highest measured) noise levels at each façade to determine suitable glazing to address the noise sensitive use of each space. Appropriate corrections were applied to the linear spectral noise levels to compensate for potential losses due to flanking paths and façade correction.

4.1 External Envelope

4.1.1 External Wall

Based on the architectural layouts (Dated 5th August 2022), it is evident that the building envelope will consist of significant glazed elements. The noise intrusion has been calculated for all façade elements relative to their surface area.

Where solid elements are used as the external wall, the walls are required to achieve $R_w + C_{tr}$ 45 as a minimum to achieve acceptable internal noise levels.

Typically, this can be achieved with the following configuration:

- 110mm Concrete Panel

Alternative construction material may be used to achieve the required performance. This will, however, require review and approval of the Acoustic Engineer.

Where lightweight construction is proposed, this will result in reduced acoustic performance specifically in the lower frequencies. As a result, this may have some impact on the recommended glazing types.

4.1.2 External Glazing

Glazing configurations to achieve the required internal noise levels have been provided for all residential units. This configuration is to achieve acceptable internal noise levels considering traffic noise generated from the identified major transport corridors. Assessment of glazing configuration to mitigate noise intrusion from other sources such as mechanical plant will be undertaken at a later stage of the project.

To ensure compliance to the recommended internal noise levels specified in AS2107, the following treatments as detailed in Table 10;

- Living areas, minimum 6mm glass or Double-Glazing Unit 6mm glass, 12mm air gap, 6mm glass;
- Bedrooms – minimum 6.38mm laminated glass or Double-Glazing Unit 6mm glass, 12mm air gap, 6mm glass.



Table 10: External Glazing Recommendations

| Area | Glazing Configuration | $R_w + C_{tr}$ | Spectrum Sound Transmission Loss (dB) | | | | | | |
|----------------|--|--------------------|---------------------------------------|--------|--------|--------|-------|------|-------|
| | | | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1k Hz | 2kHz | 4k Hz |
| Living Areas | <u>Double Glazing:</u> 6mm glass + 12mm air gap + 6mm glass | 30 (35, -5) | 23 | 25 | 21 | 35 | 41 | 37 | 39 |
| | <u>Single Glazing Option</u> 6mm glass | 29 (31;-2) | 18 | 21 | 25 | 29 | 33 | 31 | 35 |
| Sleeping Areas | <u>Double Glazing:</u> 6mm glass + 12mm air gap + 6mm glass | 30 (35, -5) | 23 | 25 | 21 | 35 | 41 | 37 | 39 |
| | <u>Single Glazing Option</u> 6.38mm laminated glass | 30 (33; -3) | 19 | 21 | 25 | 29 | 34 | 35 | 41 |

Note: Glazing performance provided for glass only. Overall performance of the glazing system including the frames and seals shall not degrade by more than 3 dB as per the performance requirement stated.

4.1.3 Roof Construction

Whilst it is not a mandatory requirement of the NCC, rain noise intrusion through any lightweight roof shall be considered with a view of ensuring an adequate level of amenity for occupants. Additionally, roof construction should be adequately designed to control external noise intrusion from noise sources identified in this report such as mechanical services. The following construction is adequate to fulfil the rain noise requirements.

One layer of Colorbond sheet metal or similar (0.42 mm); and

- 75 mm thick high-density Anticon insulation hard-fixed to the underside of roof and over steel purlins;
- Minimum ceiling cavity to be 300mm;
- Suspended ceiling system; and
- Min. 50 mm thick glass wool insulation (min. 14kg/m³) over one layer of 13 mm standard plasterboard.

Note that mechanical plant decks on a lightweight roof are likely to require additional treatment (plant deck linings) to achieve adequate internal noise levels in the apartments below. This has associated airflow and drainage challenges.



5. Waste Collection

Under the EPNR Regulation 14A, the assigned noise levels of Regulation 7 do not apply to waste collection (both domestic and commercial sources), provided:

- The works are carried out in the quietest reasonable and practicable manner;
- The equipment used to carry out the works is the quietest reasonable available; and
- In the case where a noise management plan is required (e.g. works are to occur outside of 0700 – 1900 hours Monday through Saturday or 0900 – 1900 hours Sundays and public holidays), the plan is submitted and approved, with works carried out according to the plan.

Generally, local councils cannot confirm collection times for residential waste collections. It is recommended that waste collection occurs during the hours 0700 – 1900 hr Monday to Saturday in accordance with the WA Department of Environmental Regulation's Draft Guide to Management of Noise from Waste Collection and Other Works (December 2014).



6. Mechanical Services Noise Emission

Noise generated via the mechanical services from the proposed development is required to comply with the EPNR criteria at all nearest sensitive receivers. Once details of equipment are available, appropriate recommendations will be provided as required to comply with the EPNR at all times of day.

This type of residential development is expected to use condenser units, carpark exhaust fans and pool plant. Mechanical plant selections will be reviewed during the design stages to ensure that compliance is maintained.



7. Conclusion

As part of the Development Application process for the residential project at 50 Alexandria View Mindarie, an acoustic assessment has been carried out as detailed in this report.

Traffic noise assessment has been carried out and the minimum recommended external façade construction has been provided.

Mechanical services noise emissions will be assessed to the environmental noise regulations (EPNR) in the next stages of design, with recommendations provided as necessary to ensure compliance.

Under the EPNR Regulation 14A, the assigned noise levels of Regulation 7 do not apply to waste collection (both domestic and commercial sources). It is recommended that waste collection occurs during the hours 0700 – 1900 hr Monday to Saturday in accordance with the WA Department of Environmental Regulation's Draft Guide to Management of Noise from Waste Collection and Other Works (December 2014).



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. |
| LAmx | The maximum A-weighted sound pressure level measured over a period. |
| L Amin | 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. |



| | |
|-----------------------|--|
| L _{AeqT} | 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. |

Ground Floor
226 Adelaide Terrace
Perth WA 6000
Tel +61 8 6222 7000



Connect with us



stantec.com/australia