Resonate

5-9 Gordon Avenue, Chatswood

Planning Proposal Acoustic Review

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Document Information

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Author	Andrew Parker Team Leader—Acoustics NSW p+61 2 8355 4888 m+61 432 602 803 andrew.parker@resonate-consultants.com	
Reviewed by	Peter Hüttenmeister	

Revision Table

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Glossary

'A' Weighted	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Daytime (INP)	Between 7.00 a.m. and 6 p.m. as defined in the INP. (See INP)
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level.
dB(A)	'A' Weighted sound level in dB.
Evening	Between 6.00 p.m. and 10 p.m. as defined in the INP. (See INP)
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second. The human ear responds to sound in the frequency range of 20 Hertz to 20,000 Hz.
Ground-borne noise	Ground-borne vibration transferred into a structure causing building elements to vibrate and radiate noise.
INP	New South Wales EPA Industrial Noise Policy, 2000.
Intrusive Noise	Noise emission that when assessed at a noise-sensitive receiver (principally the boundary of a residential premises) is greater than 5 dB above the background (L_{90}) noise level.
L_{10}	Noise level exceeded for 10 % of the measurement time. The L_{10} level is commonly referred to as the average maximum noise level.
L_{90}	Noise level exceeded for 90 % of the measurement time. The L_{90} level is commonly referred to as the background noise level.
L_{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
Night-time (INP)	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the INP. (See INP).
Rating Background Level (RBL)	Overall single-figure A-weighted background level representing an assessment period (day/evening/night). For the short-term method, the RBL is simply the measured $L_{90,15min}$ noise level. For the long-term method it is the median value of all measured background levels during the relevant assessment period.

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1 Introduction

Resonate has been engaged by DPG Project 32 Pty Ltd to undertake a planning proposal acoustic review for the proposed mixed-used development to be located at 5 – 9 Gordon Avenue, Chatswood NSW.

This report outlines potential acoustic requirements for consideration during the Development Application phase. It is noted that this report is at a desktop level and incorporates advice based on our experience on similar projects.

2 Project Description

The proposed mix-use development would be located at 5 – 9 Gordon Avenue, Chatswood, as shown in Figure 1. The proposal consists of a 26-storey building comprising a 2 storey commercial/retail podium and 24 storey tower above containing 23 levels of residential apartments and 1 level of common facilities for the apartments. Up to 5 levels of basement car parking will be provided.

The proposal site is located in close proximity to the North Shore railway line, and the Pacific Highway.

The current land uses surrounding the development are summarised as follows:

- North: Chatswood Bowling Club and residential receivers
- South: Gordon Avenue and residential and commercial receives beyond
- East: Residential receivers and the North Shore Railway Line beyond
- West: Residential receivers and Pacific Highway beyond

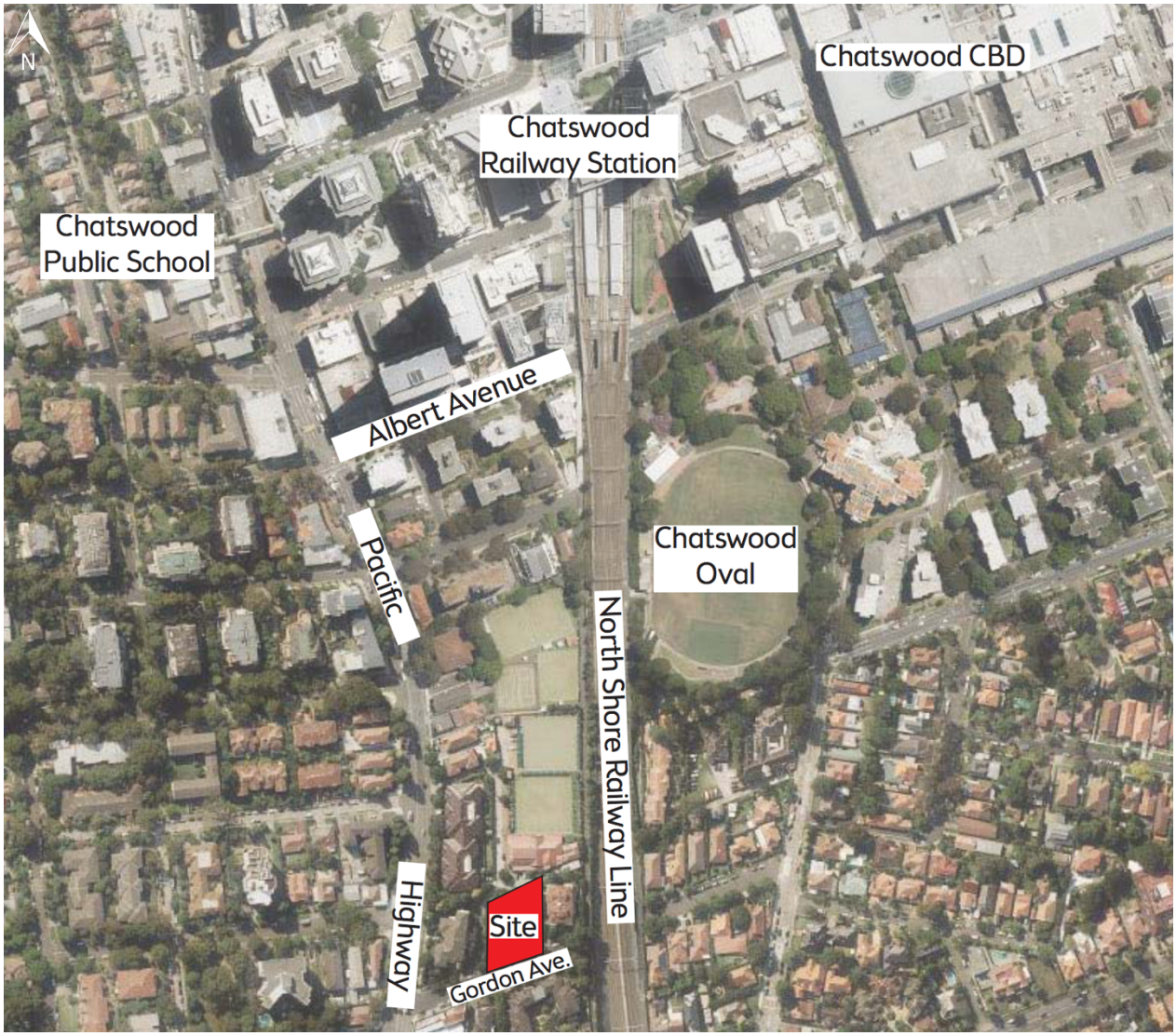

Figure 1 Proposal site map

3 Potential Acoustic Constraints

Any proposed development will encounter acoustic constraints in relation to noise both on the development itself and from it to the surrounding environment. This section outlines potential constraints and provides examples of ways to minimise noise and vibration impacts through best practice design.

3.1 Internal amenity – Airborne noise intrusion

Due to the proximity of the proposed development to the North Shore railway line and the Pacific Highway, rail and road traffic noise may impact on internal amenity. Noise surveys conducted for other similar developments on the Pacific Highway indicate that this may be the case. Therefore, glazing design recommendations would be necessary to achieve targeted internal design sound levels in bedrooms and living areas. This is based on an internal design sound level of 35 dB(A) for a bedroom (*Infrastructure SEPP and DoP's Development Near Rail Corridors and Busy Roads*) and previously measured L_{Aeq} noise levels on Pacific Highway in the order of 60 dB(A).

Based on a review of current planning documentation and our previous experience on a similar Develotek project in close proximity to the North Shore railway line and the Pacific Highway, we have predicted road traffic noise levels up the façade of the building, noting the setback of the site from each of these noise sources is approximately 50 m. Compliance with the internal design sound level targets would be readily achieved through the implementation of one or a combination of the following measures:

- Standard float or proprietary single laminated glazing systems.
- A 'winter garden' strategy may be utilised, if desirable from an architectural perspective.
- Deep void double glazed systems.

It should be noted that a detailed program of airborne noise measurements would be conducted in order to inform the development application assessment and design process.

3.2 Internal amenity – Ground-borne noise and vibration intrusion

The site is located in excess of 30 m from the North Shore Railway Line. Consequently, it is unlikely that rail-induced ground-borne noise and vibration would result in a significant impact on amenity with airborne noise being the controlling acoustic factor. The development application would include the following task in order to quantify the potential impacts and derive management strategies for incorporation into the design, if necessary:

- A vibration survey conducted on the site to confirm whether further consideration of rail induced vibration is required.

3.3 Ventilation

An alternative means of fresh air ventilation may be required for residential spaces on noise-affected façades if windows need to remain closed to ensure internal design sound level targets can be satisfied. This would be determined as part of the development application. Alternative means for achieving fresh air ventilation may include:

- Air conditioning with an outside/fresh air component (not a conventional 'split' system).
- Mechanical ventilation drawn from a 'quiet' side of the building and/or with an acoustically attenuated intake path.
- An open window on a 'quiet' side of the building (should single-sided ventilation be possible).

It is recommended that acoustical modelling be undertaken at the detailed design stage once development approval is granted to optimise glazing selections and the ventilation strategy.

3.4 Mechanical services noise emission

Mechanical services noise from equipment servicing the proposed development would be designed to comply with relevant environmental noise criteria (likely to be related to the NSW EPA Noise Policy for Industry and council requirements). Numerous options for mechanical services noise control are available for consideration including:

- Selecting the quietest plant for a given task.
- Judicious location and orientation.
- Use larger fans at a slower speed rather than smaller fans at a higher speed.
- Using variable speed drives to lower fan speed in response to lower duty/load requirements.
- Use of barriers, both incidental and purpose designed.
- Internally lined ducts and bends, external duct and equipment wrapping, silencers.

4 Proposed Development Application Methodology

In the context of the potential acoustic constraints outlined in Section 3, the following is a proposed methodology in preparing a planning stage acoustic report for the Development Application:

- Establish development specific acoustic criteria based on relevant planning approval pathways, including:
  - Willoughby City Council – Willoughby Development Control Plan (WDCP)
  - Willoughby Local Environment Plan 2012 (WLEP 2012)
  - NSW Noise Policy for Industry (EPA)
  - Building Code of Australia (BCA)
  - Development Near Rail Corridors and Busy Roads (DOP)
- Conduct a program of noise and vibration measurements at the proposed site.
- Calculate glazing and other acoustically related façade requirements based on noise survey information and determine minimum requirements to achieve internal design sound levels as set out in AS/NZS 2107 and the *DoP's Development Near Rail Corridors and Busy Roads*.
- Predict internal ground-borne noise and vibration levels within the proposed building and determine design strategies to mitigate potential impacts, if necessary.
- Predict environmental noise emissions from external mechanical services and other operational noise emissions relating to the commercial tenancies at adjacent noise sensitive receivers and conduct and assessment in accordance with the NPI and/or WDCP.
- Demonstrate how environmental noise criteria can be complied with.

5 Conclusion

A high-level desktop assessment of potential acoustic considerations has been undertaken for a proposed mixed-use development to be located at 5 – 9 Gordon Avenue, Chatswood.

Key acoustic constraints in relation to environmental noise and vibration on the proposed development and its potential impacts to the surrounding area have been outlined.

Acoustic design considerations have been summarised that show these constraints may be addressed through best practice design in the development phase.