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To: Matt Lindley
Company: Stockland Development Pty Ltd
Email: matthew.lindley@stockland.com.au
Author: Stephen Lyons/SP
Subject: Aura Development, Caloundra South, Precinct 8.4 - Lot 80025 - Noise Assessment Report
Pages: 1 of 8

Dear Matt,

1. Introduction

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2013/469

Date: 09/11/2016



ASK Consulting Engineers Pty Ltd (ASK) was commissioned by Stockland Development Pty Ltd to provide acoustic consultancy services for Lot 80025 within Precinct 8.4 of the Aura Development, which is located within the Caloundra South Priority Development Area (PDA).

The purpose of this report is to present a preliminary assessment of the potential traffic noise impacts onto Lot 80025 within Precinct 8.4. It is understood the Queensland Health has expressed interest in the construction of a health building including offices and consulting rooms, on the lot and are seeking to understand the implications of road traffic noise impacts from Bells Creek Arterial onto the subject lot.

ASK has previously undertaken noise modelling of nearby precincts of the Aura development which included Bells Creek Arterial. This assessment is an extension of the noise assessment undertaken in ASK report *Aura Development - Precincts 7, 8, 9 & 10 - Transport Noise Impact Assessment* (ref: 8342R01V01, dated 26 May 2016).

It is understood that the subject site may also include other non-sensitive buildings, therefore the configuration and layout of the site will have an influence on the potential acoustic requirements for the proposed building.

The potential noise impacts from the proposed passenger train rail corridor have not been assessed onto the subject site.

The location of the subject lot is present in **Figures 1.1** and **1.2**.

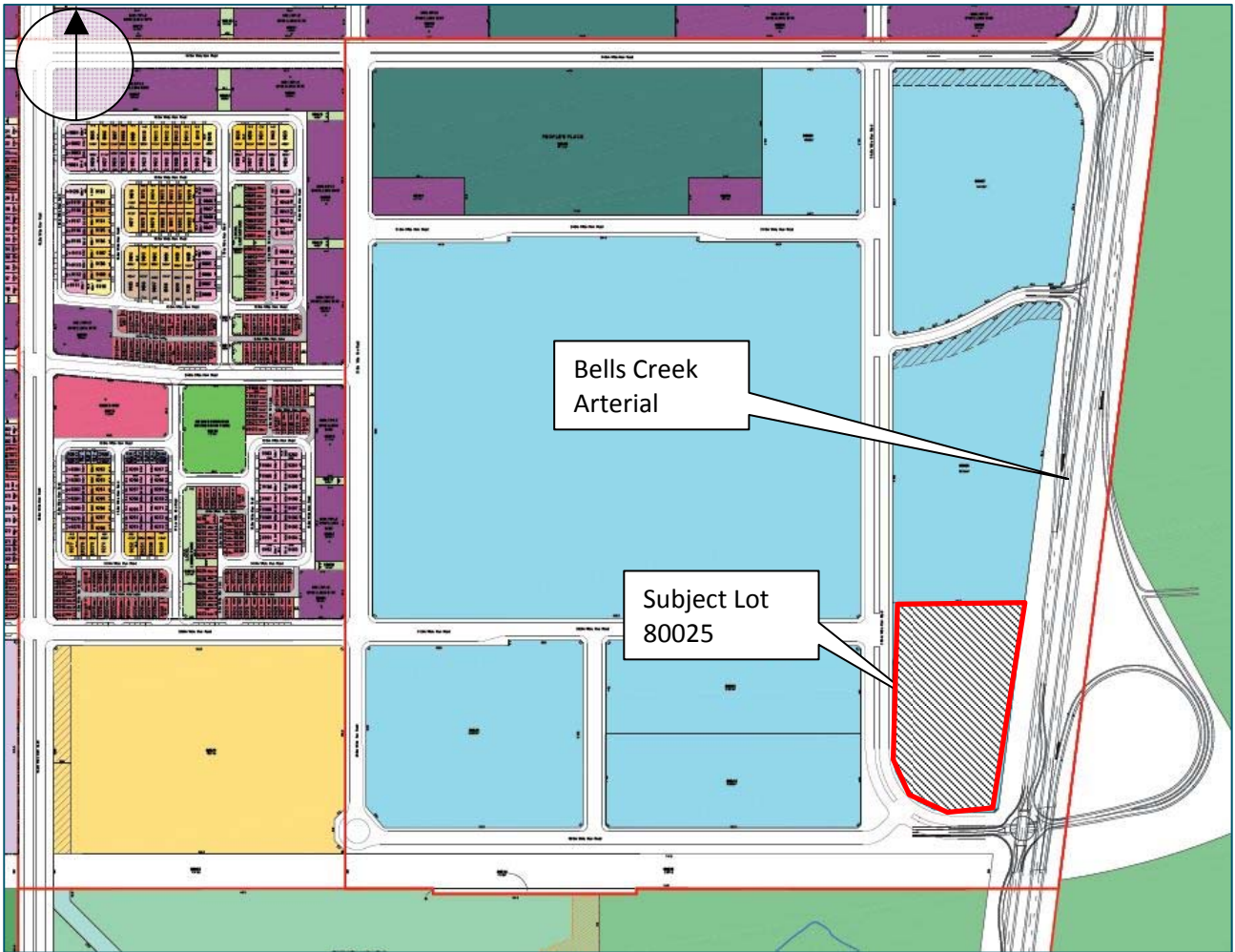


Figure 1.1 Location of Subject Lot 80025



Figure 1.2 Caloundra South Master Plan

2. Noise Criteria

The subject site is located adjacent a future state controlled road (Bells Creek Arterial) and therefore the relevant SDAP (State Development Assessment Provisions) have been considered. The noise criteria for the

project will need to address noise intrusion into the development in accordance with 'Module 1: Community Amenity' section of SDAP. The current version of the SDAP is v1.9, effective 22 July 2016.

The following glossary of terms is provided in SDAP:

- Hospital – see the standard planning scheme provisions. Editor's note: Hospital means premises used for medical or surgical care or treatment of patients, whether or not residing on the premises. The use may include ancillary accommodation for employees and ancillary activities directly serving the needs of patients and visitors.
- Patient care area – see the Building Code of Australia. Editor's note: Patient care area means a part of a health-care building normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a ward area and treatment area. A ward area means that part of a patient care area for resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities. A treatment area means an area within a patient care area such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved.

Due to the proximity of the Bells Creek Arterial on the eastern boundary of the site, noise barriers will be large ineffective at reducing external noise levels for a multi-storey building. Therefore this assessment has focused on achieving the internal noise limit presented within SDAP.

For a hospital near a state-controlled road or type 1 multi modal corridor, the relevant Performance Outcome (PO) is PO5 'Development involving a hospital achieves acceptable noise levels for workers and patrons by mitigating adverse impacts on the development from noise generated by a state-controlled road or a type 1 multi-modal corridor'. The Acceptable Outcomes (AO) are as follows:

AO5.2 Patient care areas exposed to noise from a state-controlled road or type 1 multi-modal corridor meet the following internal noise criteria:

≤35 dBA $L_{eq}(1 \text{ hour})$ (maximum hour during opening hours).

3. Road Traffic Noise Assessment

3.1 Overview

TMR recommends that the prediction of road traffic noise is to be conducted according to the United Kingdom Department of Transport (1988) procedure published as "Calculation of Road Traffic Noise" (CoRTN88). The road traffic noise levels have been predicted using the SoundPlan computer model, based on the CoRTN88 traffic noise prediction method and is approved by TMR.

ASK has been advised by Stockland that Bells Creek Arterial will initially be constructed as a single carriageway two lane road, and therefore the assessment of noise impacts from this road has been undertaken using this configuration. When Bells Creek Arterial is upgraded to a dual carriageway road, mitigation of noise impacts from the dual carriageway road will be the responsibility of the party upgrading the road. The single carriageway uses the two western (northbound) lanes of the ultimate dual carriageway design, and this is considered conservative for this assessment.

The following data has been used in the noise calculations:

- Noise source height of 0.5 m.
- Ground contours for the site and Bells Creek Arterial road corridor were provided by Calibre Consulting.
- Receiver heights for the subject lot were placed 1.8m above ground contour height for the ground floors and at higher floors with a floor to floor height of 3.5m.

- Bells Creek Arterial was included in the model based on design drawings provided by Calibre Consulting, for a design originally produced by KBR. The design of Bells Creek Arterial will be revised in the future following progression of the design of the development.
- Road width as per design drawings provided by Calibre Consulting, and traffic lane advice provided by MWH Global.
- Traffic volumes for Bells Creek Arterial (peak capacity of two lane road design) as shown in **Table 3.1** have been provided by Stockland.
- The 18-hour traffic flow is taken to be 94% of the ultimate daily traffic flow.
- The road surface for all the roads used in the noise model is dense graded asphalt (DGA).
- The CoRTN road traffic noise model predicts the L_{10} (18 hour).
- A +2.5 dBA facade reflection allowance is included in the road traffic noise level predictions.
- Road traffic noise level predictions include the CoRTN calibration factors for Queensland conditions as detailed in Section 4.3.2.1 in TMR’s Transport Noise Management Code of Practice (2013). The corrections are -1.7dBA for facade corrected predictions, and -0.7dBA for free field predictions.

Table 3.1 Traffic Data for BCA

Road	Direction	AADT	18 Hour Traffic Volume	Heavy Vehicle % (CV%)	Speed
Bells Creek Arterial	Both Directions	30,000	28,200	4	100

3.2 Predicted Noise Levels

The road traffic noise levels have been predicted at the nominal building envelop for the subject lot. It has been advised that a carpark would be located along the eastern boundary of the subject lot to increase the separation distance between the building envelope and Bells Creek Arterial. For the purposes of this assessment it has been assumed that the carparking area results in a 40m offset from the eastern boundary to the building envelope. It has been assumed that the subject building may be five storeys high. The highest predicted road traffic noise level at each facade of the building are presented in **Table 3.2**. The receptor locations are presented in **Figure 3.1**.

Table 3.2 Predicted Road Traffic Noise Levels from BCA (Maximum Noise Level at each Facade)

Location	Facade	Predicted Noise Levels dBA	
		L_{10} (18hour) dBA	Maximum Day/Night L_{eq} (1hour) dBA
E1	East	70	70
E2	East	70	70
S1	South	66	66
S2	South	61	61
N1	North	66	66
N2	North	61	61
W1	West	50	50
W2	West	50	50

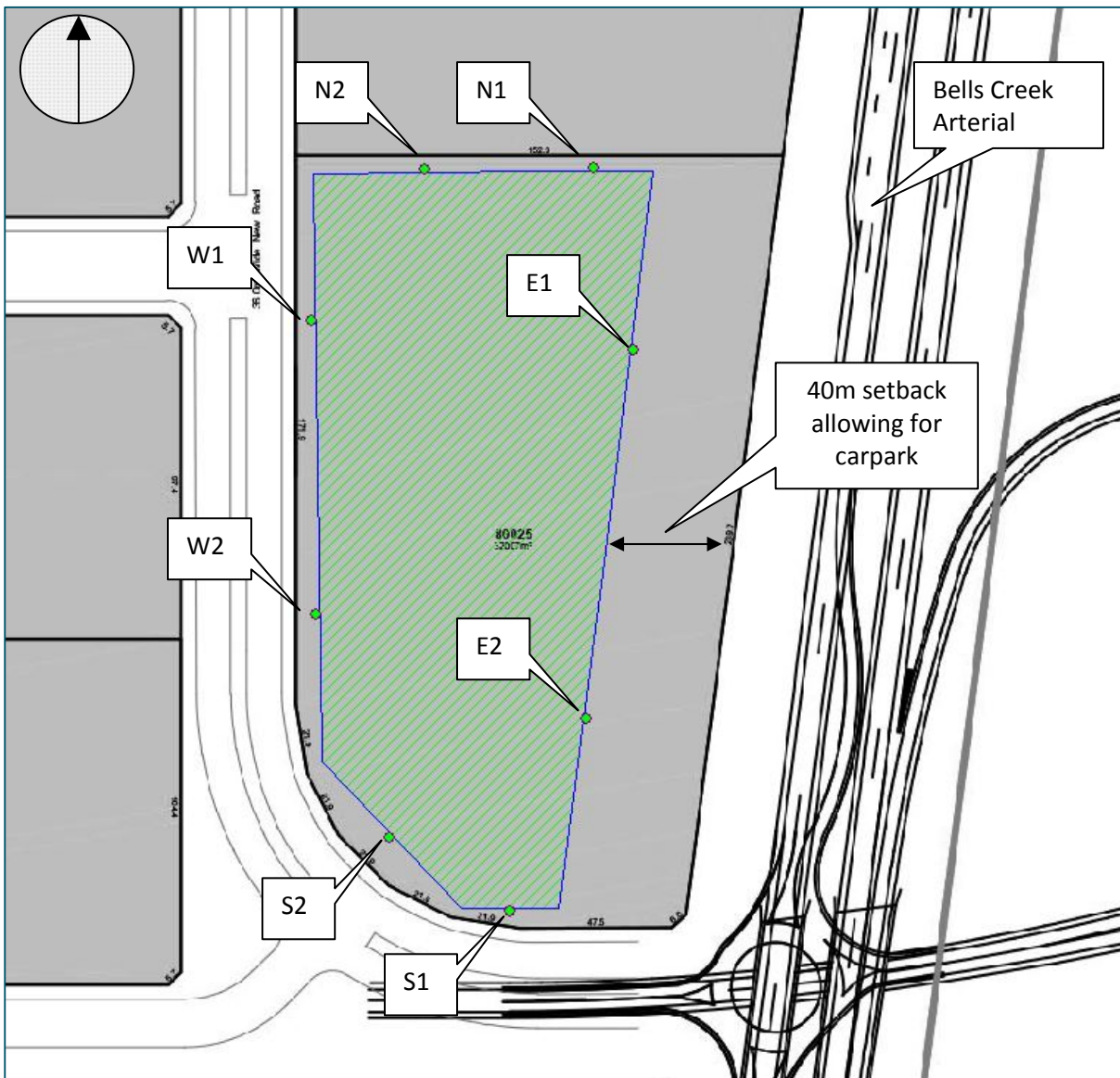


Figure 3.1 Location of Building Envelope and Receptors

3.3 Assessment and Mitigation Measures

The building construction requirements have been calculated using the algorithms in AS3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction. The calculations consider the following data:

- Room area.
- Wall, window, door and roof areas.
- Typical room reverberation characteristics.
- Building construction details.

For the purpose of this assessment it has been assumed that a small office/consulting room is located on the facade. These calculations have been conducted to determine where construction upgrades are required for the proposed development to meet the applicable noise criteria of 35 dBA $L_{eq}(1 \text{ hour})$.

Consideration has also been given to the acoustic performance of the glazing and the glazing area. The calculated acoustic performance requirements are presented in **Table 3.3**.

Table 3.3 Building Construction Upgrade Requirements (Maximum Noise Level at each Facade)

Location	Facade	Percentage Glazed Area of Facade %	Required Acoustic Ratings (Rw)	
			Walls	Glazing
E1	East	100	-	40
		50	52	37
E2	East	100	-	40
		50	52	37
S1	South	100	-	36
		50	52	33
S2	South	100	-	31
		50	52	28
N1	North	100	-	36
		50	52	33
N2	North	100	-	31
		50	52	28
W1	West	100	-	25
		50	52	25
W2	West	100	-	25
		50	52	25

Acoustic certification is required to be provided by the window/door supplier, the certification is to be based on acoustic testing of the overall window/door system (i.e. testing of the frame, glass and seals as proposed to be installed). Indicative acoustic performance ratings may include the following:

- External Walls (Rw 52):
 - Masonry external walls (Rw 52): 230mm brick veneer including 10mm plasterboard sheeting internal lining and 50 mm glasswool insulation in the cavity.
 - Steel stud: To achieve a rating of Rw 52 the lightweight walls 6mm fibre cement sheeting over minimum 76mm wide steel studwork lined internally with 2 layers of 13mm thick soundchek (or equivalent) sound rated plasterboard and 50mm glasswool insulation in the cavity.
 - Timber stud: To achieve a rating of Rw 52 the lightweight walls 6mm fibre cement sheeting over minimum 90mm wide timber studwork lined internally with 2 layers of 13mm thick soundchek (or equivalent) sound rated plasterboard mounted on a resilient channel and 50mm glasswool insulation in the cavity.
- Glazing:
 - It is recommended that a glazing supplier is consulted to ascertain the glazing systems required to achieve the acoustic performances.
 - Ratings between Rw 24 to Rw 30: Standard aluminium framed sliding window/door with 4mm (Rw 24) to 6mm laminated (Rw 30) glass and acoustic seals.
 - Ratings between Rw 31 to Rw 35: Awning window, fixed window or commercial grade window/door with 6mm laminate (Rw 31) to 12mm laminated (Rw 35) glass, or double glazed window arrangement and acoustic seals.

It is recommended that a detailed acoustic assessment is undertaken at a later stage of the project to confirm the exact acoustic performance requirements when site plans/layouts are available.

4. Conclusions and Recommendations

A preliminary road traffic noise assessment has been undertaken to assess the potential road traffic noise impacts onto Lot 80025 within Precinct 8.4. It is understood the Queensland Health have expressed interest in the construction of a health building including offices and consulting rooms, on the lot and are seeking to understand the implications of road traffic noise impacts from Bells Creek Arterial onto the subject lot. **Table 3.3** presents the potential acoustic performance glazing requirements for a building envelope located 40m from the eastern boundary. It is understood that the subject site may include other non-sensitive buildings, therefore the configuration and layout of the site will have an influence on the potential acoustic requirements for the proposed building. It is recommended that a detailed acoustic assessment is undertaken at a later stage of the project to confirm the exact acoustic performance requirements when site plans/layouts are available.