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Randwick Campus Redevelopment - Prince of Wales Hospital - Lowering of Hospital Road

Construction Noise and Vibration Management Sub Plan (CNVMP)

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TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

This Construction Noise Vibration Management Plan (CNVMP) presents the results of an assessment of potential noise and vibration impacts associated with the earthworks, excavation and construction components of the Randwick Campus Redevelopment Integrated ASB Addition

This assessment has been conducted in accordance with the requirements below:

- Conditions A30, B11, B12, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C18,C19, C21, C20, C22 and C23 of the Development Consent from the Minister for planning and Public Spaces dated 18th December 2019 with application number: SSD 10339;
- NSW EPA Interim Construction Noise Guideline (ICNG);
- A consideration of the procedures and requirements set out Australian Standard 2436-2010 "Guide to Noise Control on Construction, Maintenance and Demolition Sites";
- The requirements to control noise emissions from the construction site to levels which does not cause undue disturbance to the identified receiver locations;
- Consideration of the noise mitigation measures available.
- German Standard DIN 4150-3 (1999-02) "Structural Vibration Effects of Vibration on Structures";

Noise/ vibration Control strategies have been formulated within this plan to ensure that the construction noise/vibration impacts from the site are minimised. In particular, a detailed outline of the community consultation procedures proposed for the site which has been included which will form the basis of the noise/vibration control strategy.

The Construction Noise and Vibration Management Plan (CNVMP) should also be updated during the construction period in response to the information gathered during this period.

2 INTRODUCTION

This report presents the recommended approach for managing noise and vibration arising from the development of the Randwick Campus Redevelopment Integrated ASB Addition.

The principal objective of this study is to undertake an evaluation of work to be performed during the excavation and construction of the project and forecast the potential impact of noise and vibration emissions. The evaluation will be used to formulate and streamline effective regulation and mitigation measures. The objective is to minimise noise emissions from the construction process or to schedule works, which may have a significant acoustic impact on adjoining receivers.

The principal issues, which will be addressed in this report, are:

- Identification of the noise and vibration guidelines which will be applicable to this project.
- Identification of potentially impacted receivers.
- Prediction of likely noise levels impacting surrounding receiver locations.
- Formulation of a strategy for construction to comply with the guidelines identified.

A critical component of this report is the formulation of noise control strategies for the different construction processes. These strategies include the formulation of site management procedures, whether they be operational, or time based. A detailed noise and vibration management plan forms part of this report.

In the report construction noise and vibration management levels are formulated based on the following:

- Conditions A30, B11, B12, C4, C5, C7, C6, C8, C9, C10, C11, C12, C13, C18,C19, C21, C20, C22 and C23 of the Development Consent from the Minister for planning and Public Spaces dated 18th December 2019 with application number: SSD 10339;
- NSW EPA Interim Construction Noise Guideline (ICNG);
- A consideration of the procedures and requirements set out Australian Standard 2436-2010 "Guide to Noise Control on Construction, Maintenance and Demolition Sites";
- The requirements to control noise emissions from the construction site to levels which does not cause undue disturbance to the identified receiver locations;
- A consideration of the noise mitigation measures available;
- German Standard DIN 4150-3 (1999-02) "Structural Vibration Effects of Vibration on Structures";

Provided all measures outlined in this report are fully implemented, noise and vibration associated with the construction of the development will be strictly controlled, and the impact on the surrounding environments will be minimised.

3 SITE DESCRIPTION AND PROPOSED WORKS

The project subject site is located between the Randwick Campus Redevelopment Integrated ASB Addition (under construction) and Hospital Road, Randwick as indicated in figure 2-1.

The Randwick Campus Redevelopment Integrated ASB Addition includes the lowering of Hospital Road, These works will occur concurrently to the ASB construction.

The proposed work is detailed below:

- Services Diversion works which includes:
    - Trenching from a depth of 1m to 8m using with a 30 ton excavator;
    - Rock breaking using a combination of rock sawing and hammering depending on ground conditions;
    - Install of trench boxes; and
    - Bogie truck load out of materials, (between 4-8 vehicles per day).
- Piling works for retention to excavate and lower road, and foundation piles which includes:
    - 50 ton bored piling and CFA rig;
    - Construction of capping beam; and
    - Installation and removal of pile matt for rig which via a 30tn excavator and vibratory roller to compact the matt for engineer certification.
- Bulk excavation for the lowering of the road from 0-8m in depth including:
    - 30 ton excavator for excavating as well as rock breaking using rock saw, hammer;
    - Bogie trucks for spoil removal 4-10/day (between 4-8 vehicles per day); and
    - Road pavement construction including delivery of road base and asphalt utilising vibratory compactor roller.
- Construction of prefabricated link bridges to connect the existing hospital to the new building:
    - 2 x mobile cranes circa 200tn delivered to site to lift in prefabricated steel sections;
    - Expected over 2-6 weekends to complete activity; and
    - Boom lifts to have workers at height bolt connecting sections of steel.
- Construction of UNSW Extension building which includes:
    - Structural steel jump section which is bolted steel frame off foundation piles;
    - Form, reo pour construction of 10 storeys (normal construction);
    - External screens for edge protection of the structure for noise control; and
    - Install of façade (cold shell) base building.

4 NEAREST NOISE AND VIBRATION RECEIVERS

Site investigation indicates that the nearest noise /vibration receivers are below:

Receiver 1 – Sydney Children's Hospital located along the north eastern boundary of the project site across Hospital Road, Randwick;

Receiver 2 – Margarete Ainsworth Building located along the eastern boundary of the project site across Hospital Road, Randwick.

Receiver 3 – Prince of Wales Hospital and Prince of Wales Private Hospital located along the eastern

Receiver 4 – Randwick Royal Hospital for Woman located along the eastern boundary of the project site across Hospital Road, Randwick; and

Receiver 5 – Residential Dwellings situated along the Southern Boundary of the Project site stretching from 103 Botany Street to 15 Magill Street, Randwick.

For a detailed description of the project site, please see figures 2-1 and 2-2 below.

Figure 2-1 Full Site Map and Measurement Locations Site Map Sourced SIX maps NSW

Project site

Figure 2-2
Site Map Randwick Campus Redevelopment
Intergrade ASB Addition

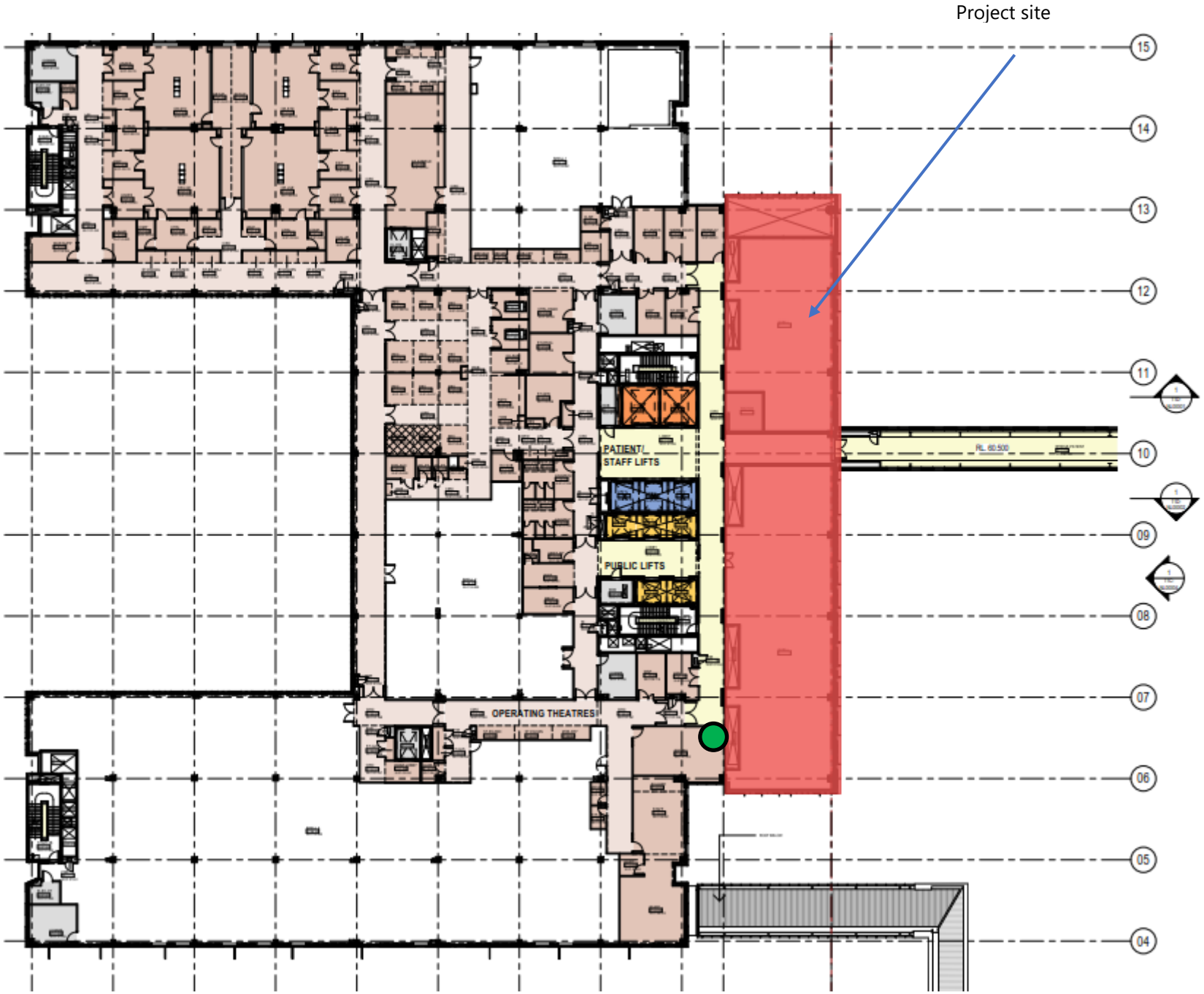


Figure 2-3
Site Map Randwick Campus Redevelopment
Intergrade ASB Addition

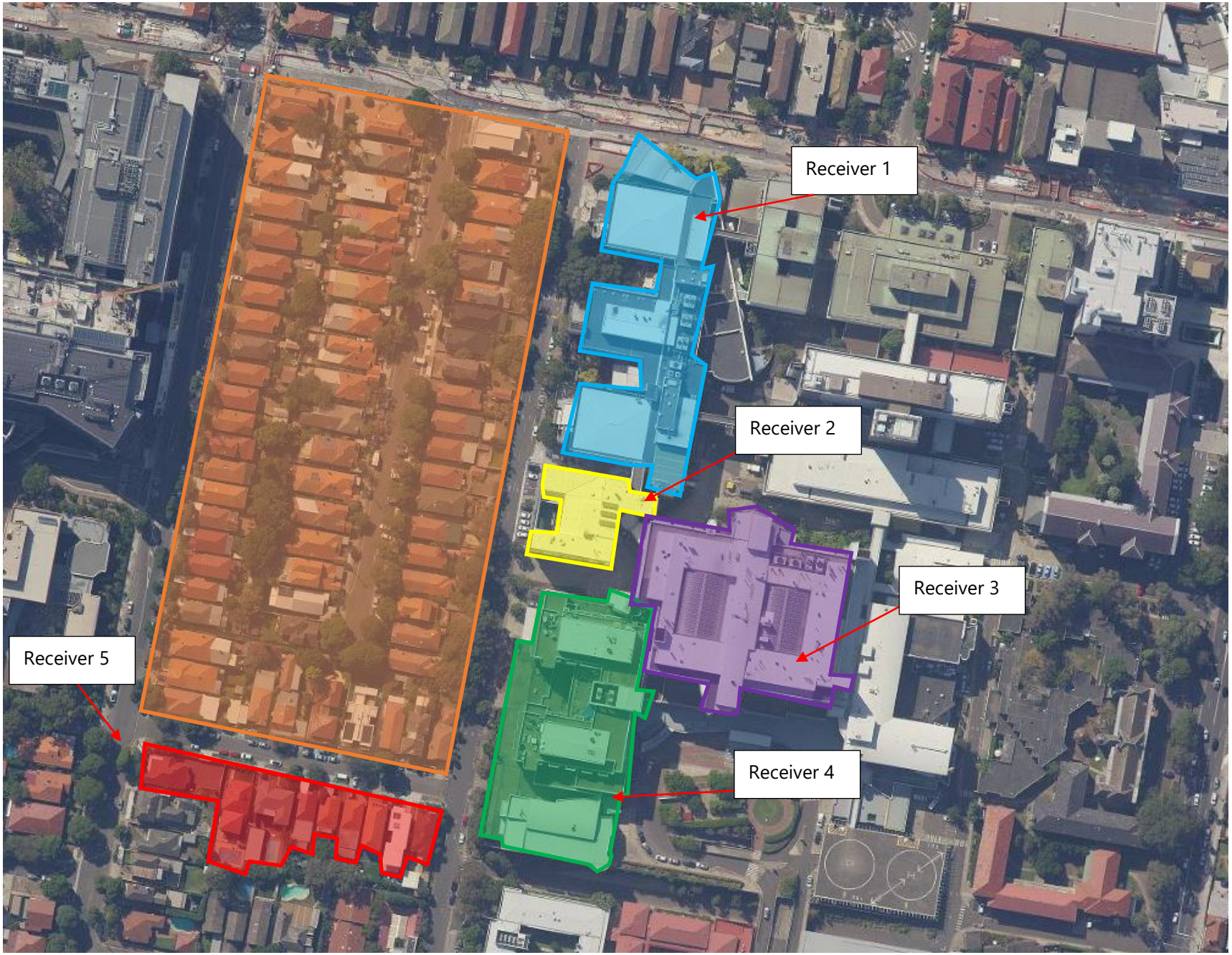


Figure 2-4 Site map and affected receivers

5 REQUIREMENTS FROM THE DEVELOPMENT CONSENT DATED 18TH DECEMBER 2019 (SSD 10339)

5.1 CONDITIONS A30, B11, B12, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C18, C19, C20, C210, C22 AND C23 OF THE DEVELOPMENT CONSENT FROM THE MINISTER OF PLANNING AND PUBLIC SPACES

A30: The Applicant must provide a Noise Mitigation Strategy prepared by a suitably qualified acoustic consultant for the approval of the Planning Secretary identifying mitigation measures, including architectural treatments (if required) to be offered to all residences on the southern side of Magill Street, to ensure the internal noise levels do not exceed the sleep disturbance criteria in accordance with the Noise Policy for Industry (EPA 2017). If accepted the treatments must be installed at no cost to the resident.

B11: Prior to the commencement of construction, the applicant must submit a Construction Environment Management Plan (CEMP) to the Certifier and provide a copy to the Planning Secretary. The CEMP must include, but not limited to, the following:

- *(a) Details of Work*
  - *i. Hours of work;*
  - *ii. 24-hour contact details of site manager;*
  - *iii. Management of dust and odour to protect the amenity of the neighbourhood;*
  - *iv. Stormwater control and discharge;*
  - *v. Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site;*
  - *vi. Groundwater management plan including measures to prevent groundwater contamination;*
  - *vii. External temporary lighting in compliance with AS 4282-2019 Control of obtrusive effects of outdoor lighting;*
  - *viii. Community consultation and complaints handling;*
- *(b) Construction Noise and Vibration Management Sub-Plan*
- *(c) Construction Waste Management Sub Plan*
- *(d) Construction Soil and Water Management Sub-Plan*
- *(e) An unexpected finds protocol for containment and associated communications procedure;*
- *(f) An unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure;*
- *(g) Waste classification (for materials to be removed) and validation for materials to remain) be undertaken to confirm the contamination status in these areas of the site;*

B12: The Construction and Noise Vibration Management Sub-Plan must address, but not be limited to, the following:

- *(a) Be prepared by a suitably qualified and experienced noise expert;*
- *(b) Describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);*
- *(c) Describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;*
- *(d) Include strategies that have been implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;*
- *(e) Describe the community consultation undertaken to develop the strategies in condition B12(d);*
- *(f) Include a complaints management system that would be implemented for the duration of the construction;*
- *(g) Mitigation measures to minimise impacts of works undertaken outside standard hours;*

(h) Adherence to the recommendations of the report titled Noise and Vibration Impact Assessment Issue 5 dated 5 August 2019 and prepared by Acoustic Studio, as modified by the conditions of this consent.

C4: Construction, including the hours of delivery of materials to and from the site, may only be carried out between the following hours:

a) Between 7am and 6pm, Monday to Friday inclusive; and
b) Between 8am and 5pm, Saturdays.

No work may be carried out on Sundays or public holidays.

C5: Construction activities may be undertaken outside of the hours in condition of C4 if required:

a) By the police or public authority for the delivery of vehicles, plant or materials; or
b) Ina an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or
c) For the delivery, set-up and removal of construction cranes, where notice of the crane related works is provided t9o the Planning Secretary and affected residents at least seven days prior to the works; or
d) Where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

C6- Notification of such construction activities as referenced in condition C5 must be given to affected residents before undertaking the activities or as soon as is practical afterwards

C7: Construction activities may be undertaken outside of the hours in condition C4, in accordance with the schedule of out of hours work nominated at section 3.4.2 and table 3.3 of the EIS to maintain operation of the hospital loading dock, unless directed otherwise by the Planning Secretary, and must be restricted to the following times and type of works:

The out of hours work weekends nominated at section 3.4.3 and table 3.3 of the EIS to maintain operation of the hospital loading dock, as follows:

a. Friday: 6:00 pm to 10:00 pm (limited to site establishment activities in preparation for weekend works)
b. Saturday: 5:00 pm to 10:00 pm (general construction activities excluding excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like);
c. Sunday: 8:00 am to 5:00 pm (general construction activities including excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like); and
d. Sunday: 5:00 pm to 10:00 pm (general construction activities excluding excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like).

C8: The Work permitted under Condition C7:

a. May be undertaken for a trial period of four weekends to monitor the effectiveness of the Construction Noise and Vibration Management Plan (CNVMP) for the out-of-hours works required by condition C9, with a start date and the weekends notified in writing to the planning secretary 14 calendar days prior to commencement. At the conclusion of the trail period, the applicant must submit a written report as required by condition C11 within 14 calendar days.
b. May continue in accordance with the schedule in accordance with C7 if the Planning Secretary does not advise within two weeks of submission of the trial period report that the works must cease.
c. Must be supported by respite days where continuous days of construction exceed 13 days. A respite day must be provided after 14 consecutive days of working.

C9: In undertaking any out-of-hours works under condition C7, the Applicant must comply with the following:

a. *Prepare a CNVMP for the out-of-hours work that is to include:*
    i. *A description of the proposed out-of-hours works;*
    ii. *Predictions of LAeq (15minute) noise levels at noise sensitive receivers from these works and activities, where noise levels are predicted to be greater than the construction noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009)*
    iii. *A monitoring plan to validate the noise predictions, based on monitoring at the boundary of representative sensitive receivers during noise generating activities that are representative of the out-of-hours works;*
b. *The Applicant must submit the CNVMP to the Planning Secretary 14 calendar days prior to any work commencing for the duration of the trial period*

C10: In undertaking any out-of-hours works under condition C7, the applicant must notify potential affected noise sensitive receivers of works outside of standard construction hours not less than five calendar days and not more than 14 calendar days before those works are to be undertaken.

a. *The notification must be:*
    i. *undertaken by letterbox drop or email; and*
    ii. *be detailed on the project website.*
b. *The notification required by this condition must:*
    i. *clearly outline the reason that the work is required to be undertaken outside the hours specified in condition C7;*
    ii. *include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks;*
    iii. *include details of relevant time restrictions that apply to the proposed works;*
    iv. *clearly outline in plain English, the location, nature, scope and duration of the proposed works;*
    v. *detail the expected noise impact of the works on noise sensitive receivers;*
    vi. *clearly state how complaints may be made and additional information obtained; and*
    vii. *include the number of the telephone complaints line, which must also be the after*
    viii. *hours contact phone number specific to the works undertaken outside the hours specified in condition C7, and the project website address.*

C11. For out-of-hours works permitted under condition C7, a validation report must be submitted to the Planning Secretary within 14 calendar days of the completion of the trial that includes the following detail:

a. *A copy of the community notification required under condition C10; and*
b. *noise monitoring undertaken during the out of hours works; and*
c. *details of any exceedances of noise levels predicted in the CNVMP; and*
d. *details of the noise and vibration mitigation measures that were implemented during the out-of-hours works; and*
e. *a summary of any community complaints received by the project during the trial period.*

C12: Rock breaking, rock hammering, sheet piling, pile driving, and similar activities may only be carried out between the following hours:

a. *9am to 12pm, Monday to Friday;*
b. *2pm to 5pm Monday to Friday; and*
c. *9am to 12pm, Saturday.*

C13: Where high noise impact activities are undertaken in accordance with the schedule of weekend closures of the loading dock nominated at section 3.4.2 and table 3.3 of the EIS to maintain operation of the hospital loading

dock, the requirements of condition C12 do not apply provided that all high noise impact activities are undertaken prior to 5pm where reasonable and feasible.

C18: The development must be constructed to achieve the construction noise management levels detailed in the interim construction noise guideline (DECC, 2009). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures identified in the approved Construction Noise and Vibration Management Plan.

C19: The applicant must ensure construction vehicles (including concrete alligator trucks) do not arrive at the site or surrounding residential precincts outside of the construction hours of work outlined under conditions C4 and C7.

C20: The applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, the use of 'quackers 'to ensure noise impacts on surrounding noise sensitive receivers are minimised.

C21: Vibration caused by construction at any residence or structure outside the site must be limited to:

a) For structural damage, the latest version if DIN4150-3 (1992-02) Structural vibration – effects of vibration on structures (German Institute for standardisation, 1999);
b) For human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: a technical guideline (DECC 2006)

C22: Vibratory compactors must not be used closer than 30 meters from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in condition 21

C23: The limits in condition C21 and C22 apply unless otherwise outlined in a Construction Noise and Vibration Management Sub-Plan approved as part of the CEMP required by condition B12 of this consent or CNVMP required by condition C9(a) of this consent.

6 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed below.

6.1 MEASUREMENT EQUIPMENT

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

6.2 MEASUREMENT LOCATION

An unattended noise monitor was installed on ground level along the southern boundary of the proposed project site at 103 Botany Street, Randwick.

6.3 MEASUREMENT PERIOD

Acoustic Logic Consultancy conducted unattended noise monitoring from Friday the 22nd of November to Friday the 6th of December 2019.

6.4 MEASURED BACKGROUND NOISE LEVELS

The Rating Background Noise Levels (RBL) established from the unattended noise monitoring are detailed in the Table below.

NSW EPA's RBL assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

This report provides detailed results of the unattended noise monitoring. Weather affected data was excluded from the assessment. The processed Rating Background Noise Levels (lowest 10th percentile noise levels during the operational time period) are presented in Table below.

Unattended and attended noise measurements have been undertaken as per the procedures outlined in Fact Sheet A and B of the NSW EPA Noise Policy for Industry.

Weather affected data (rain fall and wind speeds above 5m/s) have been excluded from the assessment as per Fact Sheet A and B. Where interval periods (day, evening and night) have 18%, 13% and 11% respectively, these periods have been excluded from the assessment.

Unattended Noise Monitor – Logger location 1 – Rating Background Noise Level

Date	dB(A)$L_{90(Period)}$ [1]		
	Day (7am-6pm)	**Evening (6pm-10pm)**	**Night (10pm-7am Next Day)**
22nd November 2019	44	45	42
23rd November 2019	44	43	42
24th November 2019	42	43	42
25th November 2019	50	47	43
26th November 2019	48	43	44
27th November 2019	47	45	42
28th November 2019	50	47	42
29th November 2019	48	48	44
30th November 2019	44	43	43
1st December 2019	43	44	41
2nd December 2019	45	44	42
3rd December 2019	44	44	42
4th December 2019	45	45	42
5th December 2019	46	44	43
6th December 2019	45	-	-
Median	**45**	**44**	**42**

Table Notes:

1. Periods marked "-" above did not collect the enough data to be considered valid as the monitor was either installed before, during or after the interval.

Onsite attended and unattended noise measurements for the project site are indicated below (Acoustic Studio Report Reference Number: 20190805AUR.0101.Rep.Issue5.docx).

Location	Background Noise Levels (RBL), dB(A)			Leq Ambient Noise Levels, dB(A)		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
Logger Location 3 79 Botany Street (Catchment D)	47	41	39	60	58	55
Logger Location 11 7 Magill Street (Catchment B)	46	44	43	55	51	51
Logger Location 12 12 Blenheim Street (Catchment A)	47	45	43	59	53	55
Logger Location 13 40 Botany Street (Catchment B)	49	46	43	65	64	59

Table 2: Long-term background and ambient noise levels

The following table provides a summary of the background noise data applicable to the subject site:

Table 1 -Summarised Background Noise Levels

Project Site	Monitor Location	Acoustic Logic Measured Noise Data	Monitor Location	Acoustic Studio Measured Noise Data	Adopted RBL*
Randwick Campus Redevelopment Intergrade ASB Addition	103 Botany Street, Randwick	Day – 45	7 Magill Street, Randwick	Day – 46	45
		Evening – 44		Evening – 44	44
		Night - 42		Night - 43	42

*Note: the lowest background noise levels have been adopted for this assessment

7 NOISE MANAGEMENT TRIGGER LEVEL

Noise emissions from excavation/construction should satisfy the following:

- Requirements of the SSD 10339 from the Minister for Planning and Public Spaces;
- NSW EPA Interim Construction Noise Guideline (ICNG) 2009; and
- Australian Standard AS 2436:2010

7.1 REQUIREMENTS BY NSW EPA INTERIM CONSTRUCTION NOISE GUIDELINE

The NSW EPA Interim Construction Noise Guideline (ICNG) 2009 details specific construction noise and vibration management levels applicable to construction sites within NSW.

Where feasible and practical measures may be applied to the construction site is to endeavour to comply with the noise management levels outlined in the guideline. A summary of the code is detailed below.

7.1.1 NSW EPA interim Construction Noise Guideline (ICNG) 2009

NSW EPA INCG adopts different management levels depending on the applicable receiver type, each is discussed below.

7.1.2 Residential Receivers

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected"* level. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than:
    - 10dB(A)Leq(15min) for work during standard construction; and
    - 5dB(A)Leq(15min) for work outside standard construction hours.
- "Highly noise affected level". Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences. Highly noise affected level only applies during standard construction hours.

Table 2 – Construction Noise Management Level

Receiver Type	"Noise Affected" Level dB(A)$L_{eq(15\text{-}minutes)}$	"Highly Noise Affected" Level dB(A)$L_{eq(15\text{-}minutes)}$
Residential Receivers	Background + 10dB(A) (Standard Construction Hours)	75
	Background + 5dB(A) (Outside Standard Construction Hours)	-

7.1.3 Other Sensitive Land Uses

Other sensitive land uses, such as schools and hospitals typically consider noise from construction to be disruptive when the properties are being used. The table below presents management levels for noise at other sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

External noise levels are to be assessed at the most affected point within 50m of the area boundary. Where internal noise levels cannot be measured, external noise levels may be used. A conservative estimate of the difference between internal and external noise levels is 10 dB for buildings other than residences. Some buildings may achieve greater performance, such as where windows are fixed (that is, cannot be opened)

Table 3 -Noise at Sensitive Land Uses

Land Use	Management Trigger Level $L_{Aeq(15min)}$
Hospital Wards and operating theatres	Internal noise level 45dB(A)

7.2 AUSTRALIAN STANDARD AS 2436:2010 "GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION SITES"

Australian Standard AS 2436 provides guidance on noise and vibration control in respect to construction and demolition sites, the preparation of noise and vibration management plans, work method statements and impact studies.

The standard states that:

- "Some construction and demolition activities are by their very nature noisy. The authorities responsible for setting noise level criteria for essential works will take note of the constraints imposed by such activities, especially when they are of short duration."
- Construction, demolition and maintenance works pose different problems of noise and vibration control when compared with most other types of industrial activity, since (a) they are mainly carried on in the open; (b) they are often temporary in nature although they may cause considerable disturbance whilst they last; (c) the noise and vibration arise from many different activities and kinds of plant, and their intensity and character may vary greatly during different phases of the work; and (d) the sites cannot be separated by planning controls, from areas that are sensitive to noise and vibration..

The standard provides advice and guidelines for the prediction of impacts and the methods available to manage impacts. The guideline promulgates feasible and reasonable mitigation strategies and controls, and stakeholder liaison, in the effort to reach a realistic compromise between site activities and impacts on neighbouring properties.

7.3 SUMMARISED CONSTRUCTION NOISE MANAGEMENT TRIGGER LEVELS

Construction noise management levels applicable to the development have been determined based on the minimum background noise level recorded and the construction noise guidelines detailed in section 7 of this report. Construction noise management levels of the site are detailed in Table 4 below.

Table 4 – External Construction Noise Management Levels

Receiver	Category	Time of Day	Background Noise Level dB(A)$L_{90(Period)}$	Construction noise Management Trigger Levels dB(A)$L_{eq(15\text{-}minute)}$
Receiver 6 (Residential)	Monday to Friday	7am to 6pm (BG + 10 Period)	45	55
	Monday to Friday	6:00pm to 10:00pm (BG + 5)	44	49
	Saturday	5:00pm to 10:00pm (BG + 5)	44	49
	Sunday	8:00am to 5:00pm (BG + 5)	45	50
		5:00pm to 10:00pm (BG + 5)	44	49
Receivers 1, 2, 3, 4 and 5 Other sensitive land uses	Monday – Sunday	Applies when properties are being used (Internal)	-	45

8 VIBRATION CRITERIA

State Significant development consent from the Minister for Planning and Public Spaces - SSD10339SSD condition C21, C22 and C23 state the following:

C21: *Vibration caused by construction at any residence or structure Outside the site must be limited to:*

a) for structural damage, the latest version of DIN 4150-3 {1992-02) Structural vibration - Effects of vibration on structures (German Institute for Standardisation, 1999); and
b) for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: a technical guideline (DECC, 2006) (as may be updated or replaced from time to time).

C22: *Vibratory compactors must not be-used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in condition C21.*

C23: The limits in conditions C21 and C22 apply unless otherwise outlined in a Construction Noise and Vibration Management Sub-Plan, approved as part of CEMP required by condition B12 of the consent or CNVMP required by condition C9(a) of this consent.

8.1 CONSTRUCTION VIBRATION

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- For structural damage vibration, German Standard DIN 4150-3 Structural Vibration: Effects of Vibration on Structures; and

The criteria and the application of this standard are discussed in separate sections below.

8.2 STRUCTURE DAMAGE CRITERIA

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 2.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 5 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

Type of Structure		Peak Particle Velocity (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

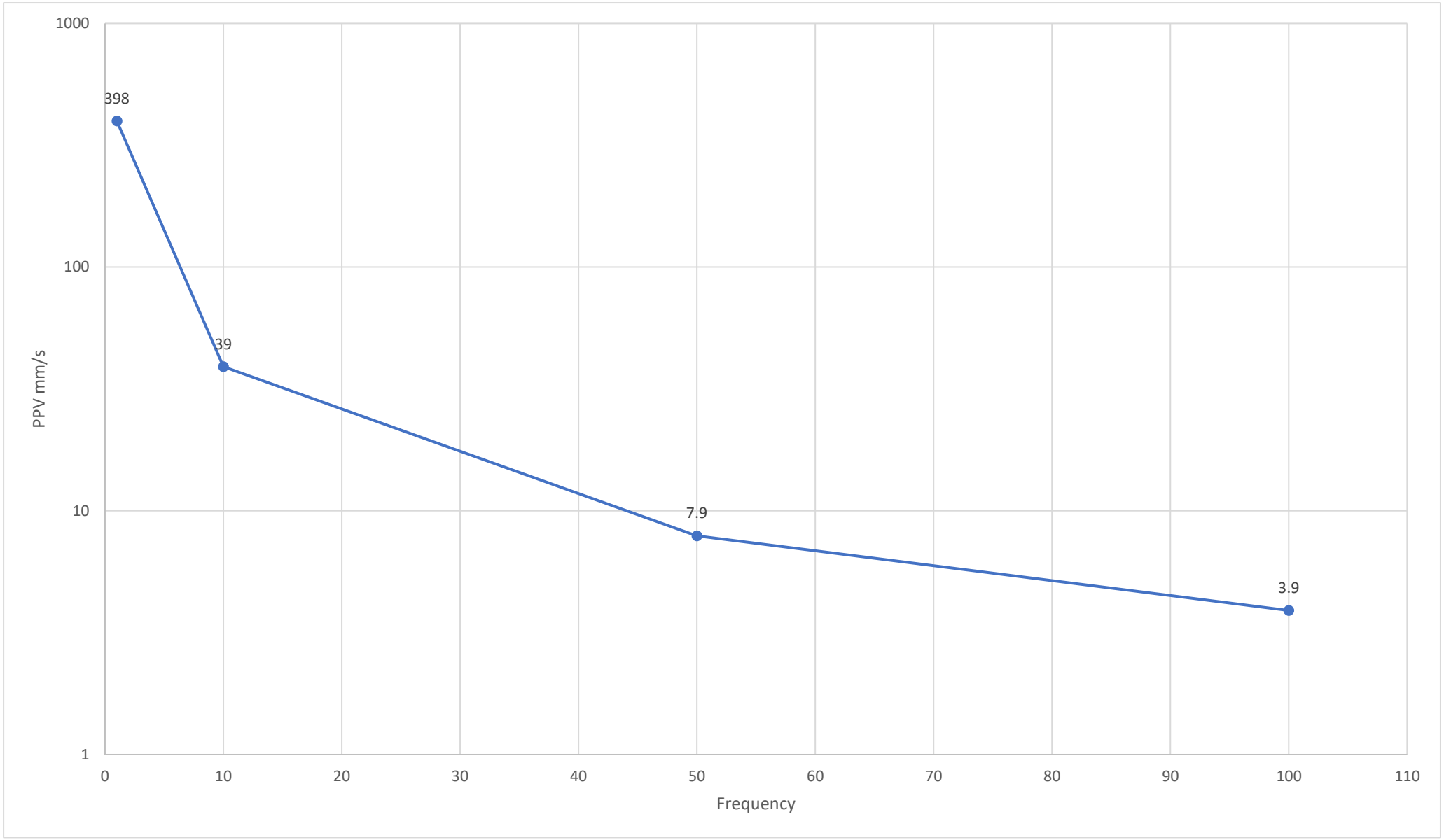
8.3 SENSITIVE EQUIPMENT VIBRATION CRITERIA

Acoustic Logic Consultancy have been advised that sensitive equipment is located within The Prince of Wales Hospital Foundation building with a nominated criterion of 2.5 m/s^2. The corresponding Peak Particle Velocity has been calculated and is presented in the table and graph below.

Table 6 –Vibration Limit to Vibration Sensitive Machines

Sensitive Equipment	Peak Particle Velocity (mms^{-1})				
	At a Frequency of				Recommended Limit
	1Hz	10Hz	50Hz	100Hz	
	398	39	7.9	3.9	3.9

Sensitive Equipment Vibration Criteria PPV



9 PREDICTED CONSTRUCTION NOISE LEVELS

Noise from the worst-case construction works for each phase of the development have been predicted to the nearest most affected sensitive receivers. The predicted noise levels are presented in this section.

The following presents the predicted noise levels for each item of typically louder plant. Noise has been predicted to surrounding sensitive uses. The loudest typical appliances for each phase has been included and presented as a cumulative assessment.

The proposed construction works proposed for the site will include the following:

- Excavation Phase
- Construction Phase

The proposed works have been divided into a number of main works phases, along with the primary noise producing equipment and activities likely to occur in each phase.

Table 7 – Excavation and Construction Activities

Construction Activity	Equipment	Sound Power Level dB(A)L_{max}
Excavation Phase	Excavator Hydraulic Hammer	120
	Excavator Bucket	110
	Saw Rock Cutting	105
	CFA Piling	105
General Construction Works	Trucks	105
	Concrete Pumps	110
	Crane	105
	Concreting Helicopter	105
	Powered Hand Tools	94

The noise levels presented in the above table are derived from the following sources:

1. Table D2 of Australian Standard 2436-1981;
2. Data held by this office from other similar studies

9.1 PREDICTED CONSTRUCTION NOISE LEVELS

Noise from the worst-case construction works for each phase of the development have been predicted to the nearest most affected sensitive receiver.

The following tables presents the predicted noise levels for each item of typically loudest plant.

Table 8 – Noise Emission Assessment Receiver 1 (Sydney Children's Hospital)

Activity	Sound Power Level	Predicted internal Noise Level dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	61-51	45	Yes
Excavator Bucket	110	51-41	45	Yes
Saw Rock Cutting	105	45-36	45	No
CFA Piling	105	45-36	45	No
Builders Hoist	105	45-36	45	No
Trucks	105	45-36	45	No
Concrete Pumps	110	51-41	45	Yes
Crane	105	45-36	45	No
Concreting Helicopter	105	45-36	45	No
Powered Hand Tools	94	35-25	45	No

Table 9 – Noise Emission Assessment Receiver 2 (Margarete Ainsworth Building)

Activity	Sound Power Level	Predicted Level at Receiver dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	67-55	45	Yes
Excavator Bucket	110	57-45	45	Yes
Saw Rock Cutting	105	52-40	45	Yes
CFA Piling	105	52-40	45	Yes
Builders Hoist	105	52-40	45	Yes
Trucks	105	52-40	45	Yes
Concrete Pumps	110	57-45	45	Yes
Crane	105	52-40	45	Yes
Concreting Helicopter	105	52-40	45	Yes
Powered Hand Tools	94	41-29	45	No

Table 10 – Noise Emission Assessment Receiver 3 (Prince of Wales Hospital and Private Hospital)

Activity	Sound Power Level	Predicted Level at Receiver dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	67-55	45	Yes
Excavator Bucket	110	57-45	45	Yes
Saw Rock Cutting	105	52-40	45	Yes
CFA Piling	105	52-40	45	Yes
Builders Hoist	105	52-40	45	Yes
Trucks	105	52-40	45	Yes
Concrete Pumps	110	57-45	45	Yes
Crane	105	52-40	45	Yes
Concreting Helicopter	105	52-40	45	Yes
Powered Hand Tools	94	41-29	45	No

Table 11 – Noise Emission Assessment Receiver 4 (Randwick Royal Hospital for Woman)

Activity	Sound Power Level	Predicted Level at Receiver dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	52-47	45	Yes
Excavator Bucket	110	42-37	45	No
Saw Rock Cutting	105	37-32	45	No
CFA Piling	105	37-32	45	No
Builders Hoist	105	37-32	45	No
Trucks	105	37-32	45	No
Concrete Pumps	110	42-37	45	No
Crane	105	37-32	45	No
Concreting Helicopter	105	37-32	45	No
Powered Hand Tools	94	26-21	45	No

During the Day Time Period

Table 12 – Noise Emission Assessment Receiver 5
Residential Receivers (Magill Street)

Activity	Sound Power Level	Predicted Level at Receiver dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	67-55	55	Yes
Excavator Bucket	110	57-45	55	Yes
Saw Rock Cutting	105	52-40	55	No
CFA Piling	105	52-40	55	No
Builders Hoist	105	52-40	55	No
Trucks	105	52-40	55	No
Concrete Pumps	110	57-45	55	Yes
Crane	105	52-40	55	No
Concreting Helicopter	105	52-40	55	No
Powered Hand Tools	94	41-29	55	No

During the Evening Period (Heavy Machinery to stop work at 6:00pm)

Table 13 – Noise Emission Assessment Receiver 5
Residential Receivers (Magill Street)

Activity	Sound Power Level	Predicted Level at Receiver dB(A)$L_{eq(15\text{-}minute)}$	Management Trigger Level dB(A)$L_{eq(15\text{-}minute)}$	Management Required
Excavator Hydraulic Hammer	120	67-55	49	Yes
Excavator Bucket	110	57-45	49	Yes
Saw Rock Cutting	105	52-40	49	Yes
CFA Piling	105	52-40	49	Yes
Builders Hoist	105	52-40	49	Yes
Trucks	105	52-40	49	Yes
Concrete Pumps	110	57-45	49	Yes
Crane	105	52-40	49	Yes
Concreting Helicopter	105	52-40	49	Yes
Powered Hand Tools	94	41-29	49	No

10 AMELIORATIVE MEASURES

On review of the tables above and the predicted areas of compliance and exceedance with noise emission goals, the following noise management recommendations have been developed.

10.1 TRIAL PERIOD

State Significant development consent from the Minister for Planning and Public Spaced – SSD10339 condition C8- The work permitted under condition C7:

a) *May be undertaken for a trial period of four weekends to monitor the effectiveness of the Construction Noise Vibration Management Plan (CNVMP) for the out-of-hour works required by condition C9, with a start date and the weekends notified in writing to the trial period, the Applicant must submit a written report as required by condition C11 within 14 calendar days.*

Acoustic testing will be carried out within noise sensitive areas during the trial periods to validate the predicted noise levels. Management controls maybe adjusted based on measured noise levels.

10.2 RESPITE PERIODS FOR HYDRAULIC HAMMERING

State Significant development consent from the Minister for Planning and Public Spaces - SSD10339SSD condition C4, C5, C6 and C7 state the following:

C4- Construction, including the delivery of materials to and from the site, may only be carried out between the following hours:

a. *between 7am and 6pm, Mondays to Fridays inclusive; and*
b. *between 8am and 5pm, Saturdays.*

- (it is noted that no works are to be conducted on Sundays or Public Holidays)

C5- Construction activities may be undertaken outside of the hours in condition C4 if required:

a. *By the Police or a public authority for the delivery of vehicles, plant or materials; or*
b. *In an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or*
c. *Where the works are inaudible at the nearest sensitive receivers; or*
d. *For the delivery, set-up and removal of construction cranes, where notice of the crane-related works is provided to the Planning Secretary and affected residents at least seven days prior to the works; or*
e. *Where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.*

C6- Notification of such construction activities as referenced in condition C5 must be given to affected residents before undertaking the activities or as soon as is practical afterwards

C7- Construction activities may be undertaken outside of the hours in condition C4, in accordance with the schedule of out of hours work nominated at section 3.4.2 and table 3.3 of the EIS to maintain operation of the hospital loading dock, unless directed otherwise by the Planning Secretary, and must be restricted to the following times and type of works:

The out of hours work weekends nominated at section 3.4.3 and table 3.3 of the EIS to maintain operation of the hospital loading dock, as follows:

a. *Monday to Friday: 6:00 pm to 10:00 pm (limited to site establishment activities in preparation for weekend works)*
b. *Saturday: 5:00 pm to 10:00 pm (general construction activities excluding excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like);*
c. *Sunday: 8:00 am to 5:00 pm (general construction activities including excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like); and*

d. *Sunday: 5:00 pm to 10:00 pm (general construction activities excluding excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like).*

10.3 GENERAL OPERATION OF EXCAVATORS

Excavators are expected to be used for the majority of the time during the excavation periods.

Where prolonged excavator use is necessary, excavators could be moved to ғ other parts of the site to offer respite to the receiver closest to the excavator. Where practical and feasible, moving the excavator from working on one part of the site to the opposite side of the site can provide a reduction of up to 9dB(A) in noise level.

Where possible excavators should not be operated during the nominated respite periods.

10.4 CONCRETE PUMPS

In the event concrete pumps are located along adjoining boundaries for extended periods of time, exceedances will occur. It is recommended that concrete pumps are located as far away from residential boundaries where practical and feasible.

10.5 CONCRETE VIBRATOR/HELICOPTER

Concrete vibrators and helicopters will exceed NML's when work is undertaken within close proximity to adjoining receivers and therefore it is recommended that they are not operated outside standard construction hours (7:00am-6:00pm - Monday to Friday).

Scheduling of work shall be investigated to minimise the use of these machines being operated along the southern boundaries during the early morning time (i.e. 7:00am to 8:00am).

10.6 EQUIPMENT MAINTENANCE

Lendlease Construction (and their subcontractors) shall ensure that all equipment are operating within the manufacturers recommendations.

10.7 MOBLIE CRANES

If opted to be used, Lendlease and their subcontractors shall ensure that all mobile cranes used throughout the construction of the project site will have silencers fitted and shall ensure that all equipment is operating within the manufacturer's recommendations.

10.8 NOISE AND VIBRATION MONITORING

Attended noise measurements should be undertaken at the start of key stages i.e; bulk excavation, first major concrete pour.

Attended noise measurements should be conducted in accordance with Australian Standard AS1055: 2018 *'Acoustics- Description and measurement of environmental noise'*, and should include the following:

- Type 1 or 2 sound meter (calibrated)
- Use of appropriate noise descriptor (in the case being $L_{eq(15min)}$.
- Detail of measurement position and proximity to reflecting surface if any (building or similar). Measurement positions will typically be a residential property boundary.
- Comment regarding influence of meteorological conditions.

Vibration monitoring is typically required during excavation, piling and compaction works. Initial vibration monitoring locations are indicated in Appendix 1. All monitors are Texcel or equal and have SMS warning capability to notify contractor in the event of excessive vibration generation.

Acoustic Logic Consultancy recommends that internal noise monitoring is conducted in sensitive spaces whilst works are being conducted, to confirm compliance with the requirements set out in section 7 of this report. Please see appendix 1 for a detailed map of the recommended locations of monitoring locations.

10.8.1 Noise and Vibration Monitoring during trial period

Manned and unmanned noise/ vibration monitoring should be carried out during the trial period at the following locations:

- Mental health departments;
- Sleeping Studying area within the hospital;
- Sydney Children's Hospital- consulting rooms, operation theatre or similar sensitive rooms facing project site;
- Margarete Ainsworth Building;
- Wards within Prince of Wales Hospital facing project sites;
- Royal Hospital for Woman – Birthing suites and antenatal suites; and
- Other noise vibration sensitive rooms of concern by hospital.

10.9 VIBRATORY COMPACTORS

Vibratory compactors must not be used closer than 30 meters from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in section above.

10.10 OTHER ACTIVITIES

- In the event of a complaint, the procedures outlined in Section 11 and 12 should be adopted.
- Compliant handling as per Section 13 is to be adopted.

11 CONTROL OF CONSTRUCTION NOISE AND VIBRATION

The execution of this work will facilitate the formulation of noise control strategies for this project.

The flow chart presented in Figure 2 illustrates the process that will be followed in assessing construction activities.

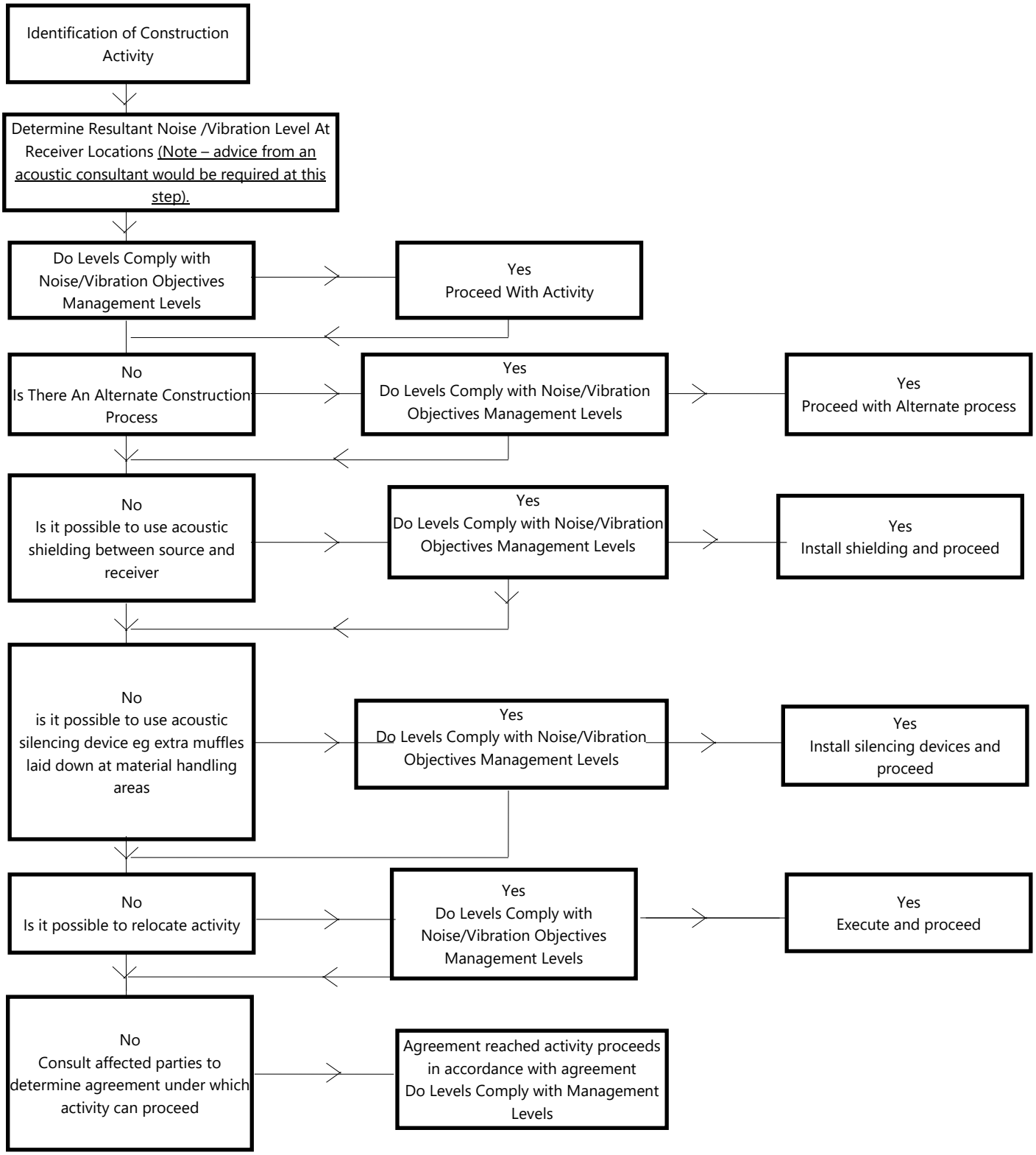


Figure 2 – Process Flowchart

12 NOISE AND VIBRATION CONTROL METHODS

The determination of appropriate noise control measures will be dependent on the particular activities and construction appliances. This section provides an outline of available methods.

12.1 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammers on certain areas of the site may potentially generate high levels of noise. By carrying this activity by use of pneumatic hammers, bulldozers ripping and/or milling machines may result in a lower levels of noise.

12.2 ACOUSTIC BARRIER

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver.

- The placement of barriers at the source is generally only effective for static plant (tower cranes). Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.
- Barriers can also be placed between the source and the receiver however this will not beneficial in this instance due to receivers overlooking the site.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be achieved. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers.

As mentioned previously, throughout the excavation stage it is recommended to install a loaded vinyl screen for any noisy works being undertaken. It is also recommended to install the loaded vinyl screen to the adjoining level above and below.

12.3 SILENCING DEVICES

Where construction processes or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

12.4 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

12.5 TREATMENT OF SPECIFIC EQUIPMENT

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

12.6 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. It is recommended that all available and reasonable treatments and mitigation strategies presented in this report be adopted to minimise noise emissions from the excavation and construction activities on site.

12.7 NOISE MONITORING

Noise monitoring can be undertaken to determine the effectiveness of measures which are been implemented. The results of monitoring can be used to devise further control measures.

Acoustic Logic Consultancy recommends that internal noise monitoring is conducted in sensitive spaces be conducted to confirm compliance with the requirements set out in section 7 of this report. It is also recommended as this office has been advised that within the Margarete Ainsworth Building, mental health and sleep study facilities are frequently used

12.8 COMBINATION OF METHODS

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

13 ASSESSMENT OF VIBRATION

13.1 VIBRATION PRODUCING ACTIVITIES

Proposed activities that have the potential to produce significant ground vibration include:

- Piling and anchoring.
- Hydraulic hammering.
- Excavator working.

13.2 SAFEGUARDS TO PROTECT SENSITIVE STRUCTURES

It is impossible to predict the vibrations induced by the excavation/construction operations on site at potentially affected receivers. This is because vibration level is principally proportional to the energy impact which is unknown given the nature of terrain in the area (type if soil), drop weight, height etc.

Acoustic Consultants should undertake monitoring of the initial excavation process when conducted near potentially affected receivers to ensure that vibration criteria set out above are not exceeded.

13.3 VIBRATION MONITORING

The proposed vibration monitoring equipment will comprise minimum two Balastronics type monitors with externally mounted geophones installed within the locations below:

- Location 1- Basement (Loading dock of Ainsworth Building)
- Location 2- Southern boundary (15 Magill Street, Randwick) with geophone mounted against brick fence.

The monitors are proposed to be fitted with GSM modem and audible alarms for vibration exceedance. In addition, the vibration loggers will be downloaded remotely using the GSM modem.

Monitoring within the Ainsworth building is recommended if there is the potential for vibration emissions to affect sensitive equipment.

13.3.1 Downloads of vibration loggers

Downloading of the vibration logger will be conducted on a regular basis. In the event an exceedance of vibration criteria or alarms occurs, downloading of loggers will be conducted more frequently. Results obtained from the vibration monitor will be presented in a graph formant and will be forwarded to Lendlease for review. It is proposed that reports are provided fortnightly with any exceedance in the vibration criteria reported as detailed in this report.

13.3.2 Presentation of Vibration Logger Results

A fortnightly report will be submitted to Lendlease via email summarising the vibration events. The vibration exceedance of limit is recorded in the report shall be submitted within 24 hours. Complete results of the continuous vibration logging will be presented in fortnight reports including graphs of collected data.

13.3.3 Persons to receive alarms

The following personnel will receive GSM alarms:

- Acoustic consultant/advisor (1 person)
- Excavation site foreman
- Main builder foreman (where applicable)
- Lendlease nominated two representatives

14 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

14.1 REQUIREMENTS FROM THE DEVELOPMENT CONSENT DATED 18TH DECEMBER 2019 (SSD 10339)

In undertaking any out-of-hours works under condition C7, the applicant must notify potential affected noise sensitive receivers of works outside of standard construction hours not less than five calendar days and not more than 14 calendar days before those works are to be undertaken.

a. The notification must be:
- *i. undertaken by letterbox drop or email; and*
- *ii. be detailed on the project website.*

b. The notification required by this condition must:
- *i. clearly outline the reason that the work is required to be undertaken outside the hours specified in condition C7;*
- *ii. include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks;*
- *iii. include details of relevant time restrictions that apply to the proposed works;*
- *iv. clearly outline in plain English, the location, nature, scope and duration of the proposed works;*
- *v. detail the expected noise impact of the works on noise sensitive receivers;*
- *vi. clearly state how complaints may be made and additional information obtained; and*
- *vii. include the number of the telephone complaints line, which must also be the after*
- *viii. hours contact phone number specific to the works undertaken outside the hours specified in condition C7, and the project website address.*

14.2 COMMUNITY CONSULTATION

The noise sensitive receivers listed and described and any other affected stakeholders should have been notified of the project. They will be kept informed of the project status throughout the project duration.

Noise sensitive receivers and affected stakeholders will be kept informed through the following channels:

- Construction briefings – regular briefings and presentations to affected stakeholders to provide advance notice of noise generating works, work hours and construction impacts management strategies. Construction briefings are utilised to gain feedback and input into construction planning and minimise impacts to stakeholders.
- Community notification – notifications circulated via letter box drop, email and project website to communicate upcoming construction activity to the local community and affected stakeholders.
- Construction Interface Meetings – regular meetings with key project stakeholders to communicate upcoming works, impacts and mitigate strategies.

These channels will be used to inform residents and business owners, describing the construction hours, potential high noise works/hours, the noise management measures being implemented and providing contact details for further information or complaints.

Site hoarding or notices on the hoarding will also identify Health Infrastructure and Lendlease as the site operators.

14.3 COMMUNITY CONSULTATION AND ENGAGEMENT REGARDING NOISE AND VIBRATION

The project team is committed to an early, coordinated, proactive and transparent communications and consultation whilst developing strategies to manage noise and vibration (as required by Condition B37).

The project identified a broad range of stakeholders and community members who had varying degrees of involvement and interfaced with the project staging and associated construction activity.

With a strong commitment to stakeholder and community consultation, the project has benefited from stakeholder input into the design and planning of the ASB. The following activities have been undertaken to inform the community, build relationships and provide an opportunity for input and feedback into project delivery.

Prior to any construction activities the following strategies were put into place:

- Community information sessions held.
- Formal and informal briefings and feedback sessions held.
- Where required face-to-face engagement with neighbouring residents and businesses.
- Distribution of project community information resources
- Established communication channels for feedback including project community contact number and project email account

The following highlights stakeholder and community consultation outcomes for managing high noise generating works (Condition B37):

- Stop works procedures and lines of communication where works may affect sensitive receivers or continuity of Hospital Campus operations
- Programming of works to acknowledge periods of increased sensitivity for receivers i.e. exam periods for UNSW and local schools
- Identification of sensitive receivers within neighbouring buildings to inform mitigation planning i.e. sensitive medical or research equipment
- Consultation with Hospital Campus on appropriate location for noise and vibration monitoring devices
- Complaints management processes for noise and vibration
- Identification of preferred communication channels with key stakeholders and neighbouring residents for works notification

The noise sensitive receivers listed and described in the CNVMP: Section 4.1.1 – Nearest Noise & Vibration Sensitive Receivers and any other impacted stakeholders have been notified of the project. They will be kept informed of the project status and key activities throughout the project duration.

- Construction briefings – regular briefings and presentations to affected stakeholders to provide advance notice of noise generating works, work hours and construction impacts management strategies. Construction briefings are utilised to gain feedback and input into construction planning and minimise impacts to stakeholders.
- Community notification – notifications circulated via letter box drop, email and project website to communicate upcoming construction activity to the local community and affected stakeholders.
- Construction Interface Meetings – regular meetings with key project stakeholders to communicate upcoming works, impacts and mitigate strategies.
- Site hoarding or notices on the hoarding will also identify Health Infrastructure and Lendlease as the site operators.

These channels will be used to inform residents and business owners, describing the construction hours, potential high noise works/hours, the noise management measures being implemented and providing contact details for further information or complaints.

14.4 COMPLAINTS AND NON-COMPLAINTS

The development of the CNVMP has been consulted with the project stake holders in accordance with the projects Community Communication strategy. This strategy outlines the key consultation that has been and continues to be undertaken

Complaints will be logged, and response actions documented.

Upon receipt of a complaint the Contractor will decide whether the complaint is in relation to offensive noise. Offensive noise is described in legislation and discussed in the Noise Guide for Local Government. In the context of this proposal, offensive noise is noise from this proposal that is as a result of:

- Works outside the work hours in Section 6.1. Offensive noise includes noise outside of the work hours as a result of arrival or departure of trucks and any site personnel or contractors parking on the surrounding streets and not entering or leaving the hotel parking, dedicated to project vehicles.
- Works generating noise above 75dBA that extends for longer than 3 hours without a minimum one hour respite break.
- Works generating noise above the levels predicted in this document;
- plant or equipment not maintained or operated in a proper and efficient manner, for example with defective mufflers or other fitted noise attenuation devices;
- loud radios, shouting (particularly swearing), and other unnecessary noise;
- site gates left open other than for entry or exit of a vehicle.

On receipt of a complaint of offensive noise, or of becoming aware of offensive noise, the contractor will take immediate action to stop the offensive noise.

For complaints about noise from this proposal other than offensive noise, the contractor will;

- Direct consultation with any affected stakeholders where noise and vibration is a planned part of construction activity. Timely communication provides stakeholder awareness, opportunity for forward community and implementation of mitigations prior to works occurring. The project team remains cognisant of nearby sensitive receivers and vigilant in providing advanced notification.
- Ongoing consultation with key stakeholders to understand and document the location of any sensitive receivers including medical and research equipment.
- Consultation with key project stakeholders to determine suitable locations for loggers that provide effective readings and limit disruption to Hospital Campus.
- Regular doorknocking of neighbouring residents to notify of planned construction activity and associated impacts.
- Construction Community Notices distributed to local businesses and residents to notify of planned construction activity and potential impacts. Noise and vibration generating activities are communicated in a timely fashion through Construction Community Notices.
- Maintenance of 24/7 Community Contact phone number and project email address for stakeholder contact and complaints.
- Maintenance of project Complaints Register detailing complaints related to noise and vibration and project response. The Complaints register is updated monthly and remains accessible via the project's website.
- Circulation and approval of Disruptive Works Notification detailing planned construction activity, associated impacts and mitigations.
- Try to ascertain from the complainant which activity is causing the problem (i.e. inside or outside the site and in what position).
- If required, establish from the monitoring equipment and or attended noise monitoring if the predicted noise levels have been exceeded. Attended noise monitoring may be required to determine this.
- Check that the activity and equipment are being operated in a proper and efficient manner.
- Immediately rectify any faulty equipment.

14.5 TRAINING AND AWARENESS

The Contractor shall provide all project personnel and subcontractors with training on the environmental obligations through project inductions, toolbox talks and through Safety Works Methods (SWMS).

Project personnel and subcontractors shall undergo a general project induction prior to commencing work. This will include a noise component reinforcing that works should be done in a manner that minimises noise and is respectful of neighbours and mindful of their amenity.

14.6 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to a Constructions Complaints Register which will be used to address any construction noise related problems should they arise.

Community consultation should be conducted prior to any works commencing on site, with letterbox notifications and all information should be available on the project website to all identified however not limited to surrounding sensitive receivers.

A permanent register of complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable;

- Noise measurements at the affected receiver;
- An investigation of the activities occurring at the time of the incident;
- Inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

14.7 REPORTING REQUIREMENTS

The following shall be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed above.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including, the actions taken and results of follow up monitoring.

14.8 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical and reasonable.
4. Selecting alternative equipment/processes where practical

15 CONCLUSION

This report presents an assessment of noise and vibration impacts associated with the excavation and construction activities to be undertaken for the potential noise and vibration impacts associated with the earthworks, excavation and construction components of the Randwick Campus Redevelopment Integrated ASB Addition to satisfy the requirements of the development consent from the Minister for Planning and Public Spaces - SSD10339.

The assessment of construction noise and vibration indicates that management and engineering measures will be needed to limit noise impacts to the buildings adjacent to the site.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
George Wei
Associate Director, MAAS