

# **Cranbrook School Redevelopment**

## **Construction Noise and Vibration Management Plan**

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## 1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to prepare a noise and vibration management plan for the proposed Cranbrook School Redevelopment at 5 Victoria Rd, Bellevue Hill.

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

- Identification of the noise and vibration standards which will be applicable to this project.
- Identify likely sources of noise generation and predict noise levels at sensitive receivers surrounding Cranbrook School (note – noise and vibration impacts to other school buildings were discussed in a separate report ref. 20171292.1/0910A/R1/RL, dated 9/10/2018).
- Formulation of a strategy for demolition and construction works to comply with the relevant standards.

This report has been prepared in order to address condition of consent C14.

This report is prepared by Thomas Taylor, Associate Director Acoustic Logic (15 years of experience), B Eng (Hons).

## 2 SITE DESCRIPTION

The area that will be redeveloped is situated on the north-eastern part of the school. The War Memorial Hall and the Mansfield Building will be demolished. Excavation will occur under these buildings current location and also under the Hordern Oval to the northeast of the school.

The proposed redevelopment will consist of:

- Demolition/strip out of existing War Memorial Hall and the Mansfield Building;
- Excavation and piling at the current War Memorial Hall, Mansfield Building locations and Hordern Oval;
- Construction of:
  - A three-storey Aquatic and Fitness Centre to the northeast of the site including a car park, two swimming pools, and a multi-purpose hall;
  - The Centenary Building, a five-storey building including a multifunction hall, a theatre, learning spaces, an orchestra room, music rooms, a dining space, offices, with a chapel and the centenary lawn at the top.

Sensitive receiver locations as presented in Figure 1 and are detailed below. These locations will be used as a basis for this assessment.

- **Receiver 1 (R1).** Residential receivers to the northwest of the site across New South Head Road.;
- **Receiver 2 (R2)** Residential receivers to the east of the site across Rose Bay Avenue;

See aerial photo below, showing the site, nearby developments and the location of key construction activities.



**Figure 1 - Site Map**

### 3 BACKGROUND NOISE LEVELS

Background noise levels have been established from monitoring on site.

#### 3.1 MEASUREMENT EQUIPMENT

Long term noise monitoring was conducted using an Acoustic Research Laboratories noise monitor. The monitor was set to an A-weighted fast response mode, recording continuously at 15 minute intervals. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted.

#### 3.2 LOCATION AND TIME OF MEASUREMENTS

Long term noise monitoring was conducted from 6<sup>th</sup> to 13<sup>th</sup> September 2017. The monitor was installed on the Rose Bay Avenue façade, along the eastern site boundary.

#### 3.3 MEASURED BACKGROUND NOISE LEVELS

The background noise levels established from the unattended noise monitoring are detailed in the Table below. The levels below will be representative of background noise levels experienced by surrounding residential receivers.

**Table 1 – Measured Background Noise Levels**

<b>Time of Day</b>	<b>Unattended Noise Monitoring Rating Background Noise Level dB(A) L<sub>90</sub></b>
Daytime (7am-6pm)	44
Evening (6pm-10pm)	39
Night time (10pm-7am)	35

## 4 CONSTRUCTION NOISE AND VIBRATION CRITERIA

### 4.1 NOISE CRITERIA

#### 4.1.1 Condition C14

Condition C14 states:

- C14. The Construction Noise and 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 developed with the community for managing high noise generating works;
  - (e) describe the community consultation undertaken to develop the strategies in condition C6(d) and
  - (f) include a complaints management system that would be implemented for the duration of the construction.

#### 4.1.2 Australian Standard AS2436:1981 "Guide to noise control on construction, maintenance and demolition sites"

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites AS2436:1981 "*Guide to noise control on construction, maintenance and demolition sites*" nominates the following:

- a. That reasonable suitable noise criterion is established,
- b. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and
- c. The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the construction site.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic compromises between construction sites and potential noise affected receivers.

Based on these criteria the following procedure will be used to assess noise emissions:

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- Adopt management conditions as per AS 2436 in the event of a non-compliance.

#### 4.1.3 EPA Interim Construction Noise Guideline (ICNG)

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaison to reach realistic compromises between construction sites and potential noise affected receivers.

A quantitative assessment requires the proponent to assess the likely noise levels generated at sensitive receivers and assess these against the Noise Affected and Highly Noise Affected Management Levels.

Where the levels are predicted to exceed the management levels the proponent should take into consideration and employ all reasonable and feasible measures to ensure that the impact on noise receivers is minimised. This is generally conducted in the following manner:

- Develop a noise management plan outlining all reasonable and feasible mitigation methods for the reduction of noise impact, which are detailed in this report.
- The assessment of high impact equipment such as hammers, saws and the like for lower noise producing methods of construction or locating them in acoustically advantageous positions where possible;
- The implementation of a complaint handling register and community consultation system;
- Employee (builders, contractors etc) education in effective noise reducing techniques and site etiquette; and
- The operation of plant in a quiet and efficient manner (i.e.: Turning off machinery when not in use) where possible.



The noise management levels for residential receivers from the ICNG are indicated in the following table.

**Table 2 – EPA Recommended Construction Noise Management Levels**

Noise criteria	Receiver	External Sound Level, Leq 15 min, dB(A)
EPA ICNG	Residential	Background + 10dB(A) <sup>1</sup>
		'Highly noise affected' noise management level 75dB(A) <sup>2</sup>

1: Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise.

2: Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.

These criteria for resultant noise from construction are aimed at maintaining comfort levels within the surrounding residential dwellings. Additionally, noise mitigation techniques as discussed in Section 8 should be used if noise emissions exceed the above criteria. All work is to be carried out in accordance with AS 2436:2010 "Guide to noise control on construction, maintenance and demolition sites".

As all construction activity will occur during the day period which has a Rating Background Noise Level of 44 dB(A) the "noise affected management level" applying to this project is 54 dB(A) Leq,15min, and the highly affected noise management level is 75 dB(A).

## 4.2 VIBRATION CRITERIA

The demolition activities at the War Memorial Hall and Mansfield Building and the civil excavation works to follow, have the potential to cause damage to the structures surrounding the construction site and affect the operation of the vibration sensitive equipment and activities occurring within them.

The following criteria is designed to give a limit on the level of vibration a building can be subject to before it begins to influence the structure and have an effect on the human comfort of the occupants of the building. German Standard DIN 4150-3 (1999-02): *“Structural Vibration – Effects of Vibration on Structures”* has been used to assess and limit building damage risk and the guidelines presented in the EPA’s *“Assessing Vibration: A Technical Guideline”* will be utilised to establish vibration emission goals for impacts on human comfort and activities.

The criteria and the application of the standards is discussed below.

### 4.2.1 German Standard DIN 4150-3 (1999-02) – Building Damage

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

It is noted that if measured vibration levels are below the guidelines listed below, damage that will reduce the serviceability of the building will not occur and if damage to the building does occur, it is assumed that the damage is related to other activities or sources. Furthermore, the DIN4150-3 guideline states the following regarding the limits presented in Table 3:

*“Exceeding the values in table 1 (table 3.1) does not necessarily lead to damage; should they be significantly exceeded; however, further investigations are necessary.”*

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

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms <sup>-1</sup> )			
		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

#### 4.2.2 EPA – Assessing Vibration: A Technical Guideline

The following guidelines are designed to give a limit on the level of continuous and impulsive vibration for the occupants of the adjacent Perkins Building.

NSW EPA's "Assessing Vibration: A Technical Guideline" (Feb 2006) is based on the guidelines contained in BS 6472:1992 and are presented below for offices, schools, education institutions and places of worship.

**Table 4 - EPA Recommended Vibration Guidelines**

Vibration Type	Peak Velocity (PPV)	
	<i>Preferred</i>	<i>Maximum</i>
Continuous Vibration	0.56 mm/s	1.10 mm/s
Impulsive Vibration	18.0 mm/s	36.0 mm/s

## 5 ACTIVITIES TO BE CONDUCTED AND ASSOCIATED NOISE LEVELS

Noise impact will be determined from primary processes and equipment. The sound power levels of these activities are presented below.

**Table 5 - Sound Power Levels of the Proposed Equipment**

EQUIPMENT /PROCESS	SOUND POWER LEVEL dB(A)
Demolition -Penetration Cutting (concrete saw) -Topping Removal (jackhammer)	115
Rock saw	117
Rock hammer	121
Piling Rig (bored)	111
Crane (electric)	105
Concrete Truck/Pump	108
Hand Tools	100

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

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

## 6 NOISE AND VIBRATION ASSESSMENT

An assessment of the principal sources of noise and vibration generation has been undertaken, as detailed below.

### 6.1 PREDICTED NOISE EMISSIONS

Noise levels from construction works have been predicted at nearby sensitive receivers and assessed against the noise and vibration management levels in Section 4.

The predicted noise levels during construction will be dependent on the:

- The activity undertaken.
- The distance between the work site and the receiver.
- The presence of any barriers

For many of the work areas, the distance between the noise source and the receiver will vary depending on which end of the site the work is undertaken. For this reason, the predicted noise levels will be presented as a range.

Predicted noise levels are presented below. Assessment of the noise from the primary activities has been presented at each of the most affected noise receivers (Receivers 1 and 2), on the most affected façades of each receiver.

The predicted noise levels take into account noise and vibration management controls identified in Section 8.

**Table 6 – Predicted Construction Noise Levels – Receiver 1**

Stage	Activity	Predicted Level dB(A) <sub>Leq(15min)</sub>	Noise Management Level	Comments
Demolition	Saw cutting Hammering	55-63	Daytime Background Noise Level + 10 dB(A) 54dB(A) <sub>Leq (15min)</sub>	Moderate exceedances of Noise Management Level from time to time. See recommendations in section 8
Excavation	Rock sawing Rock hammering Piling	56-64		Moderate exceedances of Noise Management Level from time to time. See recommendations in section 8

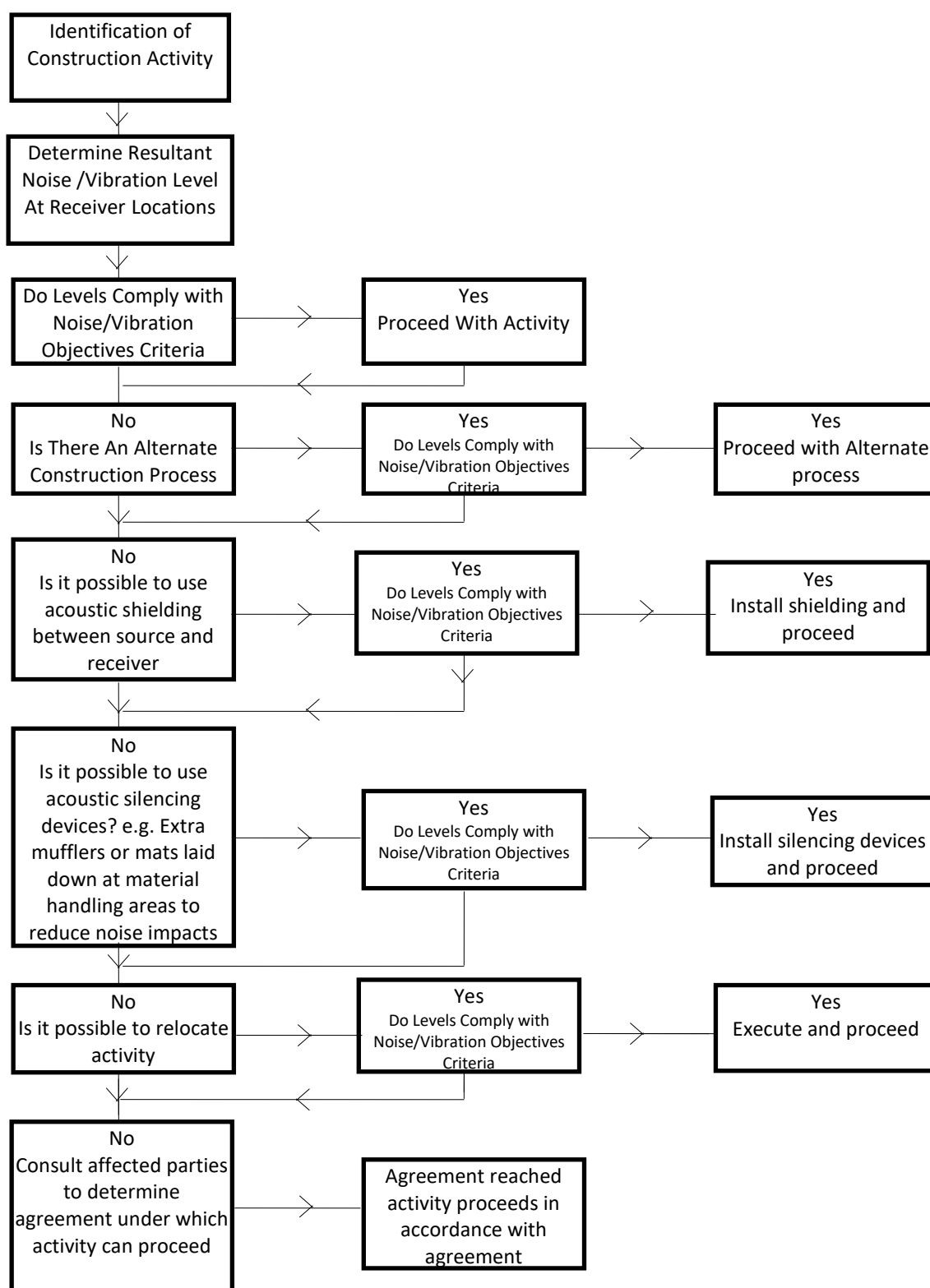
Stage	Activity	Predicted Level dB(A) <sub>Leq(15min)</sub>	Noise Management Level	Comments
Erection of Structure (Centenary Building)	Concrete Pump	51-59		Compliant with Noise Management Levels generally with minor exceedances. See recommendations in section 8.
	Hand Tools (external areas)	42-50		Compliant with Noise Management Levels.
	Crane (Electric)	48-52		Compliant with Noise Management Levels.
Internal Works	Hand Tools	42-50		Compliant with Noise Management Levels.

**Table 7 – Predicted Construction Noise Levels – Receiver 2**

Stage	Activity	Predicted Level dB(A) <sub>Leq(15min)</sub>	Noise Management Level	Comments
Demolition	Saw cutting Hammering	55-68	Daytime Background Noise Level + 10 dB(A) 54dB(A) <sub>Leq (15min)</sub>	Moderate exceedances of Noise Management Level from time to time. See recommendations in section 8
Excavation	Rock sawing Rock hammering Piling	61-74		Moderate exceedances of Noise Management Level from time to time, especially when undertaken near the eastern boundary. See recommendations in section 8
Erection of Structure (Centenary Building)	Concrete Pump	51-64		Compliant with Noise Management Levels generally with minor exceedances. See recommendations in section 8.
	Hand Tools (external areas)	42-54		Compliant with Noise Management Levels.
	Crane (Electric)	59		Will slightly exceed Noise Management Levels at times.
Internal Works	Hand Tools	42-54		Compliant with Noise Management Levels.

## 7 CONTROL OF CONSTRUCTION NOISE

As a part of this management plan a detailed study has been undertaken of each of the proposed activities which will occur as a part of the proposed excavation and construction works on this project. This facilitates the formulation of noise control strategies for this project. The flow chart which follows illustrates the process which will be followed in assessing construction activities.



## **8 AMELIORATIVE MEASURES**

### **8.1 STRATEGIES FOR MANAGING HIGH NOISE GENERATING WORKS**

Consultation has been undertaken by the Cranbrook School (refer to the Cranbrook School Community Communications Strategy report). This report has been developed in consultation with the School following their discussions with the community.

### **8.2 SITE SPECIFIC RECOMMENDATIONS**

Site specific recommendations as follows:

- All demolition/excavation/construction activities are to occur during the authorised hours of construction.
- Excavation:
  - Use of rippers (as opposed to pneumatic hammers) is recommended whenever possible to minimise noise and vibration generation.
- All plant/equipment shall be maintained as per noise control methods and procedures outlined in section 9.3 below.
- Vehicle Noise:
  - Truck movements should not commence prior to 7:00am, and should not idle outside the site prior to 7am.
  - All vehicles (excavators, bobcats, trucks, concrete trucks etc.) must turn off their engines during idling, to reduce impacts on surrounding receivers (unless truck ignition needs to remain on during concrete pumping).
- Crane:
  - If practicable, an electric crane should be used (as opposed to a diesel crane).

### 8.3 MANAGEMENT OF NOISE EMISSIONS AND COMPLAINTS HANDLING

Should ongoing complaints of excessive noise occur, immediate measures shall be undertaken to investigate the complaint, the cause of noise exceedances and identify the required changes to work practices.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

All complaints or offensive noise 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 offensive noise 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.



## **8.4 GENERAL RECOMMENDATIONS**

### **8.4.1 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 hammer 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 lower levels of noise will result.

### **8.4.2 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.

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 15 dB(A) can be affected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(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 which is approximately 10 dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10 or 15mm plywood would be acceptable for the barriers.

The identified surrounding receivers are generally multi-storey, hence installation of acoustic barriers on the site will be largely ineffective for levels above ground floor. Erection of barrier along the eastern boundary of the site (assuming a 1.8m-2.2m high standard barrier) will shield the ground level floors from the subject site, however the upper levels of these properties may still have a clear unrestricted view of the site.

### **8.4.3 Silencing Devices**

Where construction process 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.

### **8.4.4 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).

### **8.4.5 Treatment of Specific Equipment**

In certain cases, it may be possible to specially treat a piece of equipment to reduce the sound levels emitted. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

#### **8.4.6 Establishment of Site Practices**

This involves the formulation of work practices to reduce noise generation. This includes locating fixed plant items as far as possible from residents as well as rotating plant and equipment to provide respite to receivers.

Construction vehicles accessing the site should not queue in surrounding streets and should only use the designated construction vehicle routes. Loading of these vehicles should occur as far as possible from any sensitive receiver.

#### **8.4.7 Strategic Positioning of Processes On-Site**

Where practicable, particular processes of activities can be located in particular positions on site to minimise noise to surrounding sensitive receivers.

For example, stationary plant may be positioned where direct line of sight shielding can be achieved using natural barriers or temporary screens, or may maximise the distance to the nearest sensitive receiver. This may also be applicable to the demolition of building structures where the façade closest to residential receivers is left until last to provide barrier screening for the demolition of the other parts of the building.

#### **8.4.8 Regular Noise Checks of Equipment**

To determine the requirement for silencing devices on machinery it is proposed to undertake fortnightly noise check. Noise levels of all machines on site will be measured and if they are found to be higher than nominated for that equipment type, items such as mufflers and engine shrouds will be examined to ensure they are in good working order.

A record of these measurements should be kept. This measure is expected to maintain noise at constant levels, and prevent any increases.

## 9 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

Consultation with community has been undertaken by the Cranbrook School. This report has been developed in consultation with the School following their discussions with the community.

Detailed recommendations to protect the school grounds and nearby residences from construction noise and vibration are set out in section 8. Most critically, given that use of pneumatic hammer is predicted to generate noise levels of up to 80dB(A), it is recommended that use of pneumatic hammers along the southern boundary not commence prior to 8am (as detailed in section 6).

It is recommended that residences adjoining/opposite the site be advised by letter box drop of:

- Commencement and expected duration of rock excavation using hydraulic hammer or rock saw (the loudest typical construction item).
- Days of concrete pours (in the event that the truck must be parked outside of the school grounds).

Information regarding contact details for the builder should be made available at the site entry and via the school.

In the event of complaint, the following information should be recorded (if available) in order for the complaint to be actioned:

- Address of complainant.
- Location and time of the incident.
- Activity that was the source of the complaint.

In the event that Richard Crookes are unable to resolve the noise complaint, it is recommended that the advice of an acoustic consultant is sought.

### 9.1 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 processes 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 the Site Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular scheduled meetings will be required for a finite period, until all issues have been addressed and the evidence of successful implementation is embraced by all parties.

An additional step in this process is to produce a newsletter informing nearby residents of upcoming activities that are likely to generate higher noise/vibration levels.

## **9.2 DEALING WITH COMPLAINTS**

Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action; and
- Setup vibration monitoring system at the location represents the nearest vibration receiver location with alarm device which can inform the project manager on site if the vibration exceedance happened.
- Summary of feedback to the complainant.

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.

## **10 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.
4. Selecting alternative equipment/processes where practical
5. Setup noise monitoring devices at locations represent nearest noise receivers and provide noise data for each complain time period. Analysis is required and determine suitable noise mitigation measures.

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager to the general public and their contact telephone number.

## 11 CONCLUSION

As required by condition of consent C14, this construction noise and vibration management sub-plan has been prepared for the demolition, excavation and construction activities associated with the Cranbrook School Redevelopment. A noise assessment was conducted by this office, to determine the level of impact on surrounding receivers and development of a management plan accordingly.

Provide that the recommendations, management controls and procedures outlined in this report are implemented, noise and vibration impacts from the proposed works will be minimised.

Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'T. Taylor', with a stylized flourish at the end.

Thomas Taylor

Acoustic Logic Consultancy