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12 October, 2007

Report: 2007628/1709A/R3/VF

Prepared for: Frasers

**FRASERS BROADWAY**

**DEMOLITION AND RECYCLING - NOISE AND VIBRATION  
MANAGEMENT PLAN**

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**TABLE OF CONTENTS**

<b>1. EXECUTIVE SUMMARY</b>	<b>0</b>
<b>2. INTRODUCTION</b>	<b>0</b>
<b>3. PROJECT DESCRIPTION</b>	<b>0</b>
<b>3.1 DEMOLITION TRAFFIC</b>	<b>0</b>
<b>4. HOURS OF WORK</b>	<b>0</b>
<b>5. CONSTRUCTION NOISE AND VIBRATION OBJECTIVES</b>	<b>0</b>
<b>6. MITIGATION METHODS THAT WOULD BE APPLIED TO MANAGE NOISE EMISSIONS</b>	<b>0</b>
<b>6.1 NOISE CONTROL METHODS</b>	<b>0</b>
6.1.1 Selection of Alternate Appliance or Process	0
CONTROL OF NOISE FLOW CHART	0
6.1.2 Acoustic Barriers	0
6.1.3 Silencing Devices	0
6.1.4 Material Handling	0
6.1.5 Treatment of Specific Equipment	0
6.1.6 Establishment of Site Practices	0
6.1.7 Strategic Positioning of Processes On-Site	0
6.1.8 Combination of Methods	0
6.1.9 Establishment of Direct Communication with Affected Parties	0
6.1.10 Management Training	0
<b>7. VIBRATION</b>	<b>0</b>
<b>7.1 VIBRATION PRODUCING ACTIVITIES</b>	<b>0</b>
<b>7.2 SAFEGUARDS TO PROTECT SENSITIVE STRUCTURES</b>	<b>0</b>
<b>8. VIBRATION MONITORING</b>	<b>0</b>
<b>8.1 RESPONSE TO VIBRATION ALARMS</b>	<b>0</b>
<b>9. COMPLAINTS HANDLING</b>	<b>0</b>
<b>10. CONCLUSION</b>	<b>0</b>

**Appendix A - Vibration Safeguards Matrix**

**Appendix B – Noise and Vibration Monitoring Requirements**

## 1. EXECUTIVE SUMMARY

The Management Plan outlines the development of controls and safeguards that would be applied to all activity on the site by the demolition and recycling contractor. The objective of these controls is to ensure that all work is carried out in a highly controlled and predictable manner that will minimise emissions and protect the amenity of the sensitive receivers surrounding the site.

The controls and safeguards implemented would be reviewed at a number of stages including when the actual demolition and recycling contractor selected determines the actual demolition and recycling processes and equipment to be used. Further reviews would be undertaken through the demolition period, as required, in response to revised methods and equipment, as well as in response to the monitoring and evaluation of actual impacts. This management plan outlines the procedures that would be adopted by the contractor during the detailed demolition and recycling planning and execution phases.

## 2. INTRODUCTION

This document presents the demolition and recycling noise and vibration plan that will be used to manage noise and vibration from the demolition of the Frasers Broadway site; bounded by Broadway, Kensington Street, Wellington Street O'Conner Street and Abercrombie Street. The site is indicated in Figure 1.

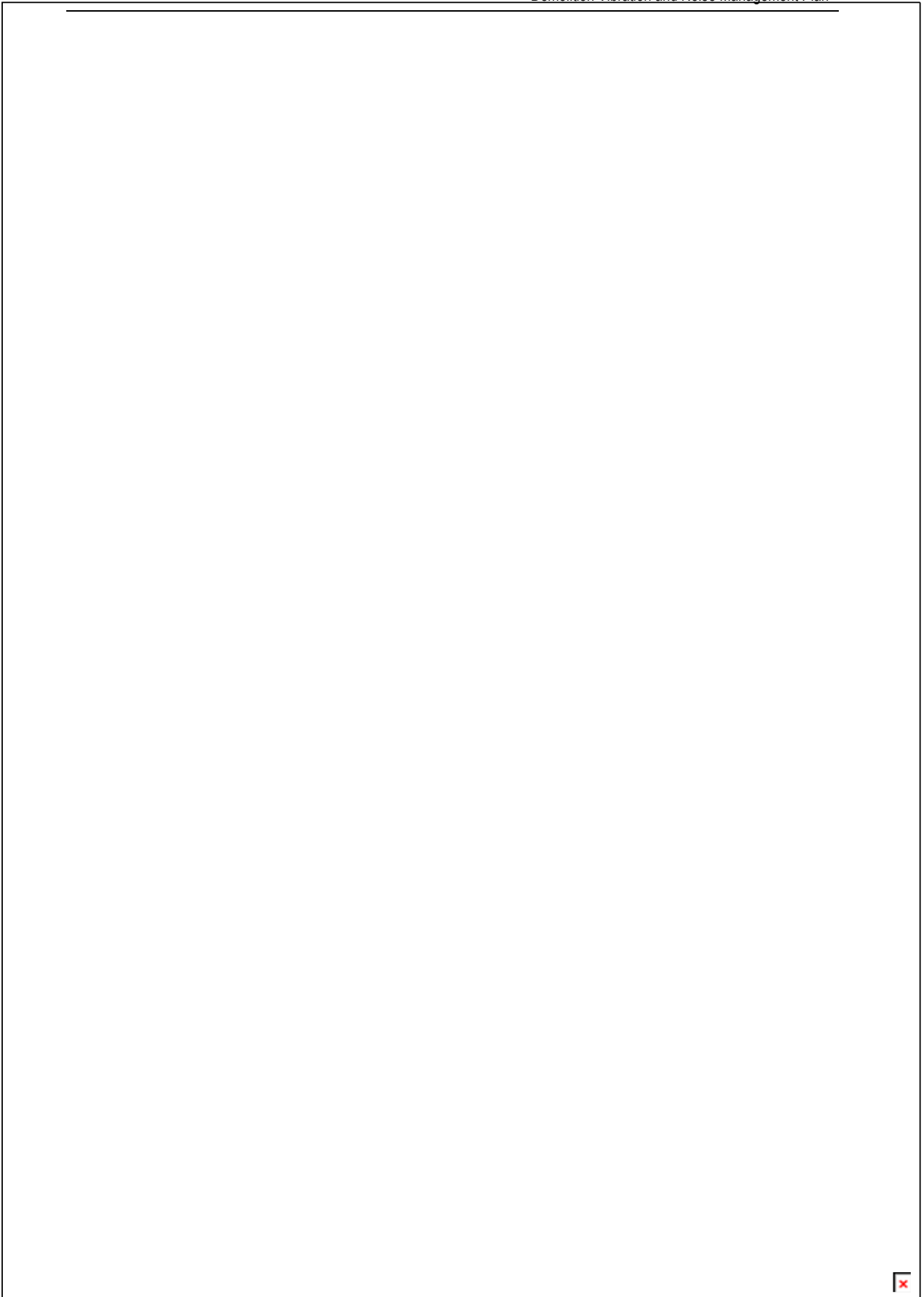
## 3. PROJECT DESCRIPTION

The development site is currently partly vacated and the remainder of the occupied buildings will be vacated in stages while the demolition and recycling works are carried out. The only noise sensitive activity within the site will be the operation of the administration buildings numbers 10A and 10B and operation of building 38 (Clare Hotel). Refer Figure 1.

The scope of work entails the demolition and recycling of most existing buildings and structures. However, there are a number of existing buildings and structures that will be retained and are desired to be protected.

Demolition is projected to occur in a number of stages as outlined below.

- Stage 1 – Mechanical demolition and recycling.
- Stages 2 a and b – Demolition and recycling works in areas as indicated in Figure 1.
- Stage 3 – Mechanical Demolition and recycling – demolition and recycling works as indicated in Figure 1.
- Stage 4 – Mechanical Demolition and recycling – demolition and recycling works as indicated in Figure 1.



### **3.1 DEMOLITION TRAFFIC**

Heavy vehicle routes within the site and external to the site are indicated in the Demolition and Recycling Traffic Management Plan. Wherever possible, the planned vehicle routes within the core of the site and onto local roads should be adopted to minimise noise emissions to adjacent properties.

## **4. HOURS OF WORK**

All work would be undertaken during daytime hours, being 7am to 6pm Monday to Fridays, and 8am to 5pm Saturdays except in emergency situations where required to ensure safety is maintained.

## **5. CONSTRUCTION NOISE AND VIBRATION OBJECTIVES**

The noise and vibration assessment procedures developed in the "Demolition and Recycling Vibration and Noise Assessment" should be adopted to regulate noise and vibration impacts.

## **6. MITIGATION METHODS THAT WOULD BE APPLIED TO MANAGE NOISE EMISSIONS**

The "Demolition and Recycling Vibration and Noise Assessment" indicates that some processes are likely to produce impacts that should be minimised.

The procedures that will be applied to these processes to regulate noise and vibration impacts are summarised in the following flow chart.

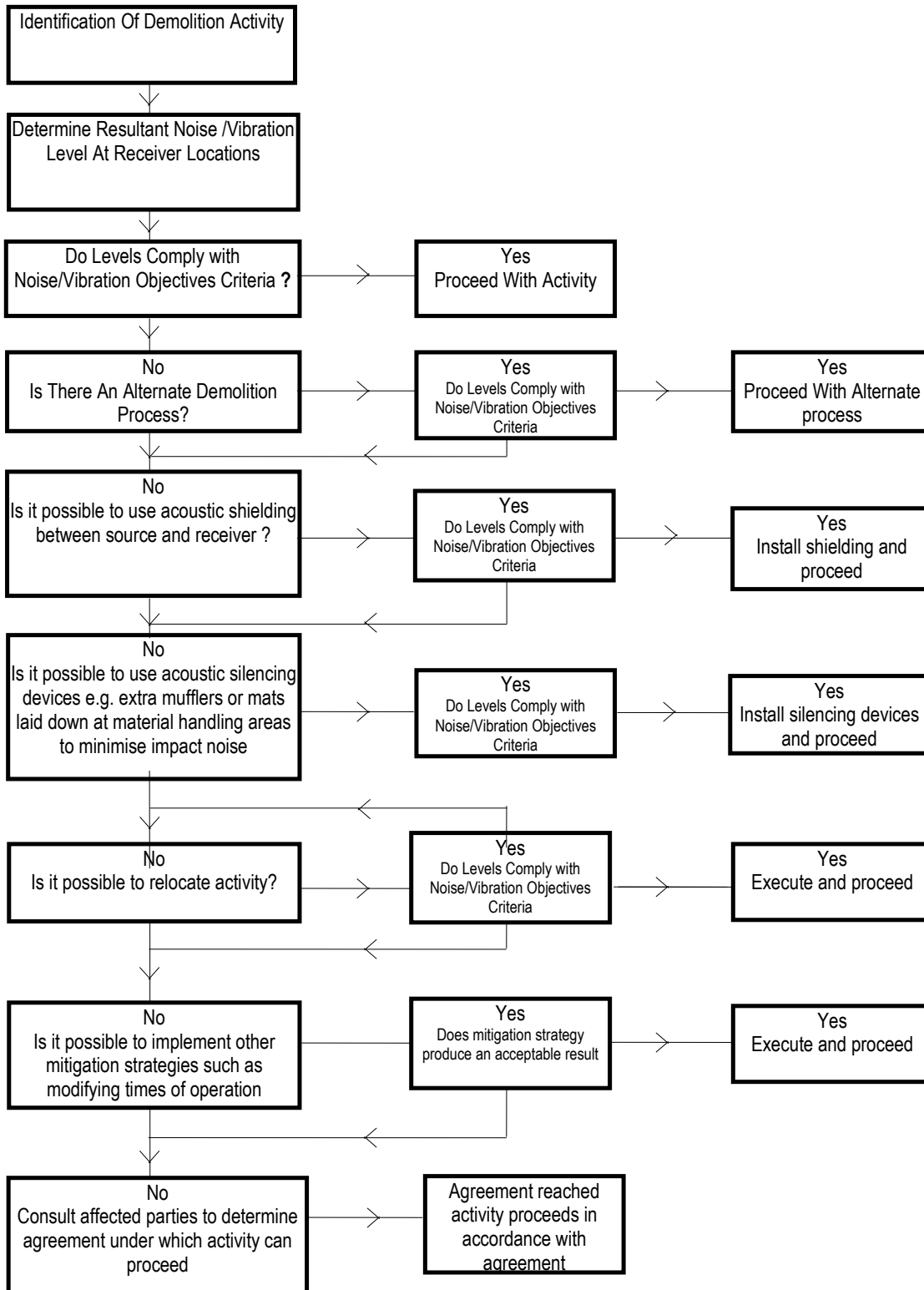
### **6.1 NOISE CONTROL METHODS**

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

#### **6.1.1 Selection of Alternate Appliance or Process**

Where a particular activity or demolition appliance is found to generate noise levels that exceed the criteria, 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.

**CONTROL OF NOISE FLOW CHART**



### **6.1.2 Acoustic Barriers**

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). Placing barriers at the source cannot effectively attenuate equipment which is on the move or working in rough or undulating terrain.

Barriers can also be placed between the source and the receiver. 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 effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where the barrier does not obstruct line of sight, 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.

### **6.1.3 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.

### **6.1.4 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).

### **6.1.5 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.

### **6.1.6 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 residential streets and should only use the designated construction vehicle routes. Loading of these vehicles should occur as far as possible from any sensitive receiver.

### **6.1.7 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 may maximise the distance to the nearest sensitive receiver. This may also

be applicable to the demolition and recycling 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.

#### **6.1.8 Combination of Methods**

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

#### **6.1.9 Establishment of Direct Communication with Affected Parties**

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

The objectives of the consultation process are 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 the options available.
- Identify group concerns generated by the project, so that they can be addressed.

#### **6.1.10 Management Training**

All site managers should be made aware of noise and vibration limits, applicable control measures and methods. They should ensure that all agreed noise and vibration measures are carried out by employees and sub-contractors.

## 7. VIBRATION

### 7.1 VIBRATION PRODUCING ACTIVITIES

Activities that have the potential to produce significant ground vibration include:

- Dropping of heavy structures.
- Demolition of floor slabs by hammering with excavator mounted hydraulic hammers.
- Demolition of footings and other masonry walls by hammering with excavator mounted hydraulic hammers.

### 7.2 SAFEGUARDS TO PROTECT SENSITIVE STRUCTURES

A preliminary matrix of work methods and monitoring regime for each receiver has been developed to regulate activities when operating close to any sensitive structures. The required safeguards depend on the sensitivity of the structure and its heritage value. A matrix would be developed based on a more detailed assessment of actual demolition techniques selected by the contractor, results of dilapidation surveys and structural assessments, and verification measurements performed on site.

For those activities identified above, and for other activities likely to produce significant ground vibration the following indicative safe working distances should be established:

- Very highly sensitive structures (Type 1)- structures that have significant value that are very susceptible to structural or cosmetic damage – 50m
- Sensitive structures (Type 3) – structures that either have significant value or are susceptible to structural damage or occupant amenity impacts - 25m
- Other non-sensitive or modern structures (Type 5) – structures being retained that have no heritage value and are not susceptible to damage or occupant amenity impacts - 5m

If works generating ground vibration are carried out within these distances then the assessment of likely vibration should be carried out and measures applied to prevent vibration levels exceeding the levels established.

Appendix A contains a sample matrix developed using these principles.

## 8. VIBRATION MONITORING

A combination of attended vibration monitoring will be used to:

- At the commencement of a new activity near a sensitive structure, establish and confirm safe working distances from sensitive structures (attended monitoring). This will be used to adjust safe working distances as required to ensure the structures are protected.
- When activity identified as producing significant ground vibration is occurring within the safe working distance established, continuously record vibration levels at sensitive structures using unattended vibration loggers. These will also provide a visual alarm/ audible alarm/SMS alarm (as appropriate) when vibration limits are being approached.
- When operating very close to sensitive structures, attended monitoring to ensure that any preventative action is taken immediately to prevent the targets from being exceeded.

A monitoring regime has been established for the 4 grades of vibration susceptibility as follows based on the proximity of the works to the sensitive receiver.

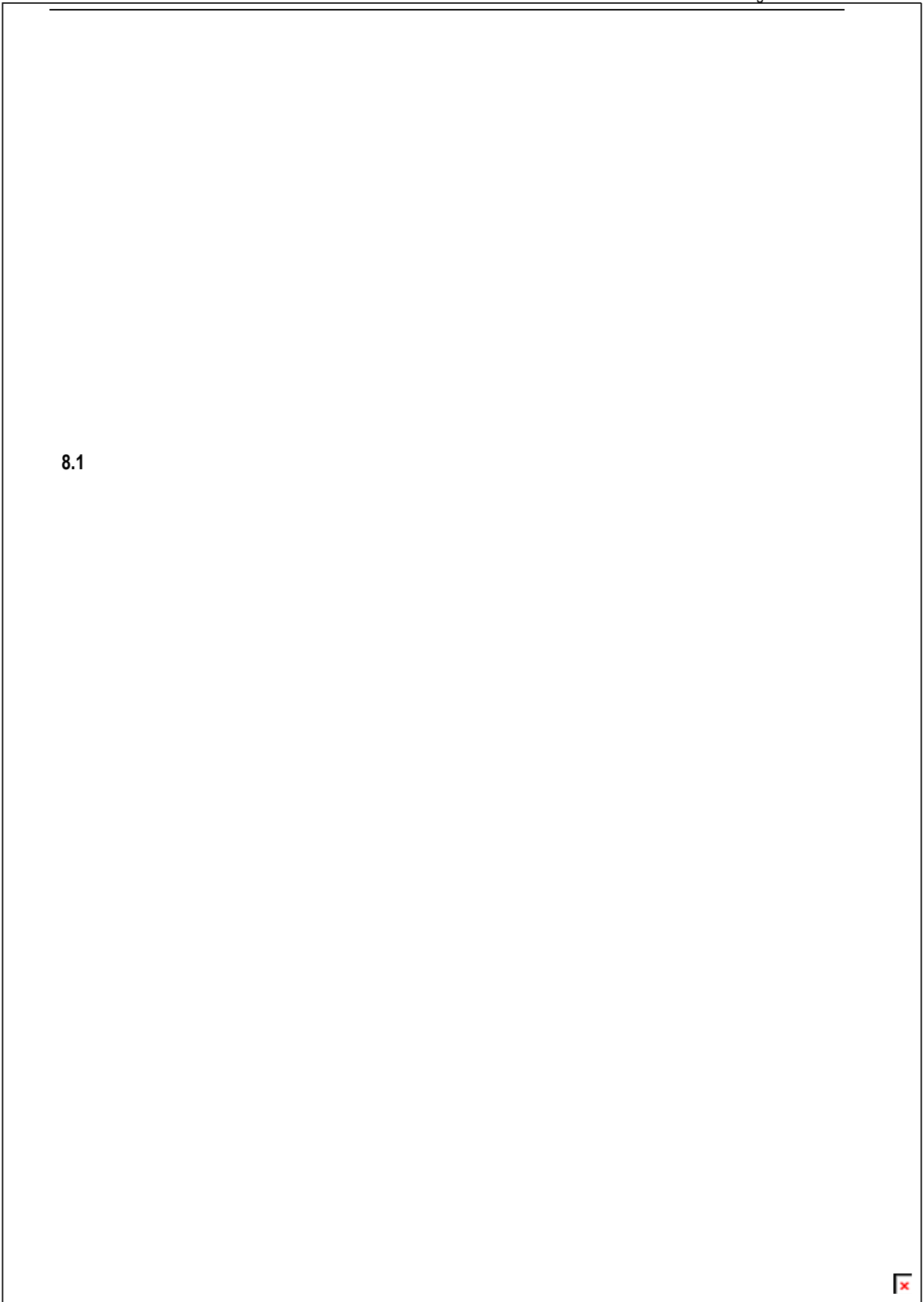
**Table 1 – Vibration Zones for Various Vibration Susceptibility Ratings**

Vibration Susceptibility of Structure	Zone	Distance (m)	Monitoring Required	
			Attended Monitoring	Unattended Monitoring and Logging
1	A	>50	None	None
	B	5-50	At commencement of vibration producing activity	Yes with alarm level set to 75% or maximum permissible level
	C	0-5	Continuous	Yes with vibration level monitored by specialist
2	A	>25	None	None
	B	5-25	At commencement of vibration producing activity	Yes with alarm level set to 75% or maximum permissible level
	C	0-5	Continuous	Yes with vibration level monitored by specialist
3	A	>5	None	None
	B	0-5	At commencement of vibration producing activity	Yes with alarm level set to 75% or maximum permissible level

Appendix B provides the detailed requirements for monitoring.

Following is a table indicating the likely vibration susceptibility ratings for the structures on the site, and adjacent structures. These ratings may be varied upon further investigation as described above.

Building Number (refer Figure 2)	Building	Susceptibility Rating
n/a	Terrace and Older Residential Buildings Around the Site	1
n/a	Modern Residential Buildings Around the Site	2
n/a	Mortuary Station	1
n/a	Older Commercial Buildings Around the Site	2
n/a	Modern Commercial Buildings Around the Site	2
14	Castle Connel Hotel	1
10A and B	Offices	1
22, 23, 25, 26, 30, 36	Misc Previous Industrial Buildings	1
40	Australian Hotel	1
42A, 42B, 42C	Terrace houses	1
38 and adjacent gate	Clare Hotel	1
27	Energy Australia Substation	2
n/a	Underground services to be retained	3



**Figure 2 – Building Layout and Structures to be Retained**

## RESPONSE TO VIBRATION ALARMS

The following general procedure should be adopted in zones where only unattended logging is required in response to alarm events.

During the course of demolition where a monitor alarm is activated the following action shall be undertaken:

- All vibration producing works in the vicinity of the alarm (zones A, B or C) shall immediately be stopped.
- The cause of the exceedence shall be investigated and if the cause is seen as a single event that is unlikely to be repeated continue with works.
- If the cause of the event is likely to occur again, or if another alarm is triggered, then the acoustic specialist should be advised and further action taken before works recommence.
- One of two courses of action can then follow. 1. If attended monitoring is established the activity can continue with the attended monitoring confirming that even if the alarm level is exceeded the works can proceed provided the vibration limit is not exceeded. 2. Work practices are modified and attended monitoring used to confirm the vibration limits are being achieved, before returning to unattended monitoring.

## 9. COMPLAINTS HANDLING

A register of noise complaints should be maintained within the site office and be made available to interested parties listing the source of the complaint, time and nature of the complaint.

The following procedure should be adopted where complaints are received.

- The particular activity causing the complaint should be suspended pending further investigation.
- Noise and/or vibration monitoring of the activity should be carried out on a trial basis.
- Where monitoring indicates that the noise or vibration emission goal is exceeded then additional noise or management control should be investigated in accordance with the flow chart.
- The activity should proceed with the additional mitigation methods in place and the resultant noise impact reassessed.

## 10. CONCLUSION

A demolition and recycling noise and vibration management plan has been developed that will be used by the demolition and recycling contractor to manage impacts from these activities.

The management plan outlines the development of controls and safeguards that would be applied to all activity on the site. The objective of these controls is to ensure that all work is carried out in a highly controlled and predictable manner that will minimise emissions and protect the amenity of the sensitive receivers surrounding the site.

The controls and safeguards implemented as a result of the analysis recommended in the Plan would be reviewed at a number of stages including when the actual demolition and recycling contractor selected determines the actual demolition and recycling processes and equipment to be used. Further reviews would be undertaken through the demolition period, as required, in response to revised methods and equipment, as well as in response to the monitoring and evaluation of actual impacts. This management plan outlines the procedures that would be adopted during the detailed demolition/recycling planning and execution phases by the contractor.

Prepared by



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**Appendix A - Vibration Safeguards Matrix**

Receiver	Description	Max Vibration Goal (mm/s PPV)	MONITORING REQUIREMENTS BASED ON VIBRATION SUSEPTABILITY CATEGORY	DISTANCE ZONE	LIMITS ON ACTIVITY
1				A	None
				B	No dropping of Structures
				C	No dropping of Structures or Hammering
2				A	None
				B	None
				C	No dropping of Structures
3					None
					None
					None

## **Appendix B – Noise and Vibration Monitoring Requirements**

Noise and vibration shall be carried out by a specialist who would also act as adviser during the period.

### **Vibration Monitoring**

Unattended vibration monitors/ vibration logging should be installed at a point or points (as required) that represent all of all sensitive structures when activities identified as potentially exceeding vibration limits when the activities are within the “A” proximity zone, or in response to complaints.

Monitors should continuously monitor vibration levels and either continuously log, or log any significant vibration levels above 25% of the vibration limit. The monitors should provide an audible and visual alarm, or SMS alarm. For structures with 1 and 2 category susceptibility then all three alarm methods should be used. All alarm events should be logged.

Monitors shall be downloaded at a maximum 2 week interval, and more often if exceedences of the alarm level occur or complaints are received.

### **Noise Monitoring**

Unattended noise monitors/ vibration logging should be installed at a point or points (as required) that represent all of all sensitive receivers when activities are occurring within 50m of the receiver, or in response to complaints.

Monitors should continuously noise vibration levels and shall log statistical noise levels every 15 minutes.

Monitors shall be downloaded at a maximum 2 week interval, and more often if exceedences of the alarm level occur or complaints are received.

### **Reporting**

A report shall be provided every 2 weeks which includes:

- Location and general description of works carried out on site during period.
- Location of noise and vibration monitors including attended monitoring.
- Results of noise and vibration monitoring including attended monitoring.
- Discussion of results, any alarm events or complaints and subsequent actions including revised practices.

Reporting shall occur in response to complaints as outlined in the management plan.