Construction Noise Management Plan

Victoria Park Viaduct – Side Protection Upgrade Project

27 November 2014

Final

NZ TRANSPORT AGENCY
WAKA KOTAHI

Styles Group
Acoustics & Vibration Consultants

Record of amendment

Revision	Description of change	Effective date	Updated by
Incomplete Draft	Incomplete draft for comment.	10 Sept 2014	J. Exeter
Draft	Update to incorporate NZTA comments.	26 Nov 2014	J. Exeter
Final	Update to timing of works and contact details.	27 Nov 2014	J. Exeter

Contents

1. Introduction

Styles Group has been engaged by Conspec Construction Limited to prepare a Construction Noise Management Plan, (CNMP) to enable appropriate management of noise effects arising during the construction works involved with the upgrade of the existing side protection along the Victoria Park Viaduct overpass and local street lighting.

This CNMP has also been prepared to satisfy the requirements of Condition 9.4 *Construction Noise Management Plan* of the Auckland Motorway Alliance Project Specification.

The CNMP must be considered a 'living document' to be updated as the works progress and as changes become necessary. The details of the CNMP will be updated as further information for various works becomes available and further site specific information will be added as Schedules to this CNMP if required.

Further relevant information regarding construction noise and vibration may be found in the NZ Transport Agency document *State Highway Construction and Maintenance Noise and Vibration Management Guide*.

1.1 Contact details

Table 1: Contacts

Role	Name	Organisation	Phone	Email
Contractor Manger	David Flaws	Conspec Construction Ltd	021 682 915	david@conspec.co.nz
Site Manager	Nick Parrot	Conspec Construction Ltd	021 865 821	-
Contractor's Acoustics Consultant	Jamie Exeter	Styles Group Acoustic & Vibration Consultants	09 308 9015	jamie@stylesgroup.co.nz
Communications and Stakeholder Liaison	Paula Lewis	Auckland Motorway Alliance	09 5200 200 or after hours 027 733 9995	vpv@nzta.govt.nz
Auckland Council noise complaints	-	Auckland Council	09 301 0101	-

The Contractor and Site Manager will be present on site during the works and will be responsible for the implementation of this CNMP. Complaints and queries should be directed to the Communications and Stakeholder Liaison.

2. Project overview

The works comprise the removal of the existing posts and outer pipe rail presently screening each side of the Victoria Park Viaduct overpass and installation of new Thriebeam guard rail. Local street lighting in the area will also be upgraded; the streetlight works will be relatively minor as the existing base of the lights will be retained. The area of the works is illustrated in Section 2.4 of this CNMP.

2.1 Construction methodology

The works require the northbound and southbound lanes of State Highway 1 (SH1) to be closed whilst the respective guard rails are being replaced. The works therefore must be undertaken at night to minimise disruption to traffic. The works will involve the complete replacement of all rails on one side of SH1; the opposite side will be completed subsequently.

2.2 Timeframe

The expected timeframe for the side protection upgrade works is 40 nights in total (with up to 25 of these nights including the street light works). The works will be undertaken between 05 January and 18 March 2015 (with contingency dates up to 31 March 2015).

2.3 Hours of operation

The works will take place at night during road closures between 22:00 and 05:00 the following day (Sunday to Friday).

2.4 Location plan

Figure 1: Location of side protection and street light upgrade works within the SH1 designation.

3. Noise performance criteria

3.1 Construction noise limits

There are no conditions for this designation with respect to noise. Typically, maintenance works would be required to comply with the noise limits specified by NZS 6803:1999 *Acoustics – Construction Noise*. However, in consultation with Auckland Council it has been agreed that less stringent noise controls for the maintenance works are appropriate due to the high level of road traffic noise in the area. The noise limits adopted for previous construction works at night within this designation (Victoria Park Tunnel project) have been adopted by the Contractor and will generally be complied with – with the exception of those activities set out as Schedules to this CNMP.

With the exception of the prescribed noise limits, all construction noise shall be measured and assessed in accordance with the provisions of NZS 6803:1999. The following noise criteria apply at 1 m from the most exposed façade of the dwelling or building. The noise limits most relevant to the works are emphasised in bold.

Table 2: Noise criteria for residential zones

Day	Time	$L_{Aeq(T)}$	L_{AFmax}
Weekdays	06:30 – 07:30	65 dB	75 dB
	07:30 – 18:00	75 dB	90 dB
	18:00 – 20:00	70 dB	85 dB
	20:00 – 06:30	**60 dB**	**75 dB**
Saturday	06:30 – 07:30	65 dB	75 dB
	07:30 – 18:00	75 dB	90 dB
	18:00 – 20:00	60 dB	75 dB
	20:00 – 06:30	45 dB	75 dB
Sundays and public holidays	06:30 – 07:30	45 dB	75 dB
	07:30 – 20:00	55 dB	85 dB
	20:00 – 06:30	**60 dB**	**75 dB**

Table 3: Noise criteria for industrial and commercial zones

Time Period	$L_{Aeq(T)}$
07:30 – 18:00	75 dB
18:00 – 07:30	**80 dB**

3.2 Potentially affected receivers

The receivers potentially affected by construction noise are those immediately adjacent to the designation, generally with 100 m of the proposed works. These properties are listed in Table 4 and illustrated in the attached Appendix A. Those receivers lying immediately adjacent to the works will be exposed to higher levels of noise, and those more distant will be deemed to comply where the noise levels at the closest receivers are compliant.

It is possible that in exceptional circumstances, dwellings beyond those identified in Appendix A may be affected by noise to a degree that requires management by this CNMP. The potential effects on these properties will be dealt with by responding to complaints in accordance with Sections 9 and 10. Any such additional dwellings will be added to Table 4 and Appendix A, should they arise. We note that the 'residential use' noise limits have been adopted for buildings comprising both commercial and residential use.

Noise predictions for some of these sites show that the adopted noise limits will be exceeded at times (see Schedules to this CNMP, attached as Appendix B). Where measurements are required in accordance with Sections 8, 9 and 10 they may be conducted at representative locations and not necessarily at all receivers listed here.

Table 4: Potentially most affected sites

Address	Land Use	Reference to Appendix A
31 – 41 Sale St	Mixed	1
43 – 45 Sale St	Commercial	2
70 Sale St	Commercial	3
81 – 95 Union St	Commercial	4
20 – 24 Centre St	Mixed	5
22 – 48A Drake St	Mixed	6
27 – 37 Drake St	Commercial	7
48 Drake St	Commercial	8
210 – 218 Victoria St West	Commercial	9
220 Victoria St West	Residential	10
27 – 37 Napier St	Commercial	11
4A – 4M Wilkins St	Residential	12
5 – 9 Wilkins St	Commercial	13
111 Franklin Rd	Commercial	14
115 – 121 Franklin Rd	Residential	15
The Birdcage Bar & Restaurant	Commercial	16

20 Beaumont St	Commercial	17
77 – 85, 62 – 98 Fisher Point Dr	Residential	18
1/7, 2/7, 1/8, 2/8 Telpher St	Residential	19
98 Beaumont St	Commercial	20
185 Fanshawe St	Commercial	21
101 – 107, 100 – 120 Beaumont St	Commercial	22
15, 23, 23B Westhaven Dr	Commercial	23
1 – 11, 4 – 16A Harbour St	Residential	24
14 – 16 Waitemata St	Residential	25
1 – 1A London St	Residential	26

4. Stakeholder engagement

No less than 2 weeks prior to works commencing on the site, the site manager must notify the potentially affected persons (as identified in Appendix A) via letter drop to advise the following:

i. Expected start date of works;

ii. Expected duration of works;

iii. The days and hours of the week when works may be undertaken;

iv. Details for the Stakeholder Communications Manager (including a phone number) for the receipt of any noise complaints or concerns.

5. Noise emissions

A list of the expected construction activities throughout the project is provided below with the closest distance these activities can approach neighbouring dwellings whilst being compliant with the noise limits applicable between 20:00 and 06:30, Monday to Saturday. There will be no significantly noisy activities undertaken during this project such as rock breaking, piling or blasting. The acoustic screening referenced in Column 2 is detailed in Section 6 of this CNMP. This table is provided as a guide only and will be updated as measurements of the site specific equipment are undertaken during the project.

With reference to the following table, if works are required closer than the distances in Column (3) where no natural or existing screening is available, then noise mitigation by localised screening will be required. If the works program requires machinery to work closer than the distances set out in Column (4), further noise mitigation measures such as those specified in Section 6 of this CNMP should be adopted wherever practicable.

Table 5: Noise emissions to residential land use

Activity on site	Reference L_{Aeq} at 10 m from plant	Column 3: Minimum compliance distance between unmitigated noise source and 1 m from dwelling facade (60 dB L_{Aeq})	Column 4: Minimum compliance distance including mitigation from temporary acoustic screening (60 dB L_{Aeq})
Cutting steel posts during removal of existing barriers	83 dB	179 m	57 m
Concrete drilling	80 dB	127 m	41 m
Hiab (under load)	77 dB	90 m	29 m
Generator	66 dB	26 m	8 m
Tracked Excavator 30 t	75 dB	72 m	23 m

6. General noise mitigation measures

The contractor will take all practicable steps to reduce the noise associated with the works by implementing the general noise mitigation measures listed below:

Control at Source

- Where possible, the quietest machinery and methods available and practicable will be used;
- All machinery will be either new or in good condition upon its arrival at the site, and will thereafter be maintained in good condition throughout the entire duration of the project. For example, all saw blades will be kept sharp, and any tracked plant will be greased to reduce squeaking;
- Upon arrival at the site, the machinery and plant will be checked to ensure that it is not generating unnecessary noise, and will be rectified if necessary;
- When selecting any compressors, generators or pumps for use on the project, the degree of noise generation between models will be considered as a major factor;
- All machinery, (including excavators, cranes and generators) will be fitted with appropriate exhaust silencers. If any supplier offers an accessory silencing kit, this should be used if practicable;
- When machinery or plant on site is not required to be running, it should be switched off and not left idling;
- Noisy plant and machinery should be strategically positioned on the site to reduce the effects on neighbours where practicable;
- Where practicable, all plant and equipment shall utilise broadband reverse alarms in place of traditional pure tone 'beepers';
- The tail gates of trucks must be closed with care and not slammed or allowed to fall closed causing unnecessary noise;
- Horns shall not be used under any circumstances unless in the case of an emergency;
- Any radios or music played on site must be inaudible at the nearest dwellings;
- All workers on site shall be familiar with this CNMP and the above methods that can be used to minimise noise emissions;

- At any property where a reasonable level of noise will be exceeded during the night-time period, it may be appropriate to offer temporary relocation to the residents to avoid sleep disturbance.

Acoustic Screening

- Where possible and appropriate, the plant and machinery on the site should be located in such a way that quiet machinery and structures can provide as much screening as possible to other noisy equipment working on the site;
- Temporary acoustic screening will be erected for all steel and concrete cutting operations. All screening will be constructed from materials with a surface density of no less than 10 kg/m^2. A small portable acoustically effective enclosure will be constructed to screen noise from cutting the existing pipe rails on the western side of the bridge. The enclosure will be moved along with the activity as the works progress;
- All screening should be located as close as practicable to the noise sources to improve their effectiveness. This will be particularly important when undertaking cutting works in the northern area where the nearest noise receivers are elevated above the site;
- Where localised screens are used, they should block line-of-sight from the noisiest part of the machinery to the receiver by as much as possible. The screens should either "wrap" around the noise source or if straight, should be at least 1.5 times the height of the noise source past the end of the noise source;
- The design of all acoustic screening and barriers shall be overseen by a suitably qualified and experienced specialist.

7. Schedules to the CNMP

Where noise predictions have shown that the adopted noise limits (Section 3) will be exceeded during certain activities (including all practicable forms of noise mitigation) a Schedule to the CNMP has been prepared and attached as Appendix B.

Where measured noise levels during the works show that the adopted noise limits are being exceeded, mitigation measures will be implemented with reference to Section 6 of this CNMP. Further measurements will be undertaken to demonstrate the effectiveness of the mitigation measures implemented. If the noise limits are still exceeded with all practicable mitigation measures implemented, the works shall cease and a Schedule will be prepared. The Schedule will be provided to Auckland Council for information and to the Auckland Motorway Alliance (AMA) for approval. All Schedules to this CNMP shall provide the following information as a minimum:

- The proposed activity and equipment to be used, location, duration and timing of the works;
- The proposed mitigation methods, including any mitigation options that have been discounted as impracticable and why;
- The predicted noise levels in accordance with NZS 6803:1999 at the nearest affected receivers;
- Identify all receivers where the relevant criteria will be exceeded;
- Identify any properties where a reasonable level of noise will be exceeded during the night-time period and any temporary relocation of residents required to avoid sleep disturbance.

If monitoring shows that the levels specified in the Schedule are being exceeded, the work generating the exceedance will stop and will not recommence until further mitigation is implemented in accordance with an amended Schedule, approved by the AMA and provided to Auckland Council for information;

The abovementioned process for Schedules to the CNMP does not apply to emergency works.

8. Monitoring and reporting

Noise monitoring must be performed at the commencement of the works to verify the noise predictions. The results of the monitoring will be used to determine whether further mitigation is required. The results shall be used to update and maintain this CNMP to ensure that minimum compliance distances and mitigation measures are specifically tailored to the equipment used on site.

If, in the opinion of the Site Manager, the noise arising from any activity on the site appears excessive, or following the receipt of any reasonable complaint, monitoring must be undertaken.

Any monitoring shall be carried out by a suitably qualified and experienced person.

Noise measurements shall be undertaken using a sound level meter conforming to at least IEC651 Type 2 (preferably Type 1) criteria. All noise measurements and assessments shall be carried out in accordance with NZS 6803:1999 *Construction Noise* and NZS 6802:2008 *Measurement of Environmental Sound*.

9. Corrective action measures

Should noise measurements undertaken by either Auckland Council (or its representative) or the contractor (or their representative) identify non-compliance with the limits set out in this CNMP (or a Schedule relevant to the activity), the following corrective action measures shall be taken:

- The activity responsible for the exceedance shall cease as soon as practicable and only if safe to do so;
- Mitigation options shall be investigated and those deemed practicable shall be implemented;
- Monitoring shall be undertaken to confirm performance of mitigation measures;
- A report detailing steps 1 – 3 shall be submitted to, the AMA and Auckland Council within 24 hours of the non-compliance being identified.

10. Complaints procedure

In addition to the requirements of Section 9 of this CNMP, noise measurements will be undertaken (with reference to Section 8 and 9 of this CNMP) on receipt of any construction noise complaints from the public that correlate with an activity on site.

The contractor will maintain a complaints register. This will include a record of the action taken for each complaint. The complaints register must remain on site at all times and made available to Auckland Council upon request. The register shall include as a minimum:

a) Details of each complaint, including date and time received and the nature of the complaint;

b) Methods used to investigate the complaint;

c) The results of any measurements undertaken as a result of the complaint; and

d) Details of how and when the complaint / noise issue was resolved.

11. General requirements

This CNMP is intended to be a 'living' document and may be updated throughout the works. Auckland Council will be provided with a copy of this CNMP, any additional Schedules that may be prepared and details of any noise complaints received throughout the project.

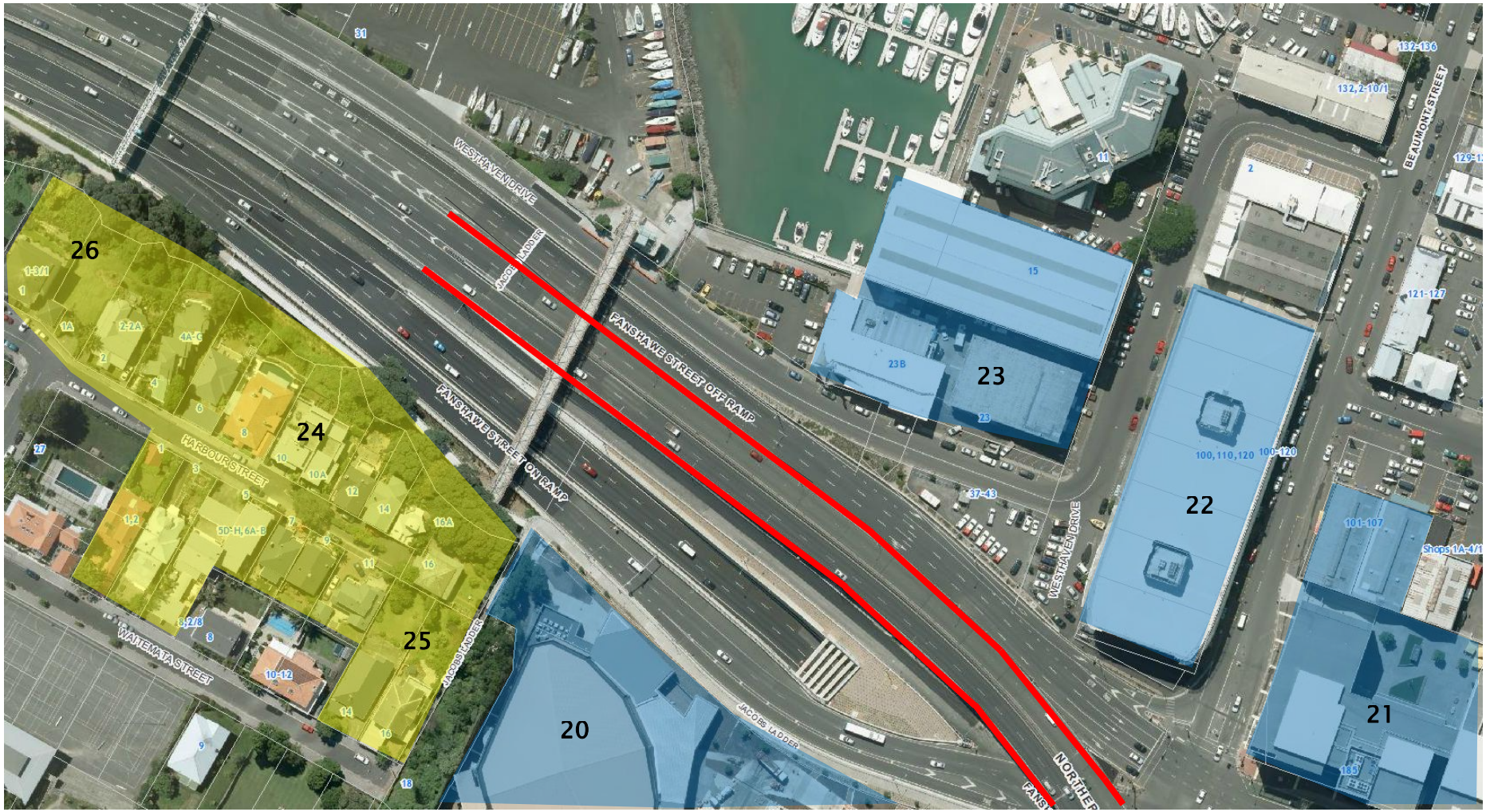
A copy of this CNMP shall be kept at the work site at all times

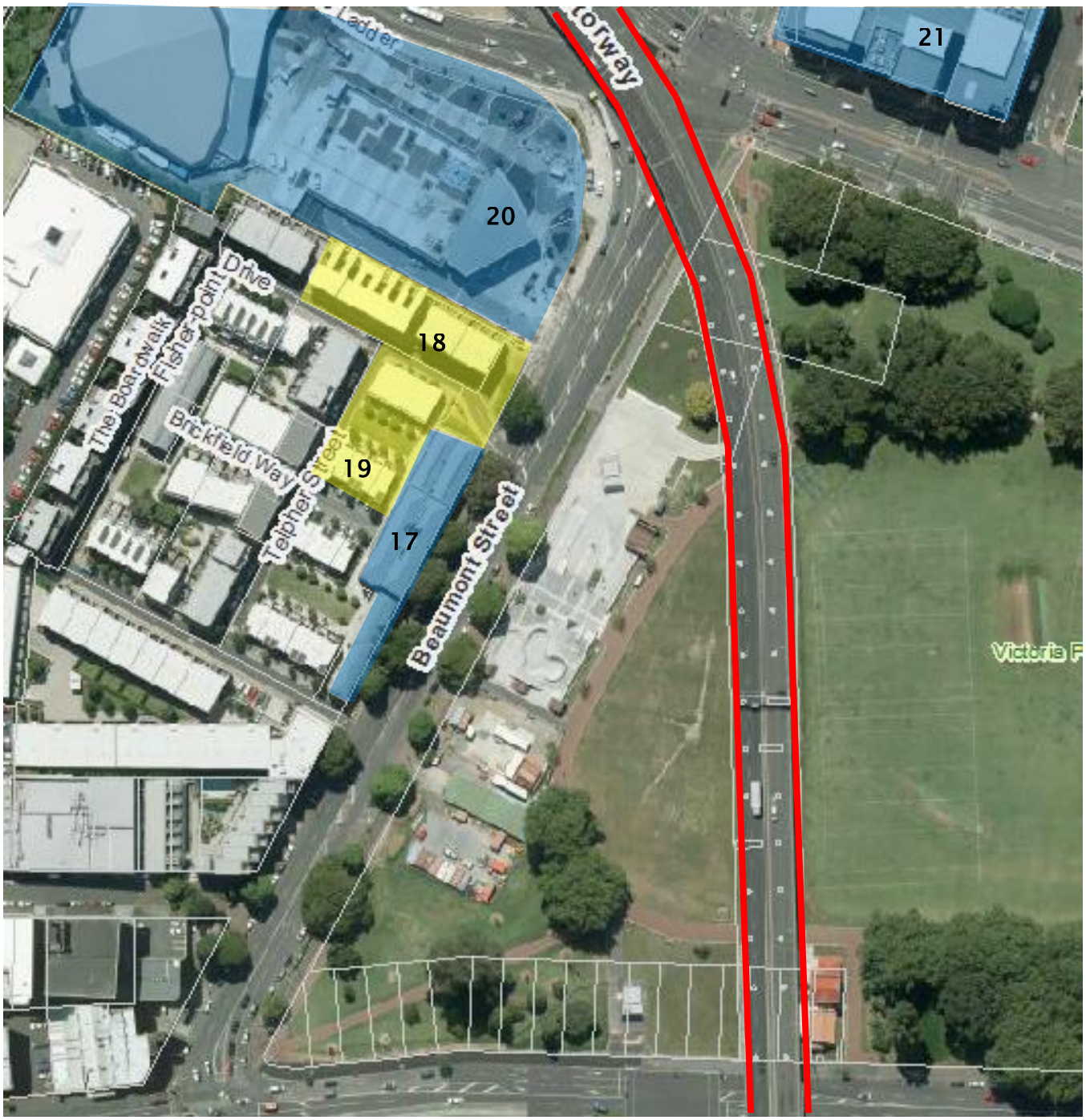
All workers shall read the CNMP before undertaking night works and shall be familiar with its provisions

Appendix A: Noise receivers

Potentially affected noise receivers – within approximately 100 m of the works

'Residential zone' receivers are shaded yellow, 'Commercial zone' receivers are shaded blue. Refer to Section 3 for the noise limits within these zones.




21
20
18
19
17
Drive
The Boardwalk
Brickfield Way
Telpher Street
Beaumont Street


10
16
9
7
Drake Street
Union Street
Cook Street Off Ramp
6
8
5
Centre Street
Adelaide Street
15
Wilkins Street
12
14
Weld Street
4
1
2
13
Cook Street
3
Street
Napier Lane
11

Appendix B: Schedules

The following activities have been predicted to exceed the residential use noise limit (60 dB L_{Aeq}) or commercial use noise limit (80 dB L_{Aeq}) adopted in Section 3 of this CNMP. Measurements will be undertaken to validate the noise predictions at the beginning of the works, and Table B1 updated accordingly. If measurements demonstrate an exceedance of the noise limits during any other construction activity on site (including all forms of practicable mitigation) the activity will be added to Table B1 as a Schedule to the CNMP.

Table B1: Schedules to the CNMP (in accordance with Section 7)

Activity	Plant / Equipment	Time of works	Expected duration of exceedance	Sites at which the noise limits will be exceeded	Predicted noise level (L_{Aeq})	Possible noise mitigation options
Cutting steel posts during removal of existing barriers and drilling holes in concrete barriers. There is no requirement for resident relocation during these works.	Grinder, concrete drill.	22:00 – 05:00. Dates for each receiver to be confirmed.	1 – 2 nights during Jan 2015 – March 2015 (relative to each receiver)	Drake St: 40, 48A	65 dB	Temporary screening, acoustic enclosure, low noise drill.
				Wilkins St: 4 (residential units).	61 dB	Temporary screening, acoustic enclosure, low noise drill.
				Victoria St West: 220 (residential units).	62 dB	Temporary screening, acoustic enclosure, low noise drill.
				Harbour St: 4, 6, 8, 10, 10A, 12, 14, 16, 16A.	63 dB	Temporary screening, acoustic enclosure, low noise drill.
				Birdcage Bar & Restaurant (Commercial use site)	82 dB	Temporary screening, acoustic enclosure, low noise drill.