

Before a Board of Inquiry
MacKays to Peka Peka Expressway Proposal

under: the Resource Management Act 1991

in the matter of: Notice of requirement for designation and resource consent applications by the NZ Transport Agency for the MacKays to Peka Peka Expressway Proposal

applicant: **NZ Transport Agency**
Requiring Authority

Statement of evidence of **Siiri Wilkening** (Construction Noise) for the NZ Transport Agency

Dated: 4 September 2012

REFERENCE: John Hassan (john.hassan@chapmantripp.com)
Suzanne Janissen (suzanne.janissen@chapmantripp.com)

Chapman Tripp
T: +64 4 499 5999
F: +64 4 472 7111

10 Customhouse Quay
PO Box 993, Wellington 6140
New Zealand

www.chapmantripp.com
Auckland, Wellington,
Christchurch



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STATEMENT OF EVIDENCE OF SIIRI WILKENING FOR THE NZ TRANSPORT AGENCY

QUALIFICATIONS AND EXPERIENCE

- 1 My full name is Siiri Wilkening.
- 2 I am an acoustical consultant employed by Marshall Day Acoustics Ltd (*MDA*). I have had twelve years experience in acoustic engineering in Germany and New Zealand, specialising in environmental noise control and computer noise modelling. I hold a Masters degree in Environmental Engineering (Land Improvement and Environment Protection) from the University of Rostock, Germany. I am a Member of the Acoustical Society of New Zealand.
- 3 Over the last fourteen years I have been involved in investigating and reporting on construction noise effects of numerous roading projects, including local roads and State highways. My work has involved all aspects of construction noise assessments, from noise level surveys, calculations and computer noise modelling, noise mitigation design, development of management plans, reporting and community consultation.
- 4 I have given evidence at Council planning hearings, and have been involved in Environment Court mediation and a Board of Inquiry process. Road construction projects I have been involved with include the following:
 - 4.1 Victoria Park Tunnel;
 - 4.2 Newmarket Viaduct Improvement Project;
 - 4.3 State Highway(*SH*)16/18 Realignment;
 - 4.4 SH1 Northern Motorway Extension Orewa to Puhoi;
 - 4.5 North Shore Busway;
 - 4.6 SH1 Improvement Projects Warkworth;
 - 4.7 East Taupo Arterial Road; and
 - 4.8 The Waterview Connection Project.
- 5 My evidence is given in support of the Notice of Requirement (*NoR*) and applications for resource consent lodged with the Environmental Protection Authority (*EPA*) by the NZ Transport Agency (*the NZTA*) for the construction, operation and maintenance of the MackKays to Peka Peka Expressway (*the Project*).

- 6 I am familiar with the area that the Project covers and the State highway and local roading network in the vicinity of the Project.
- 7 Together with my colleague Peter Ibbotson, a consultant at MDA, I co-authored the Assessment of Construction Noise Effects (*Technical Report 16*). I also reviewed the Pre-Construction Noise Level Survey (*Technical Report 17*), which was prepared by Bill Wood, also a consultant at MDA. These reports formed part of the Assessment of Environmental Effects (*AEE*) lodged in support of the Project.¹
- 8 This evidence provides an overview of the Project's construction noise effects and management and is based on the technical and detailed information contained in Technical Report 16² and in the draft Construction Noise and Vibration Management Plan (*CNVMP*).³ These reports should be referred to for additional information.
- 9 I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note (2011), and I agree to comply with it as if this Inquiry were before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 10 My evidence will deal with the following:
- 10.1 Executive Summary;
 - 10.2 Background and role;
 - 10.3 The Existing Noise Environment;
 - 10.4 Assessment Methodology;
 - 10.5 Construction Noise Standard;
 - 10.6 Construction Noise Assessment;

¹ Referred to as Technical Reports 16 and 17 respectively throughout this evidence.

² I have noted that there are a number of incorrect references and numbering in the final version of Technical Report 16, resultant from the exclusion of the Executive Summary from the overall numbering. I have included a table of corrections in **Annexure A** of my evidence for reference.

³ I contributed to the formulation of the draft CNVMP, which is Appendix F of the Construction Environmental Management Plan (*CEMP*).

- 10.7 Response to Submissions;
- 10.8 Response to section 149G reports;
- 10.9 Response to the BOI's section 92 request;
- 10.10 Proposed Conditions; and
- 10.11 Conclusions.

EXECUTIVE SUMMARY

- 11 My colleagues at MDA and I have assessed the Project's construction noise effects in accordance with the relevant New Zealand Standard NZS 6803:1999 "Acoustics – Construction Noise" (*the Standard*).
- 12 Existing ambient noise levels have been measured and we have predicted construction noise levels for a range of construction activities relevant for the establishment of the Expressway. We assessed the predicted noise levels against the recommended criteria of the Standard. Where these levels would exceed the criteria, even with the implementation of recommended mitigation measures, various management measures will be employed on a case-by-case basis, as set out in the draft CNVMP.⁴
- 13 The draft CNVMP provides an outline for management and mitigation of construction noise, both in relation to noise generation and receiver positions, in more detail than Technical Report 16.
- 14 I consider that with the implementation of suitable management and mitigation measures, the construction noise effects from the Project can be managed appropriately. While the increase in noise levels during construction will be significant due to the relatively low existing noise environment, the duration of such noise will be limited for each individual receiver.
- 15 I have reviewed submissions lodged on the Project relevant to my area of expertise. Nothing raised in those submissions causes me to depart from the conclusions reached in my technical assessment of the Project.

BACKGROUND AND ROLE

- 16 The NZTA retained MDA as subcontractor to the MacKays to Peka Peka Expressway Alliance to assist with the investigation, design and planning of the Project. Amongst other things, I was asked to prepare an Assessment of Construction Noise Effects Report

⁴ CNVMP, Section 13. Site Specific Construction Noise Management Plans (*SSCNMP*) will be developed, as is discussed later in my evidence.

(i.e. Technical Report 16). Peter Ibbotson and Graham Warren, my colleagues at MDA, assisted me with the preparation of that Report.

- 17 As noted earlier, Technical Report 16 was lodged with the EPA in April 2012 as part of the overall Project *AEE*.
- 18 My input into the Project involved the supervision of ambient noise level surveys, input into the choice of construction yard location and overall route layout having regard to acoustic considerations, calculation of construction noise levels with and without noise mitigation, determination of the recommended noise mitigation options and assessment of noise effects of the Project in relation to compliance with relevant noise criteria. In addition, I attended, and contributed to, several public open days and discussions with individual residents and affected parties.
- 19 The effects of traffic noise require separate consideration from the effects of construction noise and I have prepared a separate brief of evidence on the former.

EXISTING NOISE ENVIRONMENT

- 20 The Project will generally be constructed in a green field environment, bordered to some degree by existing residential areas. As a result, the existing ambient noise environment for most of the alignment is relatively low, between 42 and 50 dB $L_{Aeq(24h)}$. However, the noise environment at the northern and southern end of the Project, where it connects with SH1, and for areas close to major roads (e.g. Kāpiti Road) are elevated and were measured to be up to 70 dB L_{Aeq} .
- 21 Background L_{A90} levels for most of the Project route are low, typically below 35dB at night.
- 22 The existing noise environment is described in detail in Technical Report 17 and is summarised in Technical Report 16.⁵

ASSESSMENT METHODOLOGY

- 23 The methodology used for the construction noise assessment is set out in Technical Report 16,⁶ and can be summarised as follows:
- 23.1 Early acoustic input into the location of the road alignment (through the route selection process) and input into the location and layout of construction yards to avoid noise sensitive receivers where practicable (for example, unlike the Western Link Road designation, the Expressway alignment

⁵ Technical Report 16, Section 2.

⁶ Technical Report 16, Section 5.

avoids Raumati South (a low noise environment) and is instead aligned with the existing SH1);

- 23.2 Identification of potentially affected receivers in the vicinity of the Project;
- 23.3 Determination of ambient noise levels in the vicinity of the Project through measurements. Review and determination of suitable noise criteria based on relevant standards⁷ and ambient noise levels where appropriate;
- 23.4 Prediction of noise levels for each construction activity and/or piece of equipment through Standard data and information obtained through previous similar projects;
- 23.5 Prediction of construction noise levels for construction processes and assessment of the resultant noise levels against relevant criteria;
- 23.6 Recommendation of management and mitigation measures (both in the assessment report and through the CNVMP) to fulfil the requirements of Section 16 of the RMA and to avoid exceedance of the appropriate noise criteria.

CONSTRUCTION NOISE STANDARD

Application of the Standard

- 24 The Standard is the current and most widely adopted standard in New Zealand for the assessment of noise from construction operations. It is referenced in many District Plans⁸ and forms the basis of numerous designations and consents.
- 25 Construction operations are inherently noisy. The Standard acknowledges this by stating:

"... construction noise is outside the scope of NZS 6802:1999⁹ because it usually cannot be kept within the specified limits. Although this may mean that the noise is undesirable, it is not

⁷ The Resource Management Act 1991 (RMA), Kāpiti Coast District Plan (District Plan), Standard, NZTA Environmental Plan, Draft State Highway Construction Noise Guide (v0.4 Feb 2012), and NZTA Environmental and Social Responsibility Policy.

⁸ NZS 6803:1999 replaces the earlier version of the Standard (NZS 6803P:1984). While the District Plan noise rules do not apply (because this Project will be constructed under a designation), I note that the District Plan provisions relating to construction noise for new roads (Section D.2 and D1-22) specify compliance with NZS 6803P:1984.

⁹ New Zealand Standard NZS 6802:1999 "Acoustics – Assessment of Environmental Noise" provides methods for the assessment of environmental sound and sets out recommended numerical noise criteria for the protection of public health and amenity.

*necessarily unreasonable when all the relevant factors are taken into consideration. Construction noise is an inherent part of the progress of society.*¹⁰

- 26 The proposed construction operations required to establish the Expressway will result in a temporary significant increase in noise level. The Standard provides a methodology for the assessment of construction noise.
- 27 The Standard sets out varying construction noise criteria depending on the time, day, receiving environment and duration of the construction.¹¹ For example, lower noise criteria are set for Sundays in residential areas and for projects of durations greater than 20 weeks (such as this Project).¹²
- 28 I consider that the criteria recommended in the Standard¹³ form an appropriate guide for construction noise levels from the Project. This means that, where practicable, the recommended criteria of the Standard should be achieved through the management and mitigation of construction activities.¹⁴

The CNVMP and compliance with the noise criteria

- 29 I recommend that construction noise effects are managed through the use of a CNVMP. The CNVMP can be updated as methodology and equipment are developed throughout the construction of the Project, which would extend, on and off, over several years at varying locations along the alignment. The focus of the CNVMP is to appropriately and transparently manage effects as far as practicable.
- 30 The CNVMP provides for noise management schedules to be prepared for each Project sector.¹⁵ A management schedule contains a detailed list of proposed works (including equipment) relating to the management of a particular activity or group of activities (e.g. in a particular location) and corresponding affected receivers (within pre-determined distances) and will be used as a reference document for the contractor.

¹⁰ NZS 6803:1999 Acoustics – Construction Noise, 'Foreword', page 3.

¹¹ NZS6803:1999, Tables 2 and 3 (page 11).

¹² Technical Report 16, Section 6.2.1 and Tables 6-1 and 6-2. The criteria apply at a distance of 1 metre from the most exposed facade. Noise levels (L_{Aeq}) are time-based.

¹³ The criteria contained in the Standard are intended to be desirable, rather than mandatory, limits for construction noise.

¹⁴ Compliance with the Standard's recommended criteria is a requirement of proposed condition DC.30 (discussed later in my evidence).

¹⁵ CNVMP, Section 14.

- 31 The process in assessing and managing construction noise throughout the Project involves the following two steps (which are detailed in the CNVMP):
- 31.1 The contractor aims to comply with the Standard’s criteria by operating on the site appropriately and implementing general mitigation measures,¹⁶ which apply to the entire Project extent, and specific mitigation measures,¹⁷ which apply to the individual Sectors of the Project.
- 31.2 If compliance cannot practicably be achieved (as determined by calculation and/or measurement), the contractor prepares a Site Specific Construction Noise Management plan (*SSCNMP*) for the relevant site or activity, setting out further management measures. These may involve mitigation measures outside the designation (e.g. the installation of temporary noise barriers on private property) or management on a case-by-case basis (e.g. offer of temporary relocation of residents).¹⁸
- 32 Construction noise, particularly from projects that expand over long distances and extended timeframes, generally cannot be predicted accurately for all eventualities prior to the commencement of project construction. Variations in equipment (size, number and type), timing, location (or a combination of these factors) means that noise levels may vary greatly over the course of any one day.
- 33 Therefore, calculations can be undertaken based on reasonable assumptions, however, they only capture a snapshot of actual activities. Because of this inherent variance, the mechanism of the SSCNMP captures those eventualities where there is a potential for criteria to be exceeded, in a timely and accurate manner. Throughout the assessment and reporting phases, I have emphasised the use of effective communication and consultation with affected parties. The CNVMP requires that this be ongoing.¹⁹ My experience has shown that keeping people informed in a timely manner, and enabling them to give feedback that is taken into

¹⁶ General options to be implemented Project-wide include, for example, appropriate training of personnel, maintenance of equipment, use of temporary construction noise barriers or enclosures, selection of low noise plant, noise level monitoring, consultation with potentially affected sensitive receivers) (see Section 10 of the CNVMP entitled “General Management procedures & mitigation measures”. These are also discussed in Section 7 of Technical Report 16).

¹⁷ Specific options generally include a combination of the general options (refer above) relevant for a specific area or activity. See section 11 of the CNVMP entitled “Site-specific management and mitigation measures”. See also Section 8 of Technical Report 16.

¹⁸ CNVMP, Section 13.

¹⁹ CNVMP, Section 10.1 and 12. See also proposed condition DC.35.

consideration in the construction planning, results in a relationship built on mutual trust and understanding.

- 34 My assessment, while referencing the noise criteria of the Standard, focuses on the practical implementation of management and mitigation. I have also taken into consideration the NZTA's Environmental Plan (June 2008) and sections 16 and 17 of the Resource Management Act 1991.²⁰

CONSTRUCTION NOISE ASSESSMENT

- 35 In this section of my evidence, I briefly describe the key points of the assessment of construction noise effects. The full assessment is contained in Section 8 of Technical Report 16.

- 36 Due to the size of the Project and the variety of construction activities and equipment proposed, I have assessed construction effects for each Sector separately.

- 37 The main activities generating construction noise are described in Section 4 of Technical Report 16, with Table 4-1 identifying the key noise generating activities in each Sector.

- 38 For the entire Project, two aspects of construction need to be differentiated:

38.1 Ongoing stationary activities occurring almost throughout the whole duration of the works in one location (such as construction yards and laydown areas); and

38.2 Activities moving along the alignment with the road formation.

- 39 Each Sector contains construction activities that are stationary and/or move along the alignment.

- 40 Laydown areas and construction yards are proposed to be located generally at sufficient distance from dwellings so that activities in these areas will achieve compliance with the noise criteria in the Standard.

- 41 Ongoing construction work on the Project will travel along the alignment as it is being formed. This means that each individual dwelling would only be affected for a limited time by construction noise.

- 42 While my predictions are based on a worst case circumstance (i.e. with many items of equipment operating in the vicinity of a

²⁰ Technical Report 16, Sections 6.3 and 6.4.

dwelling), in practice this would only occur for short periods throughout the overall construction period.

- 43 Tables 8-6 to 8-9 in Technical Report 16 detail the predicted noise levels, and recommended management and mitigation procedures, in each Sector of the Project. These tables are also reproduced in **Annexure B** to my evidence for ease of reference.
- 44 The right hand table columns (headed "Potential exceedance with mitigation") show if there is a potential for construction noise levels to exceed the recommended criteria, even after the implementation of the general and specific mitigation measures set out in the previous column (headed "Potential mitigation option"). If such potential exceedance is identified (i.e. all brown coloured cells), then the SSCNMP process will need to be invoked, as described in paragraph 31 above. This means that, on a case-by-case basis, further management and mitigation is discussed with the affected party and implemented prior to the relevant activity occurring.
- 45 As noted earlier, most construction activities will travel along the alignment as work on the Expressway progresses. Therefore, each dwelling in the vicinity of the work would be affected for a much lesser duration than the estimated total duration of any one activity within these tables (column 3).

Sector 1²¹

- 46 Construction in Sector 1 will involve the Poplar Avenue realignment, bridge construction over Poplar Avenue and Raumati Road, construction of stormwater wetland ponds, road construction and the establishment and operation of a construction yard at Poplar Avenue Interchange.
- 47 For most activities, the relevant noise criteria in the Standard can be complied with.
- 48 Potential exceedance of these criteria may occur where dwellings are located in close proximity to construction. The potentially affected dwellings are listed in Table 8-1 of Technical Report 16.²² The main noise issues relate to earthworks, generally due to the requirement for large quantities of fill to be moved onto the alignment for pre-loading.
- 49 Mitigation is recommended in the CNVMP.²³ As explained previously, in circumstances where the criteria may potentially be exceeded even with the implementation of general and sector

²¹ Technical Report 16, Section 8.1.

²² Technical Report 16, Section 8.1.7.

²³ CNVMP, Section 11.1.1.

specific mitigation, a SSCNMP will be prepared to provide further mitigation.

- 50 No night-time construction is proposed in Sector 1.

Sector 2²⁴

- 51 Besides the construction of the Expressway, activities in Sector 2 will involve the construction of bridges over Raumati Road, Wharemauku Stream, Kāpiti Road and Mazengarb Road. In addition, Kāpiti Road will be widened, stormwater wetland ponds and construction yards established and Mazengarb Road lowered and realigned.
- 52 Construction yards are proposed close to the Raumati Road, Wharemauku Stream and Mazengarb Road bridges and in the vicinity of the Kāpiti Road Intersection.
- 53 Night works are limited to the bridge beam placements at Raumati (up to 4 nights), Kāpiti and Mazengarb Road bridges (up to 12 nights each). All of the night-time bridge works have the potential to exceed the recommended criteria in the Standard.²⁵
- 54 The use of vibro-compaction and bored piling, (both required for bridge construction), in close proximity to dwellings, also has the potential to exceed daytime noise criteria.²⁶
- 55 Detailed mitigation is set out in the CNVMP.²⁷ Due to the potential for exceedance of the recommended noise criteria even with the implementation of mitigation, Sector 2 will likely require the use of SSCNMPs and noise management schedules.²⁸ The effects are likely to be managed through the extensive consultation proposed with affected parties and the potential for temporary relocation of the most affected residents during the larger bridge construction periods, if required.

²⁴ Technical Report 16, Section 8.2.

²⁵ Refer Technical Report 16, Table 8-2.

²⁶ Note that in Technical Report 16, in Table 8-2, for all instances where the properties of 44 and 48 Milne Drive are noted, these lines should also include 51 Milne Drive. The property of 51 Milne Drive has been identified in Appendix 16.C of Technical Report 16 on the Construction Noise Hot Spots plan EN-NV-325 as being at risk of potential noise criteria exceedance during daytime and night-time.

²⁷ CNVMP, Section 11.1.2.

²⁸ CNVMP, Sections 13 and 14; Technical Report 16, Section 7.2, and evidence paragraph 30.

Sector 3²⁹

- 56 Construction works in Sector 3 involve the construction of the Expressway, bridges across Otaihanga Road, Waikanae River and Te Moana Road, realignment of Otaihanga Road, construction of the Te Moana Road interchange with ramps and widening of Te Moana Road, establishment of stormwater wetlands and construction yards.
- 57 The majority of construction activities can be undertaken in compliance with the noise criteria in the Standard.
- 58 However, where short duration night-time works are proposed and where vibro-compaction and piling for bridge construction is required, I predict that noise levels are likely to exceed the criteria. This is limited to dwellings in the vicinity of the construction of the Otaihanga Road (two dwellings) and Te Moana Road (three dwellings) bridges, with night works limited to up to 4 nights and 12 nights respectively.³⁰ As discussed earlier, in the event of potential exceedance a SSCNMP would need to be produced which provides detail regarding further noise management.
- 59 For these and other construction activities, mitigation measures are recommended in the CNVMP.³¹

Sector 4³²

- 60 Works in Sector 4 include the construction of the Peka Peka Interchange, the realignment of Ngarara and Smithfield Roads, the construction of bridges across Ngarara, Smithfield and Peka Peka Roads and the establishment of construction yards.
- 61 Sector 4 has only a small number of dwellings in the vicinity of the Project. Therefore, potential effects are limited to a small number of dwellings in the vicinity of Peka Peka Road where night-time works are proposed in order to avoid disruption to traffic on SH1.³³
- 62 Site specific management through the SSCNMP process, particularly communication and consultation with the most affected residents, is required for the dwellings identified as potentially receiving high night-time noise levels.³⁴

²⁹ Technical Report 16, Section 8.3.

³⁰ Technical Report 16, Table 8-3 and Appendix 16.C.

³¹ CNVMP, Section 11.1.3.

³² Technical Report 16, Section 8.4.

³³ Technical Report 16, Table 8-4 and Appendix 16.C.

³⁴ CNVMP, Section 11.1.4.

RESPONSE TO SUBMISSIONS

- 63 I have read the submissions lodged on the Project that raise the issue of construction noise. While most of the submissions raise a general concern regarding construction noise levels (which have been discussed already in my evidence), a number of specific issues have been noted and I address these below.

Duration of construction noise effects

- 64 A number of submitters³⁵ are concerned about the long construction duration of the Project, and the associated ongoing noise issues with this period.
- 65 As discussed both in Technical Report 16³⁶ and earlier in this evidence,³⁷ most construction activities will not occur continuously in the vicinity of individual receiver locations throughout the Project's entire construction process. In addition, my assessment is based on a conservative scenario. Accordingly, noise levels (such as those recorded in my **Annexure B** tables) will be below the levels I have predicted for most of the time.
- 66 High noise generating equipment and activities, such as earthmoving machinery or vibro hammers, will be used during specified times and periods only, as required by the Project methodology. With the construction of the Expressway, construction equipment will move along the alignment and thus be in the vicinity of noise sensitive locations for limited time periods only.
- 67 Some activities, such as the construction yards,³⁸ will remain in the same location for extended periods of the Project's construction. However, the location of these yards has been chosen, where practicable, to avoid noise sensitive receivers. The yards do not generally contain high noise generating equipment. In addition, I have recommended that the construction yards be set out and operated to avoid placing noisy equipment in close proximity to dwellings.³⁹

³⁵ Including Submitters A Douglas (173), R Mansell (203), D Evans (211), L James and P Tong (228), P Scrimshaw (307), C Fawthorpe (318), E and B Waterhouse (432), K Pomare (456), D Kieboom (494), J Gradwell of Save Kāpiti Inc (505), S West (573), H Donaldson (683), H Farr (727).

³⁶ Technical Report 16, Sections 3.5 and 6.5.3 and in the footnotes of Tables 8-6 to 8-9.

³⁷ Paragraphs 41 and 45.

³⁸ This has been noted by Submitters including, R Mansell (203), Kāpiti Coast District Council (682) and the Raumati South Residents Association (707).

³⁹ Technical Report 16, e.g. Sections 7.1.6 and 8.1.6, and CNVMP Section 10.6.

Timing of construction activities

- 68 Some submitters,⁴⁰ for noise mitigation reasons, seek to restrict construction activities to certain times of the day and certain days of the week. As noted above, construction will not occur continuously in the vicinity of individual dwellings for the entire Project construction process. I consider that it is not practicable to allow for construction only during certain times of the day and that effects can generally be reasonably mitigated or managed, such that these restrictions are not required.
- 69 Night-time works⁴¹ will generally be restricted to those related to the bridge beam placement (crossing Raumati, Kāpiti, Mazengarb⁴², Otaihanga and Te Moana Roads) and construction and road surfacing works affecting the existing SH1 at the tie-ins at either end of the Project (at QEII Park and Peka Peka Road). Works are required at these locations at night-time, in order to avoid disruption to existing roads. All of these proposed night-time construction works will be of very limited duration (for example, 4 nights in the case of construction of Raumati Road bridge and 12 nights for the construction of the Kāpiti Road bridge). All other Project construction works will be restricted to daytime operations, to avoid disturbance to affected parties.
- 70 I note that restricting construction times to suit individual needs (for instance not during night-time, outside visitor hours only or during night-time only) may adversely affect other receivers in the vicinity.⁴³ In addition, restricting construction times will result in a prolonged construction period thus affecting many receivers longer than necessary.

Construction noise levels and criteria

- 71 A recurring concern of submitters⁴⁴ is the issue of elevated noise levels arising from construction. The Standard, and the District Plan

⁴⁰ As discussed by a number of Submitters including Nga Manu (90), C Watson (126), J Watson (241), L Schager (312), W Sisarich (331), T Daniell (417), E Lenard-Taylor (594), Kāpiti Coast Grey Power Association (624), H Donaldson (683).

⁴¹ As discussed by a number of Submitters including P Scrimshaw (307), N and B Mountier (327), M Eggers (410), E and B Waterhouse (432), R and W Love (470), K Whibley (482), D Kieboom (494), R Pugh (495), Kāpiti Coast District Council (682), Metlifecare Kāpiti (608), N Beechey (663), H Donaldson (683), Raumati South Residents Association (707), H Farr (727).

⁴² Although, I note that it may be possible to undertake the Mazengarb bridge beam placement during the day, as is discussed below in my response to the submission by Metlifecare Kāpiti (608).

⁴³ For instance, night-time work for the Kāpiti Road widening and Expressway construction is being avoided to reduce sleep disturbance of neighbouring residents. However, this means that construction would occur mostly during daytime hours when the Paraparaumu Medical Centre is operating.

⁴⁴ Including Submitters E Cornick (65), C Watson (126), R Mansell (203), L James and P Tong (228), J Anderton and J Abigail (293), L Pomare (309), L Schager

(through reference to the Standard)⁴⁵, recognise that construction noise levels are higher than those of normal ongoing operations. There is a general acceptance (in those documents) that construction needs to be able to be carried out without undue restrictions. Therefore, the criteria⁴⁶ contained in the Standard⁴⁷ are higher than the operational noise limits in the District Plan and also higher than the traffic noise criteria in NZS 6806:2010 "Acoustics – Road-traffic noise – new and altered roads."

- 72 The construction noise criteria of the Standard reflect the need for times of rest, such as at night-time and on Sundays. As explained previously, night-time work on the Project will be confined to the isolated circumstances where it is required for traffic management reasons. Project work undertaken on Sundays will be subject to stringent construction noise criteria (as required by condition DC.30).
- 73 As explained earlier, for most areas noise will not occur constantly throughout the entire duration of construction of the Project. However, while construction is being undertaken in the vicinity of dwellings, I acknowledge that noise levels will be elevated.

Construction noise management

- 74 Management of construction noise levels is addressed in several submissions.⁴⁸ The CNVMP⁴⁹ contains mitigation and management measures that will be implemented to achieve compliance with the noise criteria recommended in Technical Report 16. Where full compliance is not practicable, appropriate responses will be formulated through a SSCNMP, which will be discussed with the affected parties.
- 75 Several submitters⁵⁰ discuss specific mitigation and management procedures, e.g. a freephone number for complaints, construction noise monitoring, avoidance of tonal reversing alarms and dealing

(312), C Fawthorpe (318), N and B Mountier (327), Paraparaumu Medical Centre (521).

⁴⁵ As noted above, the District Plan refers to NZS 6803P:1984, which is the earlier version of the Standard.

⁴⁶ A number of submitters discuss construction noise criteria, including L Pomare (309), L Schager (312), T Daniell (417), R and W Love (470), El Rancho (477), Paraparaumu/Raumati Community Board (501), E Jones (709).

⁴⁷ The submission of A Carter (656) contains an incorrect reference to the road noise standard NZS 6806 and its criteria in relation to construction noise, rather than the correct NZS 6803.

⁴⁸ Including Submitters W Sisarich (331), El Rancho (477) and the Takamore Trust (703).

⁴⁹ CNVMP, Sections 10 and 11.

⁵⁰ Including Submitters and M Smith (11), B Harrison (323), W Sisarich (331), R and W Love (470), D Kieboom (494), El Rancho (477), Takamore Trust (703).

with non-compliant noise levels. I consider that these issues are already addressed in various sections of the CNVMP.⁵¹

- 76 Several submitters⁵² also request double glazing for construction noise mitigation. The CNVMP sets out a hierarchy of mitigation options.⁵³ The CNVMP mitigation options include the installation of barriers on private property, temporary relocation of residents or, as a last resort, the upgrading of buildings to improve the internal noise environment. However, it is important to remember that there are implications when choosing mitigation options outside the designation boundaries, as people and sites not under the control of the construction contractor become affected.
- 77 Generally, upgrading of buildings is only recommended for buildings that are likely to be affected by noise levels above the relevant criteria for an extended period of time which would make the offer of temporary relocation impractical. As previously explained, for this Project, construction activities will move along the alignment thus reducing the noise impact on individual buildings in the vicinity. Also, night-time works are of extremely limited duration, as discussed in paragraphs 53, 58 and 61 above. Therefore, I do not consider the use of intrusive mitigation (such as double glazing) as appropriate, based on the assessed construction methodology.

Effectiveness of barriers

- 78 Some submitters question how barriers will effectively mitigate construction noise.⁵⁴ In appropriate locations, temporary barriers, or the installation of permanent barriers early in the construction process, are commonly used to reduce construction noise. In order to effectively reduce noise levels, the acoustic line-of-sight needs to be broken, i.e. a solid barrier needs to interrupt the line between the noise source and the receiver position.
- 79 Some submitters⁵⁵ seek that permanent (traffic) noise barriers be installed to a certain height and/or length and prior to construction commencing. The length and height of the operational traffic noise barriers is described in my (separate) traffic noise evidence, and I consider that the traffic noise barriers are appropriate as proposed. Regarding the timing of implementation, proposed condition DC.37

⁵¹ CNVMP, Sections 2, 9, 10.5 and 13 respectively.

⁵² Including Submitters P Aregger (382), R and W Love (470), Paraparaumu/Raumati Community Board (501), N Alexander and R Neilson (619), M and A Anderson (678), H Farr (727).

⁵³ CNVMP, Section 10.8.

⁵⁴ Including Submitters P and M Smith (11), J Watson (241), Paraparaumu Medical Centre (521), M and A Anderson (678), Kāpiti Coast District Council (682), Raumati South Residents Association (707) and E Jones (709).

⁵⁵ Including Submitters J Watson (241) and M and A Anderson (678).

requires that permanent barriers are installed prior to construction where practicable.

- 80 Some submitters comment that construction noise will still be audible and affect the outdoor environment,⁵⁶ even with mitigation measures (such as noise barriers) in place. This is correct. The existing ambient noise level in the Project area is generally low.⁵⁷ In addition, the character of the construction noise is different to the current ambient noise environment. Construction is inherently noisy in nature, and as discussed, this is acknowledged by the Standard (see paragraph 71 above). However, mitigation and management will ensure that the level of noise will be reduced to a reasonable level.

Construction traffic

- 81 Several submitters⁵⁸ are concerned about construction traffic noise, both on local roads and from traffic using the Expressway alignment as a haul road throughout the Project's construction period.
- 82 I have addressed construction traffic noise on local roads in Technical Report 16 in Section 8.5. The effects are predicted to be minor due to the relatively small number of construction trucks using the relevant local roads, as compared with the general traffic volumes using those roads.
- 83 The use of the alignment as a haul road has been incorporated in the assessment of construction noise levels for each Project Sector. Trucks associated with the construction works, e.g. placing or removing fill, are included in Tables 8-6 to 8-9 in Section 8.6 of Technical Report 16. Trucks will be managed and mitigated similarly to other construction equipment along the alignment, e.g. by requiring regular maintenance and considerate operation.

Proposed Conditions

- 84 A number of submitters⁵⁹ request that designation conditions contain specific requirements. I consider that these are already included in the proposed conditions, as set out below:

84.1 Construction of traffic noise barriers prior to construction – DC.37;⁶⁰

⁵⁶ Including Submitters R MacKay (404), J Weber (529) and M and A Anderson (678).

⁵⁷ Technical Report 16, Sections 2, 6.2.1, 6.5.2 and 9.

⁵⁸ Including Submitters D Evans (211), L James and P Tong (228), J Watson (241), L Pomare (309), E and B Waterhouse (432), R and W Love (470), J Short and G Schwass (531), Metlifecare Kāpiti (608), P Wood and A Moul (696).

⁵⁹ Including Submitters R Mansell (203), W Sisarich (331) and H Donaldson (683).

⁶⁰ For ease of reference the recommended construction noise and vibration conditions are attached in **Annexure C**.

84.2 Construction noise monitoring – DC.30 (through requirement of the certified CNVMP which contains monitoring requirements in Section 9);

84.3 Limitation of construction times – DC.30 (through more stringent construction noise criteria at nights and on Sundays and Public Holidays).

85 I now turn to discuss some of the submissions, which raise particular construction noise issues.

Nga Manu Nature Reserve (90)

86 The Nga Manu Nature Reserve (*Nga Manu*) submits⁶¹ that it should be included in the list of sensitive receiving environments in the CNVMP and that an SSNMP should be prepared for it. Nga Manu is located approximately 450 metres from the construction site, with the closest potential night-time works being for the Ngarara Road bridge construction some 600 metres away.

87 The Construction Environmental Plan in Table 2.1 referenced in the submission sets out those sensitive receivers that are close to the construction site and for which there is a potential that criteria may be exceeded. Nga Manu’s distance to the construction works means that neither daytime nor night-time construction noise criteria would be exceeded.

88 The mechanism of the SSCNMP would be implemented if there is a potential for non-compliance with the criteria, as set out earlier in my evidence. I do not consider it likely that SSCNMPs would be warranted or required for Nga Manu.

89 Nga Manu also seeks notification of construction timing, and that construction activities are conducted as much as possible outside peak visitor times. I agree that notification of Nga Manu should be undertaken in a timely manner.⁶² I have discussed the issue of specific construction times in paragraphs 68 and 70 above.

Waikanae Christian Holiday Park (El Rancho) (477)

90 Waikanae Christian Holiday Park, (referred to as *El Rancho*) retained Malcolm Hunt Associates (*MHA*) to undertake a review of my noise assessment (as presented in Technical Reports 16 and 17), in relation to the potential noise effects on El Rancho (*the MHA report*). The MHA report was attached to El Rancho’s submission.

91 The MHA report, in Section 7, briefly addresses construction noise effects. It concludes that, while construction noise will cause

⁶¹ In Section 6, page 6.

⁶² Pursuant to CEMP, Appendix S: Stakeholder and Communication Management Plan.

temporary effects for a limited duration during day time, noise levels can be mitigated by ensuring the proposed earth bund is constructed as soon as possible, thus shielding the remaining works behind it. In addition, the MHA report recommends that the CNVMP should contain specific provision for adequate prior notification to El Rancho regarding timing of construction works.

- 92 I agree with these recommendations and note that these have already been included in the CNVMP⁶³ and the proposed conditions.⁶⁴
- 93 The El Rancho submission also seeks that “*construction noise will not exceed acceptable noise standard limits to protect sleep during night-time*”.⁶⁵ I note that no night works are proposed in the vicinity of El Rancho. The closest night works are proposed at Te Moana Road bridge where bridge beam placement would occur for no more than 12 nights. Te Moana Road is approximately 1 km from the closest building at El Rancho, and night-time construction noise levels at El Rancho will be well within the night-time noise criteria of the Standard.

Paraparaumu Medical Centre (521)

- 94 The submission from the Paraparaumu Medical Centre (*the Medical Centre*) raises the issues of potential effects from construction noise levels and the effectiveness of barriers to mitigate construction noise. The Medical Centre is located at 92-94 Kāpiti Road.
- 95 In Table 8-7 of Technical Report 16 (reproduced in **Annexure B**), 94 Kāpiti Road has been identified to be the building most affected by the Kāpiti Road bridge construction. External daytime noise levels, without mitigation, of up to 73 dB $L_{Aeq(t)}$ are predicted for most piling works. Of the several mitigation and management measures recommended in the table, the use of temporary construction noise barriers along the northern boundary of 92-94 Kāpiti Road will result in a noticeable noise level reduction of between 7 and 10 decibels.
- 96 Vibro hammers would be used for short durations, which would result in noise levels of up to 80 dB $L_{Aeq(t)}$, without mitigation, and 70 to 73 dB $L_{Aeq(t)}$ with the proposed temporary barrier in place. I recommend that the Medical Centre be consulted,⁶⁶ and a suitable time found for these barrier works to be undertaken so that minimal disruption is caused to the operation of the Medical Centre without

⁶³ CNVMP, Sections 10.1 and 10.3.

⁶⁴ Proposed conditions DC.35 and DC.37.

⁶⁵ El Rancho submission (477), Section 4.2, pg 11.

⁶⁶ As indicated in Technical Report 16, Section 8.6 and **Annexure B**, table for Sector 2.

causing additional noise to residents (for example, the barriers could be constructed out of business hours, e.g. during the early evening).

- 97 The Medical Centre is also in the vicinity of one of the proposed construction yards. However, the noise levels from the construction yard are relatively low when compared with the actual construction activities along the alignment. In addition, the construction yard is recommended to be laid out such that noisy activities are located away from noise sensitive locations, such as the Medical Centre.
- 98 Overall, I consider that suitable management and mitigation can be implemented to allow the Medical Centre to operate throughout the construction duration. Further consultation with the Medical Centre will be necessary in order to find a suitable solution for all involved. This may include a combination of temporary barriers, appropriate timing of high noise construction activities, provision of alternative ventilation, timely advance notification of construction activities and similar measures. These can all be managed through the CNVMP (or SSCNMP) if required.

Metlifecare Kāpiti Ltd (608)

- 99 Metlifecare Kāpiti operates the Kāpiti Village retirement village, which is located adjacent to the Expressway at Paraparaumu. The most affected dwellings are located in Cheltenham Drive and Oxford Court, and share a common boundary with the Expressway designation. A 2.5m high existing bund extends south from the southern end of Oxford Court for about 330 metres along the designation boundary. This bund will be retained for noise mitigation purposes.
- 100 The submission is concerned with several issues, including:
- 100.1 The increase in noise levels during construction, with potential exceedance of the daytime and night-time noise criteria;
 - 100.2 The complication that temporary relocation is not a suitable alternative mitigation measure for residents of the retirement village; and
 - 100.3 The noise from trucks using the alignment as a haul road.
- I discuss each of these issues below.
- 101 Construction will result in a considerable increase in noise level, even with the implementation of noise mitigation measures (as discussed in paragraphs 71 to 73 above). The most affected dwellings in Kāpiti Village are those closest to the construction site, though some are well shielded by the existing bund noted above.

- 102 Daytime construction noise levels can be appropriately mitigated by means of permanent noise barriers, in conjunction with the existing bund. For operational traffic noise mitigation purposes, the recommended mitigation option involves a combination of the existing bund and additional noise barriers to reduce traffic noise levels. As set out in recommended designation condition DC.37, in this instance I consider that it may be practicable to install the traffic noise barriers early in the construction phase in order to achieve effective noise level reduction.
- 103 Further mitigation and management would involve timely communication with Kāpiti Village management, choice of low noise equipment where practicable and timing of activities to minimise the time adjacent to the Village. All of these matters will be managed through the CNVMP.
- 104 Night-time noise criteria are likely to be exceeded for some Village dwellings during the Mazengarb bridge beam placement, which is predicted to take up to 12 nights. Mitigation of this activity is limited by its location in relation to neighbouring dwellings. In this instance, temporary relocation of the most affected residents may be an appropriate, possible mitigation response. However, the submission notes that this is not considered a practicable option.
- 105 I understand from **Mr Andrew Goldie** (Construction Manager) that it may be possible to undertake the Mazengarb bridge beam placement during the day, by closing Mazengarb Road during off peak daytime (e.g. between 9 am and 3 pm). This would result in an increase in time required to place the beams, but would avoid night works in the area. I consider that any such decisions should be made after discussion with Village management in order to weigh up the resulting effects, and managed through the SSCNMP process.⁶⁷
- 106 Noise from trucks using the alignment as a haul road, and local roads for transporting of fill where required, has been taken into consideration in the predictions, as noted in paragraphs 82 and 83 above. I consider the predicted noise levels to be appropriate.
- Kāpiti Coast District Council (682)**
- 107 The submission of the Kāpiti Coast District Council (KCDC) seeks conditions relating to the following matters (referenced to the paragraph numbers of the KCDC submission):

⁶⁷ As discussed in paragraphs 31.2 and 33.

- 107.1 Paragraph 103(a): That night-time construction noise affecting residents is no higher than necessary and preferably compliant with the night-time criteria of the Standard.

I consider that this is addressed in proposed conditions DC.30 (which states that the Standard's night-time noise criteria shall be met (as far as practicable) and requires the CNVMP's management and mitigation measures to be implemented), DC.32 (setting out the methodology to deal with potential non-compliance) and DC.35 (setting out the requirements of notification and residents engagement).

- 107.2 Paragraph 103(b): That acoustic barriers (understood to be permanent (traffic) noise barriers) should be established prior to the main construction works to assist in screening noise.

I consider that this is addressed in proposed condition DC.37, which requires permanent (traffic) noise barriers to be installed prior to noise generating works commencing within 100m of the relevant receiver, where this is practicable. Since the Project spans several kilometres, I consider it is appropriate that the recommended condition clarifies that barriers would only need to be considered once construction occurs within a set distance (i.e. 100m) of receivers. In some instances, it may not be possible or effective to install traffic noise barriers prior to construction commencing, for example, where a retaining wall or embankment needs to be formed on which a barrier is to be installed. Therefore, the recommended condition contains a requirement of practicability.

- 107.3 Paragraph 103(c): That construction noise is monitored at appropriate sites and times and that mitigation appropriately responds to potential non-compliance issues shown by monitoring.

Proposed condition DC.30 requires the implementation of the CNVMP, which is to be certified by KCDC (see condition DC.7). Section 9 of the CNVMP contains requirements for monitoring and contingency measures in case of non-compliance. In addition, the use of SSCNMP is set out in Section 13 of the CNVMP, for instances when activities may result in potential non-compliance.

- 108 Overall, I consider that the concerns of KCDC have been addressed appropriately.

- 109 I note that the submission of the Raumati South Residents Association (707) mirrors that of KCDC in relation to construction noise issues. It has therefore also been addressed in the above paragraphs.

Takamore Trust (703)

- 110 In its submission,⁶⁸ the Takamore Trust notes procedural and mitigation considerations in relation to the CNVMP, amongst other management plans. I interpret this as meaning that the Trust seeks to be engaged with during the formulation and finalisation of the CNVMP.
- 111 I consider that this issue would be addressed through the Stakeholder and Communication Management Plan.⁶⁹

RESPONSE TO SECTION 149G REPORTS

- 112 I have reviewed the Key Issues Reports prepared by KCDC (dated 8 June 2012) and Greater Wellington Regional Council (GWRC)⁷⁰ (dated 11 June 2012), pursuant to section 149G(3) of the RMA. In this section of my evidence I will respond to the issues raised in relation to construction noise, which have not already been addressed in my evidence.
- 113 The Report prepared by KCDC raised the issue that construction noise would have a significant consequence for public health and amenity.⁷¹ This issue has already been addressed in paragraphs 25 and 26 of my evidence and throughout Section 6.5.1 and 6.5.2 of Technical Report 16. In summary, it is acknowledged that construction noise levels, while generally compliant with the relevant recommended noise criteria, will be higher than those currently experienced and therefore have an effect on residents' amenity.
- 114 Construction is an inherently noisy activity and my focus has been on providing appropriate mechanisms to manage and mitigate effects on neighbouring residents. However, the recommended noise criteria are unlikely to have adverse effects on public health as they will be well below the threshold of occupational health and safety requiring hearing protection, and will generally not occur at night-time in order to avoid sleep disturbance. **Dr Black** considers public health issues in his evidence.

⁶⁸ Takamore Trust submission, Appendix B "The Takamore Trust Cultural Impact Assessment", Section 7.1, page 30.

⁶⁹ CEMP, Appendix S.

⁷⁰ The GWRC report does not contain any construction noise issues.

⁷¹ Section 149G(3) report, Section C.14, page 36.

115 The KCDC Report requests clarification as follows:

"The AEE needs to clarify that where NZTA must meet certain noise standards (construction or operational) at residential dwellings, the circumstances under which these standard must be met. For example: whether these standards apply to:

- a. *Only dwellings that existed at the date of the confirmation of the designation;*
- b. *Future dwellings, but only those on land that was zoned for residential purposes at the date of the confirmation of the designation;*
- c. *Future dwellings, but only those on land able to be developed for residential purposes by way of a resource consent granted prior to the date of the confirmation of the designation.*⁷²

116 Construction noise is assessed pursuant to the relevant Standard (discussed previously in my evidence) and managed⁷³ at every affected dwelling existing at the time of construction. This is different to the assessment of traffic noise effects (which is addressed separately in my traffic noise evidence).

117 The reason for the difference is that construction noise predictions contain a level of uncertainty (for instance in relation to construction equipment, timing and combination) and generally address a worst case scenario. Because of the uncertainty, construction noise management and mitigation is able to be adapted as required throughout the construction process (for instance by means of SSCNMPs and noise management schedules).⁷⁴

118 The KCDC report also raises the issue of adequacy of mitigation proposed for construction of the Expressway.⁷⁵ I have discussed the methodology of how to manage and mitigate noise in Sections 7 and 8 of Technical Report 16 and in the Section 10 of the CNVMP (and specifically Section 10.8). Mitigation will need to be implemented throughout construction, and will vary along the alignment depending on (amongst other things) activity, distance to receivers, topography, timing and duration. The CNVMP sets out a framework

⁷² Section 149G(3) report, Section 8.10, page 46.

⁷³ The date on which the designation is confirmed, or the status of land as of that date, is not relevant to that issue.

⁷⁴ For comparison, such adaptable mitigation style is not practicable for the assessment of traffic noise effects. As those effects are assessed to a high level of detail, mitigation can and has been specifically designed for a certain operational scenario.

⁷⁵ Section 149G(3) report, Section C.14, page 36.

of mitigation and management options which will be implemented as appropriate.

RESPONSE TO THE BOI'S SECTION 92 REQUEST

119 I have reviewed the section 92 RMA request made by the Board of Inquiry (BOI) (by letter dated 7 August 2012) and in this section of my evidence I will address matters identified in Appendix One relating to noise standards.

120 The request states:

Noise standards

Clarification of the proposed noise mitigation measures and if the standards apply to:

- *Dwellings at the date the designation is confirmed;*
- *Future dwellings, either zoned for residential purposes at the date the designation is confirmed, or those on land able to be developed for residential purposes."*

121 In relation to construction noise,⁷⁶ I have addressed the issue of which dwellings are assessed in my response to KCDC's submission (above). To reiterate, construction noise will be assessed, managed and mitigated at all occupied buildings at the time of construction. This includes those buildings that may be built in the future (i.e. those built post-lodgement or post-confirmation of the designation, but pre or during construction).

122 I have addressed the proposed construction noise mitigation measures in Sections 10 and 11 of the CNVMP and in the attached **Annexure B**.⁷⁷ The actual mitigation measures that will be implemented by the contractor on-site will depend on a number of factors, such as the distance of noise sensitive receivers, choice of equipment and timing and duration of activities. The process set out earlier in my evidence (paragraph 31) will ensure that the appropriate mitigation is chosen in the relevant circumstances,⁷⁸ and will be certified by Council.⁷⁹

⁷⁶ I respond to the BOI's request with respect to operational (traffic) noise in my (separate) evidence in chief on traffic noise.

⁷⁷ Column "Potential mitigation option".

⁷⁸ This is supported by proposed condition DC.36 which requires the involvement of an acoustic specialist for the design of mitigation measures.

⁷⁹ As required by proposed condition DC.30 and DC.32.

PROPOSED CONDITIONS

- 123 Proposed designation conditions DC.30, 32, 35, 36 and 37⁸⁰ relate to construction noise management and mitigation. The conditions set out the relevant noise criteria that shall be met where practicable,⁸¹ require the noise management and mitigation measures in the certified CNVMP to be implemented⁸² and set out the processes through which potential exceedance shall be addressed.⁸³
- 124 As set out in my evidence above, the conditions are focused on providing a framework of management which enables the contractor, Council and affected parties to have clear expectations in the process. This includes the specification of timeframes and level of communication,⁸⁴ the timing of implementation of mitigation⁸⁵ and the expectation that all practicable mitigation measures be implemented prior to commencement of construction within 100m of such mitigation.⁸⁶
- 125 Management plans are referred to repeatedly in the construction noise conditions.⁸⁷ As discussed earlier, the draft CNVMP is contained in Appendix F of the CEMP (and will be updated, finalised and certified by the relevant Council Manager prior to construction commencing). Where construction activities may potentially exceed the criteria of condition DC.30, the CNVMP requires the use of SSCNMPs.⁸⁸
- 126 Similarly to the CNVMP, SSCNMPs also need to be certified by Council pursuant to proposed condition DC.32b). In order to avoid delays, I recommend amending proposed condition DC.32 to include a requirement for timely Council response as follows (new words shown in bold):⁸⁹

*DC.32 b) Each SSCNMP shall be submitted to the Manager for certification at least 5 working days prior to the relevant construction activity commencing. **A decision will be provided by Council within 3 working days of receipt of the SSCNMP.***

⁸⁰ Relevant conditions are attached in **Annexure C** for ease of reference.

⁸¹ Proposed condition DC.30.

⁸² Proposed condition DC.30.

⁸³ Proposed condition DC.32.

⁸⁴ Proposed conditions DC.32 and 35.

⁸⁵ Proposed condition DC.36.

⁸⁶ Proposed conditions DC.36 and 37.

⁸⁷ Proposed conditions DC.30, 32 and 36.

⁸⁸ Proposed condition DC.32.

⁸⁹ This amendment is included in **Annexure C**.

- 127 I consider that the proposed conditions relevant to construction noise set a clear and achievable framework for the Project construction works to be undertaken while appropriately managing potential construction noise effects.

CONCLUSION

- 128 Overall, I consider that with the implementation of a methodology focussed on communication and mitigation throughout construction, effects on neighbouring premises can be managed to acceptable outcomes for all involved. The noise criteria recommended in the Standard should be aimed to be complied with when practicable (as required by condition DC.30).
- 129 Where there is no practicable mitigation available, alternative management methods should be implemented through SSCNMPs, in consultation with the affected parties.



Siiri Wilkening
4 September 2012

ANNEXURE A: REFERENCE CORRECTIONS FOR TECHNICAL REPORT 16

| Section of Technical Report 16 | Reference given in Technical Report 16 | Corrected Reference |
|--------------------------------------------------------------|-----------------------------------------------|------------------------------|
| Section 3.5 last sentence pg 6 | Tables 9-6 to 9-9 | Tables 8-6 to 8-9 |
| Section 4 second paragraph pg 6 | refer Section 8 | Section 7 |
| Section 4 first bullet point pg 7 | Table 3-1, and... Section 9 | Table 4-1, and ... Section 8 |
| Section 6.2.1 first sentence pg 10, and last paragraph pg 11 | Tables 7-1 and 7-2 | Tables 6-1 and 6-2 |
| Section 6.2.2 last sentence pg 12 | Section 8.2 | Section 7.2 |
| Section 6.5.2 first sentence pg 14 | Section 9.6 | Section 8.6 |
| Section 6.5.3 first sentence pg 14 | Section 9.6 | Section 8.6 |
| Section 7.1 second paragraph pg 15 | Section 7.2.1 | Section 6.2.1 |
| Section 7.1.8 first paragraph pg 18 | Section 7.2.1 | Section 6.2.1 |
| Section 7.1.9 first paragraph pg 19 | Section 8.2 | Section 7.2 |
| Section 7.1.11 last sentence pg 20 | Section 9 | Section 8 |
| Section 7.2 last paragraph pg 22 | Section 8.1 | Section 7.1 |
| Section 8.1.1 last sentence pg 22 | Table 9-6 in Section 9.6 | Table 8-6 in Section 8.6 |
| Section 8.1.4 last sentence pg 23 | Table 9-1 | Table 8-1 |
| Section 8.2.1 last sentence pg 25 | Table 9-7 in Section 9.6 | Table 8-7 in Section 8.6 |
| Section 8.2.2 last sentence pg 26 | Table 9-2 | Table 8-2 |
| Section 8.2.3 last two sentences pg 26 | Table 9-6 Section 9.5 | Table 8-6 Section 8.5 |
| Footnote 14 pg 27 | Section 8 | Section 7 |
| Section 8.2.13 second paragraph pg 30 | Section 9.1.6 | Section 8.1.6 |
| Section 8.3.1 last sentence pg 34 | Table 9-8 in Section 9.6 | Table 8-8 in Section 8.6 |
| Section 8.3.7 last sentence pg 35 | Table 9-7 | Table 8-8 |
| Section 8.3.12 last sentence pg 37 | Section 8.1.10 | Section 8.1.6 |
| Section 8.4.9 second paragraph pg 42 | Section 8.2 | Section 8.1.6 |

| Section of Technical Report 16 | Reference given in Technical Report 16 | Corrected Reference |
|---------------------------------------|-----------------------------------------------|----------------------------|
| Section 8.5 third paragraph pg 43 | Table 9-5 | Table 8-5 |
| Section 9 last paragraph pg 56 | Section 7.2 | Section 6.2 |

ANNEXURE B: PREDICTED NOISE LEVELS AND RECOMMENDED MANAGEMENT AND MITIGATION PROCEDURES⁹⁰

Sector 1 Predicted noise levels and recommended management and mitigation procedures

| Activity | Noisiest equipment | Est. total duration ⁹¹ | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation L _{Aeq(t)} dB | Exceeds daytime criterion 70 dB L _{Aeq} | Exceeds night-time criterion 45 dB L _{Aeq} | Potential mitigation option | Potential exceedance with mitigation ⁹² | |
|-------------------------------------------------|---------------------------------|-----------------------------------|---------------------|-------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Poplar Ave realignment – earthworks and sealing | Graders Excavators Trucks | ~4 months | 1 Leinster Avenue | 78 | Yes | n/a | <ul style="list-style-type: none"> ○ temporary construction noise barriers ○ choice of low noise equipment ○ operation at north end of site during least sensitive times ○ good communication and case-by-case mitigation | No | n/a |
| Earthworks on Poplar Ave to Raumati Road | Graders Excavators Trucks | ~ 9 months | 107 Leinster Avenue | 85 | Yes | n/a | <ul style="list-style-type: none"> ○ installation of traffic noise barriers early during construction, if practicable ○ temporary construction noise barriers ○ operation in proximity to dwellings during least sensitive times ○ good communication and case-by-case mitigation | Yes | n/a |

⁹⁰ The following tables have been reproduced from Tables 8-6 to 8-9 of Technical Report 16.

⁹¹ It is important to note that, as explained in my evidence, the duration of construction activity affecting specific dwellings will be much shorter than the total estimated time period for the activity.

⁹² Refer to Figures in Appendix C of Technical Report 16 showing areas of potential exceedance.

Sector 2 Predicted noise levels and recommended management and mitigation procedures

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation $L_{Aeq(t)}$ dB | Exceeds daytime criterion 70 dB L_{Aeq} | Exceeds night-time criterion 45 dB L_{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Raumati Bridge Construction | Vibro replacement Vibro hammer Bridge beam placement (concrete breakers, trucks) | ~10 months Beam placement 4 nights | 90 Raumati Road | 71 (vibro replacement) 78 ⁹³ (Vibro hammer) 65 (beam placement) | Yes | Yes | <ul style="list-style-type: none"> ○ piling during at least sensitive times ○ resident relocation during night works ○ temporary noise barriers ○ good communication and case-by-case mitigation ○ schedule noisy activities for daytime period | Yes (Vibro hammer / vibro-replacement only) | Yes |
| Earthworks between Raumati Rd and Wharemauku Stream | Graders Excavators Trucks Scrapers | ~7 months | 79 Raumati Road | 82 | Yes | n/a | <ul style="list-style-type: none"> ○ installation of traffic noise barriers early during construction, if practicable temporary construction noise barriers ○ operation in proximity to dwellings during least sensitive times ○ good communication and case-by-case mitigation | Yes | n/a |
| Earthworks between Wharemauku Stream and Kāpiti Road | Graders Excavators Trucks Scrapers | ~6 months | Observation Place dwellings | 90 | Yes | n/a | <ul style="list-style-type: none"> ○ As above | Yes | n/a |

⁹³ Some limited acoustic screening through the topography has been assumed as piling will occur close to ground level.

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation L _{Aeq(t)} dB | Exceeds daytime criterion 70 dB L _{Aeq} | Exceeds night-time criterion 45 dB L _{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|---------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Earthworks and sealing Kāpiti Road Widening | Graders Excavators Trucks | ~6 months | Kāpiti Road dwellings south of intersection | 80 | Yes | Yes | <ul style="list-style-type: none"> o noisy activities during daytime only where practicable o temporary construction noise barriers o resident relocation during night works o good communication and case-by-case mitigation | Yes | Yes |
| Kāpiti Road bridge construction | Vibro replacement Vibro hammer | ~10 months Beam placement over 12 nights | 94 Kāpiti Road | 73 (vibro replacement) 80 (Vibro hammer) 67 (beam placement) | Yes | Yes | <ul style="list-style-type: none"> o piling to occur at least sensitive times o resident relocation during night works o temporary noise barriers o good communication and case-by-case mitigation o schedule noisy activities for daytime period | Yes (Vibro hammer and vibro-replacement only) | Yes |
| Earthworks between Kāpiti Road and Mazengarb Road | Graders Excavators Trucks Scrapers | ~ 3 months | 24 Cypress Grove | 90 | Yes | n/a | <ul style="list-style-type: none"> o installation of traffic noise barriers early during construction, if practicable temporary construction noise barriers o operation in proximity to dwellings during least sensitive times o good communication and case-by-case mitigation | Yes | n/a |

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation L _{Aeq(t)} dB | Exceeds daytime criterion 70 dB L _{Aeq} | Exceeds night-time criterion 45 dB L _{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|----------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|---------------------|----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Vertical realignment of Kāpiti Road | Piling Graders Trucks Excavators | ~ 4 months | 171 Greenwood place | 70 | Yes | Yes | <ul style="list-style-type: none"> ○ conduct piling operations during daytime ○ limit night-time operations where practicable ○ choose quiet piling methods where practicable (i.e, avoid Vibro hammer piling) ○ temporary construction noise barriers | No | No |
| Piling and beam launching for Mazengarb Road | Vibro replacement Piling Concrete breakers Large plant | ~ 4 months Beam placement over 12 nights | 20 Chilton Drive | 71 (vibro replacement) 79 (Vibro hammer) 65 (beam placement) | Yes | Yes | <ul style="list-style-type: none"> ○ piling to occur at least sensitive times ○ resident relocation during night works ○ temporary noise barriers ○ good communication and case-by-case mitigation ○ schedule noisy activities for daytime period | Yes (Vibro hammer /vibro-replacement only) | Yes |
| Earthworks on Mazengarb road | Graders Excavators Trucks Scrapers | ~4 months | 345 Mazengarb Road | 90 | Yes | n/a | <ul style="list-style-type: none"> ○ installation of traffic noise barriers early during construction, if practicable temporary construction noise barriers ○ operation in proximity to dwellings during least sensitive times ○ good communication and case-by-case mitigation | Yes | n/a |

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation L _{Aeq(t)} dB | Exceeds daytime criterion 70 dB L _{Aeq} | Exceeds night-time criterion 45 dB L _{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|----------------------------------------|-------------------------------|---------------------|------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Excavation of stormwater wetland ponds | Excavators Off road trucks | ~1 month | Oxford Court dwellings | 72 | Yes | n/a | <ul style="list-style-type: none"> good communication and case-by-case mitigation | No | n/a |
| Construction Yard (Raumati Road) | Equipment Mobilisation | ~10 months | 90 Raumati Road | 50 | No | Yes | <ul style="list-style-type: none"> Noise control to generators Avoid mobilising equipment en-masse during sensitive periods Solid site hoarding | No | No |
| Construction Yard (Kāpiti Road) | Equipment Mobilisation | ~24 months | 94 Kāpiti Road | 53 | No | Yes | <ul style="list-style-type: none"> As above | No | No |
| Construction Yard (Mazengarb Road) | Equipment Mobilisation | ~10 months | 331 Mazengarb Road | 50 | No | Yes | <ul style="list-style-type: none"> As above | No | No |

Sector 3 Predicted noise levels and recommended management and mitigation procedures

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation $L_{Aeq(t)}$ dB | Exceeds daytime criterion 70 dB L_{Aeq} | Exceeds night-time criterion 45 dB L_{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|------------------------------------------------------|---------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Bridge beam placement on Otaihanga Road | Cranes Hand tools | ~2 months Beam placement over 4 nights | 150 and 155 Otaihanga Road | 60 | No | Yes | <ul style="list-style-type: none"> ○ limit night-time construction where practicable ○ good communication and case-by-case mitigation | No | Yes |
| Earthworks for new road link to Otaihanga Road | Excavators Trucks Graders | ~4 months | Dwelling to south of 126 Otaihanga Road (no data available for allotment) | 73 | Yes | n/a | <ul style="list-style-type: none"> ○ good communication and case-by-case mitigation | No | n/a |
| Earthworks between Otaihanga Road and Waikanae River | Excavators Trucks Graders Scrapers | ~3 months | 165 Otaihanga Road | 71 | Yes | n/a | <ul style="list-style-type: none"> ○ good communication and case-by-case mitigation | No | n/a |
| Bridge construction for Waikanae River Bridge | Vibro replacement Vibro Hammer | ~12 months | East of El Rancho Christian Holiday Park | 70 | Yes | n/a | <ul style="list-style-type: none"> ○ good communication and case-by-case mitigation | No | n/a |
| Earthworks between Waikanae River and Te Moana Road | Excavators Trucks Graders Scrapers | ~6 months | 65 Puriri Street | 73 | Yes | n/a | <ul style="list-style-type: none"> ○ good communication and case-by-case mitigation | No | n/a |
| Road sealing Te Moana Road Intersection | Excavators Trucks Graders | ~4 months | Te Moana Road south of intersections | 76 | Yes | n/a | <ul style="list-style-type: none"> ○ temporary noise barriers ○ good communication and case-by-case mitigation | No | n/a |

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation L _{Aeq(t)} dB | Exceeds daytime criterion 70 dB L _{Aeq} | Exceeds night-time criterion 45 dB L _{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|--------------------------------------|---------------------------------------------------------------|------------------------------------------------|---------------------|----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Bridge Construction at Te Moana Road | Vibro replacement Vibro hammer Bridge beam placement | ~8 months Beam placement over 12 nights | 145 Te Moana Road | 70 (vibro replacement) 78 (Vibro hammer) 61 (beam placement) | Yes | Yes | <ul style="list-style-type: none"> o piling to occur at least sensitive times o resident relocation during night works o temporary noise barriers o good communication and case-by-case mitigation o schedule noisy activities for daytime period | Yes (Vibro hammer / vibro-replacement only) | Yes |
| Construction yard (Otaihanga Road) | Concrete casting Truck deliveries Site mobilisation | Entire project duration 4 years | 150 Otaihanga Road | Potentially >45 | No | Potentially | <ul style="list-style-type: none"> o locate plant and access roads away from nearby receivers o operate during daytime where practicable | No | No |
| Construction yard (Te Moana Road) | Concrete casting Truck deliveries Site mobilisation | ~ 24 months | 145 Te Moana Road | 47 | No | Yes | <ul style="list-style-type: none"> o Noise control to generators o Avoid mobilising equipment en-masse during sensitive periods o Solid site hoarding | No | No |

Sector 4 Predicted noise levels and recommended management and mitigation procedures

| Activity | Noisiest equipment | Est. total duration | Closest dwelling(s) | Maximum noise level at closest receiver w/o mitigation $L_{Aeq(t)}$ dB | Exceeds daytime criterion 70 dB L_{Aeq} | Exceeds night-time criterion 45 dB L_{Aeq} | Potential mitigation option | Potential exceedance with mitigation | |
|--------------------------------------------------|---------------------------------------------|---------------------|---------------------|------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|
| | | | | | | | | Daytime | Night-time |
| Earthworks for Smithfield Road Realignment | Excavators Trucks Graders | ~6 months | 283 Ngarara Road | 71 | Yes | n/a | <ul style="list-style-type: none"> good communication and case-by-case mitigation | No | n/a |
| Earthworks between Ngarara Road and Peka Peka | Excavators Trucks Graders Scrapers | ~ 6 months | 269 Ngarara Road | 72 | Yes | n/a | <ul style="list-style-type: none"> good communication and case-by-case mitigation | No | n/a |
| Earthworks and sealing for Peka Peka Interchange | Excavators Trucks Graders | ~6 months | 32 Peka Peka Road | 75 (earthworks) 68 (sealing) | Yes | Yes | <ul style="list-style-type: none"> resident relocation during night works temporary noise barriers good communication and case-by-case mitigation schedule noisy activities for daytime period where practicable | No | Yes |

ANNEXURE C: PROPOSED CONSTRUCTION NOISE CONDITIONS⁹⁴

| Noise and Vibration Management – Construction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|------------|----------|-----------------|-----------|----|----|-----------|----|----|-----------|----|----|-----------|----|----|------------------|-----------|----|----|-----------|----|----|-----------|----|----|-----------|----|----|------------------------------------|-----------|----|----|-----------|----|----|-----------|----|----|-----------|----|----|-------------|------------|-----------|----|-----------|----|
| DC.30 | <p>The Requiring Authority shall implement the noise management and mitigation measures identified in the certified CVNMP.⁹⁵ Construction noise shall, as far as practicable, be made to comply with the following criteria in accordance with NZS6803:1999:</p> <p>Residential receivers</p> <table border="1"> <thead> <tr> <th>Time of week</th> <th>Time period</th> <th>dB LAeq(T)</th> <th>dB LAmax</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Weekdays</td> <td>0630-0730</td> <td>55</td> <td>75</td> </tr> <tr> <td>0730-1800</td> <td>70</td> <td>85</td> </tr> <tr> <td>1800-2000</td> <td>65</td> <td>80</td> </tr> <tr> <td>2000-0630</td> <td>45</td> <td>75</td> </tr> <tr> <td rowspan="4">Saturdays</td> <td>0630-0730</td> <td>45</td> <td>75</td> </tr> <tr> <td>0730-1800</td> <td>70</td> <td>85</td> </tr> <tr> <td>1800-2000</td> <td>45</td> <td>75</td> </tr> <tr> <td>2000-0630</td> <td>45</td> <td>75</td> </tr> <tr> <td rowspan="4">Sundays and public holidays</td> <td>0630-0730</td> <td>45</td> <td>75</td> </tr> <tr> <td>0730-1800</td> <td>55</td> <td>85</td> </tr> <tr> <td>1800-2000</td> <td>45</td> <td>75</td> </tr> <tr> <td>2000-0630</td> <td>45</td> <td>75</td> </tr> </tbody> </table> <p>Industrial and commercial receivers</p> <table border="1"> <thead> <tr> <th>Time period</th> <th>dB LAeq(T)</th> </tr> </thead> <tbody> <tr> <td>0730-1800</td> <td>70</td> </tr> <tr> <td>1800-0730</td> <td>75</td> </tr> </tbody> </table> <p>(T) means a duration between 15 minutes and 60 minutes, in accordance with NZS6803:1999. Where the criteria set out above cannot be met, the process of Condition DC.32 shall be followed.</p> | Time of week | Time period | dB LAeq(T) | dB LAmax | Weekdays | 0630-0730 | 55 | 75 | 0730-1800 | 70 | 85 | 1800-2000 | 65 | 80 | 2000-0630 | 45 | 75 | Saturdays | 0630-0730 | 45 | 75 | 0730-1800 | 70 | 85 | 1800-2000 | 45 | 75 | 2000-0630 | 45 | 75 | Sundays and public holidays | 0630-0730 | 45 | 75 | 0730-1800 | 55 | 85 | 1800-2000 | 45 | 75 | 2000-0630 | 45 | 75 | Time period | dB LAeq(T) | 0730-1800 | 70 | 1800-0730 | 75 |
| Time of week | Time period | dB LAeq(T) | dB LAmax | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weekdays | 0630-0730 | 55 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0730-1800 | 70 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1800-2000 | 65 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2000-0630 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Saturdays | 0630-0730 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0730-1800 | 70 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1800-2000 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2000-0630 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sundays and public holidays | 0630-0730 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0730-1800 | 55 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1800-2000 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2000-0630 | 45 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Time period | dB LAeq(T) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0730-1800 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1800-0730 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DC.32 | <p>a) Where the criteria of Condition DC.30 cannot practicably be met, the Requiring Authority shall prepare Site Specific Construction Noise Management Plans (SSCNMPs) in accordance with the CVNMP. The SSCNMP shall describe site specific noise management and mitigation measures required, which shall be in addition to the general mitigation measures noted in the CVNMP.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

⁹⁴ As contained in the documentation lodged with the EPA. The underlining or strike through and yellow highlighting shows the correction of various typographical errors.

⁹⁵ Note that proposed condition DC.7 requires the draft CNVMP to be updated and finalised and then submitted to the Manager for certification at least 15 working days prior to commencement of construction of the relevant stage(s).

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| | <p>b) Each SSCNMP shall be submitted to the Manager for certification at least 5 working days prior to the relevant construction activity commencing. A decision will be provided by Council within 3 working days of receipt of the SSCNMP.</p> |
| DC.35 | <p>a) At least 2 working days prior to commencement of works within any construction area, the Requiring Authority shall seek to ensure that:</p> <ul style="list-style-type: none"> i) if night works (works between the hours of 2000h and 0630h) are proposed to be undertaken, the occupiers of properties within 100m of the construction area are provided with written notification of the scheduled works, including any advice for reducing internal noise levels; ii) the occupiers of properties within 100m of the construction area are provided written notification of the scheduled works; iii) the occupiers of properties within 50m of the construction area are provided individual written notification of the scheduled works with the opportunity offered for discussions on a case by case basis, if requested. <p>b) Reasonable attempts are to be made to directly engage with the occupiers of properties within 20m of the construction area to discuss the proposed construction works.</p> |
| DC.36 | <p>The detailed design of any structural construction noise or vibration mitigation measures (e.g. temporary construction noise barriers) as identified in the certified CVNMP shall be undertaken by a suitably qualified acoustics specialist, and shall be implemented prior to commencement of construction within 100m of such mitigation.</p> |
| DC.37 | <p>Where practicable, permanent (traffic) noise barriers, required as Detailed Mitigation Options for operational noise following completion of the Project (in accordance with Conditions DC.39 - DC.40 shall be erected prior to noise generating construction works commencing within 100 metres of the relevant PPFs. Where this is not practicable, temporary noise mitigation measures shall be implemented in accordance with the CNVMP as set out in Condition DC.36 above.</p> |