



Waterview Connection and NZS 6806: 2010



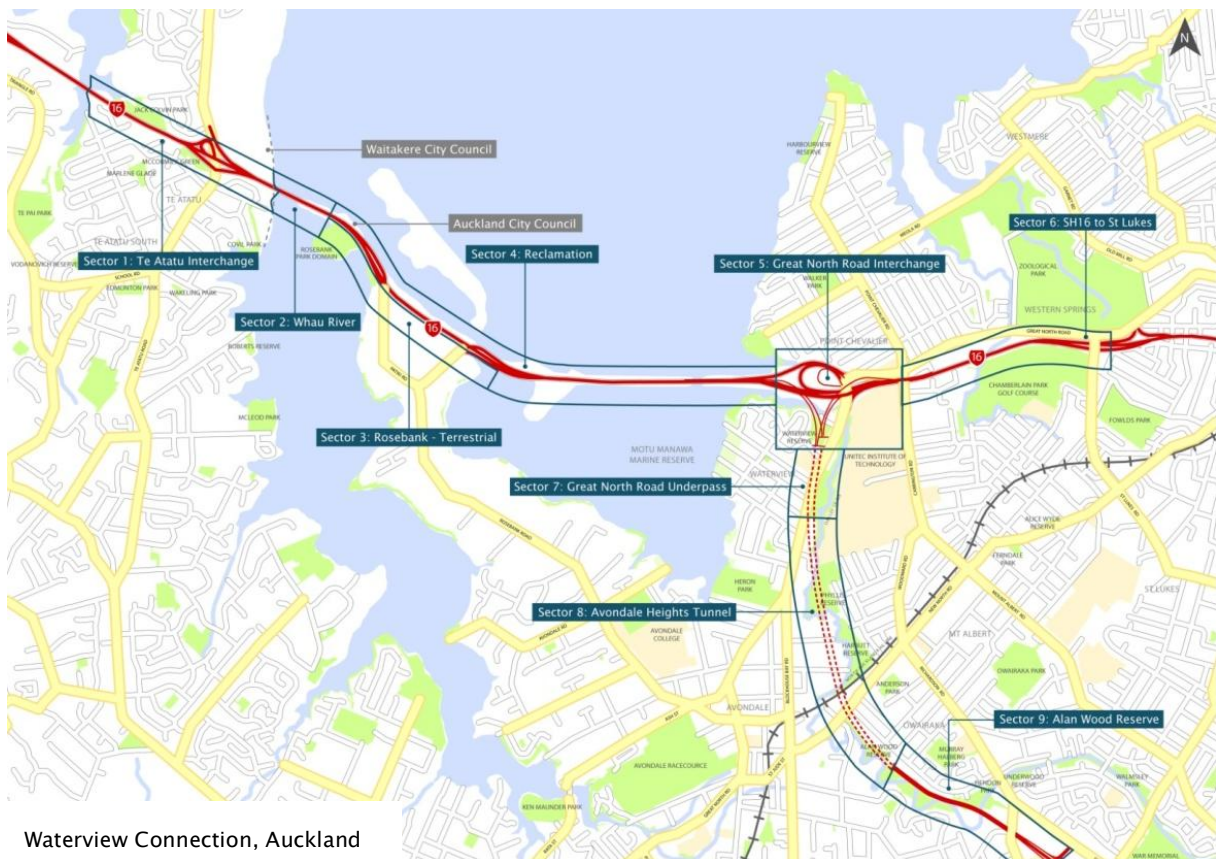
NZTA POSITION **October 2011**

Introduction

The Waterview Connection in west Auckland is the largest roading project to be undertaken in New Zealand in recent times. It includes 4.5km of new state highway connecting SH20 with SH16 between Mt Roskill and Waterview, of which 2.5km will be in tunnels, as well as alterations to 7km of the existing state highway (SH16) between St Lukes and Te Atatu.

The section of the project between SH20 and SH16 is unique in that it will involve a new surface road being constructed to carry more than 80,000 vehicles per day through a well-established, relatively densely populated, residential urban area that currently has a low existing noise environment (generally less than 50 dB $L_{Aeq(24h)}$)¹.

In contrast, alterations to the existing SH16 will involve capacity improvements to a section of state highway carrying around 130,000 vehicles per day through a similar urban area but one which is currently (2011) subject to a high road-traffic noise environment (up to 71 dB $L_{Aeq(24h)}$).



Waterview Connection, Auckland

In 2010, the Waterview Connection was one of the first state highway projects where NZS 6806² was used for road-traffic noise assessment. It was also the first roading project where the notices of requirement for designations and applications for resource consents were submitted to the Environmental Protection Authority as part of the national consenting process under the Resource Management Act 1991 (RMA).

The national consenting process has a time limit of nine months, which restricted the time available for the Board of Inquiry to consider and analyse the development and implementation of NZS 6806. The Board’s final report³ discusses NZS 6806, and disagrees with the conclusions in the final expert witness caucusing report⁴ agreed by all the acoustics experts involved in the hearing.

Board of Inquiry’s concerns with NZS 6806

The Board had the following concerns about the application of NZS 6806 to the Waterview Connection project:

<p>1 Category A and B PPFs ‘worse off’ than Category C PPFs</p>	<p>The Board considered that there was an inconsistency within NZS 6806 in that protected premises and facilities (PPFs) in Categories A and B with external noise readings of between 64 dB LAeq(24h) and 67 dB LAeq(24h) might experience internal noise levels of approximately 44 and 47 dB LAeq(24h) respectively. As a result the Board considered such PPFs to be worse off than those in Category C which would receive building modification mitigation to achieve an internal target level of 40 dB LAeq(24h). This was based on the Board’s acceptance of oral evidence that there is a 20 dB LAeq(24h) reduction between external and internal noise levels with windows closed (final report, particularly paragraphs [911] and [912]).</p>
<p>2 Rigid BPO test</p>	<p>The Board had an overarching concern about the adequacy of NZS 6806 being used to manage adverse effects of road noise under the Resource Management Act 1991 (RMA) through implementation of the Best Practicable Option (BPO) because it considered that there was rigidity in the development of the BPO under NZS 6806 (final report, paragraph [925], 6th bullet point).</p>
<p>3 Community economic well-being versus affected persons’ social well-being</p>	<p>The Board perceived there to be an imbalance in NZS 6806 between the mitigation of adverse noise effects of a project and the potential benefits of new and altered roads to people and communities. The Board considered that the balancing sought in NZS 6806 placed disproportionate weight on enabling the community’s economic and possibly social well-being relative to the social well-being and health of directly affected people. The Board considered that this inadequately addressed those parts of section 5 of the RMA concerned with avoiding, remedying and mitigating adverse effects and failed to engage those parts of section 7 of the RMA concerned with amenities and the quality of the environment likely to be of concern to impacted persons (final decision, paragraph [925]).</p>
<p>4 Not a standard test or methodology</p>	<p>The Board was concerned that NZS 6806 did not provide a set test or methodology and rather, as set out in the foreword to NZS 6806, it offered guidance and recommendations and could constitute a relevant matter to be taken into account when exercising functions and powers under the RMA (final report, paragraph [925], 6th bullet point).</p>

However, despite referring to these concerns in its final report, in its final decision on the designation conditions the Board imposed the revised operational noise designation conditions proposed by the NZTA in its comments⁵ on the Board's draft report⁶ (see also appendix 1).

The NZTA's response to the Board's concerns with NZS 6806:2010 as identified in the Board's final report is set out below.

Board concern – 1

Category A and B PPFs worse-off than Category C PPFs

The NZTA considers that NZS 6806 imposes appropriate noise criteria for the Category A and B PPFs affected by sectors 1–6 of the Waterview Connection project, particularly given the noise levels that those dwellings currently (2011) receive from SH16 as part of the existing environment.

The requirement to avoid, remedy or mitigate effects under section 5 of the RMA relates solely to the effects:

- of the project (as mitigated by all the mitigation measures that form part of the project)
- on the existing environment, ie the environment that included existing lawful developments (such as the existing SH16) and developments that might be carried out as a permitted activity under the relevant RMA plans.

A Board of Inquiry is required to correctly apply the law as it stands when the applications before it are heard. This includes the case law developed by the Environment Court.⁸ Case law has established⁷ that a condition must reasonably relate to what is being authorised. A condition requiring the amelioration of road-traffic noise to below the level experienced before an existing road is altered would not be related to the authorisation of the altered road.

The NZTA does recognise that NZS 6806 describes a process that, in certain circumstances, is intended to ensure that roading projects that involve alterations to existing roads should aim to reduce road-traffic noise below that currently received at a property without the project where there are existing high levels that have the potential to adversely affect the health of people and communities. However, in applying NZS 6806 in such circumstances an applicant, such as the NZTA, is offering to do noise reduction works over and above the level of works that could be imposed on the applicant by a consent authority.

SH16 (St Lukes to Te Atatu) – sectors 1–6 of the Waterview Connection project

The NZTA considers that the conditions originally proposed by the Board for these sectors of the project in its draft report⁶ would have meant that the NZTA was being required to go significantly beyond the requirements of both NZS 6806 and section 5 of the RMA.

This is because the NZTA had already offered to do works that would reduce the existing external levels of road-traffic noise (and by default existing internal noise levels) from SH16 received at many PPFs in line with the provisions of NZS 6806 (ie delivering a positive environmental effect). In addition to this reduction, the Board indicated that it considered it could also require the NZTA to provide

additional building modification mitigation to ensure existing internal noise levels were reduced even further to less than 40 dB $L_{Aeq(24h)}$.

However, the conditions imposed in the Board's final report⁹ relating to the altered road section of the Waterview Connection, ie sectors 1–6, where the NZTA had already offered to largely improve the noise levels currently being received from SH16, while at variance with the proposed model conditions lodged with the NZTA applications¹⁰ are acceptable to the NZTA on the basis that they retain and reflect the intent of NZS 6806. Under the conditions imposed by the Board the only PPFs affected by the alterations to SH16 that will be eligible for building modification mitigation, following implementation of all structural mitigation measures, are those PPFs where:

- the noise level increases by 3 decibels [dB $L_{Aeq(24h)}$] or more due to road–traffic noise from the project
- habitable spaces are likely to receive road–traffic noise levels in excess of 45 dB $L_{Aeq(24h)}$ from motorway operation noise [SH16] with windows closed in the design year.

SH20 (Maioro Street to Waterview) – sectors 7–9 of the Waterview Connection project

The NZTA accepted in its comments⁵ on the Board's draft report⁶ that, given the unique nature of the existing environment and the characteristics of the new area of surface road to be constructed between SH20 and SH16 (sector 9 of the project), the NZTA was willing to agree to conditions being imposed in relation to that section of the project which required greater levels of noise mitigation than NZS 6806. Therefore, because of the unique circumstances, the NZTA considers that the noise conditions applying to this section of the project approved by the Board in its final report⁹ are an acceptable alternative to the conditions¹⁰ originally proposed by the NZTA.

In sector 9 following implementation of all structural mitigation measures, PPFs will be eligible for building–modification mitigation if they are:

- within 100m of the closest lane of the new road; and
- have habitable spaces which are likely to receive road–traffic noise levels in excess of 40 dB $L_{Aeq(24h)}$ from SH20 with windows closed at the project design year.

Board concern – 2

Rigid BPO test

The Board expressed concerns that what it saw as the 'rigid development of the BPO' provided for in NZS 6806 did not align with the requirements of section 16 [duty to avoid unreasonable noise] or section 2 [definition of BPO] in the RMA. However, NZS 6806 specifically requires the application of a BPO approach and section 6.3 of NZS 6806 states that BPO for the purposes of NZS 6806 is the same as BPO as defined by the RMA.

NZS 6806 also lists 16 factors that should be considered in order to determine the BPO for mitigating noise from new and altered roads. These factors include compliance with noise criteria, consistency with the New Zealand Urban Design Protocol, and adherence to safety standards. They also include a 'catch-all' requirement to consider 'any other relevant matters'. Each of the 16 factors listed in

NZS 6806 were taken into account when determining the BPO for noise mitigation for each of the nine assessment sectors of the Waterview Connection project.

The NZTA does not agree that the NZS 6806 BPO test is 'rigid'. The NZTA believes the test to be very flexible and comprehensive, allowing a vast array of factors to be considered and balanced in order to develop an integrated noise mitigation solution.

Board concern – 3

Community economic well-being versus affected persons' social well-being

The Board suggested that NZS 6806 places 'disproportionate weight' on the community's economic, and possibly social, well-being relative to the social wellbeing and health of affected people. The NZTA does not believe this to be the case.

The Waterview Connection noise assessment considered operational road-traffic noise effects at every floor of every PPF (more than 500) within 100m of the project. Over 40 potential mitigation options were developed in accordance with NZS 6806 and presented by the NZTA for the nine assessment sectors across the project area. At least one option for each sector sought to comply with the most demanding noise criteria in NZS 6806 – Category A.

The option selected by the NZTA as that representing the BPO for noise mitigation in each sector was determined by balancing the 16 factors referred to above and prescribed in section 6.3 of NZS 6806. These factors included consideration of an extensive range of health, environmental, social, safety, cultural, economic and other matters.

Board concern – 4

Not a standard test or methodology

The Board stated that NZS 6806 did not provide a set test or methodology but instead offered guidance and recommendations. The NZTA acknowledges the non-mandatory status of the standard. Nevertheless, in the absence of any National Environmental Standard or equivalent national statutory provision, the NZTA believes that NZS 6806 reflects current best practice in New Zealand.

The NZTA remains committed to using NZS 6806 and is confident that the standard provides a robust, nationally consistent and standardised process for measuring, predicting, assessing and, where required, determining mitigation of road-traffic noise from new and altered roads, such as the Waterview Connection project.

Board's overarching concerns with NZS 6806

NZS 6806 was developed by a Standards New Zealand committee² that involved input from a wide range of stakeholders. Many of these stakeholders had the public's interest as their responsibility.

Others were acoustics experts, some of whom had over 20 years' experience and who considered and weighed the available evidence and then sought wider input through public submissions.

This is evidenced by the fact that, following discussion, the final expert witnesses caucusing report⁴ in relation to noise provided to the Waterview Board of Inquiry unanimously endorsed the noise criteria contained NZS 6806.

The appropriateness of NZS 6806 is further reinforced though its alignment with the Transit NZ Noise Guidelines¹¹ which have been used to assess road traffic noise since 1994 and have been widely accepted and applied by the Environment Court. In many ways NZS 6806 is a re-formulation of these guidelines delivering similar but more integrated environmental and design outcomes.

Implications for other state highway projects

It is important to consider the Waterview Connection, the Board's decision and the final designation conditions in context. The project is located in the highly urbanised environment of west Auckland that has a relatively high-density residential population. It involves the construction of a new surface motorway link on SH20 that will carry more than 80,000 vehicles per day, as well as alterations to an existing section of the SH16 motorway carrying around 130,000 vehicles per day.

A large number of properties are to be acquired to accommodate the new section of SH20 and facilitate the alterations to the existing SH16. Without mitigation there would have been large numbers of PPFs assessed as being in Category B and Category C of NZS 6806.

In contrast to the Waterview Connection most other new and altered state highway projects:

- are typically located in peri-urban and rural environments
- are often set largely in open land
- are generally surrounded by relatively low-density residential populations and few PPFs
- carry fewer vehicles (in all instances outside of Auckland, numbers are less than 40,000 vehicles per day and often less than 25,000 vehicles per day)¹²
- require less properties to be acquired
- normally will have fewer constraints in terms of implementing practicable noise mitigation options to address external road-traffic noise.

Designation conditions

The NZTA has developed model designation conditions that it considers should be applied to new and altered state highway projects that are to be assessed and mitigated in accordance with the requirements of NZS 6806. These conditions are available in the NZTA's *Guide to assessing road-traffic noise using NZS 6806 for state highway asset improvement projects*¹³ and the NZTA's Transport Noise website (www.acoustics.nzta.govt.nz).

As noted above the operational noise conditions ultimately imposed by the Waterview Connection Board of Inquiry on sectors 1-6 of that project, while different from the NZTA's model conditions, retain and reflect the intent of NZS 6806.

The operational noise conditions adopted by the Waterview Connection Board of Inquiry in its final report in relation to the new surface road section of the project in sector 9 might be appropriate if the NZTA were ever to seek to consent a new road carrying greater than 75,000 vehicles per day through a well-established, relatively densely populated, residential urban area with a low existing noise environment again in the future.

Further reading

Additional analysis of the Waterview Connection Board of Inquiry's concerns with NZS 6806 and application to other state highway projects can be found in:

- Memorandum of Counsel on behalf of the NZ Transport Agency providing Comments on the [Waterview Connection] Board's Draft Report and Decision – 23 June 2011⁵
- Notices of Requirement by the NZ Transport Agency to the Waipa District Council and the Waikato District Council to alter existing designations under section 181 of the RMA for the Cambridge Section of the Waikato Expressway: Supplementary evidence of Vince Dravitzki (Noise) on behalf of the NZ Transport Agency – 3 August 2011¹⁴

References

- 1 Waterview Connection Assessment of Operational Noise Effects (August 2010).
<http://waterviewapplication.nzta.govt.nz/eBooks/G12/>
- 2 NZS 6806: 2010 Acoustics – Road Traffic Noise – New and Altered Roads. www.standards.co.nz
- 3 Final Report and Decision of the Board of Inquiry into the New Zealand Transport Agency Waterview Connection Proposal: Volume 1 (29 June 2011). www.epa.govt.nz/Resource-management/completed/waterview/Pages/report-and-decision.aspx
- 4 Board of Inquiry Waterview Connection Project, Second Expert Caucusing Joint Report to the Board of Inquiry – Noise (construction and operational) Final caucusing report (17 March 2011).
- 5 Memorandum of Counsel on behalf of the NZ Transport Agency providing Comments on the [Waterview Connection] Board’s Draft Report and Decision (23 June 2011)
- 6 Draft Report and Decision of the Board of Inquiry into the New Zealand Transport Agency Waterview Connection Proposal: Volume 2 Proposed Conditions of Consent (23 May 2011).
www.epa.govt.nz/Resource-management/completed/waterview/Pages/report-and-decision.aspx
- 7 Matamata Piako DC v Matamata Piako DC – 24 May 1996, A41/96, p. 4.
- 8 Ministry for Environment Local Government and Environment Select Committee Briefing – Resource Management (Simplifying and Streamlining) Amendment Bill RMA/MFE/3 (5 April 2009).
www.parliament.nz/NR/rdonlyres/3D91BC36-8C22-4D25-83F5-E1054138867F/153617/49SCLGE_ADV_00DBHOH_BILL9045_1_A44623_Ministryfort.pdf
- 9 Final Report and Decision of the Board of Inquiry into the New Zealand Transport Agency Waterview Connection Proposal: Volume 2 Conditions of Consent (29 June 2011).
www.epa.govt.nz/Resource-management/completed/waterview/Pages/report-and-decision.aspx
- 10 Waterview Connection Assessment of Environmental Effects: Appendix E (August 2010)
<http://waterviewapplication.nzta.govt.nz/eBooks/E1/>
- 11 Transit NZ Guidelines for the Management of Road Traffic Noise – State Highway Improvements (1 December 1999). www.nzta.govt.nz/resources/planning-policy-manual/docs/planning-policy-manual-noise-guidelines-1999.pdf
- 12 NZTA State Highway Traffic Data Booklet 2006–2010.
www.nzta.govt.nz/resources/state-highway-traffic-volumes/docs/SHTV-2006-2010.pdf
- 13 Guide to assessing road-traffic noise using NZS 6806 for state highway asset improvement projects. www.acoustics.nzta.govt.nz
- 14 Notices of Requirement by the NZ Transport Agency to the Waipa District Council and the Waikato District Council to alter existing designations under section 181 of the RMA for the Cambridge Section of the Waikato Expressway: Supplementary evidence of Vince Dravitzki (Noise) on behalf of the NZ Transport Agency (3 August 2011).

Appendix 1

SH20/SH16 Waterview Connection, Auckland, Final Designation Conditions (29 June 2011)

Noise (ON) Conditions – Operation	
ON.1	<p>For the purposes of Conditions ON.2–ON.14 the following terms will have the following meanings:</p> <ul style="list-style-type: none">• Appendix E – means Appendix E to the Technical Report G.12 ‘Assessment of Operational Noise Effects’ submitted with this application.• BPO – means Best Practicable Option.• Building Modification Mitigation – has the same meaning as in NZS 6806:2010.• Design Year – means a point in time that is 10 years after the opening of the Project to the public.• Emergency Mechanical Services – means mechanical services used for emergency situations only.• Habitable room – has the same meaning as in NZS 6806:2010.• Noise Criteria Categories – means groups of preference for time-averaged sound levels established in accordance with NZS 6806:2010 when determining the BPO mitigation option; i.e. Category A – primary noise criterion, Category B – secondary noise criterion and Category C – internal noise criterion.• NZS 6806:2010 – means NZS 6806:2010 Acoustics – Road–Traffic Noise – New and Altered Roads.• PPFs – means only the premises and facilities identified in green, yellow or red in Appendix E.• Structural mitigation – has the same meaning as in NZS 6806:2010.
ON.2	<p>The NZTA shall implement the traffic noise mitigation measures identified as the ‘Preferred Mitigation Options’ in Appendix E as part of the Project, in order to achieve the Noise Criteria Categories indicated in Appendix E (‘Identified Categories’), where practicable and subject to Conditions ON.3–ON.11 below.</p>
ON.3	<p>The detailed design of the structural mitigation measures of the ‘Preferred Mitigation Options’ (the Detailed Mitigation Options) shall be undertaken by a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council prior to construction of the Project, and, subject to Condition ON.4, shall include, as a minimum, the following:</p> <ol style="list-style-type: none">a. Noise barriers with the location, length and height in general accordance with Appendix E and designed in accordance with the ULDF (Section B) (refer Schedule A, Row 38); andb. A requirement that Open Graded Porous Asphalt (‘OGPA’) or equivalent low-noise generating road surface be used on all surface roads throughout the Project, except at the Great North Road Interchange; andc. For the Great North Road Interchange, a requirement that Twin Layer Open Graded Porous Asphalt (‘Twin Layer OGPA’) or equivalent low-noise generating road surface be used as shown in Appendix E.

Noise (ON) Conditions – Operation

ON.4	<p>Where the design of the Detailed Mitigation Options identifies that it is not practicable to implement a particular structural mitigation measure in the location or of the length or height included in the ‘Preferred Mitigation Options’, either:</p> <ol style="list-style-type: none"> a. If the design of the structural mitigation measures could be changed and would still achieve the same Identified Category at all relevant PPFs, and a suitably qualified expert approved by the Major Infrastructure Team Manager, Auckland Council, certifies to the Auckland Council that the changed structural mitigation measure would be consistent with adopting BPO in accordance with NZS 6806:2010, the Detailed Mitigation Options may include the changed mitigation measures; or b. If the changed design of the structural mitigation measure would change the Noise Criteria Category at any relevant PPF from Category A or B to Category C but Major Infrastructure Team Manager, Auckland Council confirms that the changed structural mitigation measure would be consistent with adopting BPO in accordance with NZS 6806:2010, the Detailed Mitigation Options may include the changed structural mitigation measures.
ON.5	<p>The Detailed Mitigation Options shall be implemented prior to completion of construction of the Project.</p>
ON.6	<ol style="list-style-type: none"> a. Sectors 1 to 8 – Prior to construction of the Project, a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council shall identify those PPFs within 100m of the edge of the closest traffic lane of the motorway carriageway where, following implementation of all the structural mitigation measures included in the Detailed Mitigation Options: <ol style="list-style-type: none"> i. A noise level increase of 3 decibels or more will occur due to road-traffic noise from the Project; and ii. Habitable spaces are likely to receive in excess of 45 dB $L_{Aeq(24h)}$ from motorway operational noise with windows closed, in the Design Year. <p>For those PPFs, following the process set out in Conditions ON.7 to ON.11, it shall be determined which Building Modification Mitigation is required to achieve 40 dB L_{Aeq} inside habitable spaces.</p> b. Sector 9 – Prior to construction of the Project, a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council shall identify those PPFs within 100m of the edge of the closest traffic lane of the motorway carriageway where, following implementation of all the structural mitigation measures included in the Detailed Mitigation Options, habitable spaces are likely to receive in excess of 40 dB $L_{Aeq(24h)}$ from motorway operational noise with windows closed, in the Design Year. For those PPFs, following the process set out in ON.7 and ON.8, it shall be determined if Building Modification Mitigation may be required to achieve 40 dB L_{Aeq} inside habitable spaces. For those PPFs where Building Modification Mitigation is required to achieve 40 dB L_{Aeq} inside habitable spaces, this shall be implemented following the process set out in ON.9 to ON.11.

Noise (ON) Conditions – Operation

ON.7	<p>a. Prior to commencement of construction of any sector of the Project in the vicinity of a PPF identified under Condition ON.6, the NZTA shall write to the owner of each-such building seeking access for the purpose of measuring internal noise levels and assessing the existing building envelope in relation to noise reduction performance.</p> <p>b. If the owner(s) of the building approve the NZTA's access to the property within 12 months of the date of the NZTA's letter (sent pursuant to Condition ON.7(a)), then no more than six months prior to commencement of construction in any sector of the Project, the NZTA shall instruct a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council, to visit the building to measure internal noise levels and assess the existing building envelope in relation to noise reduction performance.</p>
ON.8	<p>Where a PPF identified under Condition ON.6 is identified, the NZTA shall be deemed to have complied with Condition ON.7 above where:</p> <p>a. The NZTA (through its acoustics specialist) has visited the building; or</p> <p>b. The owner(s) of the building approved the NZTA's access, but the NZTA could not gain entry for some reason after repeated attempts; or</p> <p>c. The owner(s) of the building did not approve the NZTA's access to the property within the time period set out in Condition ON.7(b) (including where the owner(s) did not respond to the NZTA's letter (sent pursuant to Condition ON.7(a) within that period); or</p> <p>d. The owner(s) of the building cannot, after reasonable enquiry, be found prior to completion of construction of the Project.</p> <p>If any of (b) to (d) above apply to a particular Building, the NZTA shall not be required to implement any Building Modification Mitigation at that Building</p>
ON.9	<p>Subject to Condition ON.8, within 6 months of the assessment required under Condition ON.7(b), the NZTA shall give written notice to the owner of each PPF identified under Condition ON.6):</p> <p>a. Advising of the options available for Building Modification Mitigation to the building; and</p> <p>b. Advising that the owner has three months within which to decide whether to accept Building Modification Mitigation for the building, and if the NZTA has advised the owner that more than one options for building modification mitigation is available, to advise which of those options the owner prefers.</p>
ON.10	<p>Once an agreement on Building Modification Mitigation is reached between the NZTA and the owner of an affected building, the mitigation shall be implemented (including the NZTA undertaking any required third party authorisation) in a reasonable and practical timeframe agreed between the NZTA and the owner. Building Modification Mitigation shall be to the standard specified in section 8.3.2 of NZS 6806:2010.</p> <p><i>Advice note: The NZTA will be responsible for obtaining any necessary building consents or other approvals to undertake the above Building Modification Mitigation.</i></p>

Noise (ON) Conditions – Operation

ON.11	<p>Subject to Condition ON.8, where Building Modification Mitigation is required, the NZTA shall be deemed to have complied with Condition ON.10 above where:</p> <ul style="list-style-type: none"> a. The NZTA has completed Building Modification Mitigation to the Building; or b. The owner(s) of the Building did not accept the NZTA's offer to implement Building Modification Mitigation prior to the expiry of the timeframe stated in Condition ON.9(b) above (including where the owner(s) did not respond to the Requiring Authority within that period); or c. The owner of the Building cannot, after reasonable enquiry, be found prior to completion of construction of the Project. 												
ON.12	<p>The NZTA shall manage and maintain the Detailed Mitigation Options to ensure that, those mitigation works are maintained to retain their noise attenuation performance indefinitely.</p>												
ON.13	<p>All mechanical services associated with the general operation of the tunnels shall be designed such that noise emissions do not exceed the following noise limits, when measured at or within the boundary of any residential-zoned site:</p> <table border="0" data-bbox="416 936 1161 1077"> <tr> <td style="padding-right: 20px;">Monday to Saturday</td> <td style="padding-right: 20px;">7 am to 10 pm</td> <td>50 dB $L_{Aeq(15 \text{ min})}$</td> </tr> <tr> <td>Sunday & Public Holidays</td> <td>9 am to 6 pm</td> <td>50 dB $L_{Aeq(15 \text{ min})}$</td> </tr> <tr> <td>At all other times</td> <td></td> <td>40 dB $L_{Aeq(15 \text{ min})}$</td> </tr> <tr> <td></td> <td></td> <td>75 dB L_{Amax}</td> </tr> </table>	Monday to Saturday	7 am to 10 pm	50 dB $L_{Aeq(15 \text{ min})}$	Sunday & Public Holidays	9 am to 6 pm	50 dB $L_{Aeq(15 \text{ min})}$	At all other times		40 dB $L_{Aeq(15 \text{ min})}$			75 dB L_{Amax}
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ON.14	<ul style="list-style-type: none"> a. Prior to construction, the NZTA shall arrange for a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council to undertake a minimum of 8 (eight) representative measurements of ambient noise levels. Measurements shall be undertaken in accordance with the requirements of Section 5.2 of NZS 6806:2010. b. Following completion of the work, the NZTA shall arrange for a suitably qualified and experienced acoustics specialist approved by the Major Infrastructure Team Manager, Auckland Council to undertake traffic noise monitoring at the same sites surveyed in Condition ON.14 (a) above, within 2 to 3 years following completion of construction of the Project. Measurements shall be undertaken in accordance with the requirements of Section 5.2 of NZS 6806:2010. c. The results of the noise level monitoring in accordance with ON.14(b) above shall be used to verify the computer noise model of the Detailed Mitigation Option. A report describing the findings of the verification shall be provided to the Major Infrastructure Team Manager, Auckland Council within one month of it being completed. 												