BEFORE the Kapiti Coast District Council Hearings Panel

The Proposed District Plan; Kapiti Coast District Council

Under:	of the Resource Management Act 1991 ("**RMA**")
In the matter of	a submission by the **NZ Transport Agency** (submitter number 457) on the Proposed Kapiti Coast District Plan
And In the matter of	Chapter 12: General and District-wide (excluding Financial Contributions)

Statement of Primary Evidence of Michael James Smith for the NZ Transport Agency regarding Chapter 12: *General and District-wide (excluding Financial Contributions)*

Dated 15 April 2016

Executive Summary

1 The Proposed District Plan recognises the potential conflict when noise sensitive activities are established adjacent the State highway network. The Council has proposed restrictions similar to those used within the air noise boundary, adjacent railway, or within high noise zones (e.g., civic, centres or industrial zones).

2 These controls are required to protect the health and amenity of the occupants, and also to minimise the likelihood of complaints and other reverse sensitivity effects relating to the State highway network.

3 The Council's proposed rules require a certain acoustic performance of façade elements for all occupied rooms. In most instances, the Council rules will provide adequate protection for occupants, but in my opinion, it is not the most efficient form of control. Specifically, the 'façade performance' approach does not consider the varying noise levels at different distances from the State highway, nor the orientation of the receiving building. It is a 'one size fits all' approach. Despite its apparent simplicity, with ratings available in catalogues for walls, doors, and windows, it still requires an acoustic specialist to determine the overall performance, and thus compliance with the permitted activity standard.

4 The approach in the NZ Transport Agency ("**Transport Agency**") submission, which I support, is to specify an appropriate internal noise level — 40 dB $L_{Aeq(24h)}$.

5 One area of disagreement is how to best protect noise sensitive activities within 40 metres of the State highway. In my opinion, a straight level difference or an internal noise criterion is not sufficient, as there are no controls for outdoor amenity. I propose that for such buildings to go through a consenting process, and I have suggested that these activities become Restricted Discretionary.

6 There is agreement with the Council that noise effects can increase up to 57 dB $L_{Aeq(24h)}$. In my opinion, rather than listing this as a distance from the carriageway or designation, it is best to show this as an overlay in the

District Plan. This also allows the distance to be reduced where low-noise surfaces will be or are used.

7 With the above controls, I consider that both public health and reverse sensitivity effects can be adequately addressed.

Introduction

8 My name is Michael James Smith. I am an acoustics engineer with a degree in mechanical engineering from the University of Adelaide. I am a member of the Acoustical Society of New Zealand and Australian Acoustical Society.

9 I have practised in the field of acoustics since 2006. I am currently employed by AECOM as a Senior Acoustics Engineer. I was previously employed by the specialist acoustics firm Marshall Day Acoustics, and joined engineering firm URS in Christchurch in 2010. URS and AECOM merged in 2014.

10 I have recently undertaken acoustics assessment for many Transport Agency projects; including the Peka Peka to North Ōtaki Expressway, Waikato Expressway (Tamahere-Cambridge), Russley Road 4-Laning, and the National War Memorial Park underpass. I have also assessed various Council projects such as the Ashburton Second Bridge, and the Long Bay development in Auckland. I am currently managing the acoustics aspects during the construction phase of the Transmission Gully Project.

11 I have given evidence on district plan reviews for Christchurch city, Ashburton, and Wanganui districts.

12 I am currently reviewing the processes that the Transport Agency adopts when assessing noise effects from asset improvement projects, and updating its guidance[1] to reflect lessons learned from recent major projects, changes in industry best practice, and internal procedures.

13 Over the past nine years I have performed computer noise modelling and undertaken measurements of road-traffic noise for a large number of other projects in New Zealand and Australia.

[1] Guide to the management of the effects on noise sensitive land use near to the state highway network; https://www.nzta.govt.nz/resources/effects-on-noise-sensitive-land

Code of Conduct

14 I have read the Environment Court's Code of Conduct for Expert Witnesses, and I agree to comply with it. 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. I understand that the Code of Conduct requires me to assist the Hearings Panel impartially on matters within my expertise, and not to advocate for the Transport Agency.

Scope of Evidence

15 My evidence addresses the following matters:

a The potential road-traffic noise and reverse sensitivity effects from noise sensitive activities being established adjacent to the State highway network.

b Chapter 12, Rules – reverse sensitivity and noise;

i Separating provision for state highways from other noise sources;

ii Agreed position on appropriate external noise levels;

iii Inclusion of a transport buffer areas where noise sensitive activities are Restricted Discretionary;

iv The distance of the transport noise effects area; and

v The performance criteria used.

Background

Road-traffic noise effects

16 The impact of road-traffic noise on the health and wellbeing of local populations has been researched extensively worldwide. Noise from the

State highway network has the potential to cause adverse public health effects on people, and reduced residential amenity.

17 For new State highway projects, these effects are carefully considered during the statutory approval process for new projects, with mitigation such as low-noise road surfaces and noise barriers designed, where appropriate, and enforced by designation conditions.

18 For the existing State highway network, the Transport Agency performs both proactive and reactive maintenance (from fixing potholes and other defects, to periodic resurfacing, guided by annual condition surveys).

19 When new properties are built adjacent to the State highway, there is the opportunity to protect the occupants through appropriate building siting, orientation, fences, building design, and ventilation. The Transport Agency has little control over this, unless resource consent is required and the Transport Agency is considered an affected party.

20 In the case of a large subdivision, protection is often provided in the form of noise bunds or walls adjacent to the State highway. These controls can be required as part of a subdivision consent.

21 For individual properties, site-specific assessment and design is required.

22 If not addressed properly, people can be exposed to road-traffic noise at a level which causes adverse effects. In addition to the public health effects, people may also complain, thereby creating reverse sensitivity effects. This is particularly the case where there is significant growth anticipated, and also where roads have been designated, but not yet built.

23 Apart from total separation, no control can completely avoid this conflict. The proposed rules try to proactively avoid issues which occur around the country. Mitigation after the fact is expensive, and generally not completely effective.

State highway network

24 State highway 1 passes through Kapiti Coast District, and as the main connection from Auckland to Wellington has a significant amount of

through traffic, including heavy vehicles. The existing road mostly has a chipseal surface; however there are small sections of low-noise surfaces such as open-graded porous asphalt ("**OGPA"**).

25 State highway 1 is currently being improved with several significant projects, which are at different stages of design or construction. Some of these projects have significant changes in their alignment.

a Transmission Gully (under construction – expected to be operational in 2020)

b MacKays to Peka Peka (under construction)

c Peka Peka to North Otaki (design / procurement)

d Otaki to north of Levin (investigation)

26 Current traffic volumes are typically 23,000 vehicles per day, with 9% heavy vehicles. Significant growth is predicted.

Predicted noise levels

27 To provide context, the following noise levels are predicted at different distances on relatively flat rural section with potential for subdivision land adjacent to the proposed Peka Peka to North Otaki[2] expressway in the year 2026. These levels are presented as a noise contour plot on is provided in Annexure B. These predictions are for a chipseal surface; noise levels are approximately 5 dB lower will occur where OGPA is installed (i.e. certain parts of MacKays to Peka Peka)

a 70 dB at 20 m

b 66 dB at 40 m.

c 62 dB at 80 m

d 60 dB at 100 m

e 57 dB at 170 m

[2] Traffic data and noise modelling methodology from URS Report "Operational noise and vibration assessment" 12 February 2013t

Management of noise effects

28 The Transport Agency has an established guide to proactively avoid and manage public health and reverse sensitivity effects relating to the State highway network[3] (the **Guide**). The Guide involves working with local authorities, land owners and developers.

29 The Transport Agency made numerous submissions on Chapter 12 which sought various amendments to acoustic treatment and setback rules to manage situations that would give rise to reverse sensitivity effects. These submissions pre-dated the Guide and some of the language and desired relief is slightly different, however the fundamental issues remain the same.

30 The submission and Guide identifies two different areas which are likely to be affected by road-traffic noise. These areas are included in the original submission as 40 metres and 100 metres setbacks, but I will use the language from the Guide in my evidence as below.

a Transport Noise Buffer Area: An area adjacent to a State highway where new or altered sensitive activities should ideally be avoided. Controls are essential to address outdoor amenity, and other potential effects such as vibration and air quality. Transport Noise Effects Area: An area near a State highway where new or altered sensitive activities should be assessed and treated as necessary to mitigate effects from the State highway. Consideration on building design and siting is important to appropriately protect occupants. Acoustic treatment of buildings addresses sleep disturbance and indoor amenity.

b The threshold between the buffer and effects areas is 64 dB $L_{Aeq(24h)}$. The effects area extends to 57 dB $L_{Aeq(24h)}$, however is capped at 100 metres.

31 Within the Transport Noise Effects Areas, acoustic treatment may be required. The most common measure to reduce noise levels inside a house is to keep the windows closed. Therefore 'acoustic treatment' will

[3] Guide to the management of effects on noise sensitive land use near to the state highway network, V1.0. October 2015

often be the provision of alternative ventilation/cooling, such as with a mechanical system, so that windows can remain closed. To provide a genuine alternative to opening windows the ventilation system should provide thermal comfort, which requires performance in excess of the Building Code minimum. Otherwise residents may end up having to choose between using an ineffective and noisy ventilation system, or opening windows and suffering excessive road-traffic noise. Other forms of treatment include additional plasterboard layers, and thicker or laminated glazing.

Chapter 12: Rules

Consolidation of rules

32 The section 42A report[4] contains a consolidated rule which addresses the acoustic performance requirement of all dwellings which are exposed to high noise levels from aircraft, commercial or industrial zones, and road and rail noise. The approach for each of these sources is to apply a performance requirement to the acoustic insulation of the property.

33 In many instances this makes sense. For example, in a commercial zone, the maximum noise level at the site boundary can be readily determined based on district plan noise limits, which will apply on all of the property boundaries. Similarly with aircraft, noise exposure is more uniform across the house.

34 Adjacent to the road, however, there is considerable difference in noise levels based on the building orientation, and also distance from the road.

35 In my opinion, the sources captured by rule 12.D.1 are different from traffic and they should not all be addressed within the same rule as traffic. I recommend that State highways are listed separately..

External noise levels

36 I agree with Ms Hinton, that when predicted road-traffic noise levels are less than 57 dB, no specific treatment is required.

[4] Proposed Kapiti Coast District Plan 2012, section 42A report: Part B – Chapter 12 General and District Wide Provisions (excluding Financial Contributions)

Buffer areas

37 The Transport Agency originally submitted that noise sensitive activities should be 'prohibited' within 40 metres of the State highway. I do not agree that no new noise sensitive activities can occur close to the State highway, because mitigation measures are available. However, I do consider that some form of restriction is appropriate for reasons I have outlined below. I have discussed this in detail with the Transport Agency's planner, Ms Penfold, and she advises that a Restricted Discretionary status is most appropriate.

38 Ms Hinton's position is that within 40 metres of the State highway noise sensitive activities still should be permitted provided a 35 dB level difference is met. Other 'setbacks' exist that are sufficient to address external amenity. These specific setbacks have not been highlighted in the section 42A report.

39 Noise levels will be at least 64 dB at 40 metres from the State highway, excluding shielding provided by boundary fences. With a two story house, there will be no shielding for the second floor.

40 The World Health Organisation specifies noise limits for outside areas, that are between 40–55 dB $L_{Aeq(24h)}$ to avoid annoyance. The New Zealand Standard for road-traffic noise NZS 6806[5] specifies limits that are somewhat higher, but are still adequate to protect external and internal amenity, and health effects.

41 As advised by Ms Penfold, the Restricted Discretionary activity status allows the Council to consider the suitability of the property design, including outdoor living spaces. For example, higher noise levels may be suitable in a townhouse with limited outdoor areas, but a larger property with extensive outdoor entertaining spaces will have higher amenity expectations.

[5] NZS 6806:2010 Acoustics – Road-traffic noise – new and altered roads.

Effects areas

42 The Transport Agency's primary submission was that noise effects extent out to 100 metres from the carriageway.

43 The Council has stated that noise effects only need to be considered out to 80 m. The report by Malcolm Hunt Associates ("**MHA**") states that their research shows it is unlikely that any extra measures are needed in new or altered habitable rooms to address the level of effects found beyond 80 metres from a State highway in the Kapiti District. As shown in contour plot in Annexure B, for flat land with no shielding, less than 2 dB difference between 80 and 100 m, and still above 57 dB.

44 Rather than specifying an arbitrary distance, the Guide contains an equation[6] which calculates the distance using the number of cars and heavy vehicles, speed limit, road surface, and other parameters. This is capped at 100 metres to minimise constraints on land, and noting that where building or terrain screening occurs, external noise levels may be below 57 dB $L_{Aeq(24h),}$ below which acoustic treatment is not required.

45 I note that when considering effects from new roads in rural areas, NZS 6806 considers out to 200 m. This means that the Transport Agency accepts a higher imposition of effects mitigation than it expects in return.

46 Rather than specifying a distance, in my opinion, including a plan overlay is preferable. Not only does this allow the distance to be tailored to the traffic and surface, if gives certainty to landowners as to the status of their property. This is particularly useful for the current expressway projects in the district which have wide designations that will be pulled back after construction is complete. For Transmission Gully and MacKays to Peka Peka, the road alignments are confirmed, and these can be used for the overlays.

47 The Transport Agency can provide the Transport Noise Buffer and Effects areas as a GIS Shapefile.

[6] Equation 1 on page 9

48 This also allows for much simpler rule definitions, by referring to buffer and effects areas directly.

Form of performance standard

49 Both the Council and Transport Agency are trying to control internal levels, but are using different mechanisms for doing it. Each method has pros and cons; there is no perfect method.

50 The Transport Agency promotes the use of indoor design levels. The rationale for using internal design levels can be summarised as follows:

a It differentiates based on distances from road. The noise environment is different at 20 metres from the State highway than from 100 metres from the State highway.

b It allows screening provided by other rows of houses, terrain, road-side barriers, etc. to be taken into consideration, which provides property owners flexibility and the potential to use more cost effective measures in reducing noise levels.

c It encourages smart building design, by positioning noise-sensitive spaces within a building away from roads.

51 The Council approach to providing a suitable internal noise environment is to specify the performance of building façades – 35 dB for the buffer area, and 30 dB for the effects area.

52 One advantage of this is manufacturers have published data for different constructions. An acoustics specialist is required to determine the overall façade performance, combing all the different elements (walls, glazing, doors, and roof). This is required to be done on a case-by-case basis.

Compliance reports

53 Requiring a design certificate to be included in a building consent is not new. There are several ‘design only’ standards for other district plan elements (e.g., building heights, site coverage etc.).

54 A design certificate is required for both the ‘indoor design level’ and ‘façade performance’ approaches. The majority of time and cost is calculating the façade performance, and calculating corresponding internal noise levels adds little assessment cost.

55 No post-construction acoustics inspections are required. If any issues arise, the construction can be checked against drawings and building consent documents. I consider this to be a robust process.

Conclusion

56 Both the Council and the Transport Agency agree that controls are required to address both public health and reverse sensitivity issues associated with noise sensitive activities adjacent the State highway network.

57 I believe that noise sensitive activities within 40 metres of the State highway should not be permitted activities. The Restricted Discretionary activity status allows for some checks and balances, without being excessively onerous.

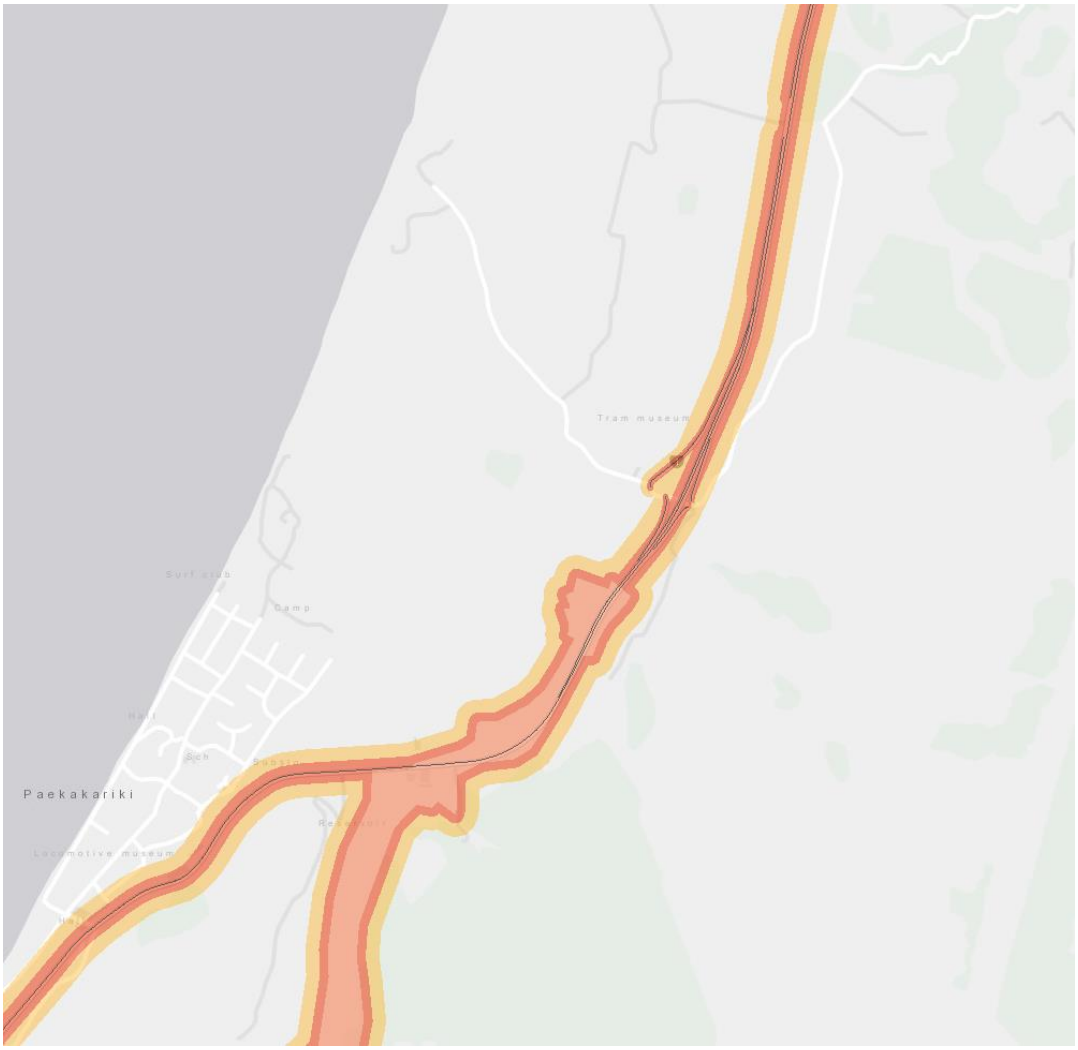
58 Providing an overlay of buffer and effects areas will provide certainty to landowners as to the assessment requirements. In some areas, the effects area will extend to 100 metres.

59 In my opinion, the indoor design level approach contained within the Transport Agency’s submission is preferable as it is effects based, and construction costs will be better focussed.

Michael James Smith
15 April 2016

Annexure A

Overlay example



Annexure B

Indicative noise contours for land adjacent SH1