

3 May 2019

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Dear Burnette,

RE: Warkworth North Private Plan Change – Effects of Road Traffic Noise

Introduction

Styles Group has been engaged to provide advice on the noise effects of the Puhoi to Warkworth Motorway (Motorway) and the existing State Highway 1 (SH1) on the proposed residential development inside the Warkworth North Private Plan Change (PPC) area.

The designation process for the Motorway did not anticipate there being residential in the manner proposed by the PPC, so no noise mitigation measures are required by the designation conditions. Similarly, the designation conditions for SH1 do not contain any conditions that require management of traffic noise into the area covered by the PPC. It is therefore important to ensure that the separation distances are sufficient to ensure that the noise levels arising from traffic on the Motorway and SH1 are reasonable at the residential areas in the PPC, or that mitigation is incorporated if the noise levels are too high.

Appendix 1 shows the PPC area and its proximity to the existing SH1 and the Motorway. Whilst the PPC will result in the Business- Light Industry zone abutting the existing SH1 corridor, all other zones including the noise sensitive residential activity will be separated from the two major roads by considerable distances.

This assessment identifies that the separation distances between the Motorway, SH1 and the proposed Residential zones are large enough to reduce traffic noise to below the level that would otherwise require acoustic insulation controls or specific noise mitigation measures to be adopted.

Adverse Effects & Criteria

Although there are no controls in the Auckland Unitary Plan: Operative In-Part (AUP) that require new or altered dwellings near to major roads to be insulated from the external noise of the road, it is our opinion that where road traffic noise levels are high, some mitigation of the potential adverse effects of road traffic noise are necessary and appropriate. This ensures that the occupants can enjoy a reasonable level of noise amenity indoors to the extent that adverse

effects on health are avoided, and also to avoid the potential for reverse sensitivity effects to arise on the New Zealand Transport Agency (as the operator of SH1 and the Motorway).

The adverse health effects arising from exposure to high noise levels from transport infrastructure are demonstrable and potentially significant. Exposure of the residents to such levels may also give rise to reverse sensitivity effects on NZTA, where they receive complaints about traffic noise from future occupants of the site.

The New Zealand Transport Agency (NZTA) have published their guide to assessing and managing effects on noise sensitive land uses¹, which recommends design noise levels of 57dB and 40dB $L_{Aeq(24hr)}$ for outdoors and indoors respectively, and suggests that no controls are required beyond 100m from the road.

Whilst we understand the reasons for the broad approach to buffer and effect zones adopted in the NZTA guidance, we recommend that where information is available to determine the noise levels arising from road traffic, that information should be used to determine the areas of land that will be exposed to noise levels greater than 57dB $L_{Aeq(24hr)}$, and to use that as the basis for the determination of whether mitigation or controls are required. If the traffic noise levels are no greater than 57dB $L_{Aeq(24hr)}$, then no mitigation or controls are required.

Notwithstanding that 57dB $L_{Aeq(24hr)}$ is the control for outdoor noise in the NZTA guidelines, we suggest that all practicable mitigation options are investigated to reduce the noise further, and to least 55dB $L_{Aeq(24hr)}$. Such mitigation is not required to meet any statutory requirement, but given that a noise level of 57dB $L_{Aeq(24hr)}$ remains above the recommendations of the World Health Organisation for exposure to traffic noise, and that a reasonable proportion of the population will remain highly annoyed at such levels, we recommend that further mitigation is applied if practicable.

Noise Levels across the PPC Area

Noise level predictions based on traffic speed, flows, road surface and surrounding topography are typically used to determine the spatial propagation of noise across land surrounding major roads for the Design Year, or at least 10 years into the future. In this case, we have adopted the Motorway Design Year of 2036.

The Motorway is currently under construction, and we understand that the final alignments and designs are not yet confirmed, including the widening of SH1 between the Motorway and Hudson Road, (to the south), the Matakana Link Road (MLR) and accordingly neither is the final design of the intersection between SH1 and the Motorway. This means that it is not possible to obtain noise level measurements of the traffic noise to extrapolate from; nor is it possible to accurately model or predict the noise levels for the Design Year using computer noise modelling software.

¹ <https://www.nzta.govt.nz/assets/resources/effects-on-noise-sensitive-land/effects-on-noise-sensitive-land-use.pdf>

Notwithstanding, it is possible to provide noise level predictions with a reasonably high degree of certainty for the purpose of the PPC. We have prepared noise level predictions based on our knowledge of the various projects in the area, including the following factors which we understand can be relied on for this assessment:

- 1) The Motorway road surface will be a low-noise Open Graded Porous Asphalt (OGPA) on the main alignment, with Stone Mastic Asphalt (SMA) on the roundabout (SH1 intersection) and approaches;
- 2) For the Design Year of 2036, we understand the traffic flows on the Motorway to be approximately twice that on SH1, at approximately 40,000 AADT and 20,000 AADT respectively. This will mean that the noise from traffic on SH1 will be at least 3dB quieter than from the Motorway;
- 3) The motorway will be a 100km/hr speed environment;
- 4) SH1 between Hudson Road and the Motorway intersection will likely be a 60km/hr speed environment, with an asphalt or SMA pavement likely, (not chip-seal); and
- 5) There are no 'noise walls' or bunds specifically for noise mitigation proposed in this section of SH1 or the Motorway.

Based on our knowledge of the Motorway, MLR and SH1 widening projects and based on the assumptions above, we predict that a level of 57dB $L_{Aeq(24hr)}$ will be reached at approximately 130-140m from the edge of the nearest lane of the Motorway where there is no screening from cut embankments or topography generally. Importantly, this distance is beyond the standard 100m zone required by the NZTA guidelines.

Based on the same assumptions as above, we predict that the noise level from traffic on SH1 will reach 57dB $L_{Aeq(24hr)}$ at approximately 75m from the nearest lane.

Should the final Motorway or SH1 designs include any cut batter or earth screening that would prevent line-of-sight between the lane surfaces and a point 1.5m high on the residential properties, the noise levels in the residential zones of the PPC will be considerably lower.

Assessment and Recommendations

Based on the PPC plans provided to us, the areas zoned Residential are all at least 135m away from the edge of the Motorway and at least 220m from the edge of SH1. On this basis, the noise levels from traffic inside the Residentially zoned areas of the PPC area will not exceed 57dB $L_{Aeq(24hr)}$. No specific mitigation is therefore required based on compliance with the NZTA guidelines.

Notwithstanding, we recommend that it would be desirable to investigate whether an earth bund or acoustically effective fences (or a combination) could be used to reduce traffic noise levels further along the interface with the Motorway.

Please contact me should you have any queries or require any further information.

Kind regards,

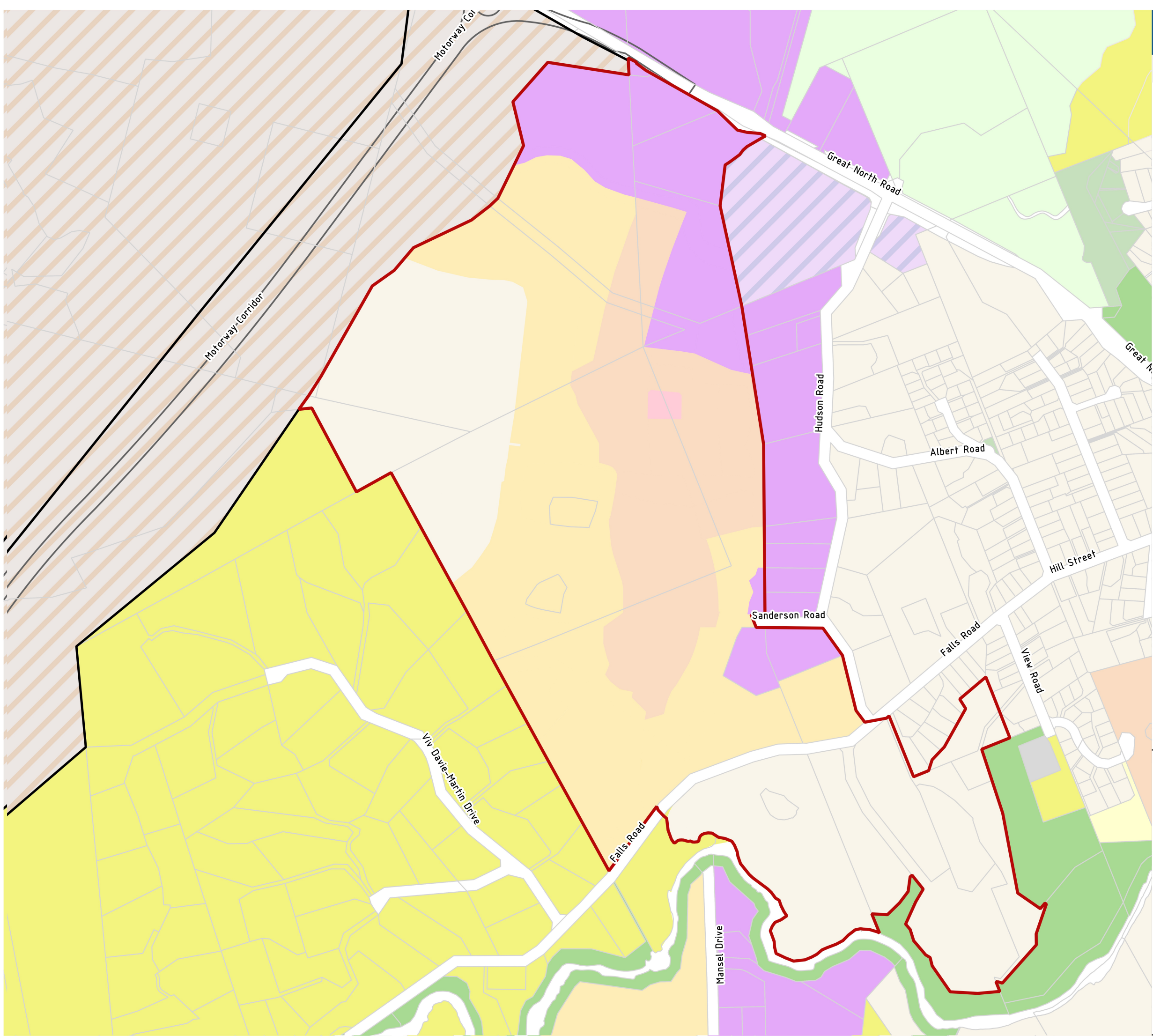


Jon Styles
Director & Principal
Styles Group

Appendix 1 PPC Zone Map showing proximity to SH1 and Motorway

Proposed Zoning Map

- Plan Change Extent
- Land Parcels
- Unitary Plan Zones**
- Residential - Large Lot Zone
- Residential - Single House Zone
- Residential - Mixed Housing Suburban Zone
- Residential - Mixed Housing Urban Zone
- Open Space - Conservation
- Open Space - Informal Recreation
- Open Space - Sport and Active Recreation
- Business - Neighbourhood Centre Zone
- Business - General Business Zone
- Business - Light Industry Zone
- Future Urban Zone
- Rural - Rural Production Zone
- Rural - Mixed Rural Zone
- Special Purpose - Healthcare Facility and Hospital Zone



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REVISION	DATE	COMMENT	CHECK
5	20/12/2018	ZONE BOUNDARIES	NJ
6	11/01/2019	NEIGHBOURHOOD ZONE	NJ
7	18/01/2019	ZONE BOUNDARIES	NJ
8	22/03/2019	LEGEND	NJ
9	2/04/2019	LEGEND	NJ

