10 June 2016

The Lakes Tauranga
PO BOX 345
Tauranga 3140

Attention: Simon Maxwell

Dear Sir

Re: Proposed Dwellings at 'The Lakes' Residential Development Stage 3CD, Road Traffic Noise Measurements and Assessment

As requested, we have visited the subject site and carried out measurements of the noise environment at Lots within Stage 3CD of 'The Lakes' residential development.

There currently is a noise consent condition which applies to new dwellings on these lots, to control noise from road traffic on the adjoining State Highway. The requirement is that dwellings on these lots shall have an acoustic design certificate prepared, showing the noise control treatment which will be implemented to comply with the internal noise criteria for 'habitable rooms' within these dwellings.

Our findings and recommendations are set out below. The focus of our assessment is noise received at the lots adjoining the State Highway.

1.0 Noise Performance Standards – Road Traffic Noise

Our assessment relates to compliance with the relevant Noise Rule of the Tauranga City Plan. We understand that in order to control road traffic noise from State Highway 36/Takitimu Drive, the dwellings need to comply with the 'Reverse Sensitivity' rule of the City Plan. This is set out in Rule 4E.2.5 of the City Plan which is summarised below:

- Dwellings within the NZTA Reverse Sensitivity Plan Area shall be designed, located or treated so that the internal noise level within all 'habitable rooms' does not exceed 40 dB LAeq24hr with ventilating windows open.
- The internal noise limit applies to 'habitable rooms' such as bedrooms, living rooms and offices and does not include service or transit areas such as bathrooms, corridors or laundries.

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- Where windows need to be closed to comply with the internal noise limit, an alternative ventilation system must be provided, in accordance with the Rule.

It is important to note that:

- Rule 4E.2.5 (e) (ii) also specifies that where it can be demonstrated that the road-traffic noise level is less than 55 dB LAeq24hr at the dwelling, then the internal noise limit is deemed to be met and no acoustic treatment is required.
- This also applies to facades of dwellings which are at least 50 metres from the highway and there is an intervening building, fence or landform that blocks 'line of sight' to the Highway, such as the timber fence along the boundary with the Highway, as specified in Rule 4E.2.5 (e) (i) as follows:

  Rule 4E.2.5 (a), (b) and (c) - Managing Reverse Sensitivity Effects on the Strategic Road network (excluding secondary arterial roads) or a New Zealand Transport Agency Designation do not apply to any new residential dwelling or addition, extension or alteration to an existing residential dwelling if; i) The nearest façade of the dwelling is at least 50 metres from any strategic road (excluding secondary arterial roads) and there is a solid building, fence, wall or landform that blocks the line of sight from all parts of all windows and doors to habitable spaces to any part of the road surface of any strategic road (excluding secondary arterial roads).

A report prepared by the Building Industry Authority showed that for road-traffic noise the outdoor-to-indoor noise reduction was typically 15 dBA with windows/doors ajar for natural ventilation. On this basis, when external noise levels are 55 dB LAeq24hr or lower, the internal noise level of 40 dB LAeq24hr will be achieved and the noise rule of the City Plan is consistent with this finding.

At the subject site, the lots adjoin the Highway but the road is at a lower level than the residential lots and there is acoustic screening provided by the existing timber fence on the western boundary which will remain in place. This fence is 2.0m high of close-boarded construction, and 'airtight' with overlapped palings/battens over gaps, in full accordance with the acoustic design report prepared by Hegley Acoustic Consultants dated 22 May 2015. This fence and the topographical conditions, mitigates the road traffic noise which is received at the facades of dwellings on the Lots adjoining the Highway.

2.0 Measurements and Assessment

We visited the subject site on two separate occasions to measure the noise environment at the platform of dwellings on the Lots next to the Highway. Hand held measurements were used since construction noise and noise from other environmental noise sources strongly affected the noise environment in this area. Measurements were taken to avoid these other sources, by pausing/

restarting the meter and we consider that we have taken sufficient noise measurements to obtain a representative noise level at these Lots.

An adjustment has been made for increased traffic flows on the highway in the future. Measurements were carried out during daytime hours and since the night time levels will be significantly lower, with reduced traffic flows, we have adjusted the measured sound level to determine the 24-hour average (LAeq24hr) which is the relevant noise descriptor.

The Lots are highlighted in the following figure:

A summary of the results of our noise surveys is set out in the following table:

Single storey or lower level of two-storey dwellings

Lots (inclusive)	Measured Noise Level	Complies with 55 dBLAeq24hr?
104-106	51-52 dB LAeq24hr	Yes
148-162	50-53 dB LAeq24hr	Yes
236-254	47-55 dB LAeq24hr	Yes

On the basis of the above, no acoustic treatment is required for single storey dwellings on the above Lots. The same applies for the lower level of two-storey dwellings on these lots, if any.

In relation to any two-storey dwellings which could potentially be constructed, it is not possible for us to measure at this high level above the ground. However, based on our measured levels, 1.2m above the ground, as well as the previously quoted levels for upper levels of two-storey dwellings (Hegley report dated 22 May 2015) we consider that noise levels at the upper level of dwellings next to the Highway is likely to exceed 55 dBA, depending on the particular house design/layout.

As such, the provision of an acoustic design certificate should still be required for the upper level of two storey dwellings on the above lots which adjoin the Highway. Any noise control treatment is likely to be limited to upgraded glazing of habitable rooms facing the highway, and provision of a mechanical ventilation system. However, habitable rooms with windows/doors facing away from the highway may not require any treatment.

In relation to dwellings built on lots across Puhirake Crescent and Okataina Street to the north-east (within The Lakes development) we consider that:

- Compliance will be achieved for all single storey dwellings, and the lower level of two-storey dwellings.
- Compliance at the upper level of two-storey dwellings will be achieved with the possible exception of lots 255,258,259. However, this is based on there being no dwellings on the intervening sites, and once dwellings on the lots next to the Highway are constructed, these are likely to provide further screening from the roof,walls etc. and likely to comply. Unless the upper storey is screened and can be shown to comply with Rule 4E.2.5 (e)(i), we recommend that an acoustic design certificate should be prepared for the upper storey of dwellings on lots 255,258,259 should a two-storey design be contemplated for these lots.

3.0 Conclusions

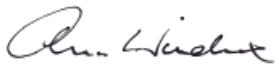
We have visited the subject site and carried out measurements of noise within Stage 3CD of The Lakes residential development. Our findings are summarised in the following table:

Type of Dwelling	Lot Number		
	Lots 234-240	Lots 104-106, 148-162, 241-254	Lots across Puhirake Cres/Okataina St to north east, within The Lakes development
Single storey, or lower level of two storey dwelling	No acoustic certificate required - will comply	No acoustic certificate required - will comply	No acoustic certificate required – will comply
Upper level of two storey dwelling	No acoustic certificate required - will comply	Acoustic certificate required	No acoustic certificate required, except that upper level of any two-storey dwelling on Lot 255,258,259 may require this unless 4E.2.5(e)(i) is shown to apply (see section 1.0 and 2.0 above)

Where an acoustic design certificate/assessment is required, any noise control treatment is likely to be minimal. This may be limited to upgraded glazing of bedrooms facing the highway, and a mechanical ventilation system may also be required to these rooms. Bedrooms or other habitable rooms which face away from the Highway may not require any treatment.

We trust this information is satisfactory. Please do not hesitate to contact us if you have any questions.

Yours faithfully,
Design Acoustics Ltd



Tony Windner
Director