HEGLEY ACOUSTIC
CONSULTANTS

21 July 2013

Dave Needham
Harrison Grierson
PO Box 1199
TAURANGA 3140

Dear Dave

THE LAKES – STAGE 2QRST

Thank you for the information provided on stages 2QRST of The Lakes development in Tauranga. The development consists of a residential subdivision adjacent to Takitimu Drive (SH 36). As requested, I have considered the mitigation required to control traffic noise to the proposed subdivision.

Road Noise

Noise from road traffic has been predicted to the subdivision using the TNM computer prediction program. TNM uses the electronic files of the alignment and surrounding topography to build a full scale model of the road and adjacent sites. As there are no houses in the area currently being assessed, the analysis has been based on the most exposed facade of future houses being 2m from the road side boundary, which is typical of the houses that have already been constructed further north along Takitimu Drive.

Traffic noise has been predicted based on the understanding that the road will be surfaced with a medium grade chip seal. It is understood that the traffic flow north of the roundabout at station 2150 is 15,337 vehicles per day while to the south the flow is 5,540 vehicles per day. There will be 5% heavy commercial vehicles and the speed of all traffic will be 100km/hr.

Design Criteria

It is understood that Taranga City Council, Western Bay of Plenty District Council, Transit New Zealand (now NZTA) and Grasshopper Farms Ltd, who were the original developer, have signed an agreement which includes the following noise condition:

> *5.5 Noise attenuation for the Bypass is to be designed and constructed by the Developer in a location agreeable to Transit. Beca Drwg No 3932311-C-002 on Appendix 1 shows the extent of noise attenuation barriers proposed by the Developer.*

The above condition does not provide a numerical limit for the traffic noise to comply with. The Proposed Plan Change to the Tauranga City Council's District Plan titled 'Pyes Pa West Growth Area' includes the following:

355 MANUKAU ROAD, P O BOX 26-283, AUCKLAND 1344
TEL 09 638-8414 FAX 09 638-8497 EMAIL hegley@acoustics.co.nz

3.2.3 Roading and Traffic – The Arterial By-pass

The road will be built in accordance with Transit New Zealand's Standards for noise mitigation, which is designed to reduce the exposure to traffic noise at the nearest dwelling to 62dBA L_{eq}...

Based on this, the design has been undertaken using the assessment method described by Transit New Zealand's Guidelines for the Management of Road Traffic Noise – State Highway Improvements. From this, road traffic noise must be controlled to within a level of 62dBA $L_{eq(24hour)}$ when measured 1.0m from the assessment point.

The analysis has been undertaken for ground floor residences and, where mitigation was found to be necessary, the use of barriers was investigated. As the subdivision is still under development, there is the potential that any future houses could be of two storey construction. It is not considered practicable to use barriers to screen the first floor of any future dwellings due to the required height of the barriers. Where barriers are considered to be impracticable, the Transit Guidelines requires that the building façade be designed to control traffic noise to a reasonable internal level in all habitable rooms. Specifically, the Transit Guidelines require that:

In these circumstances, the internal noise level criterion for residential buildings is either the level given in Table 1 [62dBA $L_{eq(24hour)}$] *minus 20dB(A), or 40dBA $L_{eq(24hour)}$, whichever is the higher.*

Based on this requirement, the internal noise criterion for the first floor habitable rooms of all dwellings within the subdivision would be 42dBA $L_{eq(24hour)}$. Analysis has shown with the proposed barrier mitigation, the upper floors of any future houses on the following Lots will require the facades to be designed to control the internal level of traffic noise:

Table 1. Summary of Lots where Façade Mitigation will be required

Lots on which the First Floor of any Dwelling would require a Specific Façade Design		
Lot 848	Lot 860	Lot 868
Lot 849	Lot 861	Lot 869
Lot 854	Lot 864	Lot 870
Lot 855	Lot 865	Lot 879
Lot 856	Lot 867	Lot 890

For the houses identified in Table 1, the following condition could be placed on the title to ensure compliance with the road traffic noise rules that apply to the subdivision:

Should a two storey house be built, the upper floor shall be designed and constructed such that the internal traffic noise level from Takitimu Drive does not exceed 42dBA $L_{eq(24hour)}$ in all habitable rooms. The design shall be based on the incident level of traffic noise as described in Table A below. The required internal level shall be achieved at the same time as the habitable rooms are ventilated in accordance with the requirements of the Building Code and must therefore include any noise as a result of mechanical plant.

Table A. Traffic Noise Incident on First Floor Façade

Frequency	*63Hz*	*125Hz*	*250Hz*	*500Hz*	*1kHz*	*2kHz*	*4kHz*
Road Traffic Noise (dB)	*73*	*75*	*70*	*64*	*67*	*63*	*54*

Barrier Mitigation

Analysis has shown that the barrier mitigation will be required for some of the sites adjacent to Takitimu Drive. The coordinates and minimum height of a barrier option are summarised in Table 2 and shown on Figure 1.

Table 2. Coordinates for Barrier Mitigation Option

Barrier Point	Barrier x- coordinate	Barrier y - coordinate	Level at Base of Barrier (Ground Level) (m)	Barrier Height (m)	Level at Top of Barrier (m)
1	368,059.90	800,079.20	16	1.5	17.5
2	368,052.30	800,103.70	15.5	2	17.5
3	368,045.00	800,128.70	15	2	17
4	368,035.00	800,162.40	14.5	2	16.5
5	368,029.40	800,179.80	15.92	1.5	17.42
6	368,026.20	800,189.80	16.11	1.5	17.61
7	368,024.10	800,204.20	16.46	1.5	17.96
8	368,021.00	800,220.10	16.46	1.5	17.96
9	368,017.60	800,240.90	16.24	1.5	17.74
10	368,014.80	800,257.20	16.2	1.5	17.7
11	368,011.10	800,277.30	15.69	1.5	17.19
12	368,009.30	800,294.50	15.55	1.5	17.05
13	368,008.20	800,313.20	15.62	1.5	17.12
14	368,006.50	800,330.30	15.41	1.5	16.91
15	368,004.50	800,349.90	15.12	1.5	16.62

It is understood there is a temporary pond in the vicinity of Lots 869 and 870 that is required to remain for a further year. As a result, it is proposed to stop the barrier at point 4 of Table 2 until the pond is removed and the barrier completed as per Table 2. While the shorter barrier is in place, noise to all Lots other than the two with the pond will comply with the 62dBA $L_{eq(24hour)}$ criterion. Once the pond is removed and prior to dwellings being constructed on Lots 869 and 870, the barrier will be completed to ensure compliance to the future dwellings on all Lots.

The barriers could be constructed as a wall, a bund or a combination of each. If a bund is selected, the coordinates of Table 1 describe the bund centreline. If the wall option is selected the wall must be constructed from a material with a surface density of 10kg/m^2 or greater. Suitable materials consist of 20mm pine palings, 9mm fibre cement sheet or 20mm plywood. Concrete and masonry are also suitable. There must be no untreated openings in the wall, including at the base and if timber palings are used, they must be butted together with battens placed over the joints to control openings forming as the palings dry and shrink. Suitable construction details are shown on Figure 2 below.

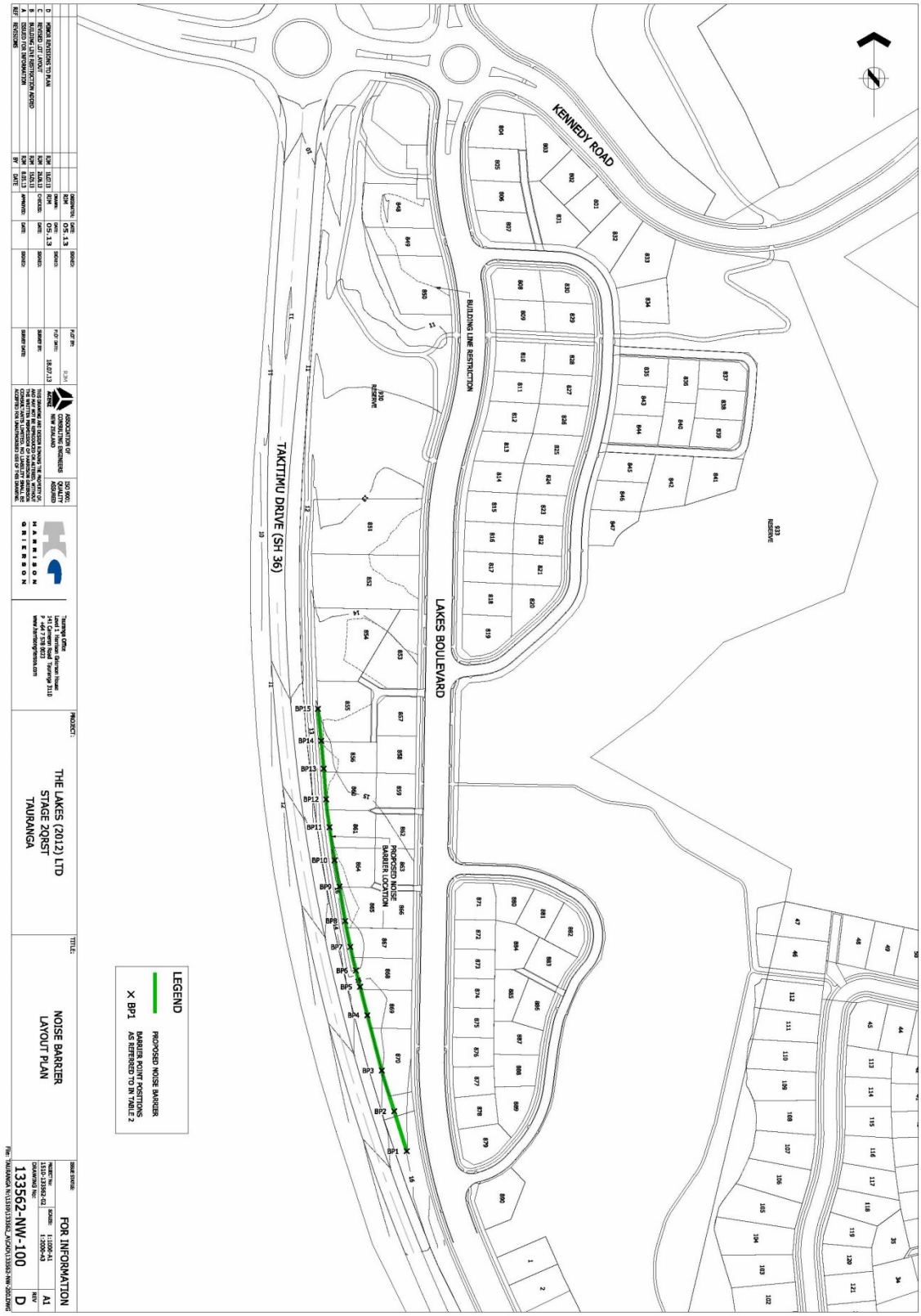

Figure 1. Proposed Location of Noise Barrier

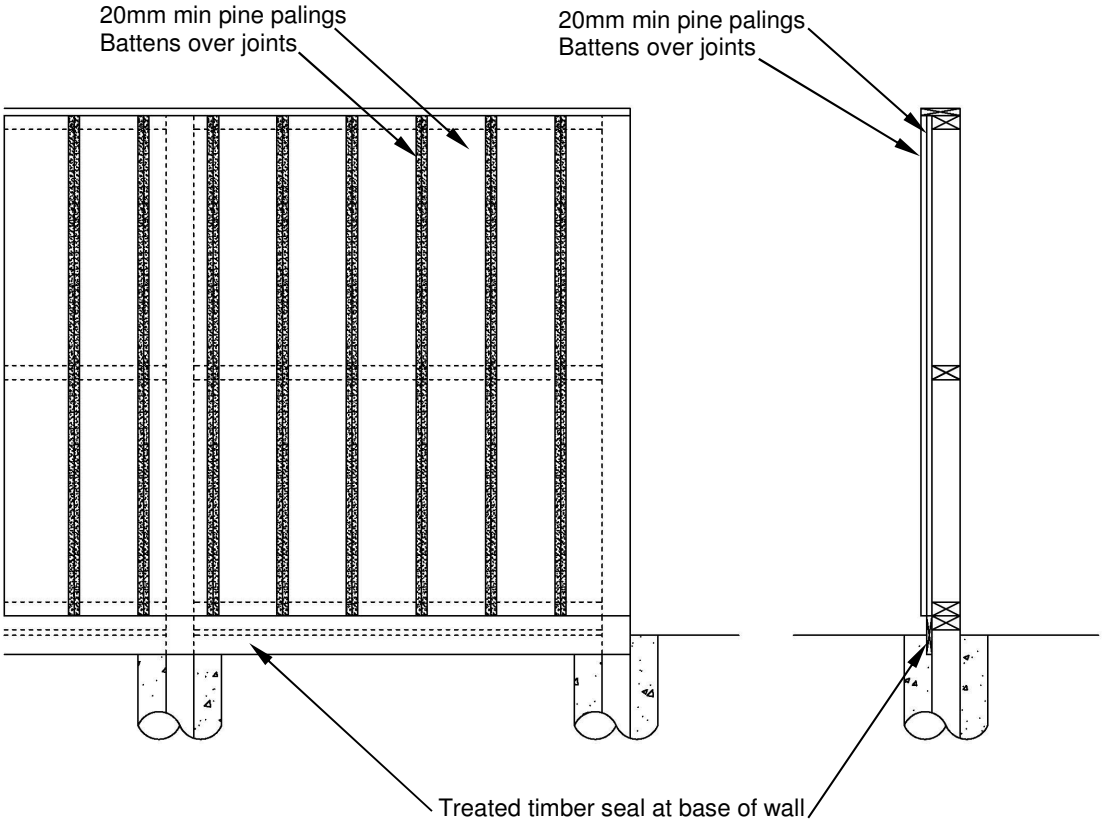

Figure 2. Suitable Timber Wall Detail

Should you have any questions regarding the above please do not hesitate to contact me.

Yours sincerely
Hegley Acoustic Consultants

Rhys Hegley