REPORT

Tonkin+Taylor

TKKM O Ngaringaomatariki Relocation

Acoustics Assessment

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1 Introduction

The Ministry of Education (MoE) is proposing to designate land on behalf of the Minister of Education to enable the relocation of Te Kura Kaupapa Māori O Ngaringaomatariki (Te Kura), a Māori immersion school, to a suitable site in Kaiwaka. The MoE is giving Notice of Requirement (NoR) to designate the site for 'Education purposes' for use as a Kura Kaupapa Māori for Years 0 – 13, and a Puna Reo. MoE anticipate that the new kura could accommodate up to 200 students and have approximately 15 staff.

The MoE has engaged Tonkin & Taylor Ltd (T+T) to provide an acoustic assessment of the proposed kura. Noise from external sources (traffic noise) onto the site has been assessed as well as noise from the kura on nearby noise sensitive receivers.

1.1 Project description

The MoE has identified Māori-medium education and the transmission of Māori language as a key focus area to provide for an alternative learning pathway for students to learn Te Reo Māori from their early childhood education through to secondary school. Therefore, the location of the facilities is important in enabling the kura to be accessible for students around the catchment area.

The existing Kura is located on a rural site, approximately 17 km south of the proposed new site. The existing site is temporary as it is unsuitable for the ongoing operation of an educational facility due to the isolated location, and accessibility challenges. The existing site also restricts the potential for growth.

The proposed new site is located at 9 Tawa Avenue, Kaiwaka. It is an approximately 4.6 ha property and is approximately 1.5 km east of the township of Kaiwaka. This site is more accessible for staff and students and has provision for growth due to the size and permanency of the site.

The MoE's goal is to have the school open for Term 1 of 2025.

There is currently no design for the kura. The design will occur with the input of Te Kura and will take into account any requirements and conditions that arise from the designation process. The site entrance is likely to be located along Tawa Avenue.

2 Site details

The site at 9 Tawa Avenue is located 1.5 km to the east of Kaiwaka and State Highway 1 (SH1) in the Kaipara district, approximately 15 km north-northwest of Wellsford, as shown in Figure 2.1. It is a predominantly rural area with no obvious local noise sources other than road traffic noise. The site is shown in Figure 2.2.

Figure 2.1: Location of the new kura site.

Figure 2.2: Site boundary of 9 Tawa Avenue, Kaiwaka.

2.1 Noise sensitive receivers

Properties within approximately 200 m of the site are shown in Figure 2.3.

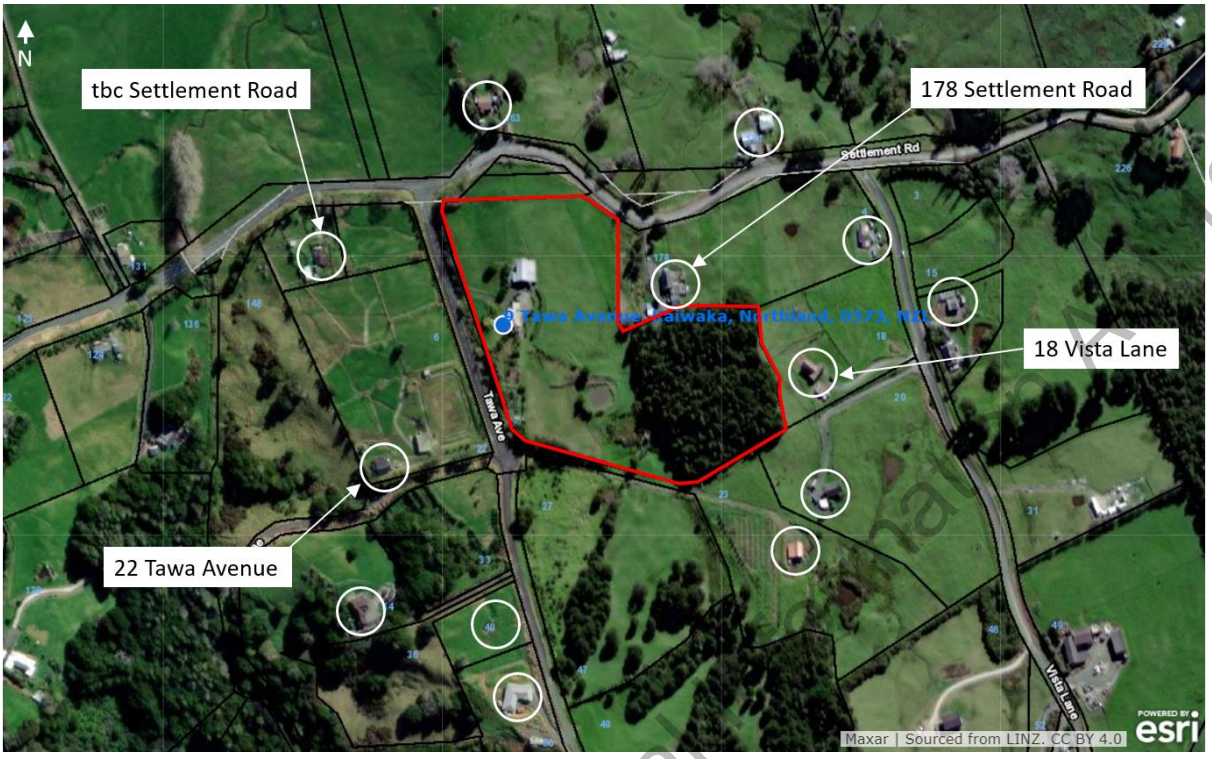

Figure 2.3: Nearest noise sensitive receivers.

The two closest dwellings (178 Settlement Road and 18 Vista Lane) are approximately 5 m and 20 m from the site boundary respectively. Other dwellings are at least 60 m from the site boundary. There are two properties located near Tawa Avenue opposite the school site: 148 Settlement Road and 22 Tawa Avenue. These properties are well set back from Tawa Avenue and 148 Settlement Road is closer to Settlement Road than Tawa Avenue.

3 Noise standards and guidance

3.1 Kaipara District Plan

The site and all surrounding sites are zoned Rural in the Kaipara District Plan (DP). The applicable noise limits from the DP are as follows:

Rule 12.10.14 General Noise (Rural zone)

Any activity is permitted if noise from the site does not exceed the following limits, as measured either at or within any other site zoned Residential, or within the 'notional boundary' of a dwelling in the Rural or Māori Purpose zoned site:

a	7 am to 7 pm	50 dB LAeq
b	7 pm to 10 pm	45 dB LAeq
c	10 pm to 7 am	40 dB LAeq and 70 dB LAFmax

Note 3: Sound levels shall be measured in accordance with NZS 6801: 2008 Acoustics – Measurement of Environmental Sound and assessed in accordance with NZS 6802: 2008 Acoustics – Environmental Noise.

The DP references NZS 6803 for construction noise (Rule 12.10.15) and reproduces the noise limits in that Standard.

3.2 New Zealand Standards

3.2.1 NZS 6801 / NZS 6802

The Standards Association of New Zealand publish recommended standards that councils may treat as a guide in their decision making. These standards are also often incorporated in district or regional planning rules or consent conditions as a benchmark for noise to be measured or assessed against.

In general, noise sources should be measured in accordance with New Zealand Standard NZS 6801:2008 *Acoustics – Measurement of environmental sound* and assessed in accordance with NZS 6802:2008 *Acoustics – Environmental noise*.

NZS 6802 sets out a procedure for the assessment of environmental noise for compliance with noise limits and provides guidance for the setting of noise limits for consent conditions, rules or national environmental standards. The Standard does not apply to the assessment of sound where the source is within the scope of, and subject to, the application of other New Zealand acoustical standards.

3.2.2 NZS 6803:1999 Acoustics – Construction noise

NZS 6803:1999 includes guidance on recommended noise limits, which depend on the time of day and the duration of construction noise. In most cases, construction noise limits are less restrictive than the relevant operational noise limits, on the basis that the effects of construction activities are of limited duration. The Standard advises that resource consent may be required whenever noise from construction activities exceeds the guideline noise limits which are applicable to the construction project.

3.3 MoE guidance

The MoE Designing Quality Learning Spaces (DQLS) Acoustics guide is mandatory for all new school projects. The guide provides minimum standards for acoustic performance within indoor and outdoor learning environments.

The guide requires internal ambient noise levels to be within the range 35-45 dB L_{Aeq} for flexible learning spaces. A typical building construction will provide 25 dB of sound reduction against external noise. Therefore, external design levels of 60-70 dB L_{Aeq} would require enhanced mitigation to ensure that the MoE design levels are met. Enhanced mitigation could comprise improved sound insulation or external noise walls to reduce the level of noise incident on the building's façade.

The MoE has a standard noise condition to manage noise effects from school sites, which is reproduced below:

The operation of the school shall comply with the following noise limits at the boundary of any site zoned primarily for a residential purpose, or in the case of a rural zone, at a point 20 m from the façade of any dwelling, or the site boundary, whichever is closest to the dwelling:

Hours	**Noise Level**
0700 – 1900 hours	*55 dB $L_{Aeq\ (15min)}$*
1900 – 2200 hours	*50 dB $L_{Aeq\ (15min)}$*
2200 – 0700 hours the following day	*45 dB $L_{Aeq\ (15min)}$*
2200 – 0700 hours the following day	*75 dB $L_{AF\ max}$*

These noise levels shall not apply to noise from standard school outdoor recreational activities occurring between 0800 and 1800 hours Monday to Saturday.

Noise levels shall be measured and assessed in accordance with NZS 6801: 2008 "Measurement of Environmental Sound" and NZS 6802:2008 "Environmental Noise".

Noise from construction shall not exceed the limits recommended in, and shall be measured in accordance with, New Zealand Standard NZS 6803:1999 "Acoustics – Construction Noise".

The MoE proposed noise limits divide the day into two periods reflecting that people are likely to be more sensitive to noise during the evening period 7 pm to 10 pm. The daytime and evening limits are 5 dB higher than the district plan requirements. For context, an increase of 3 dB is generally regarded as just perceptible, while an increase of 10 dB is perceived as a doubling of sound level. The exclusion of a noise limit for use of outdoor recreational activities signifies that control of these noise generating activities would not only be unreasonable (as they are part of any school environment) but more importantly, compliance (and ultimately enforcement) would be difficult to demonstrate due to the variability of this type of noise source in terms of its location and noise character.

The noise level parameter for the MoE proposed noise limits is a 15-minute average level, whereas the DP's Rural noise limits are specified over a 12-hour period. Where a sound is not present for the full duration of the time frame being assessed (12 hours in this case), NZS 6802 allows for a duration adjustment of up to 5 dB to allow for the lower level of annoyance. Hence a noise level of 55 dB LAeq produced over a 15-minute period could still be compliant with the DP rules, and the two sets of noise limits are equivalent.

The school will typically open between 8 am and 4 pm, with the core period being 8.30 am to 3.30 pm, i.e. a 7-hour day. Therefore, the school day would not coincide with the noise assessment time periods of the District Plan. To assess noise from the site, the 7-hour school day has been used rather than averaging noise over a 12-hour period (7 am – 7 pm). The use of the 7-hour day provides a more conservative assessment than that allowed for in the District Plan.

As the design / layout of the kura is not required for a NoR,[1] this noise assessment has considered noise at the boundaries of the site and within the site to establish the effects of noise across the proposed designation and the potential effects of noise on neighbouring noise sensitive land uses.

As the MoE DQLS Acoustics guide is mandatory for all new school projects, adverse levels of ambient noise will be controlled within the school site by a combination of good design and specification of appropriate building materials.

[1] The NoR establishes the principle that a school can be accommodated on the site.

4 Noise assessment

This report assesses both noise incident on the site and noise produced by the kura which may affect surrounding rural receivers.

4.1 Road traffic noise at site

Based on traffic count information supplied by the Northland Transport Alliance (as provided by the Project's Transport Planner) the existing daily traffic flows are 44 vehicles per day on Tawa Avenue and 748 vehicles per day on Settlement Road. This low level of traffic is unlikely to cause any adverse noise effects within the site.

SH1 is approximately 1.5 km west from the site. At this distance traffic noise may be perceptible, depending on other local sources of ambient noise, but is expected to be a low level of noise which is unlikely to affect the outside amenity space.

There are no other significant sources of noise that have been identified in the local area and no reverse sensitivity issues are anticipated.

4.2 Noise from the kura

The noise generated by educational facilities will typically include:

- Traffic noise from staff and at student drop-off and pick-up times;
- Building services noise caused by heating, ventilation, cooling plant; and
- Children playing outdoors, including the Puna Reo facility.

4.2.1 Traffic noise

Traffic flow information has been taken from the Integrated Traffic Assessment[2] for the kura. Vehicles will travel along Settlement Road and access the site from Tawa Avenue. Existing Average Daily Traffic (ADT) flows are 44 vehicles per day (6 % heavy vehicles) on Tawa Avenue and 748 vehicles per day (6 % heavy vehicles) on Settlement Road.

Traffic generated by the kura at full development is estimated to be 222 trips per day, with 111 trips during each of the peak drop-off and pick-up hours. This is based on 200 students and 15 staff, with an assumed 80 % of students arriving by bus (eight 20-seater buses), and the remaining 20 % of students and all staff arriving by car with one student / staff per car. This level of traffic from the kura would increase existing daily traffic flows by approximately 30 % on Settlement Road and approximately 500 % on Tawa Avenue (noting the very low level of existing traffic movements on this road).

Traffic movements associated with the kura will be almost exclusively in the morning and afternoon peak hours (8 am to 9 am and 2.30 pm to 3.30 pm). The existing AM and PM peaks are estimated to be 76 vehicle movements during each peak hour on Settlement Road and 4 vehicle movements during each peak hour on Tawa Avenue.

The average noise level from traffic movements along Tawa Avenue during the AM and PM peak hours is predicted to increase by approximately 20 dB. For context, an increase of 3 dB is typically just perceptible, while an increase of 10 dB is typically perceived as a doubling of the noise source. This clearly perceptible increase in noise is due to the very low existing traffic flows along Tawa Avenue. Overall noise levels will remain relatively low. Limited noise effects are anticipated from the

[2] T+T report *Integrated Transport Assessment for new Kura at 9 Tawa Avenue, Kaiwaka.* V4 dated February 2023.

increase in traffic along Tawa Avenue as there is only a small number of dwellings along the approach to the kura and these are set back from the road.

Along Settlement Road, where traffic during peak hours is expected to increase by nearly 250 %, an increase in noise level of approximately 4 dB during the AM and PM peak hours is predicted. This increase is expected to be clearly perceptible due to the low existing traffic levels. The overall noise level will still be relatively low. For the remainder of weekdays, and at other times when the school is closed (weekends and holidays) traffic movements, and therefore noise impacts, are likely to be minimal.

Noise from individual vehicles, such as engine revving and car door slams, is only a factor when neighbouring noise sensitive sites directly bound an educational premises or early childcare / Kōhanga Reo facility. The nearest properties on Tawa Avenue (where parking on site is likely to be located) are set back some distance from the road and therefore noise from individual vehicles is not expected to cause disturbance.

Noise from vehicles accelerating / decelerating at the Tawa Avenue / Settlement Road junction is not anticipated to contribute to the overall traffic noise level.

4.2.2 Building services noise

Building services noise can be controlled by ensuring that noise does not exceed the MoE's standard noise limits when measured at the relevant boundary of the receiving site. Building services plant will be able to meet these limits when designed appropriately.

Table 4.1: MoE standard noise limits

Time of day	Hours	Limit
Day	7 am to 7 pm	55 dB LAeq
Evening	7 pm to 10 pm	50 dB LAeq
Night	10 pm to 7 am	45 dB LAeq 75 dB LAmax

4.2.3 Noise from children playing outdoors

The standard MoE noise condition does not restrict recreational noise during the period 8 am to 6 pm as it is an inherent noise generating school activity which occurs during the least sensitive part of the day and to assess this type of noise on a large school site would be problematic (i.e. difficult to assess, difficult to demonstrate compliance and difficult to enforce).

Nonetheless, an indication can be given of the likely noise levels from outdoor play. Industry guidelines[3] on acoustics from childcare centres provide an effective sound power level of 84 to 90 dB L_{wA} for a group of 10 children aged three to six years. This is likely to be comparable to a similar sized group of older children. Using the upper value of 90 dB L_{wA}, this equates to a sound pressure level of 55 dB L_{Aeq} at 23 m, or 50 dB L_{Aeq} at 40 m.

The assessment locations for 178 Settlement Road and 18 Vista Lane are on the site boundary and therefore these properties may experience noise levels higher than the Rural daytime noise limit at times. As noise from children playing is likely to be a short-term noise event, when averaged over the 7-hour school day noise levels can be reduced by 5 dB (this is the maximum reduction due to time averaging that is allowable under NZS 6802; it is possible that actual noise levels will be lower than this). Therefore, a setback distance of 23 m from the notional boundary of adjacent properties

[3] The Association of Australasian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment v2.0.

would ensure that a 7-hour average noise level would be below the Rural zone daytime limit of 50 dB LAeq. This setback distance is shown in Figure 4.1. A 2 m high noise barrier along the boundary with 178 Settlement Road and 18 Vista Lane would achieve a similar result.

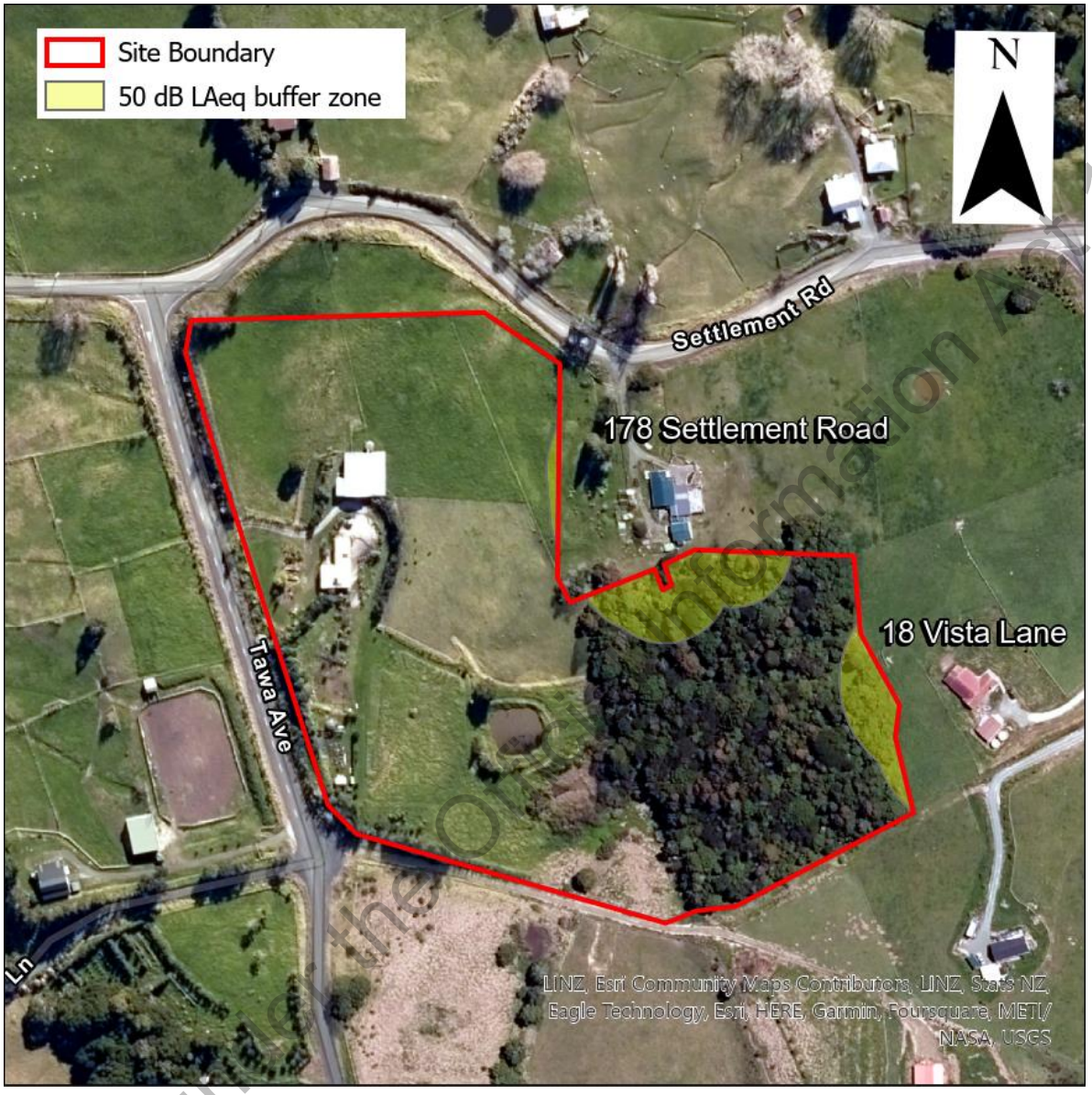

Figure 4.1: Buffer of 23 m from notional boundary of neighbouring properties to achieve 50 dB LAeq.

Other nearby dwellings are likely to be compliant with both the MoE standard noise limits and the District Plan limits regardless of the design of outdoor play areas.

4.2.4 Construction noise

There will also be temporary noise effects during construction of the facility. Both the MoE standard condition and the DP require that noise is managed and assessed in accordance with NZS 6803:1999 *Acoustics – Construction Noise*, which will ensure that these temporary effects are reasonable. Given the distances of the nearest noise sensitive receivers from the location of the built kura it is likely that the construction noise limits in NZS 6803: 1999 can be readily complied with.

5 Conclusions

Local traffic levels are very low and unlikely to cause any adverse noise effects within the site. There are no other significant sources of noise that have been identified in the local area.

Traffic generated by the kura will increase existing daily traffic flows by 30 % on Settlement Road and approximately 500 % on Tawa Avenue, noting that the existing levels of traffic are very low (44 trips per day). During the AM and PM peak hours, the increase in traffic noise level is expected to be perceptible on Settlement Road, while still at a relatively low level overall. The increase to the low level of traffic on Tawa Avenue is not expected to have significant noise effects due to the limited number of dwellings, which are set back from the road.

Noise from building services can be controlled by designing such that the MoE's standard noise limits are not exceeded at the relevant boundary of the receiving site.

It is considered that the standard MoE noise conditions are appropriate, which do not restrict recreational noise between 8 am and 6 pm. Nevertheless, noise levels from a group of children playing have been calculated, which indicates that noise levels higher than 50 dB LAeq could be experienced at the assessment location (boundary) of 178 Settlement Road and 18 Vista Lane. Noise from children playing is likely to be a short-term noise event, with a lower average noise level over the 7-hour school day. Compliance with the Rural zone daytime noise limit could be achieved through a setback distance for children playing of 23 m from the site boundary adjacent to these properties, or by constructing a noise barrier along these boundaries.

MoE noise limits are specified over an average 15-minute period. As the DP noise limits are specified for a 12-hour daytime period and NZS 6802 allows for a duration adjustment of up to 5 dB, the two sets of noise limits are equivalent.

Construction noise is likely to readily comply with the applicable noise limits.

6 Applicability

This report has been prepared for the exclusive use of our client Ministry of Education, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for a NoR and that Kaipara District Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

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