Auckland Unitary Plan

Practice and Guidance Note

Measuring and Assessing Noise

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Auckland Council
Te Kaunihera o Tāmaki Makaurau

1 Introduction

Noise levels for zones and activities are contained in E25 Noise and vibration of the Auckland Unitary Plan (Operative in Part) (AUP (OP)). In accordance with this chapter, noise levels are typically measured within the adjacent site's boundary (residential zones), within the notional boundary[1] of the adjacent site (rural zones), or at the incident level[2] on the façade of any building for some business zoned sites. These locations are specified in the various applicable standards. Exactly how these noise levels are to be measured and assessed is set out in Standard E25.6.1.

Standard E25.6.1 of the AUP (OP) requires noise levels from activities to be measured and assessed in accordance with New Zealand Standards NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise except where more specific requirements apply.

Standard NZS6802:2008 states the precise location and height from where measurements should be made. The relevant sections of this standard are shown below.

6.1.2 Reflections from surfaces near the microphone can affect the measured sound level, therefore measurements made outdoors should, whenever practicable, be carried out at least 3.5 m from any reflecting surface other than the ground, and 1.2 m to 1.5 m above the immediate ground level. Should there be any deviation from this height range, the reason for such deviation shall be recorded. Alternative measurement heights could be specified in other Standards. In all cases, if there are reflecting surfaces nearby, the distance of the microphone from those surfaces shall be recorded.

C 6.1.2 *ISO 1996-2, Annex B provides a method for assessing the possible effect of reflections.*

6.1.3 Where measurements are needed close to a building, the preferred measurement positions are 1 m to 2 m from the external wall of the building and 1.2 m to 1.5 m above the floor levels of interest. In these cases the effect of the building reflection may be removed to give an approximation of the free field incident level by subtracting 3 dB from the measured value. Guidance on making measurements in other positions is provided in Annex B of ISO 1996-2.

C6.1.3 *If the windows can be opened, it is usually practicable to measure external noise at a location outside the building by supporting the microphone through the open window. Measurements may be adjusted for the façade effects.*

[1] A line 20m from any side of a building containing an activity sensitive to noise, or the legal boundary where this is closer to the building

[2] The incident level is the free field level without reflected sound from the façade.

This Practice and Guidance Note (PGN) explains how to use NZS6802:2008 when measuring and assessing noise under two different situations. They are:

1. Where to take and measure noise to determine if a noise source is complying with the noise limits in the AUP (OP) (actual noise).
2. Where to assess noise (typically predicted or modelled noise) to determine who may be an affected person for notification, and to inform a substantive decision.

Important: This guidance is an overview summary only. The measurement and assessment of noise can be complex and advice from appropriately qualified persons should be sought if unsure. Note that this PGN does not cover measurement of sound inside a building.

2 Taking and measuring actual noise

Vacant sites

For a vacant site with no reflecting surfaces, noise should be measured 1.5m above ground within the boundary of the site adjacent to the noise emitting activity. The horizontal setback distance within the site boundary should reflect the worst-case receiver position. Where there is no acoustic screening this will typically be immediately within the boundary. This is shown in Figure 1 below. Where there is acoustic screening, this would be behind the screen.

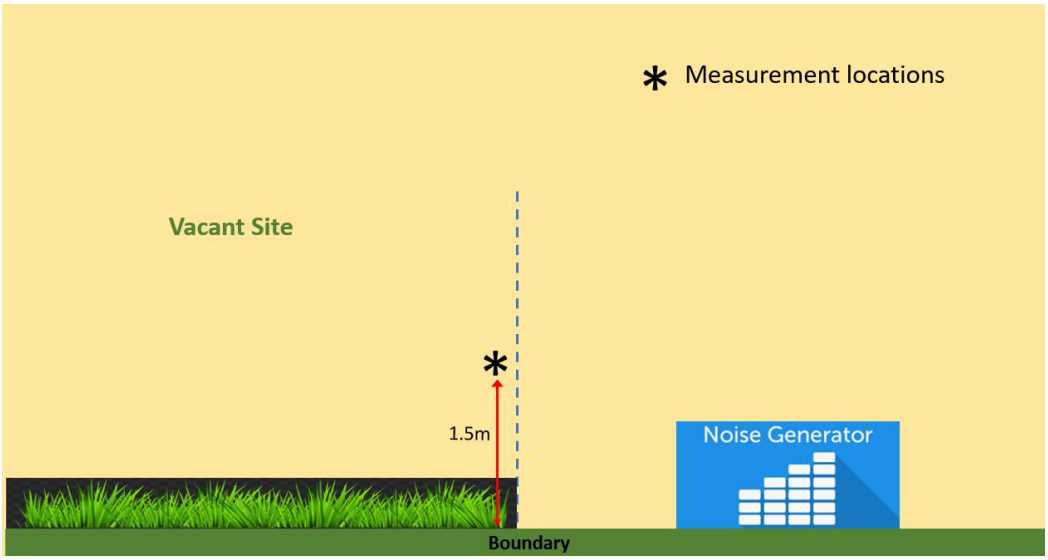

Figure 1: Measuring actual noise on a vacant site

Non-vacant sites

Where there are reflecting surfaces (e.g., a building on one side, and a boundary fence/wall), then the measurement should be taken 3.5m from each reflecting surface (if possible) and 1.5m above ground level. Hence while the AUP (OP) noise standard says this reading should be made within the boundary (for example E25.6.2 Maximum noise levels in residential zones), NZS 6802:2008 describes where exactly where within the boundary the noise level should be measured. If the existing building is more than one level high, then noise should be measured 1.5m above each floor level (as per NZS6802:2008, 6.1.3). Further, if there is a reflecting surface within 3.5m horizontally of the point where a noise measurement is required, then a shorter distance of at least 1m horizontally may be used with 3dB subtracted from the measured noise level (NZS6802:2008, 6.1.3). These various measurement locations are shown in Figure 2 below.

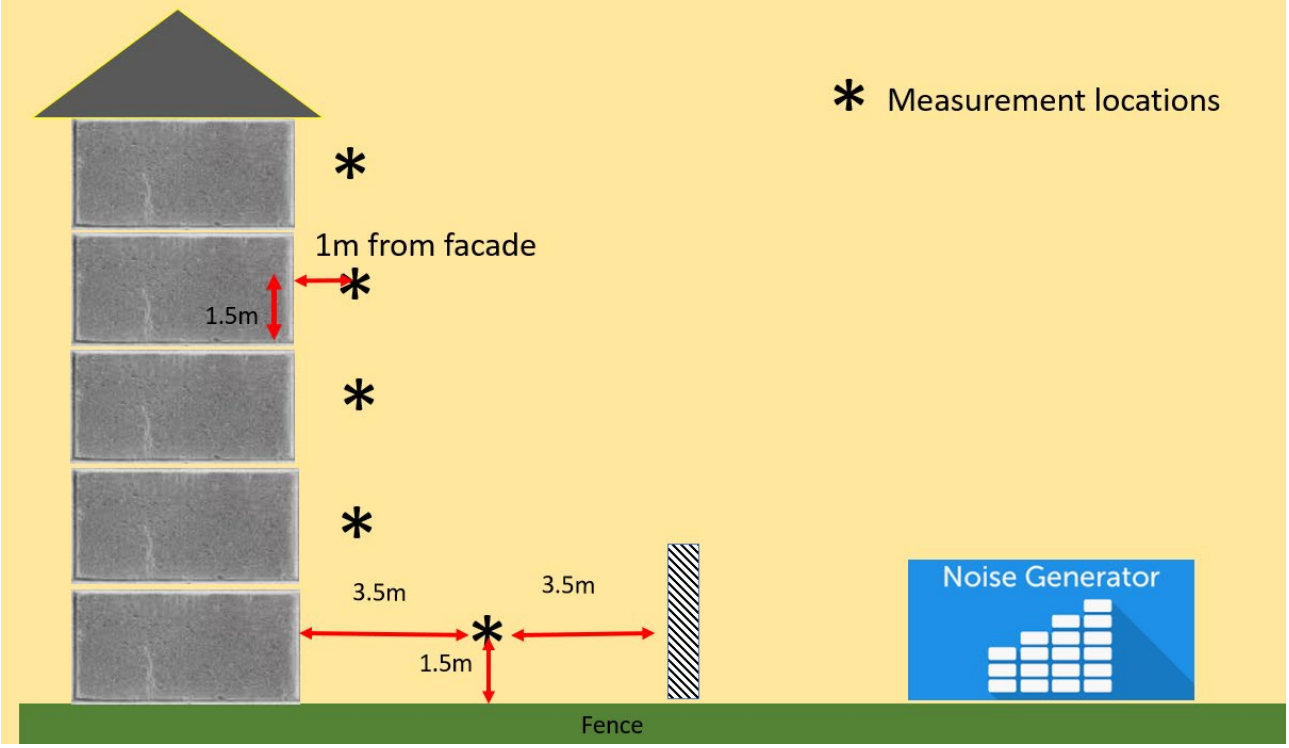

Figure 2: Measuring actual noise on non-vacant sites

Note that if the existing building is single level only, then only one vertical noise measurement is required - i.e., 1.5m above ground level. As there are no other levels in the building, additional floor level readings are not relevant. This could mean that a site with an existing single-storey dwelling, where noise measured at a vertical height greater than 1.5m above ground level exceeds the AUP (OP) noise limit, nevertheless will still comply with the AUP (OP) if the measurement taken at 1.5m above ground level complies.

3 Measuring predicted/modelled noise

Actual noise measurements relate to the physical presence (or not) of any buildings and structures whereas predicted/modelled noise may need to consider existing **and** future buildings which do not yet exist. In Resource Management Act 1991 (RMA) terms, this is known as the receiving environment – an environment which includes activities which currently exist as well as those in the reasonably foreseeable future as modified by activities that are permitted under the AUP (OP) and/or any unimplemented resource consents that are likely to be implemented. Note that this will only be considered if the matters for discretion/control enable the planner to consider amenity and/or noise effects, and not for the purpose of determining compliance with the standards in Chapter E25.

If an adjacent site contains a single dwelling or is vacant, the vertical height measurement should include levels taken 1.5 metres above ground level as well as each floor level that may potentially exist as a permitted activity.

These hypothetical vertical locations are to be determined by the permitted activity rules and standards (e.g., height, height in relation to boundary, yards) in the AUP (OP) and any unimplemented resource consents (i.e., the receiving environment). As an example, if a new 3 level dwelling could be built as a permitted activity to replace the existing dwelling, then these higher vertical noise level locations should be modelled/predicted. In Figure 3 below, which shows an existing dwelling as well as a potential permitted dwelling, the predicted noise levels should be measured at each vertical location shown by the asterisk*. This captures the existing dwelling as well as the future dwelling and both should be used in determining what the potential effect is on neighbouring person(s), which includes landowners who may look to develop in future.

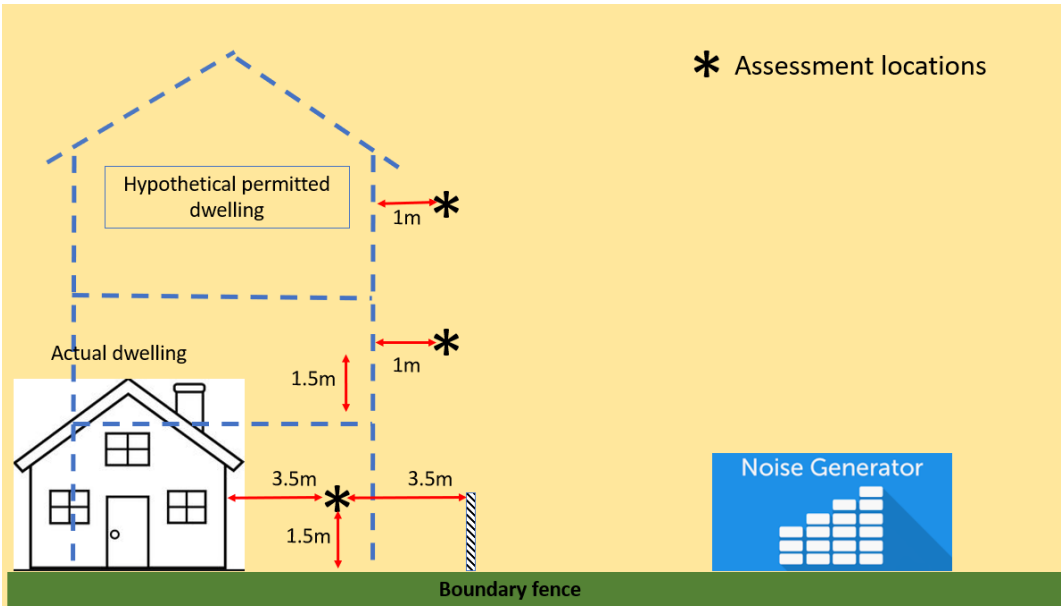

Figure 3: Modelling/predicting noise – hypothetical permitted dwelling

Note that the hypothetical new dwelling/building will need to meet the RMA tests for the receiving environment. That is, the building needs to be permitted or an unimplemented resource consent, that is **likely** to be implemented and is not fanciful. The planner cannot consider built development that is not permitted/consented as part of the receiving environment. Further if the adjacent site has a new dwelling on it which means that site is unlikely to be redeveloped in the short to medium future, then modelling a new dwelling with the maximum permitted height and minimum yard may be fanciful. What is reasonable and valid in terms of a receiving environment assessment is case specific and requires an individual assessment. For this reason, planners should clearly set out the receiving environment when briefing the noise expert. Be realistic when setting this out and don't simply rely on creating a permitted building baseline scenario where the adjacent site/s are developed to its maximum permitted potential.

Where the adjacent site is located in a zone that requires resource consent for all new dwellings or buildings (for example the Residential – Terrace Housing and Apartment Buildings (THAB) Zone and the Business – Mixed Use Zone) it should not be assumed that a future building can be established and what that building may look like. The planner is unable to take into account 'anticipated development', as much development in this zone will require consents and as such do not form part of the receiving environment. The approach described above and shown in Figure 3 would apply however in the THAB Zone where there is a valid but unimplemented resource consent for a building. If there is no consented building then the predicted/modelled noise level assessment locations may need to be based on the existing situation shown in Figures 1 and 2 above, in terms of an assessment under the receiving environment and compliance with the AUP (OP) rule.

While it is well established that the effects assessment required for Council's notification and substantive decisions on resource consent applications under the RMA must be made in the context of the legislation and the Unitary Plan, and s104 requires that the objectives and policies must be had regard to, caution needs to be applied to ensure that this does not go as far as setting up an 'anticipated development' receiving environment for assessing adverse effects at notification or at the substantive stage.

The planner must, however, in terms of their s104 substantive decision, have regard to any relevant provisions of a plan under s104(1)(b)(vi). For example, policy E25.3(5) seeks to prevent significant noise-generating activities from establishing in or adjoining residential zones and policy H6.3(9) requires non-residential activities to avoid, remedy or mitigate adverse effects on residential amenity. Hence while the effects of the noise-generating activity may be acceptable in terms of a receiving environment test (as one cannot consider future potential development), in terms of its compatibility with the zone objectives and policies (and potential future development) it may not be suitable. As such, the planner may process a consent on a non-notified basis but then decline it on policy grounds. In addition, be wary of the differences between the objectives and policies in the different residential zones. For example, the Residential – Single House Zone has greater

emphasis in maintaining existing amenity values (including noise) than the more intensive residential zones.

Scenario: New Childcare Centre

The proposal

A new childcare centre for 80 children is proposed for a site in the Residential – Mixed Housing Suburban Zone. The proposal includes a 2m high acoustic fence along its boundaries with its residential neighbours. The activity status for a childcare centre accommodating greater than 10 people per site excluding staff is RD and the matters of discretion at H4.8.1(1)(a) include noise effects on residential amenity. The AUP provides for up to three two-storey dwellings on these sites as a permitted activity. There is an old single storey dwelling on a site adjoining the childcare site and a very new single-story dwelling on a site adjoining the other side.

Acoustic modelling shows that the proposed childcare centre will comply with childcare noise standard E25.6.23 in relation to the current position of the two existing dwellings on adjoining sites and is therefore a permitted activity under rule E25.4.1(A1). As such a resource consent for a noise infringement is not required. The acoustic modelling however shows that if the existing single-storey dwellings are replaced by two-storey dwelling/s, the childcare noise limit will be exceeded and a resource consent for a noise infringement would be required. At this stage the applicant has decided not to apply for a consent for this potential noise infringement.

Permitted baseline

The Council has a discretion to disregard an adverse effect under sections 95D(b), 95E(2)(a) and 104(2) of the RMA, if a rule or national environmental standard permits an activity with that effect. The potential permitted baseline for this scenario is a childcare centre up to 10 children which complies with the childcare noise standard (standard E25.6.23)[3]. As the proposed childcare centre contains 80 children, it may not be appropriate to apply that permitted baseline and disregard the effects of a 10-child childcare centre. However, this will need to be determined on a case-by-case basis.

Receiving Environment

The receiving environment beyond the subject site includes permitted activities under the AUP, lawfully established activities (via existing use rights or resource consent), and any unimplemented resource consents that are likely to be implemented. In this scenario, the receiving environment includes the two existing neighbouring dwellings. However, two storey dwellings could also be established on those sites as a permitted activity. In this case it is not fanciful that up to three new two-storey dwelling(s) could be built on the site

[3] The childcare noise standard allows 5dB more during the day than the default noise standard for the residential zone.

that contains the old dwelling as that dwelling is nearing the end of its life. The new dwelling on the other side of the childcare centre however is unlikely to be replaced as it is quite new. Hence in this scenario the receiving environment includes the existing old and new dwelling plus up to three new two storey dwelling(s) to replace the old dwelling, recognising each proposal needs to be considered on a case by case basis as to whether new permitted development on adjoining sites is likely or fanciful.

Assessing noise in this scenario

Noise effects on neighbouring persons must be considered. Amenity noise effects are a matter of discretion for childcare centres accommodating greater than 10 people per site excluding staff in residential zones. On the assumption that there is no relevant permitted baseline to disregard noise effects (see discussion under the "Permitted baseline" heading above), and the receiving environment includes the sites with existing dwellings and a site with up to three new two-storey dwellings, the existing childcare noise standard (E25.6.23) provides some guidance for the notification and substantive assessments. The standard provides plan context for these assessments but that does not mean that there are no noise/amenity effects to consider or that those effects will be less than minor.

In terms of the assessment, it is important to note that the AUP (OP) noise limits like Leq quantify the noise dimension. The qualitative dimension, such as children screaming, is not well represented in a quantitative measurement such as Leq. As such, the effects from the qualitative dimension also need to be considered. Adequately managing this dimension may require on-site management (e.g., a noise management plan) or other means so that the noise effects satisfactorily maintains the surrounding residential amenity. Often the qualitative characteristics and nature of the noise can be such that they can have an adverse amenity effect even at quite low levels despite complying with any permitted noise rules in the plan. Hence while the permitted noise rule provides some context for understanding noise effects, it does not capture all relevant noise considerations that need to be assessed under the matters of discretion.

If, in the future, a new two-storey dwelling (or more) are located on one of the adjoining sites, then the childcare centre **may** no longer comply with its consent conditions and/or the AUP (OP) childcare noise standard at E25.6.23.

As such the childcare centre may need to obtain a variation under section 127, or an entirely new resource consent, or bring the centre into compliance by reducing the number of children. Alternatively, the childcare centre could attempt to future-proof their consent by appropriately assessing the future receiving environment and applying now for any exceedances of the applicable standards under the original application, or, by proposing additional mitigation when such dwellings are built to reduce noise to within AUP (OP) or resource consent condition limits. If the latter, this would not require an additional reason for consent for a noise infringement as the additional mitigation would keep the childcare centre compliant with the noise standard. The effects of that future mitigation would need

to be assessed as part of the original application. The existing and future receiving environment, any effects which arise, and their mitigation should be carefully considered by the applicant and, if appropriate, be included with their application.