

KINGSTON PARK STAGES 1 & 2 – TRAFFIC NOISE ASSESSMENT

A residential subdivision is proposed for the land at 42 Channel Highway, Kingston (the former Kingston High School site), now known as Kingston Park. An acoustic assessment is required for the development application, to investigate the potential for traffic noise from the neighbouring highways to intrude on residential amenity within the development. This letter contains the results of this assessment, conducted by NVC in February 2019.

1. THE DEVELOPMENT

The site, located at 42 Channel Highway, Kingston, is an 8.5ha parcel of land, formerly occupied by Kingston High School. The proposed development includes low and medium density residential living, and various accompanying amenities. Stages 1 and 2 comprise the construction of some 82 dwellings, along with a community club and café. The site is comprised of four different zone types under the Kingborough Interim Planning Scheme 2015; Urban Mixed Use, Community Purpose, Open Space and Central Business zones. Stages 1 and 2, as assessed in this report, are within the Urban Mixed Use zone.

The site gently slopes down to the north-east, and is bounded on the west by the Southern Outlet and Channel Highway, and on the north-eastern boundary by open space. To the south-west are a row of houses containing local business and some residences, beyond which is the Channel Highway. To the south-east are existing residences and business, beyond which is the John Street, and the Kingston Plaza shopping complex. The site and surrounding area is shown in Figure 1. The site boundary is shown in blue, and the red line depicts the 50m buffer from the road verge of the Southern Outlet and Channel Highway.



Figure 1: Site and Surrounds

Traffic flow data has been obtained from the Department of State Growth, as traffic count data for a week in May 2017. The data has been adjusted by the department to 2039 (20 years ahead), resulting in the following:

Channel Highway	AADT ¹ (2039) 15,254 vehicles	7.7% Trucks
Southern Outlet	AADT (2039) 28,864 vehicles	5.7% Trucks

2. CRITERIA

The Kingborough Interim Planning Scheme does not contain any noise criteria for residential use within an Urban Mixed Use zone. The relevant clause from the scheme is then *E5.6.1 – Development adjacent to roads and railways*, which states its objective as:

“ to ensure that development adjacent to category 1 or category 2 roads or the rail network.....is located to minimise adverse effects of noise, vibration, light and air emissions from roads and the rail network.”

To satisfy this, the Scheme provides Acceptable Solutions under A1.1 and A1.2, and a secondary Performance Criteria under P1.

“ A1.1 Except as provided in A1.2, the following development must be located at least 50m from the rail network, or a category 1 road or category 2 road, in an area subject to a speed limit of more than 60km/h:

- a) new buildings;*
- b) other road or earth works; and*
- c) building envelopes on new lots*

A1.2 Buildings, may be

- a) located within a row of existing buildings and setback no closer than the immediately adjacent building;*
- b) an extension which extends no closer than*
 - i. the existing building;*
 - ii. an immediately adjacent building*

P1 The location of development, from the rail network, or a category 1 road or category 2 road in an area subject to a speed limit of more than 60km/h, must be safe and not unreasonably impact on the efficiency of the road or amenity of sensitive uses, having regard to:

- ... (e) any noise, vibration, light and air emissions from the rail network or road;*
- ... (j) any recommendation from a suitably qualified person for mitigation of noise, if for a habitable building for a sensitive use; and*

... ”

The Southern Outlet and Channel Highway are assumed category 1 or 2 roads, and as the front row of houses is within 50m of these, and closer to the road than adjacent houses, the Acceptable Solutions are not satisfied. The proposed development is then assessed against the Performance Criteria, requiring that traffic noise does not unreasonably impact on the amenity of the dwellings.

Reasonable external traffic noise levels are taken from the *Tasmanian State Road Traffic Noise Management Guidelines* (DIER 2011), which state the following criteria:

Design Target	63 dBA, L10 _{18 hour}
Operational Upper Limit	68 dBA, L10 _{18 hour}

The L10_{18-hour} is typically taken as 3dB higher than the Leq_{18-hour} implying an external design target of 60 dBA and upper limit of 65 dBA, as Leq_{18-hour}. The 18-hour period is 0600 to 0000 hours, as per DIER.

¹ AADT – Annual Average Daily Total.

Where outdoor amenity cannot be practically protected, AS2107² is referred to for indoor noise level criteria. For houses or apartments near major roads, criteria are specified as 35 – 45 dBA for living areas and 35 – 40 dBA for sleeping areas (night time), both as an Leq (time period not specified). Indoor noise levels of 35 – 40 dBA are then deemed appropriate for both day and night time periods.

3. PREDICTED NOISE LEVELS

Noise levels across the site have been predicted using *iNoise* software, which implements the ISO9613 algorithms for environmental noise. The predictions account for geometric spreading, barrier attenuation, atmospheric absorption, reflections off buildings, and ground absorption. The following assumptions have been made in the predictions:

- The source of noise for the vehicle is the tyres and so the source is modelled as 0.5m above the road³.
- A 1.8m high barrier fence is to be installed on the western boundary, as indicated in Figure 2. Construction is to be solid (no gaps), with a minimum surface mass of 15kg/m².
- The vehicle sound power level used is from the CNOSSOS-EU project for a medium vehicle at 80 km/hr on the Southern Outlet, and a light vehicle at 50 km/hr on the Channel Highway. The choice of these vehicle types is based on the comparison of model predictions with noise measurements, made by NVC, of Southern Outlet traffic at Whitewater Creek in Kingston.
- Vehicle numbers were obtained from the Department of State Growth, and are based on traffic count measurements on the nearest measurements points on both the Southern Outlet and Channel Highway. The noise model uses the numbers for 2039, as predicted by the department.
- The ground has been assumed 100% reflective everywhere – this is conservative.
- The building façades are taken as 80% reflective.
- As per the Tasmanian Noise Measurement Procedures Manual, noise levels are predicted at 1.5m above ground level. A second set of predictions is also included at 4.5m above ground level, which approximately equal to 1.5m above the height of the first-floor balconies.

The results are shown in Figure 2 and Figure 3 via coloured noise contours. Three contours are shown, defining acceptable levels (less than the DIER design target) in green, marginal levels (between the design target and operational upper limit) in blue, and excessive levels (over the DIER operational upper limit) in yellow. Note the contours at 4.5m of elevation generally show higher levels within the site boundaries, due to reduced screening by the existing bund beside the highway. The sawtooth appearance in some of the contours is an artefact of resolving the spatial resolution used to define the contour map (in this case a 5m square grid has been used).

4. ASSESSMENT

Due to a significant difference in screening to the highways, noise levels along the boundary differ significantly between 1.5m and 4.5m above ground level. The two heights (ground level and first floor) are therefore assessed separately.

It should also be noted that the predicted levels and therefore the assessment assume traffic count data for the busiest day time period. Noise levels during the night are therefore likely to be significantly lower.

At 1.5m above ground level, the noise contour plot of Figure 2 shows noise levels across the site are acceptable with a small area of marginal noise levels near the corner on the north-west boundary. As the noise levels across the site meet the criteria adopted by DIER, they are taken as constituting reasonable traffic noise levels, and so satisfy the Performance Criteria under the Planning Scheme.

At 4.5m above ground level, the noise contour plot of Figure 3 shows noise levels at the house façades along much of the north-western boundary are marginal, with several houses showing excessive levels at the façades nearest the highway. Note that the barrier fence on the site boundary has no effect on noise levels at this height.

² AS2107:2016 – Acoustics – Recommended design sound levels and reverberation times for building interiors.

³ Department of Transport, Welsh Office – Calculation of Road Traffic Noise (CoRTN) “, 1988, Figure 1

As there is alternative outdoor space at ground level available to residents where noise levels are acceptable, it is considered reasonable to accept the excessive outdoor levels at some first-floor balconies, provided the indoor amenity is suitably protected there. Indoor amenity is then assessed against the design noise levels from AS2107. Incident noise levels at the building façades are up to 69 dBA, Leq. To achieve noise levels of 35dBA internally, the façade construction should achieve a minimum acoustic insulation of Rw35. Standard wall constructions will meet this, however glazing will need to be minimum 10mm laminated, and operable sections shut.

5. SUMMARY

A traffic noise assessment of Stages 1 and 2 of the Kingston Park development has been conducted, based on Southern Outlet and Channel Highway traffic flow data from DIER. Using iNoise software, traffic noise across the development has been predicted for receivers on the first and second floors of the houses nearest the highways, and assessed against clause E5.6.1 of the Planning Scheme. As the houses are within 50m of the Southern Outlet, the Acceptable Solutions are not met, and the development is therefore assessed against the Performance Criteria. This requires assessing if the traffic noise levels are reasonable, and for this report the criteria specified in the DIER *Tasmanian State Road Traffic Noise Management Guidelines* have been adopted to define reasonable traffic noise levels.

The assessment has then shown that provided:

- A noise barrier is constructed on the site boundary on the north-west side, the extents of which are shown in Figure 2, with a minimum height of 1.8m, and a minimum surface mass of 15 kg/m².
- Façade construction on the first floor, including windows and roof, achieves a minimum acoustic insulation of Rw35.

Then traffic noise levels will be reasonable under the DIER guidelines, and clause E5.6.1–P1 of the Planning Scheme satisfied regarding acoustic amenity.

Should you have any queries, please do not hesitate to call this office directly.

Yours faithfully



Jack Pitt

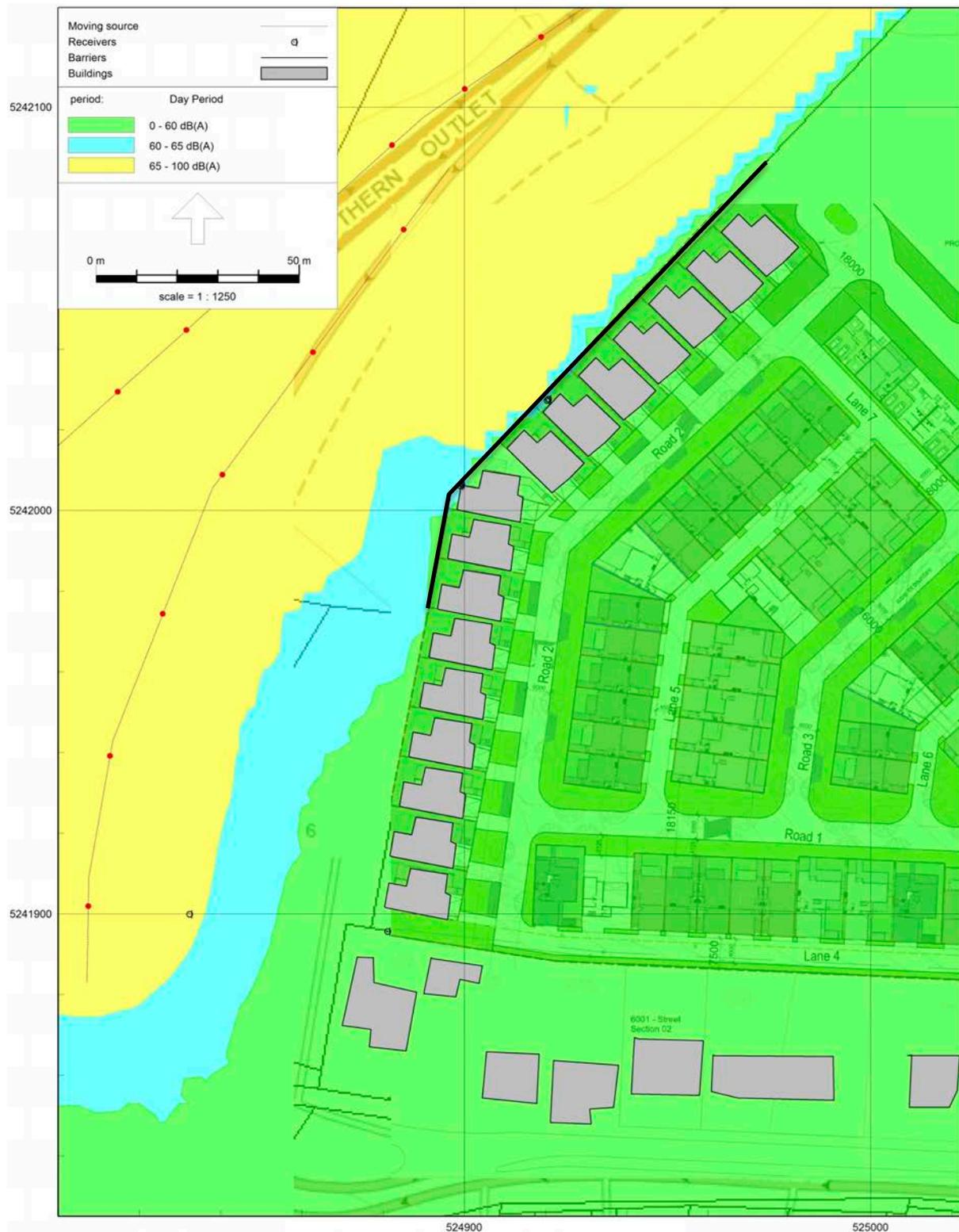


Figure 2: Predicted Noise Contours, 1.5m Above Ground Level

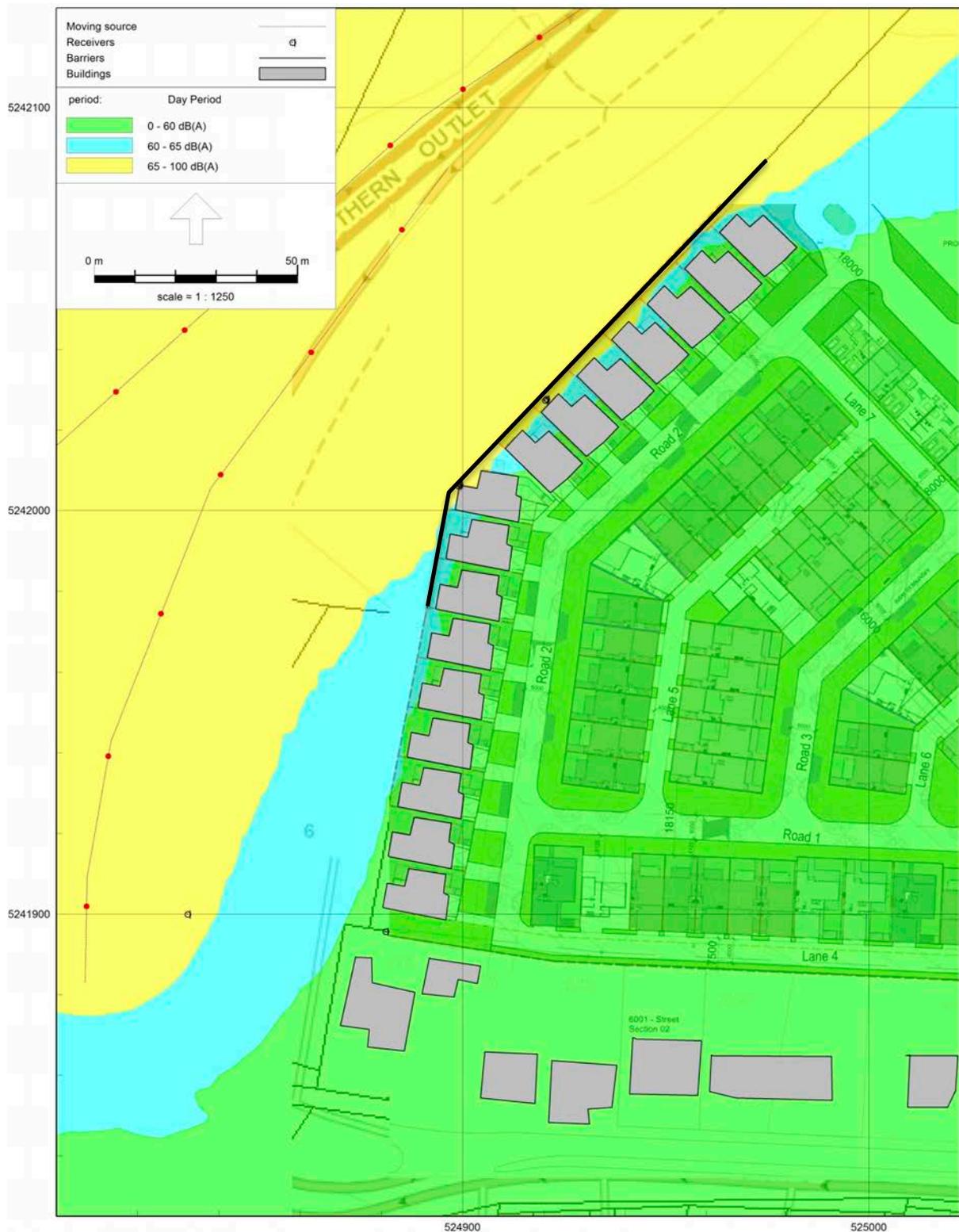


Figure 3: Predicted Noise Contours, 4.5m Above Ground Level