

Noise Barrier CASE STUDY 3: Location



The Avalon Drive bypass project

Avalon Drive, Hamilton

The Avalon Drive bypass project (2008) consisted of the construction of a new 2 kilometres long two-lane road avoiding a congested area of Avalon Drive in Hamilton. The bypass was constructed east of and parallel to Avalon Drive, connecting to the existing road at roundabouts. Avalon Drive remains as a local road. Overall, the aim of the bypass is to reduce congestion, improve safety, and separate inter-regional state highway traffic away from internal city traffic in the Nawton area.

The new bypass runs through a predominantly commercial/industrial area, with housing present in some locations. The majority of the bypass also runs adjacent to the mainline railway corridor.

A road-traffic noise assessment of the proposed bypass was undertaken against the NZ Transit Noise Guidelines, as required by the designation conditions. To meet noise limits barriers were needed at two locations. The first was required for 320 metres at the northern end of the bypass where existing houses are close to the road corridor, and the second for 900 metres along a section of the bypass to protect houses on the far (eastern) side of the railway corridor.



The concrete noise barrier panels incorporated elements of the surrounding environment including a river stone and wave pattern to represent the Waikato River

Noise barrier design

Noise barriers have been constructed from pre-cast concrete panels varying in height between 2.5 metres and 4 metres. The use of concrete as a noise barrier material rather than timber has a number of advantages relating to lengthened design life, easier cleaning /graffiti removal and ease of construction. However, care must be taken to ensure that aesthetics are considered, and that materials used are suitable for their location e.g. concrete may be suitable for an urban, but not rural environment.

For Avalon Drive, urban and visual design was carefully considered to ensure the monotonous and bland look of a continuous solid concrete wall would be broken up. Elements of the local surrounding environment were incorporated into the barrier design. The concrete panels include a river stone and wave pattern to resemble the Waikato River. Two tones of grey colour were also used on the panels, serving to emphasise the river pattern. Overall the noise barrier design has proved to be a great success, earning a high level of praise from local residents and road users.

In addition to the graffiti deterrent provided by the concrete design detail on the noise barrier panels, an anti-graffiti coating has also proved particularly effective. Concrete panels have been finished in two coats of specialised protective paint. Any graffiti that does occur can be washed off using a water soluble solvent product, designed to leave the paint surface intact. The area between the road and the wall has also been planted with a variety of native shrubs and grasses to discourage access.

Since the noise barriers have been installed on the Avalon Drive bypass there have been reports of minor flooding after extreme rainfall events. The general area is low lying and lacks natural run off. Adding to the problem, the drains through the noise barrier base are prone to blocking by accumulated debris. To resolve the issue it is likely that catchpits will be installed in neighbouring properties, and a separate drainage system reticulated to the road.

The cost of the noise barriers were approximately \$1,600 per linear metre (average height 3 metres).



Noise barriers were placed on the NZTA designation boundary between the railway and the new road, meaning railway noise was not mitigated (view from residential properties adjacent to the railway, onto the back of the noise barrier).

Location

The noise barriers were located on the state highway designation boundary, which is the default position used on NZTA projects. In instances where noise barriers were required for properties on the far side (east) of the railway corridor, the designation boundary runs between the railway and the new road. Subsequently, the barrier was located on the boundary between the railway and the road. Although providing attenuation for road noise, the noise barrier did not address the issue of railway noise for residents. Ideally for the residents, the noise barrier may have been best placed on the boundary of KiwiRail (formerly Ontrack) land in order to minimise all environmental noise (rail and road).

From a planning perspective, a barrier on the other side of the railway may have presented an opportunity for the Hamilton City Council to meet District Plan objective (7.4.3) to 'protect residential activities from the adverse effects of transport noise'. The issue of placement of the noise barrier to mitigate rail noise was raised by the Council's noise advisor during the statutory approval process. However, the NZTA objected to this on account of maintenance and access issues.

The issue of reflection of rail noise from the outer face of the noise barrier was also raised during the council hearing. Although discounted by the NZTA's noise consultants, some residents have since complained that noise levels have actually increased. Noise surveys undertaken since the barriers were installed have shown no perceivable increase in rail noise.

Under the noise standard NZS 6806 (used for new projects since 2010), an assessment process determines the best

practicable option for noise mitigation. In a situation where a road runs alongside a railway, one mitigation option that could be considered is placing the noise barriers outside the NZTA designation to screen both road and rail noise.

The placement of barriers on third-party land is not a straight forward issue. Despite the obvious benefits from a noise mitigation perspective the placement of noise barriers on third-party land must also take into account numerous issues, including: planning, legal agreements, maintaining access/right of way to noise barriers, along with responsibilities for maintaining barriers.

The noise barriers on the Avalon Drive bypass have provided improved security for the railway as well as the road. The barriers have prevented pedestrians crossing or accessing the rail corridor from the roadside, however not from the residential side. Additionally, the height of the noise barriers has prevented uncontrolled pedestrian movement across the new bypass, which is likely within urban areas. However, KiwiRail has reported some minor safety concerns regarding impaired visibility of the railway corridor from their control tower.



Noise barriers prevent pedestrians accessing the rail corridor from the roadside

Lessons learnt

- The default location of noise barriers on the designation boundary might not always be the best practicable option. Additional noise mitigation may sometimes be achieved by locating the barriers on land outside of the designation. The new noise standard NZS 6806:2010 addresses this issue through an integrated design process.
- The use of anti-graffiti coating can prove effective in areas of pedestrian access.
- Drainage and water flow through/under noise barriers can be an issue and should be considered in the design stage.

Contact details

Rob Hannaby NZTA, Principal Environmental Specialist Telephone: 09 928 8761 - rob.hannaby@nzta.govt.nz

