



**Traffic Noise Monitoring
Post Completion Stage 2
Gungahlin Drive Extension**

AVU 00312

**for
Roads ACT
Territory and Municipal Services**

**by
Marion Burgess
BSc (Hons) MSc (Acoust), FAAS
Acoustics & Vibration Unit
School of Aerospace, Civil & Mechanical Engineering
UNSW, Canberra**

February 2012

**Traffic Noise Monitoring
Post Completion Stage 2
Gungahlin Drive Extension**

AVU 00312

for

Roads ACT

Territory and Municipal Services

February 2012

Contents

| | PAGE |
|--|-------------|
| 1.0 Introduction | 1 |
| 2.0 Background | 1 |
| 3.0 Noise Level Measurement | 3 |
| 4.0 Discussion | 5 |
| 5.0 Conclusion | 7 |
| Annex 1 Charts of noise level variation over the placements | |
| Annex 2 Images from each placement | |
| Annex 4 Noise level descriptors for each of the placements | |

Any use of the Report, use of any part of it or use of the names University of New South Wales and UNSW, the name of any unit of the University or the name of the consultant in direct or in indirect advertising or publicity is forbidden.

Traffic Noise Monitoring

Post Completion Stage 2

Gungahlin Drive Extension

AVU 00312

February 2012

Marion Burgess BSc(Hons), MSc(Acoust), FAAS

1.0 INTRODUCTION

This report has been prepared by the Acoustics and Vibration Unit of the University of New South Wales, Canberra, following the request from Roads ACT, which is within ACT Department of Territory and Municipal Services. Noise monitoring was undertaken at a number of locations prior to the construction of Gungahlin Drive Extension (Unisearch 545949 of June 2002, Unisearch 57034 of Oct 2002, AVU 04503 of Oct 2003 and AVU 0707 of April 2007). Stage 1 of the road was opened in April 2008 and measurements were made at each of the monitoring locations, plus additional sites of interest in late 2008 and early 2009 (AVU 02208). Following the opening of Stage 2 of Gungahlin Drive Extension in early October 2011 further measurements have been made at the monitoring locations in late 2011 and early 2012 for comparison with the previous data.

2.0 BACKGROUND

Gungahlin Drive Extension is a 9 km road link in Northern Canberra which extends from the Barton Highway at Gungahlin Drive to the Tuggeranong Parkway at the Glenloch Interchange, as shown in Figure 2.1. Stage 2 involved duplication of the carriageway from the Barton Highway through to Caswell Drive. The main features of the road cross section (extracted from www.gde.act.gov.au/design_and__construction) are:

- 2 x 3.5 metre wide lanes in each direction
- 2.5 metre left shoulder which is also an on-road cycle lane
- 1.0 metre right shoulder
- 1.0 metre verge

The road has a posted speed limit of 80 kilometres per hour with the interchange ramps having posted speed limit of 60 kilometres per hour.

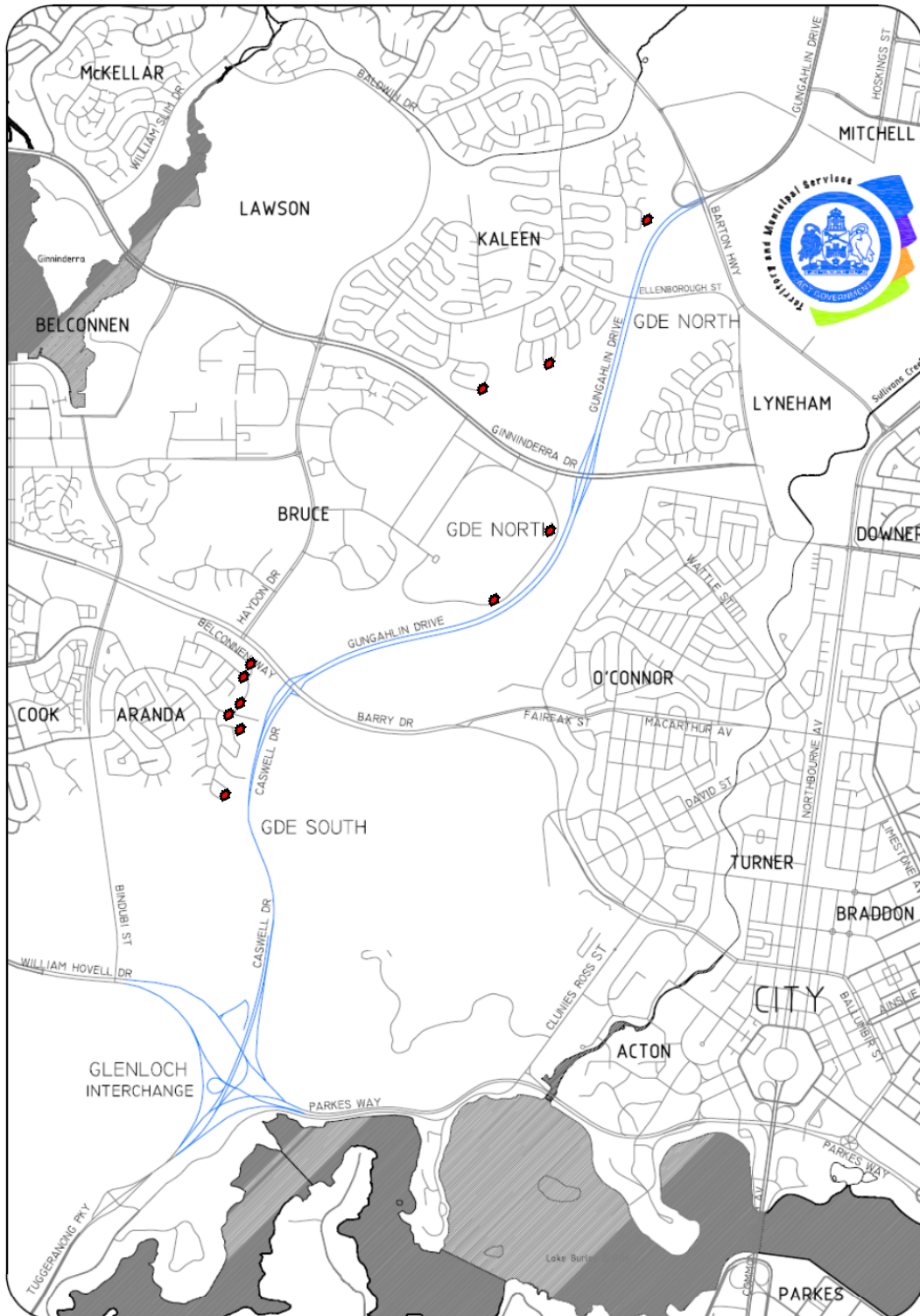


Figure 2.1 Map showing Gungahlin Drive Extension with noise monitoring locations are indicated [base map from http://www.tams.act.gov.au/_data/assets/pdf_file/0016/104119/GDE_Alignment_Layout.pdf]

3.0 NOISE LEVEL MEASUREMENT

A noise logger, either ARL EL215 or Ngara, was placed at each location and left in place for a 7 day period. Each placement was as close as practical to the previous monitoring location. Any substantial differences in the placements have been identified on the data tables and Figures.

The performance of each logger was checked before and after each placement. The data was downloaded and subsequently analysed in terms of the various descriptors in A weighted decibels over 15 minute periods. The A weighting has a frequency response similar to that of the human ear.

The guidelines for assessing traffic noise impact in the ACT are currently based on the L_{A10} which is the level exceeded for 10% of the time period. This is determined for each hour and the $L_{A10(18hr)}$, which is the average value over the 18 hour period from 0600 to 2400 hrs, is then determined.

The L_{A90} , the level exceeded for 90% of the time period, is also of interest as it indicates the background noise levels in the area.

The charts showing the noise level variation for each day of the placement at each location are shown in the Appendix along with photos relevant to each placement.

The values for $L_{A10(18hr)}$ for each day are shown in Table 3.1 for the three sets of measurements: pre construction, post Stage 1 and post Stage 2.

Table 3.1 Comparison of the $L_{A10(18\text{hour})}$ at each location for the pre construction, post Stage 1 and post Stage 2 measurements

| Address | Location | $L_{A10(18\text{hour})}$ | | |
|---------------------------|-------------------------------------|--------------------------|-------------------------------|--------------|
| | | Pre construction | Post Stage 1 | Post Stage 2 |
| 19 Pieman Cres, Kaleen | In garden | 45-50 | 51-53* | 49-52* |
| 14 Skardon St, Kaleen | In garden | 46-53 | 46-51 | 50-53 |
| 47 Shannon Cct, Kaleen | In garden | 43-47 | 49-53 | 46-53 |
| AIS Archery Field | On boundary | 47-56 | 52-55 | 51-53 |
| AIS Athletics Track | On boundary | 44-58 | 48-52 | 51-53 |
| 60 Banambila St, Aranda | On front porch at 1m facade | 50-54 | 52-54 | 51-55 |
| 79 Banambila St, Aranda | On upper level balcony | 49-53 | 52-53 | 51-52 |
| 79 Banambila St, Aranda | In garden | 53-54 | 49-52 | 47-51 |
| 63 Arabana St, Aranda | On rear porch at 1m facade | 52-54 | 52-55 | 50-52** |
| 127 Bandjalong Cr, Aranda | At ground level at 1m facade | 57-60 | 59-63 June 08 59-63 Nov 08 | 60-61 |
| 127 Bandjalong Cr, Aranda | On Upper level balcony at 1m facade | 58-61 | 60-63 June 08 60-63 Nov 08 | 61-61 |
| 23 Noala Place, Aranda | In front garden | 55-58 | 53-56 | 50-53 |
| 23 Araba St, Aranda | In front garden | 53-57 | 52-55 | 50-52 |
| 16 Gairdner, Kaleen | 1m front facade | n/a | n/a | 46-52 |

* Due to works at the property in Pieman Cres, the logger was in a slightly more exposed location in the rear garden for the 2009 and 2011 placements

** Due to substantial change to the rear of the property the logger could not be placed on the rear porch in 2011 and was placed in the yard. The $L_{A10(18\text{hour})}$ was found to be 48-49 dBA and approx 2.5 dB has been added to allow for facade reflection for comparison with previous data.

4.0 DISCUSSION

4.1 ACT Traffic Noise Guidelines

The guidelines for $L_{A10(18hr)}$ from the draft ACT Noise Management Guidelines (1996) for noise from road traffic for new/upgraded roads or new residential areas are shown in Table 4.1.

Table 4.1 Guidelines for road traffic noise for new roads from draft ACT Noise Management Guidelines (1996)

| | | |
|--------------------------------------|----------|--|
| Residential and community facilities | 63 dB(A) | $L_{A10(18hr)}$, at 1 m from the building facade |
| Private open space | 58 dB(A) | $L_{A10(18hr)}$, at 1 m inside the nearest boundary of the private open space |
| Pedestrian plaza | 69 dB(A) | $L_{A10,1hr}$ between 1230 to 1330, at edge of plaza, |
| Commercial facilities | 75 dB(A) | $L_{A10(18hr)}$, at 1 m from the building facade |

4.2 Noise Levels at Monitoring Locations

- At all sites the $L_{A10(18hr)}$ has been found to be less than the applicable ACT traffic noise guideline.
- At all sites the noise levels after the opening of Stage 2 have been found to be similar to, or less than, those measured after the opening of Stage 1.
- For all the sites the noise levels after the opening of Stage 2 have been found to be similar to the noise levels measured before construction commenced.

The highest noise levels were found at 1m from the façade at 127 Banjalong Cr, Aranda. At this location it appears that the noise is primarily from traffic along Banjalong Cr and not from GDE. The noise levels measured in 2011 were similar to those obtained before construction of GDE.

The residents at the measurement locations in Aranda and Kaleen commented that the noise from GDE was barely noticeable. Those residents in the vicinity of Belconnen Way commented that they considered Belconnen Way was the main source for traffic noise at their property. The resident at 16 Gairdner, Kaleen has expressed concern about traffic noise impact since the opening of Stage 2. The

data from the measurements at that location are well below the guideline for road traffic noise impact and similar to the noise levels measured at other sites in Kaleen.

4.3 Estimate of Change in Current Noise Levels with Increase in Posted Speed

GDE has a posted speed limit since the time of opening of 80 km/hr. The effect of increasing the posted speed limit has been estimated using the TNOISE software package. This software was developed by Main Roads in Western Australia, is based on the modelling procedure of the Calculation of Road Traffic Noise (CORTN) method developed in the UK. When considering changes in noise level it should be noted that an increase in sound level of 1 dB is considered to be just noticeable under ideal listening conditions and an increase of 2 to 3 dB is considered to be just noticeable under normal listening conditions. It should also be noted that estimated changes in traffic noise level would only apply if the noise from GDE was the dominant noise at the site.

Current traffic flow data and drawings showing the current road layout were provided by Roads ACT. The applicable traffic volumes, % heavy vehicles and % road gradient were used to estimate the change in noise level for an increase in posted speed limit from 80 km/hr to 90 km/hr for each of the three main sections of GDE.

The estimations of the effect of increase in speed for the current traffic volumes are shown in Table 4.2. For each segment of the GDE it is estimated that any increase in noise level from GDE traffic from an increase in posted speed limit of 80 km/hr to a posted speed limit of 90 km/hr would be under 1 dB. However the change in noise level may be even less than this estimated value as the current average traffic speed is greater than 90 km/hr.

The effect of an increase in traffic volume combined with an increase in posted speed limit has been estimated as shown in Table 4.3. The proportion of heavy vehicles usually decreases as the overall traffic volume increases so an estimate has also been made for the effect of an increase in total traffic volume combined with a small decrease in proportion of heavy vehicles plus a zoned speed increased from 80 km/h to 90 km/hr. The increase in noise level from GDE is estimated to be less than 2 dB.

Table 4.2 Estimation of increase in noise level to be expected for current traffic volumes and increase in posted speed from 80 to 90 km/hr

| Portion of GDE | Traffic Volume per day | %heavy vehicles | % road gradient | Estimated noise level change for zoned 80km/h increase to zone 90 km/h |
|-------------------------------|------------------------|-----------------|-----------------|--|
| Barton-Ginninderra | 31,000 | 5 | 2 | + 0.9 dB |
| Ginninderra-Belconnen | 31,000 | 5 | 2.5 | + 0.9 dB |
| Bridge to Aranda-Glenloch Int | 40,000 | 4 | 2 | + 0.9 dB |

Table 4.3 Estimation of increase in noise level to be expected for increased traffic volumes combined with an increase in posted speed from 80 to 90 km/hr.

| From traffic volume | To traffic volume | Estimated noise level change for zoned 80km/h to zoned 90km/h |
|---------------------|-------------------|---|
| 31,000 and 5% | 40,000 and 5% | +2.0 |
| 31,000 and 5% | 40,000 and 3% | +1.6 |

5.0 CONCLUSION

Following the completion and opening of Stage 2 of GDE, noise monitoring has been undertaken for locations where measurements have previously been made. Comparison of the noise levels before and after the completion of GDE show very little change in noise level at each location. All the noise levels were found to be below the ACT traffic noise guidelines. Those residents in Aranda in the vicinity of Belconnen Way commented that the noise from Belconnen Way appeared to be the main source of traffic noise at their property.

Estimations indicate that, for any property where GDE was the dominant source of road traffic noise, the noise level may increase by less than 1 dB if the posted speed is increased to 90 km/hr. The resultant noise level would still comply with the ACT traffic noise guidelines. Estimations also indicate that, for any property where GDE is the dominant source of road traffic noise, the noise level may increase by less than 2 dB if the traffic volume increased as well as the posted speed change to 90 km/hr. The resultant noise level would still comply with the ACT traffic noise guidelines.