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REVIEW OF ENVIRONMENTAL FACTORS

QUEANBEYAN NORTHERN ROUTE UPGRADE

Roads and Traffic Authority

NOVEMBER 2002

PREPARED BY:

NECS

NATIONAL ENVIRONMENTAL CONSULTING SERVICES

EXECUTIVE SUMMARY

National Environmental Consulting Services (NECS) was commissioned by the Roads and Traffic Authority (RTA) to prepare this Review of Environmental Factors (REF).

The REF has been prepared in accordance with the RTA REF guidelines, and satisfies all relevant requirements of the Environmental Planning and Assessment Act (EP&A Act) 1979 and the Environmental Planning and Assessment Regulation (EP&A Regulation) 2000.

Under the terms of the EP&A Act, the determining authority must consider the likely environmental impact of the upgrades. The proposed works are an activity for the purposes of Part V of the EP&A Act. This REF provides information as specified in Clause 228(2) of the EP&A Regulation 2000 to enable the RTA to assess whether the proposal has a significant effect on the environment. If the assessment concludes that there is not likely to be a significant effect on the environment, the proposal can proceed, subject to safeguards outlined in the REF.

The RTA proposes to upgrade a northern heavy vehicle route around Queanbeyan to provide an alternative route for heavy vehicles on Monaro Street, hence improving traffic efficiency, safety and central business district (CBD) amenity. Upgrading roads north of the Queanbeyan CBD and creating a bypass would achieve this.

The proposed improvements would create an alternative route for heavy vehicles around Queanbeyan and are located to the north of Queanbeyan City. Sites proposed for improvement are located both within the Queanbeyan City Council Local Government Area (LGA) and the Australian Capital Territory (ACT).

Since its settlement in 1828, Queanbeyan has evolved from being a rural based economy to one that now provides a variety of services, retail, tourism and light manufacturing that is characteristic of a modern economy.

Monaro Street, which runs through the Queanbeyan CBD, is currently the main route for heavy vehicle traffic from the coast to Canberra and further inland. In addition, Monaro Street provides the only link between heavy vehicle origins and destinations within Queanbeyan due to the restricted number of crossings over the Queanbeyan River. Consequently most heavy vehicle traffic passes through the CBD.

There is increasing concern in the Queanbeyan community about the deteriorating amenity of the CBD caused by high volumes of heavy vehicles passing along Monaro Street. This loss of amenity is related to noise and air quality impacts, as well as, a perceived reduction in the level of road safety.

Seven options were considered for an alternative route around Queanbeyan in terms of the associated costs and the time required for implementation. A preferred shorter-term strategy was identified involving a northern route via Thurralilly Street, Yass Road, Pialligo Avenue, Oaks Estate Road, Railway Street and Kendall Avenue North, and was chosen due to its relatively low cost and the benefits associated with it.

A meeting of the Parents & Citizens (P & C) of East Queanbeyan Public School and school authorities, attended by representatives of the RTA, raised concerns regarding safety of school children, potential increased noise and air pollution if heavy vehicle use of Thurralilly Street was increased. Investigations by the RTA identified a route along Faunce Street and Aurora Avenue, which would bypass Thurralilly Street and address the concerns of the P & C.

The proposed route would provide an alternative for heavy vehicles to connect the east industrial area of Queanbeyan with the west industrial area avoiding most of the residential and business areas, thus minimising impacts associated with amenity, noise and safety for Queanbeyan residents. The industrial areas are largely characterised by heavy vehicle service of the local industries. Given this, the provision of a route to connect these areas would allow for greater efficiency.

The weights of heavy vehicles are expected to increase in the future and the Queanbeyan City Council would be required to improve its roads, including bridges, in order to provide suitable roads and supporting infrastructure for these vehicles. One step in meeting this goal is to improve current roads to a standard so as to allow for heavy vehicles movements on a route that allows for practical and efficient transport. The improvements made to the intersections would permit the use of the route by B-Double vehicles.

The proposal would also provide an improvement to five sites in Queanbeyan and four within the ACT. Whether these are utilised as a route or individually, the proposal would improve safety on the region's roads. The ACT sites would be subject to development approvals by the ACT Government.

Vegetation would need to be removed in areas where roadways are widened, and the proposed route also crosses the Molonglo River at two locations. Erosion and sediment control measures would be implemented during the construction phase in order to prevent sedimentation and any deterioration of the quality of the water entering the waterways.

In order to prevent deterioration in water quality of the waterways the proposed safeguards outlined in the REF would be put in place. Noise impacts resulting from increased traffic movements have been assessed and monitoring proposed. Other impacts, such as the impact of noise on the nearby residences and any disruption to traffic flow during the construction would be temporary.

The benefits of this proposed development outweigh the potential impacts, providing the controls and mitigation measures outlined in this proposal are implemented.

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LIST OF ABBREVIATIONS

ACT	Australian Capital Territory
ADV	Average Daily Volume
AHD	Australian Height Datum
AS	Australian Standard
CBD	Central Business District
CO	Carbon monoxide
DLWC	Department of Land and Water Conservation
DO	Dissolved Oxygen
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EPA Act	Environment Protection Act 1997 (ACT)
EPA Regulation	Environment Protection Regulation 1997 (ACT)
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
kg	Kilogram
km	Kilometres
kph	Kilometres per hour
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metre
M	Million
mg	Milligram
mm	Millimetre
NCA	National Capital Authority
NECS	National Environmental Consulting Services
NEPM	National Environment Protection Measure
NO_x	Oxides of nitrogen
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NTU	Nephelometric turbidity units

PAD	Area of Archaeological Potential
PALM	Planning and Land Management
QCC	Queanbeyan City Council
REF	Review of Environmental Factors
REP	Regional Environmental Plan
RIC	Railway Infrastructure Corporation
RTA	Roads and Traffic Authority
POEO Act	Protection of the Environment Operations Act 1997
PO_4^{3-}	Phosphates
ppm	parts per million
QCC	Queanbeyan City Council
s	second
SEPP	State Environmental Planning Policy
SoE	State of the Environment
SPS	Special Protection Status
STP	Sewage Treatment Plant
VPD	Vehicles Per Day
°C	degrees Celsius
%	Percentage
µg	Micrograms

REVIEW OF ENVIRONMENTAL FACTORS
QUEANBEYAN NORTHERN ROUTE UPGRADE

SECTION A – PRELIMINARIES

1. INTRODUCTION

1.1 Brief Description of the Proposal

The Roads and Traffic Authority (RTA) proposes to upgrade a northern route around Queanbeyan to provide an alternative for heavy vehicles using Monaro Street, and hence improve traffic efficiency, safety and Central Business District (CBD) amenity. Upgrading roads north of the Queanbeyan CBD and creating an alternative route would achieve this objective.

This Review of Environmental Factors (REF) covers the works proposed by the RTA for the Queanbeyan Northern Route Upgrade. The Proponent is the RTA.

Figure 1.1 shows the location of the proposed Northern Upgrade route, around the City of Queanbeyan. Figure 1.2 provides a regional setting for the route.

National Environmental Consulting Services (NECS) was commissioned by the RTA to prepare this REF.

1.2 Need for the Proposal

Monaro Street, which runs through the Queanbeyan CBD, is currently the main route for heavy vehicle traffic from the coast to Canberra and further inland. In addition, due to the restricted number of crossings over the Queanbeyan River, Monaro Street provides the only link between heavy vehicle origins and destinations within Queanbeyan. Consequently most heavy vehicle traffic passes through the CBD.

There is increasing concern in the Queanbeyan community about the deteriorating amenity of the CBD caused by high volumes of heavy vehicles passing along Monaro Street. This loss of amenity is related to noise and air quality impacts, as well as, a perceived reduction in the level of road safety.

In recognition of the community's concern, the Queanbeyan City Council referred the issue to the Minister for Roads.

At a meeting held with the Council on 5 March 1999, the Minister agreed that the RTA and the Council should develop short, medium and long-term options to reduce the usage of Monaro Street by heavy vehicles.

Following collation of the available information, and the review of previous studies, a workshop was held on 31 March 1999 to identify a number of options. This workshop included representatives from the Council, the Queanbeyan Traffic Committee, the RTA and heavy vehicle operators.

The workshop identified seven options worthy of further investigation. These options ranged widely in cost (approx. $1.1M to $53M) and would have varying impacts on the Queanbeyan community.

FIGURE 1.2

REGIONAL LOCATION MAP

The proposed route was chosen due to its relatively low cost and the benefits associated with it (RTA, 2001).

The proposed route would connect the east industrial area of Queanbeyan with the west industrial area. These areas are largely characterised by heavy vehicle service of the local industries. Given this, the provision of a route to connect these areas would allow for greater efficiency.

The path selected for the proposed heavy vehicle alternative route aims to avoid residential areas, thus minimising impacts associated with noise and safety for Queanbeyan residents.

Bungendore Road, to the east of the CBD, is the major road for heavy vehicles travelling south to Bungendore or Braidwood. Kendall Avenue links with Canberra Avenue to the west, which leads to Fyshwick (another area characterised by industry).

1.3 Legislative Framework

This REF satisfies all relevant requirements of the New South Wales (NSW) *Environmental Planning and Assessment Act* 1979 (EP&A Act) and the NSW *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation). Given that there are a number of sites located within the Australian Capital Territory (ACT), this REF also satisfies the requirements of the ACT *Land (Planning & Environment) Act* 1991, the ACT *Environment Protection Act* 1997 (EPA Act) and the ACT *Environment Protection Regulation* 1997 (EPA Regulation).

For all NSW sites Clause 35 (a) and Schedule 1 (Item 6) of the EP&A Model Provision 1980, which are adopted by Queanbeyan Local Environmental Plan (LEP) 1998, would apply to the proposed works. These state:

> *"35 Nothing in the local environmental plan shall be construed as restricting or prohibiting or enabling the consent authority to restrict or prohibit -*
> *(a) the carrying out of development of any description specified in Schedule 1..."*
>
> *Schedule 1 Item 6*
> *"The carrying out by persons carrying on public utility undertakings, being road transport undertakings, on land comprised in their undertakings, of any development required in connection with the movement by traffic by road including the construction, reconstruction, maintenance and repair of buildings works and plant required for that purpose, except -*
> *(a) the erection of buildings and the reconstruction or alteration of buildings so as materially to affect the design or external appearance thereof; or*
> *(b) the formation of alteration of any means of access to a road."*

The proposed works meet the requirements of Schedule 1 Item 6 and consequently development consent from Queanbeyan City Council is not required. Consequently, Part V of the *EP&A Act* applies to this proposal and the RTA is the determining authority.

Under the terms of the *EP&A Act*, the determining authority must consider the likely environmental impact of the upgrade. The proposed works are an activity for the purposes of Part V of the *EP&A Act*. This REF provides information as specified in Clause 228(2) of the *EP&A Regulation* to enable the RTA to assess whether the proposal has a significant effect on the environment. If the assessment concludes that there is not likely to be a significant effect on the environment, the proposal can proceed, subject to safeguards outlined in the REF.

The proposal has been considered in terms of the principles of Ecologically Sustainable Development (ESD), and the environmental management during both the construction and operational phases involves provisions to meet these principles.

The RTA requires waste material to be recycled where possible. The implications of the *Waste Minimisation and Management Act 1995* have been incorporated into the REF.

The REF has been prepared in accordance with the RTA REF *Guidelines (Proforma 2)* (RTA, 2000).

1.4 Contact for Project

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2. PROPOSAL IDENTIFICATION

2.1 Name of Proposal

Queanbeyan Northern Route Upgrade (Alternative Heavy Vehicle Route).

2.2 RTA Region/Zone

The proposed Queanbeyan Northern Route Upgrade is located within the Southern Region.

2.3 Local Government Area

Five locations (Sites 1, 2, 3, 8 and 9) projected for improvement along the proposed Queanbeyan Northern Route Upgrade are located within the Queanbeyan City Council Local Government Area (LGA). The remaining four are proposed intersection improvements (Sites 4, 5, 6 and 7) located within the ACT (refer Figure 1.1).

2.3.1 National Capital Plan

The proposed Queanbeyan Northern Route Upgrade requires consideration of two provisions in the National Capital Plan (NCA, 1990).

The first provision relates to Designated Area "Main Avenues and Approach Routes" as specified under Section 10 (1) of the ACT *Planning and Land Management Act* 1988. Pialligo Avenue, from the ACT/NSW border to Morshead Road, is defined as an Approach Route under Section 2.1 of the National Capital Plan, and is therefore specified as a Designated Area (under Section 10 (1) of the ACT *Planning and Land Management Act* 1988). For this proposal, this provision relates to Site 4, located at the junction of Pialligo Road with Oaks Estate Road. It is in the interest of the National Capital that development flanking Approach Routes to the city is of a type and quality complimentary to the role and status of the city. More specifically, development at Site 4 is subject to Works Approval and would conform to Development Control Plans agreed by the National Capital Authority (NCA).

The second provision of the National Capital Plan that requires consideration relates to Special Requirement 8.6.4 for the Molonglo River Corridor. It is in the interests of the National Capital to ensure that the Molonglo River corridor is conserved and managed in accordance with an agreed plan. The following special requirements for the Molonglo River Corridor are given in Section 8.6.4 of the National Capital Plan:

(i) To conserve the natural and cultural resources, and landscape and environmental qualities of the rivers while providing for a balanced range of compatible secondary uses; and

(ii) Development within the Molonglo River Corridor is to be in accordance with a Development Control Plan agreed by The NCA.

Due to Site 5 being located on the border of the Molonglo River Corridor, special consideration must be given in relation to sediment control during construction. Works at this site must also be carried out in consultation with the NCA, in general accordance with a Development Control Plan agreed to by the NCA.

2.3.2 Territory Plan

Under the Territory Plan, Sites 4, 6 and 7 are located in areas designated as land use policy B10 (Broadacre). The objectives for the Broadacre Land Use Policy are:

(a) to make provision in a predominantly rural landscape setting for a range of uses which require larger sites and/or a location outside urban areas;

(b) to make provision for activities requiring clearance zones or protection from conflicting development;

(c) to ensure that development does not adversely impact on the environmental quality of the locality; and

(d) to ensure, where appropriate, that development and the use of land does not undermine the future use of land which may be required for urban and other purposes.

Under this designation, there are several land uses possible for Sites 4, 6 and 7, which include agriculture, nature conservation and community facilities. A road is also designated as a purpose for which the land may be used.

Under the Territory Plan, Site 5 is located at the junction of two different land use designations, land use policy B10 (Broadacre) and land use policy B13 (River Corridors). The objectives for the Broadacre Land Use Policy are described above, with the objectives for the River Corridor Land Use Policy described as follows:

(a) to conserve the ecological and cultural values of the ACT's major river corridors;

(b) to protect stream flow, water quality and flood plains from adverse impacts;

(c) to ensure that the type and intensity of development is sustainable;

(d) to provide opportunities for a range of water and land based recreational activities;

(e) to ensure compatibility between land uses, water uses and the general character of the rivers; and

(f) to provide opportunities for appropriate environmental education and scientific research activities.

Land management facilities (i.e. roads) are designated as a purpose for which the land may be used under this designation. The land may also be used for agriculture and nature conservation areas.

2.3.3 Queanbeyan Local Environmental Plan 1998

Sites 1, 2, 3, 8 and 9 are located within the Queanbeyan LGA. The Queanbeyan LEP identifies the zoning for the areas adjacent to the sites where the upgrades are proposed. Sites 1, 2 and 3, located on the eastern section of the route, are adjoined by areas zoned for residential, industrial or open space. Sites 8 and 9 on the western section of the route adjoin land with similar zoning.

Site 1 – Bungendore Road and Thurralilly Street Junction

The land adjoining Site 1 is zoned 6 (b) Open Space, 4 (b) Industrial B and 2 (b) Residential B. The land zoned Open Space occurs on the western edge of Bungendore Road and would by affected by the inclusion of an acceleration lane. Land zoned Industrial occurs on the northern corner of Thurralilly Street and Bungendore Road. The opposite corner is zoned Residential. Roads are not a prohibited development in these zones.

Site 2 – Aurora Avenue

Aurora Avenue is zoned 9 (b) Road B and the surrounding area is zoned 4 (a) Industrial A. The improvement proposed for Aurora Avenue would involve parking restrictions on the southern edge of the road, thus improvements would not extend beyond the road reserve.

Site 3 – Aurora Avenue and Yass Road Junction

The area surrounding Site 3 at the corner of Yass Road and Aurora Avenue is zoned 4 (a) Industrial A. Roads are not prohibited development in this zone, however, the improvement works proposed for this site would remain within the road reserve.

Site 8 – Uriarra Road and Kendall Avenue Intersection (Roundabout)

The area surrounding Site 8 is zoned 2 (b) Residential B and 4 (a) Industrial A. Property Acquisition would be required at this site, encroaching onto land zoned Industrial. Roads are not a prohibited development in this zone.

Site 9 – Kendall Avenue North

The areas surrounding Kendall Avenue North are zoned 5 (a) Special Uses A [Railway] and 4 (a) Industrial A. The purpose of the Special Uses zonings is for Utility undertakings and as such roads are not a prohibited development in these zones. However, the improvements proposed for this site would not extend beyond the road reserve.

2.4 Proposed Construction Program

The program for the development and implementation of the project indicates that the development activities would be completed to allow commencement of roadwork in late 2002. The project would be completed by the end of 2004.

2.5 Road Location

The roads that combine to create the route are located to the north of Queanbeyan City CBD, and are located both within the Queanbeyan City Council LGA and the ACT. The route crosses the Molonglo River at two locations. Figure 1.1 shows the location of the proposed upgrades along the route. The proposed works are substantially within existing road reserves. Prior to commencement of activities the location of all existing utilities would be confirmed.

The RTA would confirm the condition of existing pavements and formation along the route as a basis for identification of the need to undertake any improvements required as a result of increased heavy vehicle use following the proposed upgrades.

2.6 Source of Funding

The Federal Government, the NSW State Government and the Queanbeyan City Council would provide funding for this project. The Federal Government would contribute $2M, while $2.6M would come from the NSW State Government. In addition, the Queanbeyan City Council may also make some financial contribution.

2.7 Local Area Information

2.7.1 Queanbeyan

Located on the NSW-ACT border, Queanbeyan City has a close geographical relationship with Canberra. Queanbeyan achieved city status with a population of 15 000 in 1972.

The majority of the population is concentrated within the limits of the city, with the estimated population now 30 100 Queanbeyan has one of the higher population densities in the Australian Capital Region (Queanbeyan City Council, 2001).

A 7.3% growth in the population of the region is projected to the year 2006, while a population of 34 400 has been projected for the City of Queanbeyan in 2011. A major factor facing the future population projections is an ageing population and a fall in the birth rate. By 2026, one third of the population in the region is projected to be aged 65 or over.

Since its settlement in 1828, Queanbeyan has evolved from being a rural based economy to one that now provides a variety of services, retail, tourism and light manufacturing that has characteristics of a modern economy (Queanbeyan City Council, 2001).

Residential development has moved eastwards and westwards from the CBD until it has been limited by the Eastern Escarpment and the ACT border, and is now moving southwards past Mt. Jerrabomberra. Most of the area that has not been used for urban development is undeveloped forest, woodland and grassland. A small proportion of the grassland is used for grazing.

Monaro Street, which runs through the Queanbeyan CBD, is currently the main route for heavy vehicle traffic from the coast to Canberra and further inland. In addition, Monaro Street provides the only link between heavy vehicle origins and destinations within Queanbeyan due to the restricted number of crossings over the Queanbeyan River. Consequently most heavy vehicle traffic passes through the CBD.

There is increasing concern in the Queanbeyan community about the deteriorating amenity of the CBD caused by high volumes of heavy vehicles passing along Monaro Street. The weights of these heavy vehicles are expected to increase in the future and the Queanbeyan City Council would be required to improve its roads, including bridges, in order to provide suitable roads and supporting infrastructure for these vehicles.

The proposed route would provide an alternative for heavy vehicles to connect the east industrial area of Queanbeyan with the west industrial area avoiding most of the residential and business areas, thus minimising impacts associated with amenity, noise and safety for Queanbeyan residents.

2.7.2 Oaks Estate

Oaks Estate is a semi-rural community on the outskirts of the ACT, separated from the NSW City of Queanbeyan by the railway line. Oaks Estate covers an area of 40 hectares, with

approximately 300 residents. It shares a rich local history associated with settlement in the Queanbeyan and Canberra region. The suburb pre-dates Canberra and became part of the newly proclaimed ACT in 1911. Prior to that it had been part of Queanbeyan and to this day it retains close links to the NSW regional centre. It lies adjacent to the confluence of the Molonglo and Queanbeyan Rivers. Oaks Estate Road is part of an existing B-double vehicle route.

3. PROPOSAL DESCRIPTION

3.1 Location

The proposed upgrades associated with the Queanbeyan Northern Route are located north of the City of Queanbeyan, and fall within both NSW and the ACT.

3.2 General Features

The proposed Queanbeyan Northern Route Upgrade begins at the intersection of Thurralilly Street and Bungendore Road, north east of the Queanbeyan CBD. The route then continues to form a northern ring road around the city, finishing north west of the CBD in Kendall Avenue North (refer Figure 1.1). The proposed upgrades comprise nine sites, involving mostly intersection improvements.

3.3 Site 1 – Bungendore Road and Thurralilly Street Junction

The proposed route begins at Bungendore Road from the northeast and turns into Thurralilly Street (Plate1). It is proposed to improve the channelling of the Bungendore Road and Thurralilly Street junction to enhance traffic safety. This would entail construction of an additional island in Bungendore Road, as well as, adjustments to the existing traffic islands in both Bungendore Road and Thurralilly Street, to better control turning traffic. The works would also necessitate the relocation of the existing kerb lines to provide a wider pavement for heavy vehicles turning into and out of Thurralilly Street. An acceleration lane is proposed for traffic turning left out of Thurralilly Street, to assist light vehicles in passing heavy vehicles that are travelling slowly up the grade on Bungendore Road (Figure 3.1).

It is further proposed that traffic be diverted into Faunce Street, which becomes Aurora Avenue, immediately west of the junction. To facilitate this, kerb lines would be relocated to deny westbound traffic access to Thurralilly Street. Eastbound traffic in Thurralilly Street would still be able to turn left into Faunce Street. A section of the existing raised median at the eastern end of Thurralilly Street would be replaced with a painted median, which would allow heavy vehicles, entering and leaving businesses in Thurralilly Street, to readily access Yass Road and Mulloon Street.

Proposed Design and Construction

Geometry

- Two lanes northbound in Bungendore Road at the junction to allow through traffic to pass left turning traffic and to allow left turning B-doubles access to Faunce Street;
- Acceleration/merge lane provided north of the junction for traffic turning left out of Thurralilly Street;
- Right turn bay in Bungendore Road;
- Raised traffic islands to control turn movements;
- Lane widths to suit B-double turn paths into Faunce Street;
- Left turn lane to enable eastbound Thurralilly Street traffic to access Faunce Street; and
- No westbound access into Thurralilly Street.

FIGURE 1.1

Queanbeyan Northern Route

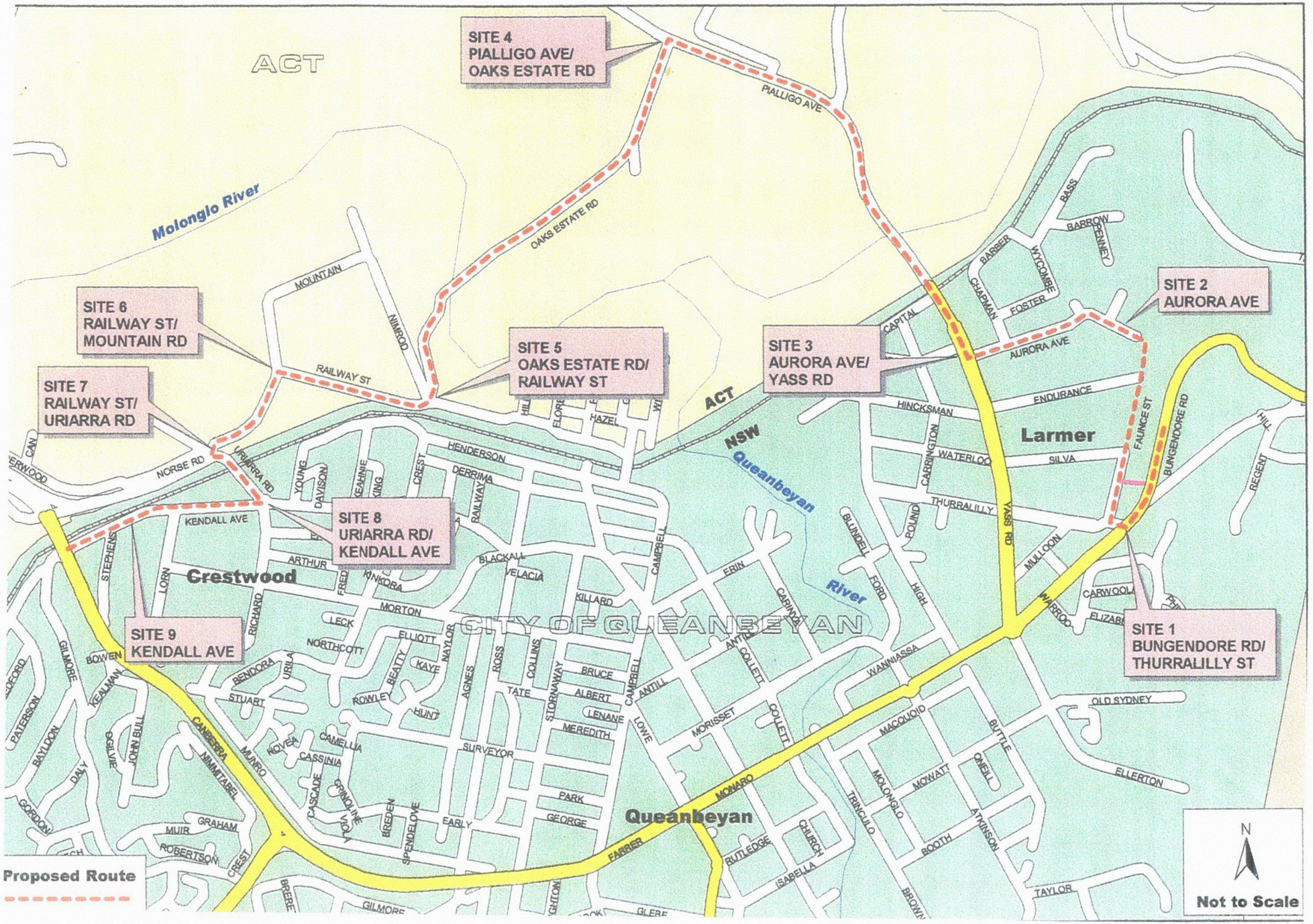


Plate 1 : View of Site 1 – Bungendore Road (left) and Thurralilly Street Junction (right)

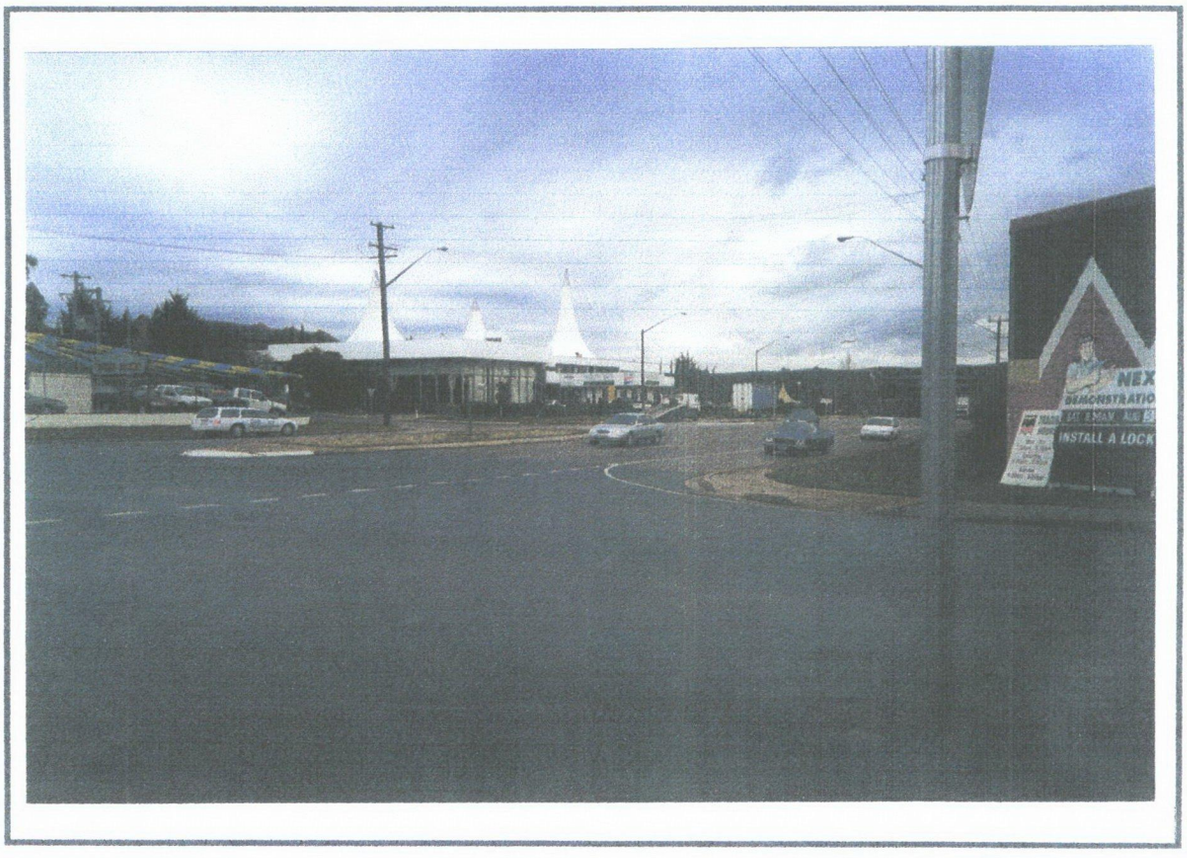


Plate 2 : View from Aurora Avenue – Site 2 Aurora Avenue and Yass Road Junction

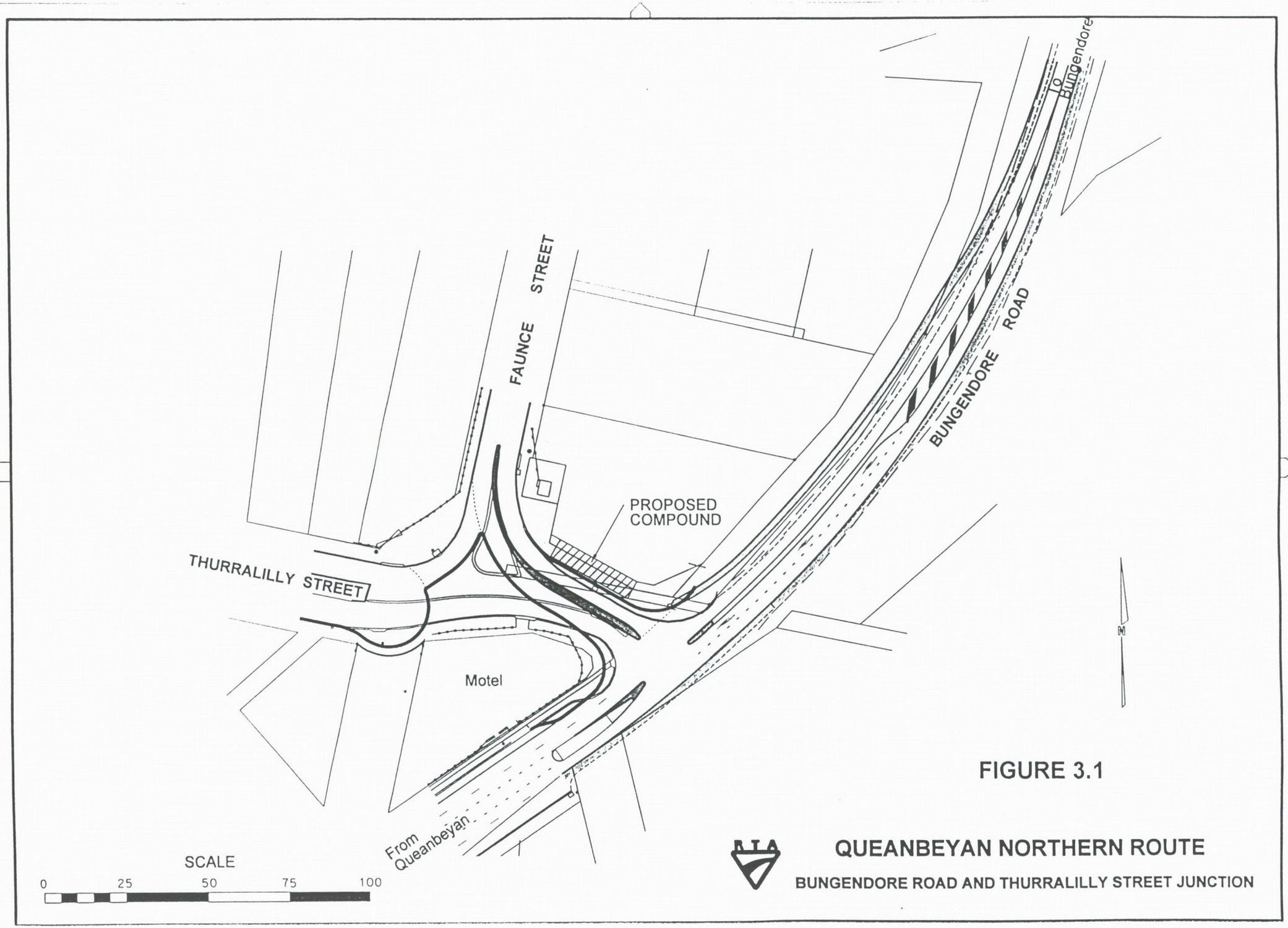


FIGURE 3.1

QUEANBEYAN NORTHERN ROUTE

BUNGENDORE ROAD AND THURRALILLY STREET JUNCTION

Construction

- Pavement widening;
- Adjustments to kerb and gutter, medians and drainage; and
- Public utility adjustments to be determined after detailed survey and design.

3.4 Site 2 – Aurora Avenue

The proposed route then continues along Faunce Street, which becomes Aurora Avenue. Faunce Street has recently been sealed and will be open to traffic in late 2002. For the provision of safe passage for heavy vehicles, parking restrictions would apply, where required, in Faunce Street and Aurora Avenue.

Proposed Design and Construction

Geometry

- No change to configuration.

Construction

- No construction required; and
- Parking restrictions to be put in place for safe passage of heavy vehicles.

3.5 Site 3 – Aurora Avenue and Yass Road Junction

The proposed route then turns right out of Aurora Avenue into Yass Road (Plate 2). This site intersects Yass Road, a busy link road between Canberra and Queanbeyan. The junction upgrade for Aurora Avenue and Yass Road involves the provision of possible traffic signals (Figure 3.2). The improvement at this intersection would make access into and out of this area safer. The RTA would consult with operators of commercial premises at this junction before the proposed works (traffic signals) would proceed.

Proposed Design and Construction

Geometry

- No change to configuration.

Construction

- Adjust raised medians to provide for pedestrian crossings;
- Install traffic control signals (when required); and
- Public utility adjustments to be determined after detailed survey and design.

3.6 Site 4 – Pialligo Avenue/Oaks Estate Road Junction

The route then proceeds along Yass Road into the ACT, where the name of the road changes to Pialligo Avenue. Site 4 is located at the junction of Pialligo Avenue and Oaks Estate Road (Plate 3). It is proposed to improve the channelling of traffic at this intersection to enhance traffic safety (Figure 3.3). Raised traffic islands would be constructed to control heavy vehicle turning

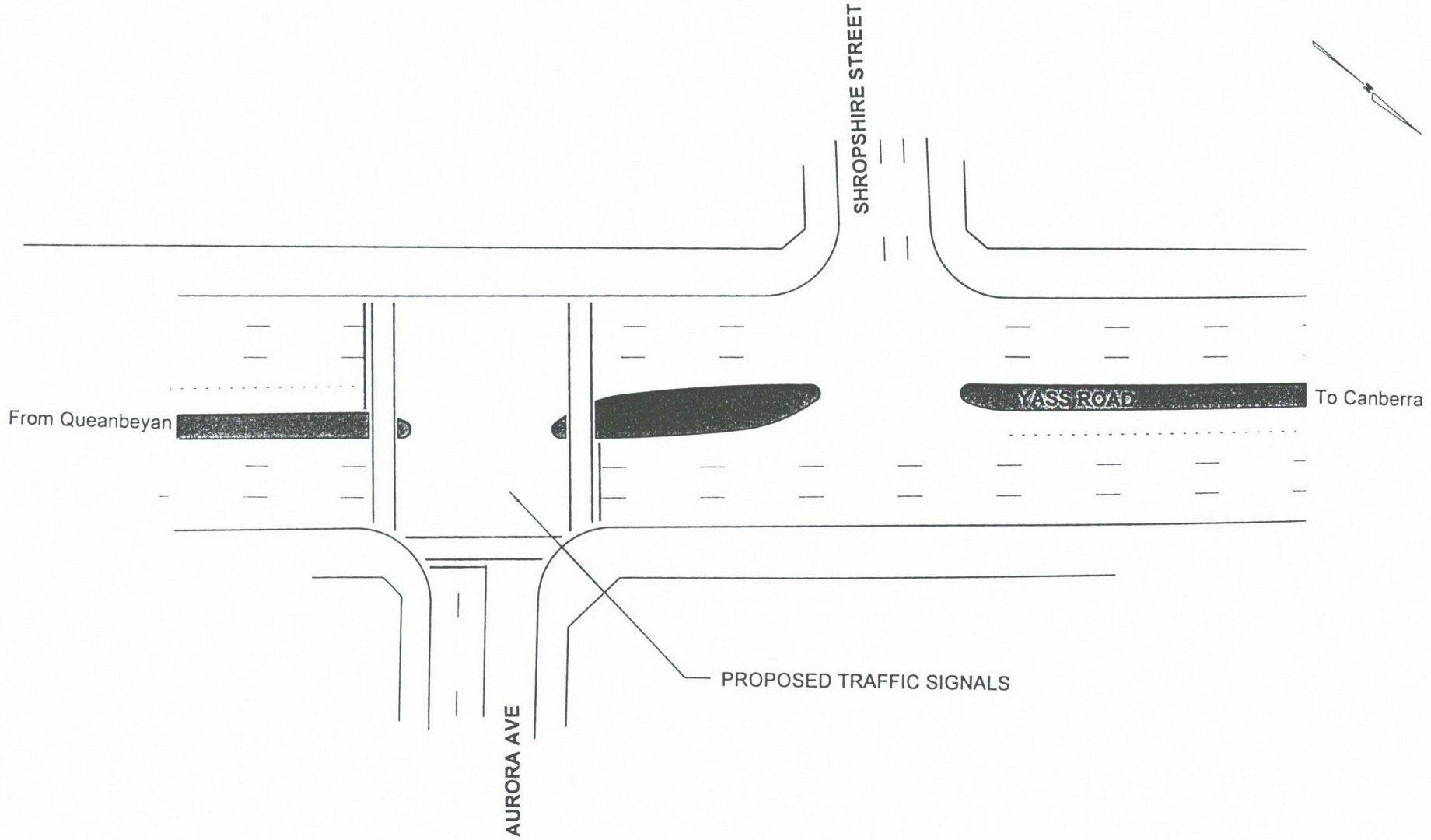


FIGURE 3.2

SCALE

0 10 20 30 40 50

QUEANBEYAN NORTHERN ROUTE

YASS ROAD AND AURORA AVENUE JUNCTION

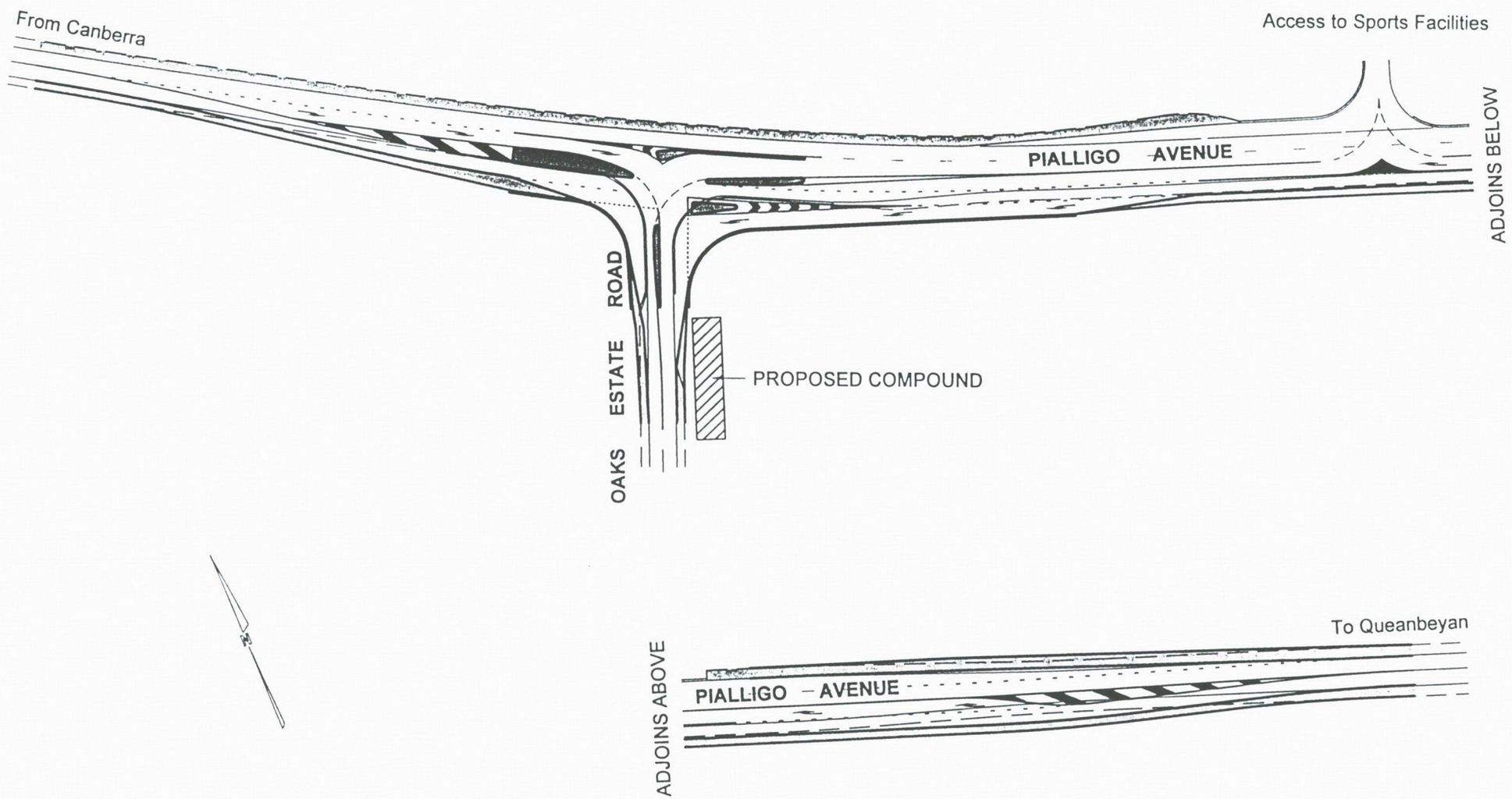


FIGURE 3.3

SCALE

0 25 50 75 100

QUEANBEYAN NORTHERN ROUTE

PIALLIGO AVENUE AND OAKS ESTATE ROAD JUNCTION

Plate 3 : Site 4 - Pialligo Avenue/Oaks Estate Road Junction

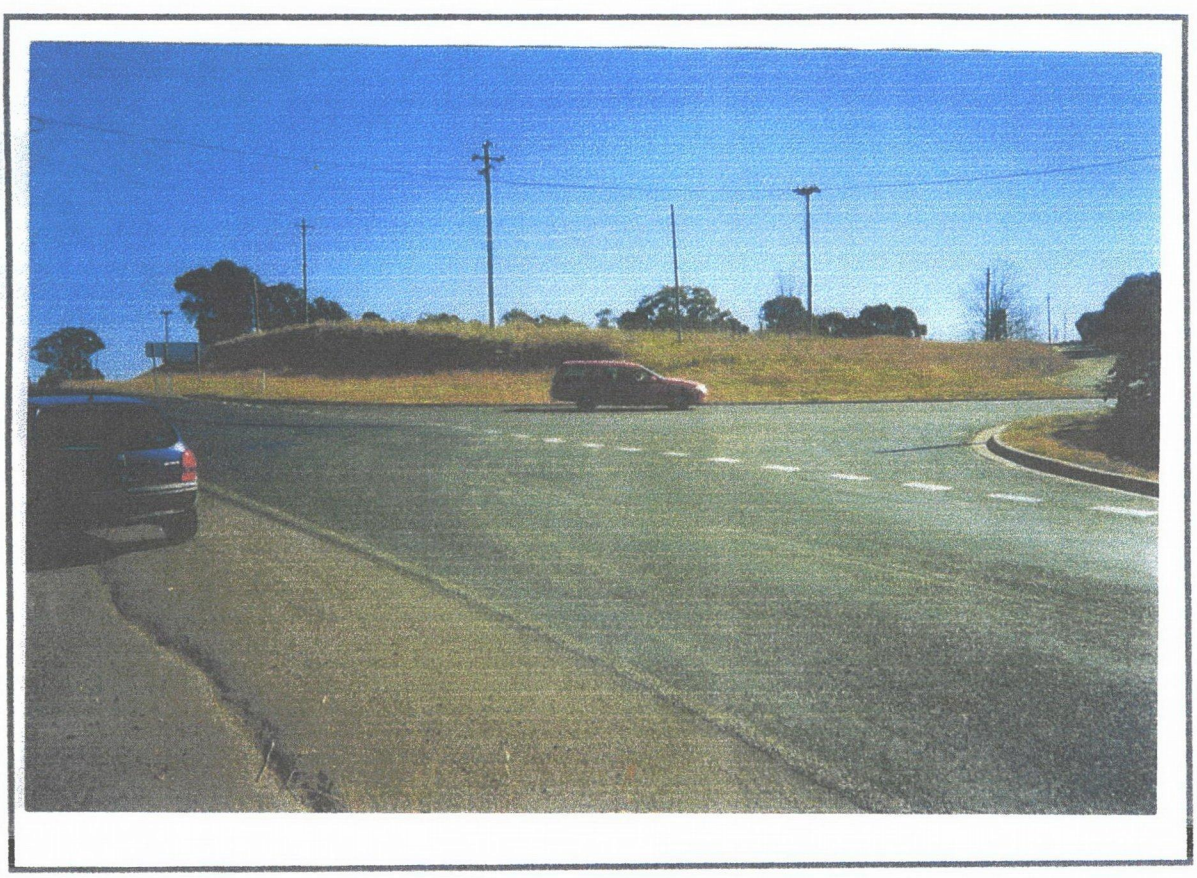


Plate 4 : Site 5 – Oaks Estate Road and Railway Street Junction

movements. Pialligo Avenue would be widened, where required, to provide longer acceleration lanes and right turn bays, as well as, a separate left turning lane into Oaks Estate Road. The provision of street lighting at this junction is proposed, due to safety concerns associated with the addition of raised traffic islands. The provision of electricity for the inclusion of lighting at this intersection has been confirmed, should the proposal proceed.

Proposed Design and Construction

Geometry

- Through traffic on Pialligo Road to merge right into the extension of the acceleration lane for traffic turning right out of Oaks Estate Road;
- Right turn bay into Oaks Estate Road to be lengthened;
- Separate Westbound left turn lane provided to maximise sight distance/gap acceptance for traffic turning right out of Oaks Estate Road;
- Lane widths at the junction to be increased to allow for B-Double turn paths on all movements;
- Raised traffic islands to be constructed to control turning traffic;
- Right turn bay into sports facility access road to be lengthened; and
- Right turn acceleration lane out of sports facility access road to be lengthened.

Construction

- Pavement widening;
- Construction of kerb and gutter and raised traffic islands;
- Installation of street lighting; and
- Public utility adjustments to be determined after detailed survey and design.

3.7 Site 5 – Oaks Estate Road and Railway Street Junction

The route then proceeds along Oaks Estate Road until it junctions with Railway Street (Plate 4). Changes to this intersection would give priority to the traffic turning from Oaks Estate Road into Railway Street (Figure 3.4). This would require the installation of "Give Way" signs on both sides of Railway Street at the function. The existing kerb lines would be relocated to enable widening of the pavement to provide for heavy vehicles turning into and out of Oaks Estate Road. The upgrade would also include the closure of Nimrod Road, which currently provides access to the Queanbeyan Sewage Treatment Plant. Alternative existing access to the Sewage Treatment Plant from Mountain Road would be used. It is considered that the current location of Nimrod Road would be unsafe for the new configuration, as it is too close to the intersection with Railway Street.

Proposed Design and Construction

Geometry

- Lane widths at the junction to be increased to allow for B-Double turn paths west to north and north to west;
- Priority given to Oaks Estate Road traffic to improve safety. Give Way removed from Oaks Estate Road and installed on both legs of Railway Street; and
- Nimrod Road to be closed to improve safety.

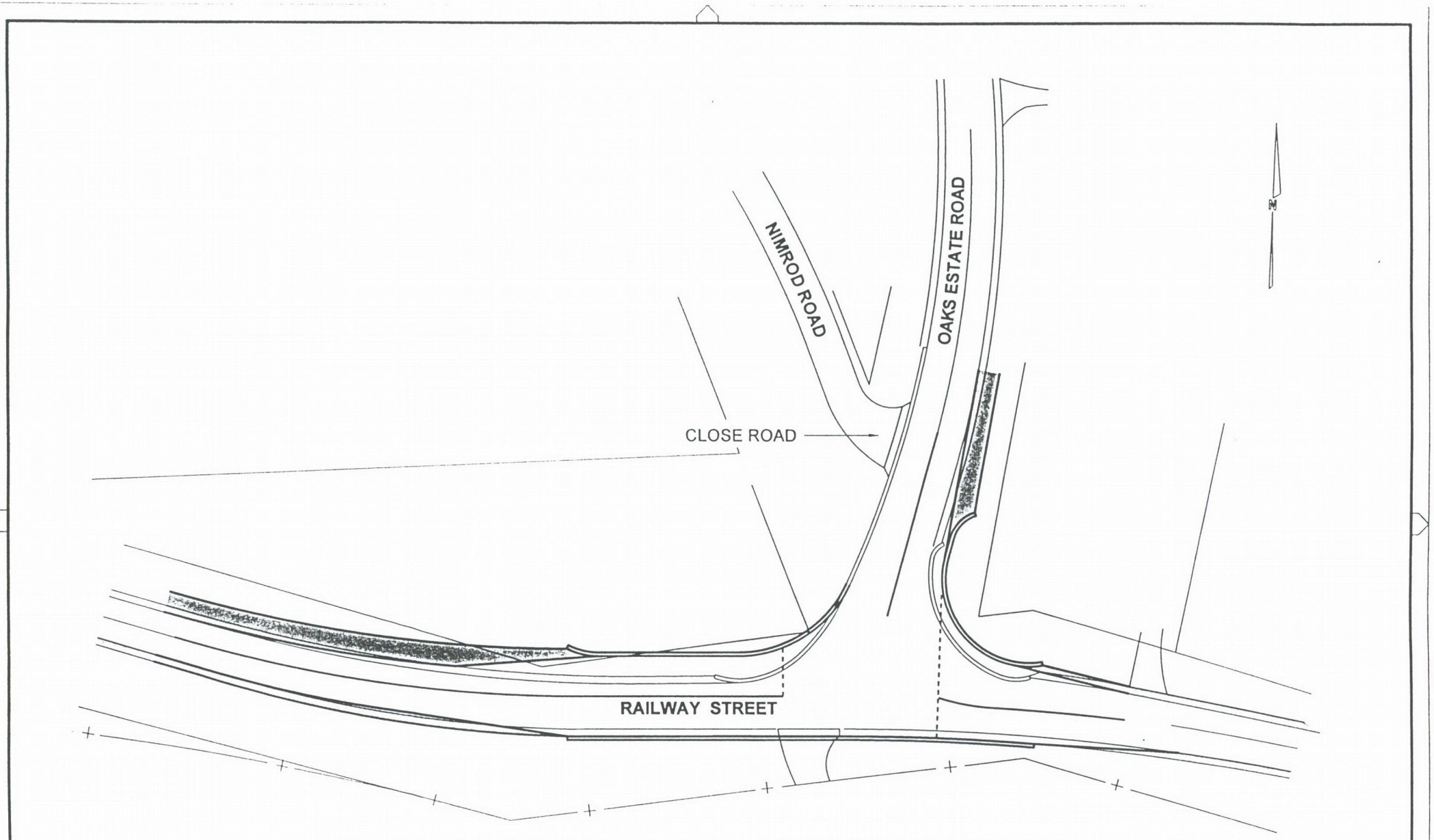


FIGURE 3.4

SCALE

0 10 20 30 40 50

QUEANBEYAN NORTHERN ROUTE

OAKS ESTATE ROAD AND RAILWAY STREET JUNCTION

Construction

- Pavement widening;
- Construction of kerb and gutter; and
- Public utility adjustments to be determined after detailed survey and design.

3.8 Site 6 – Railway Street and Mountain Road Junction

As the route proceeds along Railway Street, it traverses a single lane rail overbridge located adjacent to a sharp bend (Site 6). This restricts heavy vehicle movements and does not provide safe passage for pedestrians or cyclists. In order to improve both pedestrian and heavy vehicle safety, it is proposed that a new rail bridge be constructed, along with the associated realignment of Railway Street (Figure 3.5 and Plate 5). The new 13 m wide single span concrete bridge would be located to the west of the existing bridge, and would be wide enough to allow heavy vehicles travelling in both directions to pass. A separate 2 m wide shared pedestrian pathway would be provided on the eastern side of the bridge. The new bridge would be approximately 100 mm higher than the existing bridge. The upgrade would also involve the relocation of one utility pole, as well as, the acquisition of land. The land requiring acquisition is ACT public land, from which several trees and understorey would have to be removed. The construction of the new bridge and approaches would significantly improve safety at the junction of Mountain Road with Railway Street. This project does not involve the removal of the existing bridge at this stage. This would be the subject of future consultation between the RTA, Railway Infrastructure Corporation (RIC) and RoadsACT. The existing bridge is owned and maintained by RoadsACT.

Proposed Design and Construction

Geometry

- Deviate Railway Street to the west of the existing railway bridge;
- Realign Mountain Road at the junction;
- Lanes to be widened at the junction to allow B-Doubles to turn on all movements; and
- Provide pedestrian/cycleway on eastern side of new bridge.

Construction

- New bridge over railway;
- Construction of new road formation and pavement;
- Widening of existing pavement;
- Construction of kerb and gutter;
- Possible adjustment/relocation of electricity substation access; and
- Public utility adjustments to be determined after detailed survey and design.

3.9 Site 7 – Railway Street and Uriarra Road Junction

The route continues along Railway Street until its intersection with Norse Road and Uriarra Road. Heavy vehicles may either turn right into Norse Road towards Canberra or left into Uriarra Road heading back to the west Queanbeyan Industrial Estate. Site 7 is located at the Railway Street and Uriarra Road Junction (Plate 6). The proposed upgrade at this site would involve the widening of Railway Street, as well as, providing a turning bay for the traffic turning right from Uriarra Road into Railway Street (Figure 3.6). The traffic island in Railway Street would be relocated and enlarged, providing improved safety for pedestrians and cyclists. The possible relocation of the old access road to the abattoirs is also proposed to improve the safety and

Plate 5 : View to Railway Street and Mountain Road Junction, including bridge over railway

Plate 6 : Site 7 – Railway Street and Uriarra Road Junction

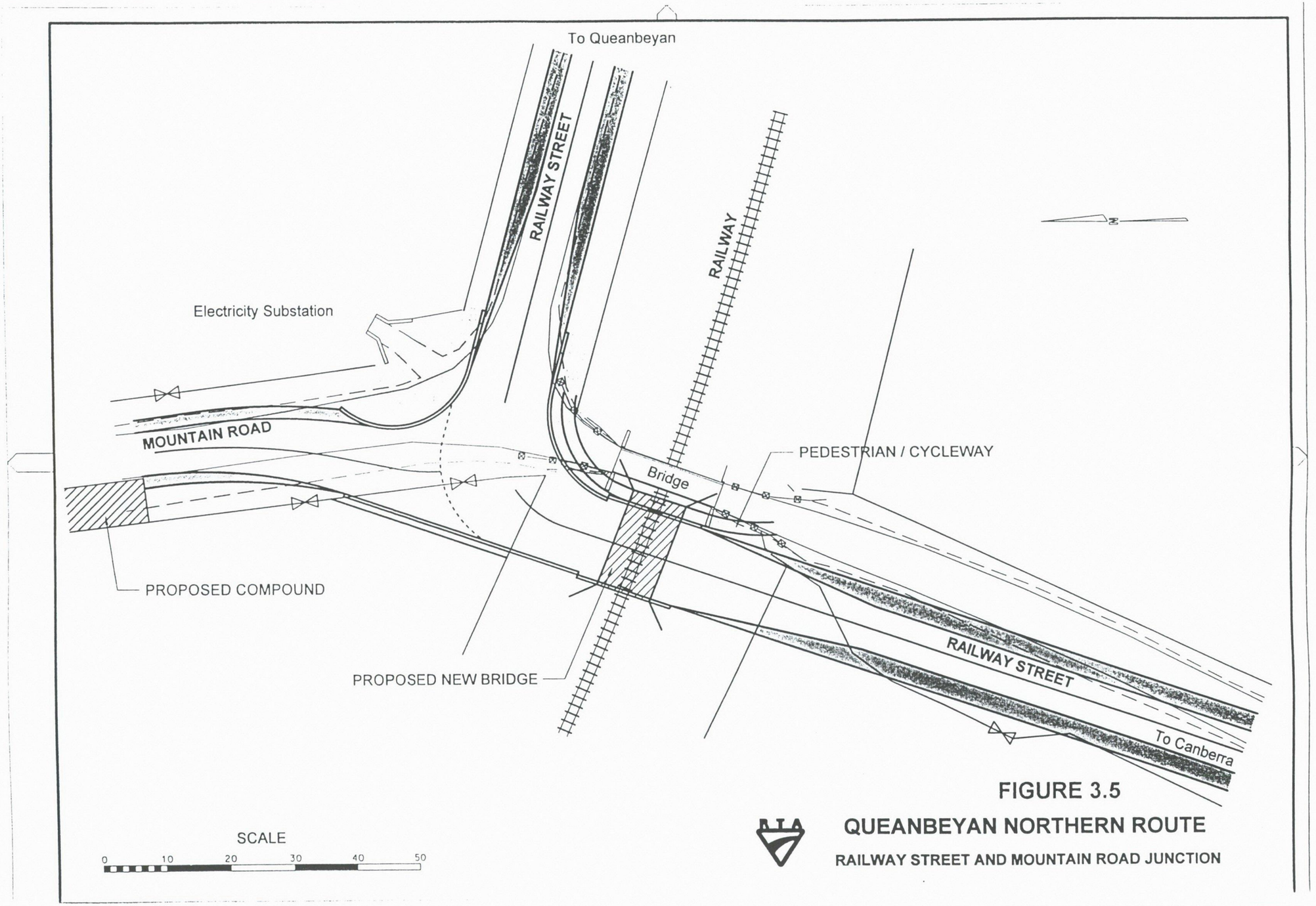


FIGURE 3.5

QUEANBEYAN NORTHERN ROUTE

RAILWAY STREET AND MOUNTAIN ROAD JUNCTION

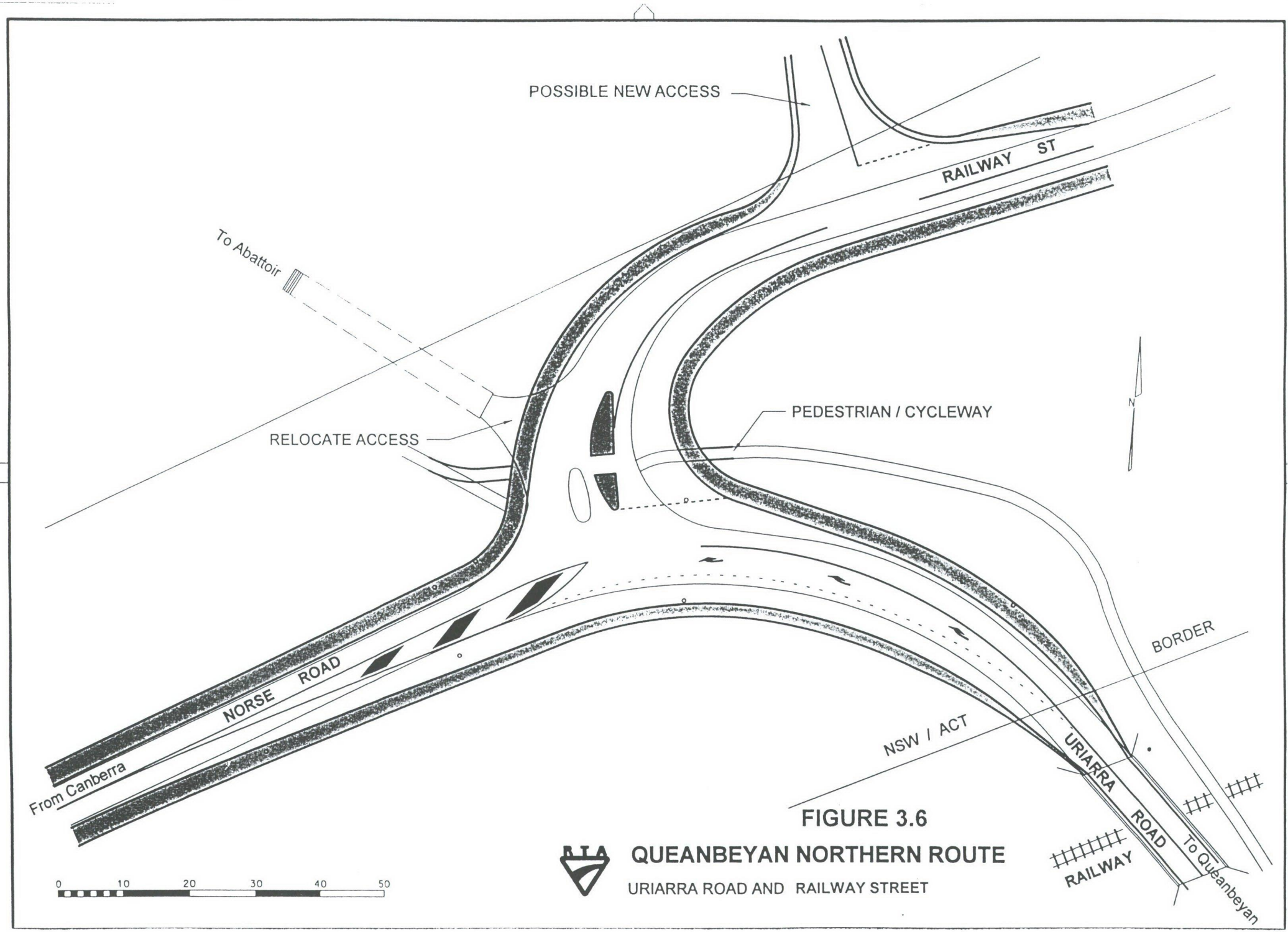


FIGURE 3.6

QUEANBEYAN NORTHERN ROUTE

URIARRA ROAD AND RAILWAY STREET

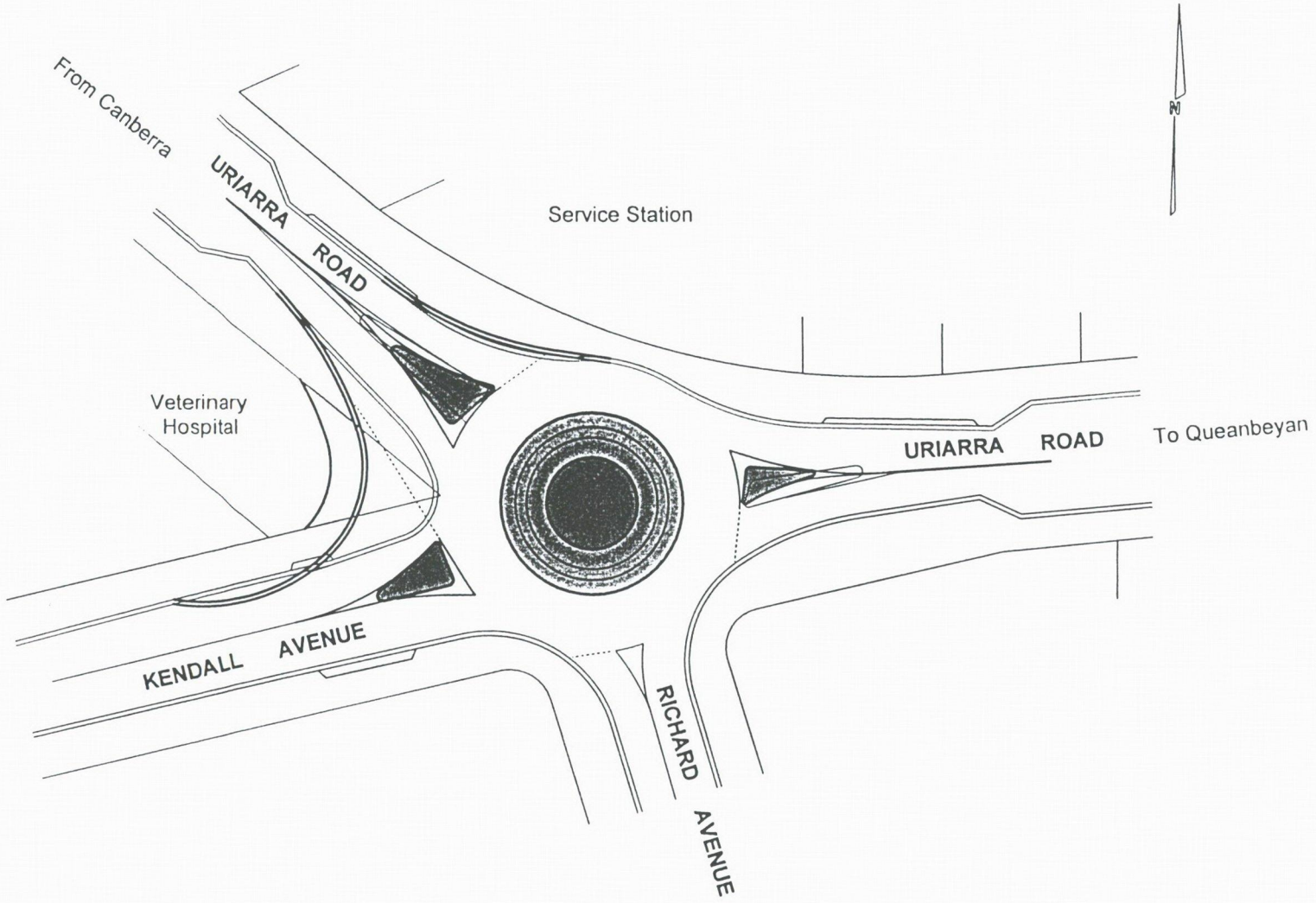


FIGURE 3.7

SCALE

0 10 20 30 40 50

QUEANBEYAN NORTHERN ROUTE

URIARRA ROAD AND KENDALL AVENUE JUNCTION

operation of the junction. The abattoir no longer operates and the area is proposed for industrial development. The relocation of the access road would be the subject to advice from RoadsACT, and agreement with the existing users of the abattoir site and the developer of the industrial subdivision. When the RTA lodge the DA for Site 7 with the ACT authorities the agreed access point would be defined.

Proposed Design and Construction

Geometry

- Widen Uriarra Road to provide right turn bay for traffic turning into Railway Street;
- Lanes to be widened to allow B-double turns on all movements;
- Relocate traffic island in Railway Street; and
- Relocate access to industrial area away from junction.

Construction

- Pavement widening;
- Construction of new access road junction;
- Construction of traffic island;
- Relocation of street lighting; and
- Public utility adjustments to be determined after detailed survey and design.

3.10 Site 8 – Uriarra Road and Kendall Avenue Intersection (Roundabout)

The proposed route continues along Uriarra Road to the roundabout located at the intersection of Uriarra Road with Richard Street and Kendall Avenue, the location of Site 8 (Plate 7). The proposed upgrade at this intersection would better facilitate heavy vehicle movements. Of particular concern is the left turn into Uriarra Road from Kendall Avenue, a relatively sharp turn that currently cannot be easily negotiated by B-doubles (Figure 3.7). The proposed improvements would involve the removal of some of the pavement, and a rounding of the kerb line, on the corner of Uriarra Road and Kendall Avenue. This would require some land acquisition at this corner, as well as, the appropriate adjustment to the existing traffic islands.

Proposed Design and Construction

Geometry

- Adjust roundabout central island width to improve B-double right turn into Kendall Avenue North;
- Widen pavement on northwest corner to allow B-double left turn out of Kendall Avenue North; and
- Adjust roundabout entry widths where required to suit B-double turns.

Construction

- Pavement widening;
- Adjust kerb and gutter and traffic islands; and
- Public utility adjustments to be determined after detailed survey and design.

Plate 7 : Uriarra Road and Kendall Avenue Intersection (Roundabout)

Plate 8 : Site 9 – Kendall Avenue

3.11 Site 9 – Kendall Avenue North widening

The proposed route continues west along Kendall Avenue towards Canberra Avenue. Site 9 is located on the eastbound section of Kendall Avenue running between Lorn Road and Stephens Road, which is considered too narrow for the safe passage of heavy vehicles (Plate 8). At this site, an existing length of raised median in this section would be narrowed to allow easier access by B-doubles.

Proposed Design and Construction

Geometry

- Widen eastbound lane adjacent to raised median.

Construction

- Adjust raised median; and
- Widen pavement.

3.12 Temporary Construction Compound Areas

Compound areas would be established at Sites 1, 4 and 6 for the duration of works (refer Figures 3.1, 3.3 and 3.5. The sites would be located on areas previously disturbed and would be managed and rehabilitated in accordance with the measures outlined in Section 8.

3.13 Property Acquisition

The land use surrounding the proposed upgrade sites includes industrial, residential, agricultural and commercial activities. The land to be affected by the proposed upgrades at all the sites is predominately within the road reserves. However, the works proposed for Sites 5, 6, 7 and 8 would effect land outside of the road reserve. Appendix A shows the acquisition requirements for each of the sites and the RTA Land Acquisitions Policy Statement.

3.14 General Design Parameters

The RTA, in consultation with Roads ACT (for Sites 4, 5, 6 and 7 only), would undertake road and bridge design.

It is proposed that the existing single lane rail bridge (Site 6) would be replaced with a modern cost-effective concrete structure. The new bridge would be in accordance with *AUSTROADS Bridge Design Code (1996)*. The construction of the new bridge would necessitate the realignment of the bridge and both the southern and northern approaches of Railway Street (Figure 3.5).

The designs for the remaining sites are focussed on safety improvements allowing for heavy vehicle movements.

3.15 Costs

An estimate for the cost of the proposal, based on the concept plans, preliminary quantities and proposed cash flow, is approximately $4.6M. This estimate includes an allowance for contingencies on items of higher risk.

3.16 Timing

Construction at each site would take a maximum of two months to complete.

The timing for the proposed works is presented in Table 3.1.

Table 3.1
Proposed Project Milestones

Activity	Date	
	Commencement	Completion
Site 1 – Bungendore Rd/Thurralilly Junction	Late 2002	June 2003
Site 2 – Faunce Street	June 2004*	September 2004
Site 3 – Aurora Avenue & Yass Road Signals	April 2004*	December 2004
Site 4 – Pialligo Avenue/Oaks Estate Rd Junction	April 2004	September 2004
Site 5 – Oaks Estate Road/Railway Street Junction	July 2003	December 2003
Site 6 – Railway Street & Mountain Rd Junction and bridge over railway line	September 2003	December 2004
Site 7 – Railway Street/Uriarra Rd Junction	January 2004	September 2004
Site 8 – Uriarra Rd / Kendall Avenue Intersection	July 2004	December 2004
Site 9 – Kendall Avenue North widening	July 2004	December 2004

* Pending outcome of consultation with businesses located at the junction of Yass Road and Aurora Avenue

4. SPECIALIST STUDIES AND COMMUNITY INVOLVEMENT

4.1 Specialist Studies

4.1.1 Indigenous Heritage

Background

Navin Officer Heritage Consultants were commissioned to undertake an archaeological assessment of the impact of the proposed upgrades and to identify as appropriate management strategies and mitigation measures. The report is provided as Attachment A to the REF. Section 7.2.13 provides a summary of the findings of the report.

A range of documentation was used in assessing the state of archaeological knowledge for the Queanbeyan/Oaks Estate area and the surrounding region. Literature sources included the NSW National Parks and Wildlife Service Register of Aboriginal Sites and associated files and catalogue of archaeological reports, and the heritage database of the Act Heritage Unit and associated files and heritage reports.

Numerous archaeological investigations have been carried out in the general region in which the Queanbeyan Northern Route Upgrade sites are located. Larger scale, research-orientated projects that have been carried out in the region and/or included the region in wider analyses/syntheses include Flood (1980) - the southern uplands, English (1989) along the Molonglo River near Kowen, Kuskie (1989) at Jumping Creek, Queanbeyan, and Trudinger (1990) at Pialligo (refer Attachment A). However most investigations have involved relatively small area surveys, necessitated by proposed developments. These studies provide local contextual and site location data for the study area(refer Attachment A). This background research was used to determine if known Aboriginal sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and research management context.

A reconnaissance field inspection of the intersections relevant to the Queanbeyan Northern Route upgrade was conducted in October 2002 to ascertain the archaeological sensitivity of the various areas.

Taking account of previous landscape disturbance and known site location patterns it was concluded that intersections 4, 5, 6, and 7 should be subject to archaeological field survey. The other intersections had negligible archaeological potential due to major landscape disruption and disturbance and urbanisation.

Survey of intersections 4, 5, 6, and 7 was then conducted by archaeologist Kerry Navin and field assistant Rebecca Powell in November 2002. Ms Suzanne Malligan (Aboriginal Liaison Officer, RTA) and Mr Percy Knight (Buru Ngunawal Aboriginal Corporation) and Mr Bruce Merritt (Ngunnawal Aboriginal Corporation) also participated in the survey.

Survey involved comprehensive inspection on foot of each intersection and the road easements (reserves) within 100 m of each intersection. All areas of ground surface exposure were inspected and an assessment of the archaeological sensitivity was made for each survey area.

Consultation

There are three Aboriginal community groups in the ACT/Queanbeyan district which have been recognised as having an interest in cultural heritage issues, and which are registered with the ACT Heritage Unit. These are:

- Buru Ngunawal Aboriginal Corporation (formerly the Ngunawal ACT and District Aboriginal Council of Elders Association Incorporated;
- Ngunnawal Aboriginal Corporation (formerly the Ngunnawal ACT and District Indigenous Peoples Association); and
- Ngunnawal Local Aboriginal Land Council (formerly represented by the Ngunnawal Elders Council Incorporated).

Faxes were sent to each of the three groups prior to the field inspection of the intersections and a representative was invited to participate in the fieldwork. Phone calls were made subsequent to the faxes and arrangements were made to meet at Oaks Estate Road on November 11, 2002 to conduct the survey.

Mr Percy Knight represented the interests of the Buru Ngunawal Aboriginal Corporation in the project and participated in the field inspections at Queanbeyan.

Mr Bruce Merritt represented the interests of the Ngunnawal Aboriginal Corporation in the project and participated in the field inspections at Queanbeyan.

The Ngunnawal Local Aboriginal Land Council could not be contacted by phone and a representative did not arrive at the appointed meeting place, consequently the LALC did not participate in the field survey.

The field representatives did not express any concerns with regard to the proposed upgrade project.

4.1.2 Non-Indigenous Heritage

In 1999 Queanbeyan City Council initiated a "Community Based Heritage Study' that covered cultural, indigenous and natural heritage.

The Non-Indigenous Heritage sites and items, as listed in the Queanbeyan Local Environmental Plan (LEP) are shown in Table 4.1. None of the listed sites and items are located at or in the vicinity of the sites (within NSW) proposed for upgrade.

Table 4.1
Non-Indigenous Heritage Sites and Items

Item	Road, Suburb	LGA
"Glenrock House" Dwelling	Malcolm Rd, Queanbeyan	Queanbeyan City
School of Arts Building	Crawford St, Queanbeyan	Queanbeyan City
Byrne's Mill and Millhouse	Collett St, Queanbeyan	Queanbeyan City
"Hibernia Lodge" Craft Shop	Collett St, Queanbeyan	Queanbeyan City
Old Hospital	Collett St, Queanbeyan	Queanbeyan City
"Bull's Cottage" Dwelling	Henderson St, Queanbeyan	Queanbeyan City
"Kawaree" Aged Persons Home	Canberra Av, Queanbeyan	Queanbeyan City
Old Police Residence	Farrer Pl, Queanbeyan	Queanbeyan City
St Benedict's Convent	Isabella St, Queanbeyan	Queanbeyan City
Public School House	Isabella St, Queanbeyan	Queanbeyan City
Roman Catholic Church	Macquoid St, Queanbeyan	Queanbeyan City

Item	Road, Suburb	LGA
"Coroda" Dwelling	Atkinson St, Queanbeyan	Queanbeyan City
St Stephens Presbyterian Church	Morisset St, Queanbeyan	Queanbeyan City
"Furlong" Dwelling	Morisset St, Queanbeyan	Queanbeyan City
Isabella Street Suspension Bridge	Isabella St, Queanbeyan	Queanbeyan City
Christ Church Anglican Church	Ruthledge St, Queanbeyan	Queanbeyan City
Ye Old de Kent Hotel	Macquoid St, Queanbeyan	Queanbeyan City
Railway Station & Station Master's Residence	Henderson St, Queanbeyan	Queanbeyan City
Queanbeyan Show Ground	Farrer Pl, Queanbeyan	Queanbeyan City
Queanbeyan Recreation and Leisure Centre	Crawford St, Queanbeyan	Queanbeyan City

Within the ACT, the Oaks Estate Village Precinct is listed on the ACT Interim Heritage Register. This interim listing includes the total residential area. The locations listed in Table 4.2 have been nominated for their individual significance, but have yet to be fully assessed. The placement of these sites and items on the Interim Heritage Places Register provides legal protection under the *Land (Planning and Environment) Act 1991.*

Table 4.2
List of Non-Indigenous Heritage Places

Place	Location	Historical Notes
The Oaks Section 2 Blocks 16 & 19	Hill Street	Oldest substantial building in Queanbeyan district. Early colonial style, stone built gentlemen's residence c. 1837.
Florence Street Section 5 Blocks 1-3 Section 13 Block 3,5 & 6	House numbers 2,4,6 Hazelbrook Nursery and River.	 Forms part of the first industrial area in Queanbeyan district.
River Street Section 6 Blocks 17,18 & 19 Section 8 Blocks 1-5, 7 & 9	Houses 9,11 & 13 Houses (10, 12, 14, 16 & 18) 22, 26	No. 11: a workers cottage transported from Acton after WW II. Heritage status recognised when considered collectively.
Hazel Street Section 7 Blocks 11 & 12	9 Hazel Street	Last example of a "workers' humpy" in ACT.
George Street Section 8 Blocks 24-26 Section 11 Blocks 1-4	House 7,9,11 House 2,4,6,8	No. 7: example of Slab cottage. Examples of old style residence c.1910 – 1930.
William Street Section 11 Block 36 Section 12 Block 21	Corner of William (no.11) and Hazel St. 25 William Street.	One of only two Air Force huts from 2 STT Kingston, now the corner shop. Opposite Bede's house.

Place	Location	Historical Notes
Oaks Estate Hall Section 15 Block 3	Located at the end of William Street near the railway line.	Old dormitory building from Eastlake (now Kingston) Hostel.
Chinese Market Gardens Section 14 Block 1 - (Part of 2)	Bottom of River Street on the right hand side, next to the river.	This site dates from mid 1800's to very early 1900's.
Market Garden Section 13 Block 5 (part)	Left hand side of River Street Opposite the Chinese Market Garden site.	This site dates from early 1900's and was run by Europeans.
Hazelbrook Industrial Estate Section 14 Blocks 1-3 Section 13 Blocks 5 & 6	The riverfront area that separates the residential from the river channel.	This site contains remnants of Johns Bull's Fellmongery and Woolwashing Business. Now infested with fennel and blackberries where area is not cultivated by the nurseries.
Easement	Road verge between McEwan Avenue and William Street at the intersection of Railway Street.	Old Water Supply Tanks.
Railway Bridge Fording Section 15 Block 3	The Queanbeyan River adjacent to the Oaks Estate Community hall.	

Source: ACT Heritage Place Register 2001

The proposed upgrades within the ACT in particular at Site 5 would not impact on heritage sites including those associated with the Oaks Estate.

4.1.3 Other Specialist Studies

A number of specialist studies have been carried out previously (RTA, November 1999). These studies cover issues such as traffic usage of Monaro Street, and investigate a number of proposals for Queanbeyan City CBD bypass routes and ring road systems. The studies, listed in chronological order, are as follows:

- PG Pak-Poy & Associates Pty Ltd, "Queanbeyan Traffic Report" (1973);

This traffic study carried out by PG Pak-Poy & Associates in 1973 produced a number of recommendations that have since been incorporated into the Queanbeyan arterial road network. This study recognised the need for an additional crossing of the Queanbeyan River and recommended a bridge linking Thurralilly Street with Erin Street.

- RJ Nairns & Partners Pty Ltd, "Queanbeyan Arterial Road System Review" (1985);

This study, completed in April 1985, has largely influenced the existing Queanbeyan Structure Plan. It includes recommendations for the Edwin Land Parkway, together with the Lanyon Drive and Southbar Road extensions. This study also highlighted a much needed link between the existing industrial areas in Queanbeyan, as well as, the necessity for a bypass of the CBD.

- NSW Roads and Traffic Authority, "Queanbeyan Origin Destination Survey" (1993);

At the request of the Queanbeyan City Council, the NSW RTA carried out a detailed investigation into traffic origins and destinations in February 1993. The primary aim of the study was to identify potential bypass traffic. It was found that provision of a ring road around the CBD would give the best results for bypassing traffic. A bypass route located on the northern perimeter of the CBD was identified as a first stage component of the ring road system.

- Ove Arup & Partners, "Queanbeyan Traffic Management Study" (1995);

In 1995 Ove Arup & Partners was commissioned by Queanbeyan City Council to provide an updated assessment of the traffic requirements for the City of Queanbeyan. The study recommended both short-term and medium to long-term traffic management strategies. One medium to long-term option proposed in this study was to provide an "inner northern bypass" connecting Henderson Road to Thurralilly Street via a new bridge crossing the Queanbeyan River.

- Arup Transportation Planning, "Queanbeyan Ring Road Study Report" (1995);

Undertaken on behalf of the Queanbeyan City Council, the ACT Department of Urban Services and the NSW RTA, this study aimed to establish and evaluate a set of preferred long term options for bypass roads in Queanbeyan. The major objective in completing the study was to improve the amenity of the Queanbeyan CBD by removing the through traffic and heavy vehicles from Monaro Street. The study recommended a combination ring road system, including both a northern bypass (to the north of Oaks Estate) and the Edwin Land Parkway, together with an inner CBD treatment via Morisset Street. In addition, the study recommended that a northern bypass should be provided as a first stage.

- ERM Mitchell McCotter Pty Ltd, "Queanbeyan Northern Ring Road Route Selection Study", Draft Report (1997);

In recognition of the need to identify the route of the northern bypass (recommended in the Arup Transportation Planning report) in the ACT and Queanbeyan planning strategies, ERM Mitchell McCotter was commissioned to complete a route selection study to identify a preferred route and associated boundaries.

- RTA "Queanbeyan Heavy Vehicle Usage of Monaro Street" (1999); and

Following collation of the available information and a review of the previous studies, a workshop was held, including representatives from the Queanbeyan City Council, the Queanbeyan Traffic Committee, the NSW RTA and heavy vehicles operators. The workshop identified seven options worthy of further investigation and eight evaluation criteria to allow appropriate assessment of the benefits and cost of each of the options. This report outlines the outcomes of the workshop and assesses the seven options identified against the selection criteria. This report identified the preferred shorter-term strategy, which involved a route via Yass Road, Pialligo Avenue, Oaks Estate Road, Railway Street and Kendall Avenue. It further stated that "provision of the Edwin Land Parkway in the medium term, followed by the ultimate construction of the Northern Bypass

in the longer term, would result in a Queanbeyan ring road system with significant benefits for the removal of trough traffic and heavy vehicles from Monaro Street".

- RTA " Addendum Queanbeyan Heavy Vehicle Usage of Monaro Street – Benefit Cost Analysis" (2001).

This report is an extension of the 1999 RTA report (described above). It reports on the derivation of benefit-cost ratios and the examination of economic factors associated with the provision of two potential alternative heavy vehicle routes around the Queanbeyan City CBD, the Northern Upgrade Route and the Edwin Land Parkway.

In addition to the above reports, the following specialist study has been conducted on the proposed Queanbeyan Northern Route Upgrade for the purpose of this REF:

- Scott Wilson Nairn Pty Ltd, "Queanbeyan Northern Route Upgrade – Road Traffic Noise Impacts" (2002)

Scott Wilson Nairn was commissioned by NECS to undertake this study for the purpose of this REF. The report provides an assessment of the exiting exposure to road traffic noise at noise sensitive areas, and provides predictions of levels of noise for 2012 around the proposed Queanbeyan Northern Route Upgrade. Noise and vibration levels throughout the construction phase were also examined. The details of this specialist study are presented in Section B.

4.2 Community Involvement

A community consultation program was undertaken during the preparation of this REF. The program involved the following:

- An Information Session held at the East Queanbeyan Public School on 24 September 2002. An invitation was distributed to local residents and businesses and the Information Session was advertised in the School Newsletter. Members of the community were invited to comment on the Design Options for the proposed works at the Bungendore Rd and Thurralilly Street Junction; and

- Liaison with the Oaks Estate Progress Association.

The Information Session, conducted at East Queanbeyan Public School, allowed interested parties to review and comment on four Design Options being considered for the Bungendore Road and Thurralilly Street Junction. The Design Options on which the community was invited to comment are outlined in detail in Section 6.5.

A proforma comment sheet was provided to participants so they could provide comment on the Design Options being considered. A copy of the comment sheet is attached in Appendix B.

Approximately 20 members of the local community attended, with 14 comment sheets completed. Four of the comment sheets were completed by local businesses, with the remainder being completed by a combination of local residents or parents/teachers of students at East Queanbeyan Public School. Tables 4.3 and 4.4 summarise the responses provided.

Table 4.3
Rating of Design Options for Site 1 by Participants at Information Session
(Number of Responses)

Design Option	Very Good	Good	Fair	Poor
A - Deviate junction into Faunce Street and close westbound access to Thurralilly Street	11	1	-	3
B - Deviate junction into Faunce Street and retain all access to Thurralilly Street	1	1	5	6
C - Left in / left out only at Bungendore Road	-	3	2	8
D - Left in / left out only at Bungendore Road plus new junction.	-	3	7	2

Table 4.4
Issues Raised in Relation to Each Design Option
(Number of Responses)

Design Option	Amenity	Noise	Access	Safety	Other
A - Deviate junction into Faunce Street and close westbound access to Thurralilly Street	3	8	4	8	Note 1,2,3
B - Deviate junction into Faunce Street and retain all access to Thurralilly Street	4	6	6	8	
C - Left in / left out only at Bungendore Road	4	8	6	8	Note 4
D Left in / left out only at Bungendore Road plus new junction.	2	6	4	7	Note 5

Note 1 – Increased traffic would be generated along Aurora Avenue
Note 2 – Restrict access for businesses on Thurralilly Street
Note 3 – Would improve safety at the School
Note 4 – Impact on access for customers of business on Thurralilly Street
Note 5 – Adds an additional intersection increasing accident potential

Design Option A was considered by 11 respondents to be a very good Design Option. Design Option D was rated as good by 3 respondents, with Design Options B and C considered poor by approximately half the respondents. The respondents listed amenity, noise and safety as the main issues that impacted on them.

The owner of the Motel at the corner of Bungendore Road and Thurralilly Street raised issues in relation to existing traffic and the potential for the Design Options to impact on access to the Motel.

The Oaks Estate Progress Association have identified concerns relating to Site 5 at the junction of Oaks Estate Road and Railway Street. The issues raised relate to Railway Street to the east of Oaks Estate Road and potential impact of increased traffic on Railway Street. Concerns also included speed of traffic, narrow road verges, bends and restricted vision, location of power poles and road edges close to drains and open culverts.

The RTA met with representatives of the Oaks Estate Progress Association on Wednesday November 20 to discuss these issues. The information session was attended by the RTA, Queanbeyan City Council, Roads ACT and members of Progress Association. The proposed improvements within ACT and NSW were discussed with the Association. The Association raised

concern regarding existing high speed along the Railway Street, safety and turning difficulties from Railway Street to Norse Road at peak times, narrow bridge on Molonglo River and provision of cycleway and footpaths along the roads in the vicinity of Oaks Estate.

The owner of the Yass Road Takeaway also raised issues in relation to the proposed traffic lights at Site 3 at the junction of Yass Road and Aurora Avenue. The issues raised included impacts on parking availability to customers; access to the shop, impact on other businesses, safety issues and impact on the business.

Peter Webb, NSW State Member for Monaro, has raised concerns in relation to impact on businesses adjacent to a number of the upgrade sites. He has also raised issues in relation to the potential usage of the route by truck drivers.

4.3 Government Agency Consultation

The RTA has developed the project in consultation with officers of Queanbeyan City Council.

A part of the ACT planning process, a pre-application meeting was convened (on 26 September 2002) to discuss the proposed upgrades of the sites located within the ACT. Representatives from the Department of Urban Services, specifically from Planning and Land Management (PALM) and Environment ACT, attended the pre-application meeting. Separate meetings were also held with representatives from the NCA (on 30 August 2002) and Roads ACT (on 24 September and 13 September 2002) to discuss the proposed works in the ACT.

Table 4.5 summarises the issues raised at the above meetings.

Table 4.5
Summary of Issues

Authority	Issues
Planning and Land Management (PALM)	Requested that the REF address environmental issues, specifically the following: • Yellow Box Gum Endangered Ecological Community; • Aboriginal Sites/Artefacts; • Land acquisition; • Width of proposed railway bridge; • Heritage issues associated with Oaks Estate; • Flooding of Oaks Estate Road; and • Capability of existing road to accommodate increased traffic loadings.
National Capital Authority (NCA)	• Determination of the capability of Pialligo Avenue to accommodate increased traffic loadings.
Roads ACT	Raised the following issues for consideration: • Capability of existing road to accommodate increased traffic loadings; and • Information relating to the present widths of Oaks Estate Road and Railway Street to accommodate heavy vehicles passing from opposite directions.

SECTION B – ENVIRONMENTAL IMPACT ASSESSMENT

5. STRATEGIC STAGE

5.1 General

To enable an adequate assessment of the likely environmental impact of a proposal, including its cumulative impact, it is necessary to examine its relationship to broader national, state, regional and local planning and environmental issues. This strategic stage of environmental assessment is achieved in this REF by reporting strategic planning and environmental information from existing sources, rather than undertaking additional studies.

5.2 Planning and Environmental Background

The weights of heavy vehicles are expected to increase in the future and the Queanbeyan City Council would be required to improve its roads, including bridges, in order to provide suitable roads and supporting infrastructure for these vehicles. One step in meeting this goal is to improve current roads to a standard so as to allow for heavy vehicles movements on a route that allows for practical and efficient transport.

5.3 Strategic Justification and Needs Definition

There has been increasing concern within the Queanbeyan community about the deteriorating amenity of the CBD caused by the high volumes of heavy vehicles passing along Monaro Street. The issues of safety, impacts on noise and air quality have also been raised. Monaro Street provides the only link between the heavy vehicle origins and destinations in the Queanbeyan area, due to the restriction created by available bridge crossings of the Queanbeyan River. As a result most heavy vehicle traffic in Queanbeyan is funnelled through the CBD.

In 1995, a study by Ove Arup & Partners was commissioned to provide an assessment of the traffic requirements for the City. The report recommended short, medium and long-term traffic strategies. The study recommended a combination of a ring road system including both a northern bypass route and the Edwin Land Parkway.

In recognition of community concern, Queanbeyan Council referred the issue to the Minister for Roads in conjunction with a submission for funding towards provision of the Edwin Land Parkway. At a meeting held with Council on 5 March 1999, the Minister agreed that the RTA and Council should develop a short, medium and long-term options to reduce the usage of Monaro Street by heavy vehicles.

Following collation of the available information and a review of the previous studies (outlined in Section 4.1.3), a workshop was held, including representatives from the Queanbeyan City Council, the Queanbeyan Traffic Committee, the NSW RTA and heavy vehicles operators. The workshop identified seven options worthy of further investigation and eight evaluation criteria to allow appropriate assessment of the benefits and cost of each of the options. The 1999 RTA "Queanbeyan Heavy Vehicle Usage of Monaro Street" report outlines the outcomes of the workshop and assesses the seven options identified against the selection criteria. The options (Options A to G) identified and the selection criteria (Selection Criteria (a) to (h)), against which each option was evaluated, are described in Section 6.

A preferred shorter-term strategy was identified based on Option E (see Section 6). This involved a route via Yass Road, Pialligo Avenue, Oaks Estate Road, Railway Street and Kendall Avenue.

The proposed route is expected to decrease the through traffic and heavy vehicles from the Queanbeyan City CBD and, in doing so, addresses the concerns associated with the current conditions, such as increasing usage of Monaro Street by heavy vehicles and the associated noise, air quality and amenity impacts.

6. CONCEPT STAGE

6.1 Objectives

The objectives of the project are:

- To provide safer passage through Queanbeyan for local traffic;
- To provide easier access to Queanbeyan CBD for local traffic;
- To provide an alternative route between the two industrial areas of Queanbeyan;
- To provide safer passage for heavy vehicles;
- To improve the overall amenity of Queanbeyan;
- To reduce noise within the Queanbeyan CBD;
- To improve the air quality within the Queanbeyan CBD; and
- To provide safer intersections for both ACT and Queanbeyan residents;

6.2 Options

Seven options (for a bypass route) were identified as worthy of further investigation by the RTA (RTA, 1999) (refer Figure 6.1). The options proposed were as follows:

Option A

(GREEN) Via Atkinson Street, low level bridge, Morisset and Lowe Streets. Works identified for this option included either replacement of the existing bridge or widening and strengthening of the bridge. In addition, pedestrian facilities would need to be upgraded in Morisset Street together with improvements at the intersection of Farrer Place and Low Street.

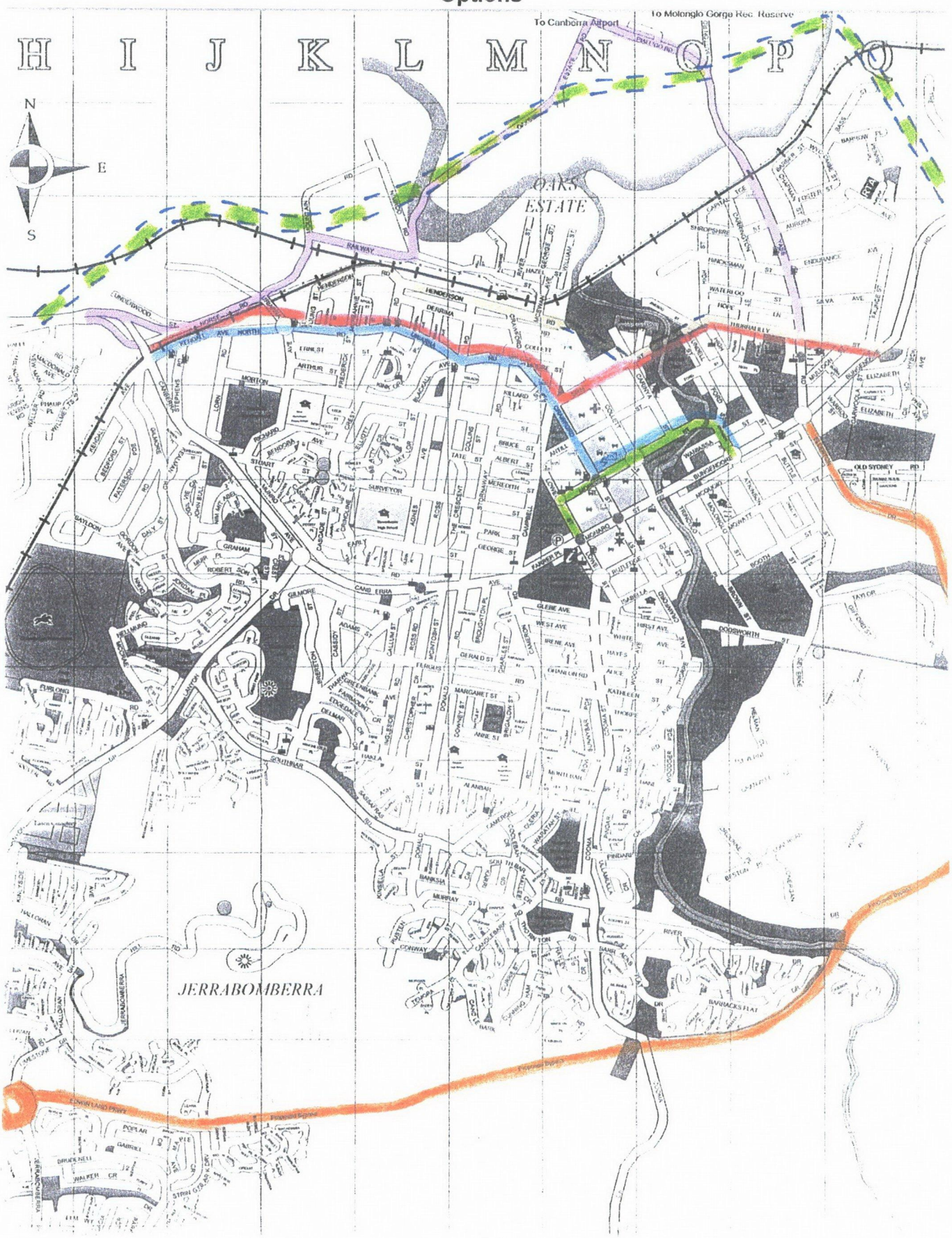
Option B

(BLUE) Starts via **Option A** to Crawford Street, thence Uriarra Road, Kendall Avenue North. It also includes Uriarra Road across the railway line into Norse Road. This option would require the same works for Option A along Morisset Street, as well as the upgrading of traffic management along Uriarra Road, improvement of the roundabout at Uriarra Road/Kendall Avenue North and provision of a full four-way signalised intersection at Canberra Avenue/Kendall Avenue North/Gilmore Road. Provision would also have been made for noise attenuation along this route.

Option C

(RED) Thurralilly Street, new bridge and approaches to Erin Street, thence **Option B** from the junction of Erin Street with Crawford Street. A Primary School fronts Thurralilly Street, and works have been identified to attempt to re-direct school traffic towards Mulloon Street in conjunction with this option. A major new high level bridge and associated roadworks would also be required, as well as noise attenuation along Erin Street. The works described above for Option B west of the junction of Crawford Street with Uriarra Road would also be required.

Figure 6.1:
Options



(Source: Queanbeyan Visitor Information Centre)

Option D

(YELLOW) Thurralilly Street, new bridge and approaches to Erin Street, extended new road to join with Henderson Road, Young Street, Uriarra Road, thence **Option B**, from the junction of Young Street with Uriarra Road. Works along Thurralilly Street and across the Queanbeyan River would be as required for Option C. An additional length of new road would be needed to connect to Henderson Road as well as noise attenuation measures along Henderson Road and Young Street. Works required for Option B west of the junction with Young Street would also be required.

Option E

(PINK) Starts via **Option C** (Thurralilly Street), then Yass Road, Pialligo Avenue, Oaks Estate Road, Railway Street, Norse Road. This option could utilise parts of **Option F** as stages. Works in Thurralilly Street between MR51 and Yass Road would be required – as for both Option C and D (RED & YELLOW). The junction of Pialligo Avenue with the Oaks Estate Road would require upgrading, as well as the Oaks Estate Road/Railway Street junction, provision of a new bridge over the railway, a new roundabout at the Norse Road/Uriarra Road junction, upgrading the roundabout at Uriarra Road/Kendall Avenue North and provision of a four-way signalised intersection at Canberra Avenue/Kendall Avenue North/Gilmore Road.

Option F

(BROKEN GREEN) Northern Bypass route. Consideration of this option should also include deletion of the proposed new section east of Yass Road, instead utilising Thurralilly Street and Yass Road. Could be completed in stages in conjunction with **Option E**. This option involves major new road construction to provide a Queanbeyan Northern Bypass. The above Option E could be seen as a first stage for this ultimate route.

Option G

(ORANGE) Edwin Land Parkway also involves major new road construction to link Ellerton Drive with Cooma Street and Lanyon Drive.

Sub Option 1

For Options C, D and E a sub-option to utilise Silva Avenue instead of Thurralilly Street was identified for further investigation. Assessment shows that this sub-option would involve provision of a new road linking Silva Avenue with MR51 at a very high additional cost of around $2.5M.

Sub Option 2

Upgrading Southbar Road for improved utilisation by heavy vehicles was also identified as a potentially desirable sub-option in conjunction with all other options.

6.3 Evaluation Criteria

Eight evaluation criteria were identified to allow appropriate assessments of the benefits and costs of each option (RTA, 1999). These are described below (not listed in any order of priority):

a) The percentage of heavy vehicles that would be attracted away from use of Monaro Street;

b) The percentage of light traffic that would be attracted away from Monaro Street;

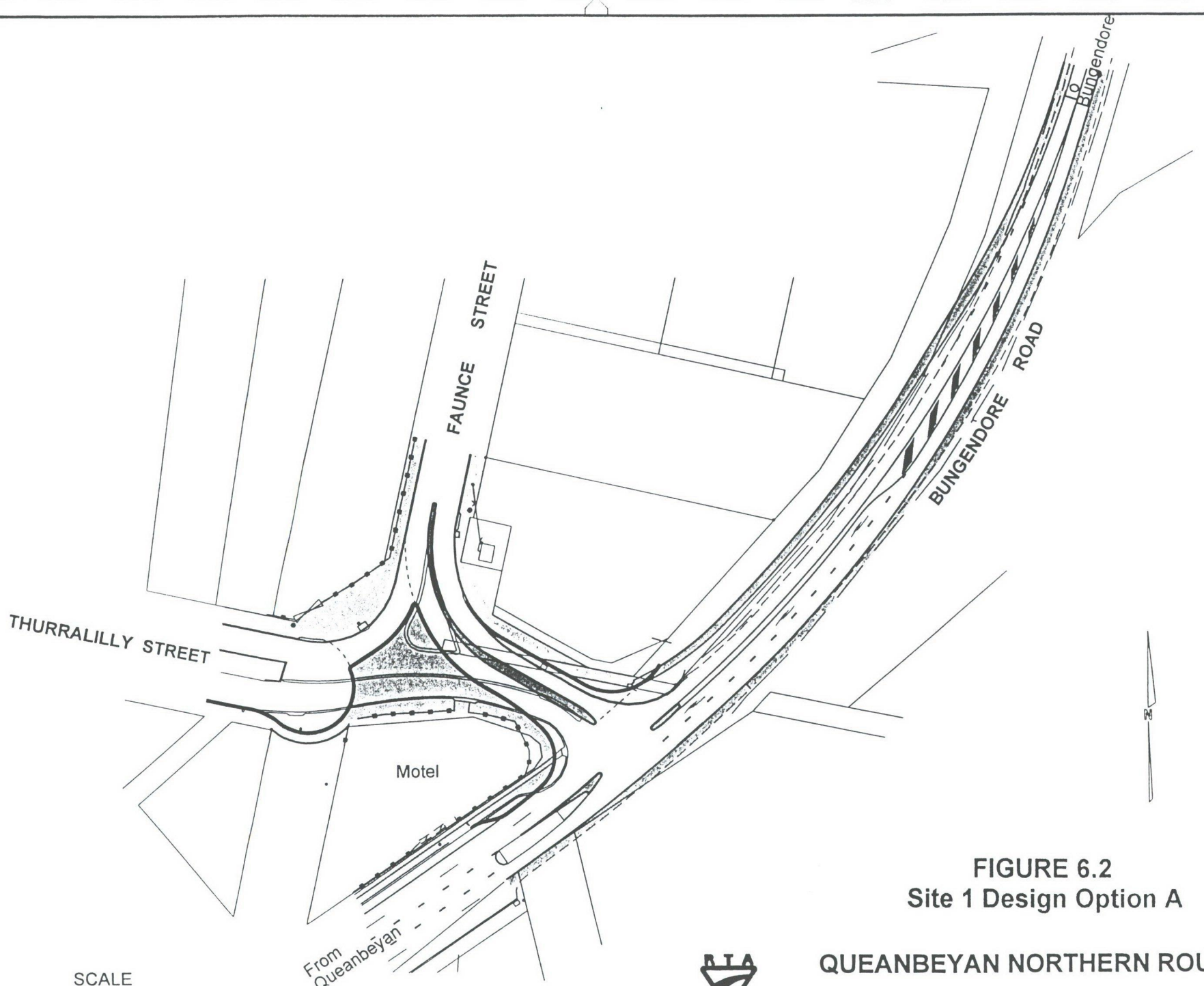


FIGURE 6.2
Site 1 Design Option A

QUEANBEYAN NORTHERN ROUTE

BUNGENDORE ROAD AND THURRALILLY STREET JUNCTION

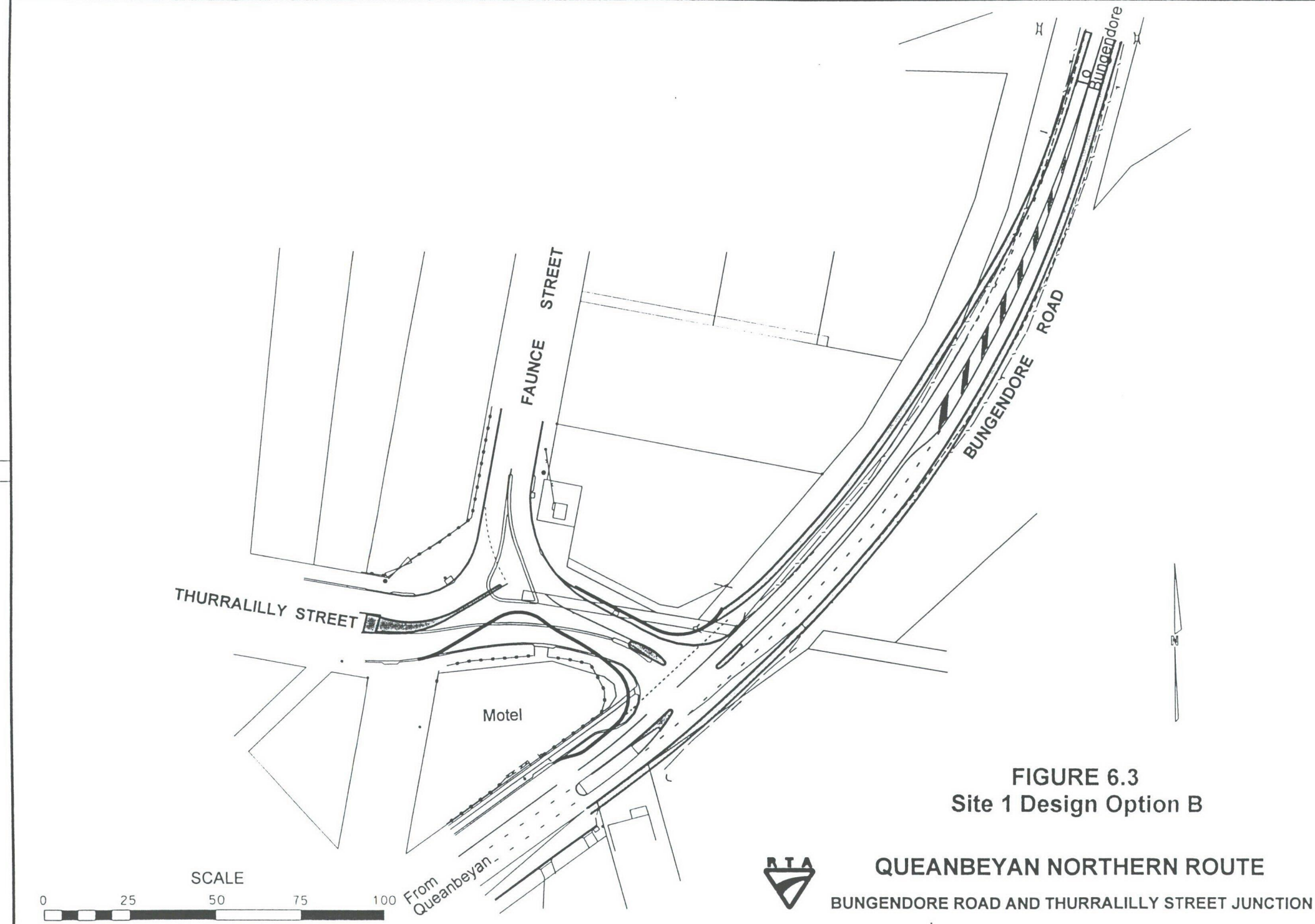


FIGURE 6.3
Site 1 Design Option B

QUEANBEYAN NORTHERN ROUTE

BUNGENDORE ROAD AND THURRALILLY STREET JUNCTION

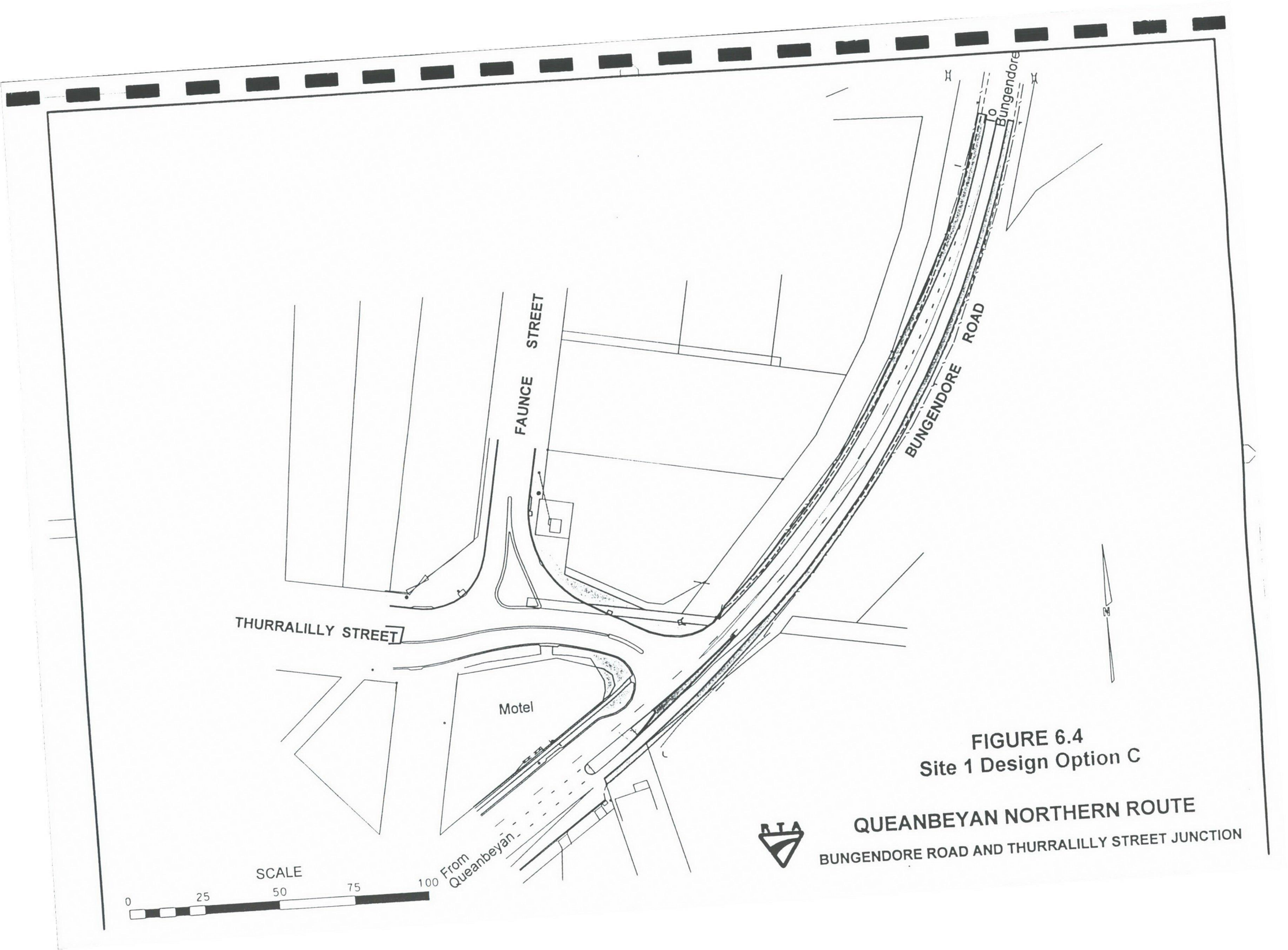


FIGURE 6.4
Site 1 Design Option C

QUEANBEYAN NORTHERN ROUTE

BUNGENDORE ROAD AND THURRALILLY STREET JUNCTION

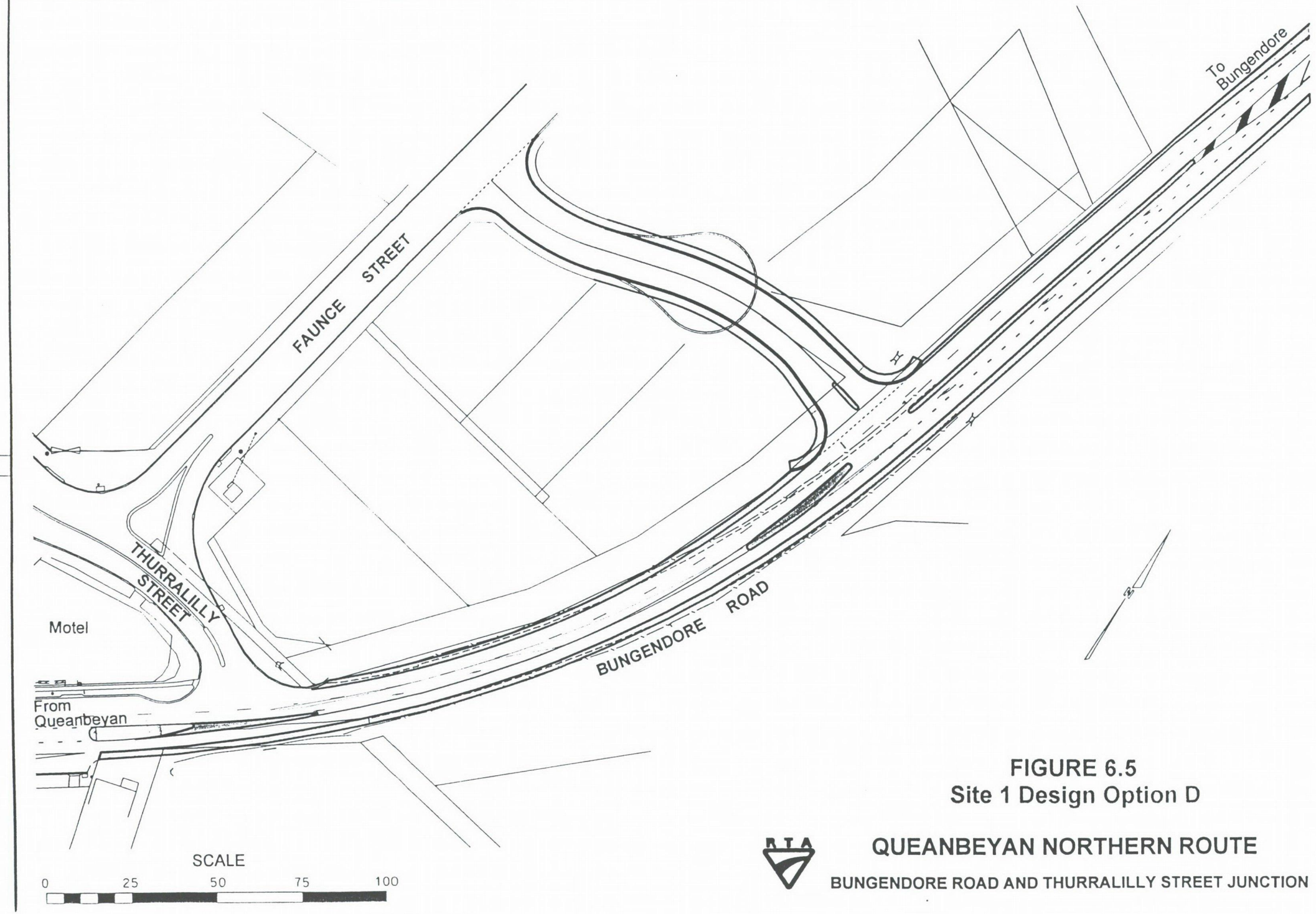


FIGURE 6.5
Site 1 Design Option D

RTA

QUEANBEYAN NORTHERN ROUTE

BUNGENDORE ROAD AND THURRALILLY STREET JUNCTION

c) Social impacts associated with the option, including noise, reduced accessibility, air quality, visual impacts and residential amenity;

d) Road safety impacts;

e) Economic costs and benefits;

f) Transport industry acceptance;

g) The level of community acceptance, that is, the degree to which the Queanbeyan community as a whole would be prepared to support each option; and

h) Natural environmental impacts.

Of the eight evaluation criteria, three were identified as being quantitative criteria that were objectively measures. These include the percentages of light heavy vehicles that would be attracted away from use of Monaro Street, as well as the estimated cost of each option. The remaining five criteria are more qualitative, and were assessed by a workshop approach and given a weighted criteria score, the greater the score the best the option suits the criteria. Details of the assessment for both quantitative and qualitative criteria are provided in the 1999 RTA "Queanbeyan Heavy Vehicle Usage of Monaro Street" report A summary of the results of assessment against these criteria is presented in Table 6.1.

Table 6.1
Option Assessment Summary

Option	Quantitative Criteria			Qualitative Criteria Score
	Cost *	% Heavy Vehicle Diversion	% Light Vehicle Diversion	
A: GREEN	$ 1.1M	30%	40%	1.80
B: BLUE	$ 2.4M	40%	40%	1.95
C: RED	$10.1M	65%	25%	1.85
D: YELLOW	$10.8M	65%	25%	1.65
E: PINK	$ 5.4M	45%	20%	3.85
F: BROKEN GREEN	$53.0M	>45%	20%	-**
G: ORANGE	$25.6M	40%	15%	3.80

* Includes only the immediate pavement upgrading costs

** Not assessed as this option involves major new road construction and represents a longer term solution

While Option A and Option B appear to be quite effective in achieving a high diversion of traffic from Monaro Street for relatively low cost, the both score relatively poorly with respect to the qualitative criteria, mainly due to adverse impacts on Morisset Street and Uriarra Road. Option C and Option D both have the greatest potential for diverting traffic from Monaro Street, but scores poorly with respect to social impacts and community acceptance. The high estimated costs of Option G make it a less attractive shorter-term solution, despite its relatively high qualitative criteria scores.

Option E offers high heavy vehicle diversion benefits in conjunction with relatively high qualitative criteria scores at a relatively low cost. Option E is largely located within the ACT, with approximately $3.8M of the estimated $5.4M required for works within the ACT.

6.4 Proposal Selection

The assessment of the identified alternative route options against the adopted evaluation criteria identified the following preferred strategy:

- Short to Medium term

Develop Option E within a series of stages. This would initially include provision of a new railway overbridge and upgraded intersections at Pialligo Avenue and Oaks Estate Road, Oaks Estate Road and Railway Street, and Railway Street and Norse Road. A second stage would include the new signalised four-way intersection at Kendall Avenue North and Canberra Avenue, followed by the works associated with upgrading Thurralilly Street. Liaison would be undertaken with Queanbeyan Shire Council and the ACT Government to enable the future route for the Northern Bypass to be examined for inclusion in the Queanbeyan and ACT Environmental Planning Instruments in the shorter term.

- Medium to Long term

Provision of the Edwin Land Parkway as an arterial road, in conjunction with the expanding urban development to the south of Queanbeyan, would offer a southern alternative route to complement the northern route outlined in Option E. This would potentially result in a significantly increased diversion of heavy vehicles from the CBD.

- Long Term

When warranted, completion of the Northern Bypass Route and Edwin Land Parkway would effectively provide a ring road system for Queanbeyan in the longer term.

6.5 Route Selection

The proposed Queanbeyan Northern Route Upgrade (Option E) begins at the intersection of Thurralilly Street and Bungendore Road, north east of the Queanbeyan CBD. The route then continues to form a northern ring road around the city, finishing north west of the CBD in Kendall Avenue North (Figure 1.1). The proposed upgrades comprise nine sites, involving mostly intersection improvements.

Four design options were suggested for Site 1 at the junction of Bungendore Road and Thurralilly Street (refer Figures 6.2 to 6.5). Each design option, including the advantages and disadvantages, is described below:

Site 1 - Design Option A: Deviate junction into Faunce Street and close westbound access to Thurralilly Street.

Advantages

- All movements are provided for at the junction;
- All westbound traffic is directed into Faunce Street providing access to the industrial area and reducing traffic volumes in Thurralilly Street;
- The cul-de-sac provides a turning facility for traffic movements within Thurralilly Street;
- Two lanes are provided northbound in Bungendore Road at the junction allowing traffic turning left to decelerate clear of the through traffic;
- An acceleration lane is provided for traffic turning left out of Thurralilly Street; and
- A right turn bay is retained for traffic turning into Thurralilly Street.

Disadvantages

- Traffic can only enter Thurralilly Street from Yass Road or Mulloon Street; and
- Increased travel time for traffic that currently accesses Thurralilly Street from the East.

Site 1 - Design Option B: Deviate junction into Faunce Street and retain all access to Thurralilly Street.

Advantages

- All movements are provided for at the junction;
- All westbound traffic is directed into Faunce Street providing access to the industrial area;
- Two lanes are provided northbound in Bungendore Road at the junction allowing traffic turning left to decelerate clear of the through traffic;
- An acceleration lane is provided for traffic turning left out of Thurralilly Street; and
- A right turn bay is retained for traffic turning into Thurralilly Street.

Disadvantages

- Possible increase in light and heavy vehicle traffic volumes in Thurralilly Street;
- Possible increase in air pollution and noise levels in Thurralilly Street;
- Possible safety issues at student set down and pick up areas adjacent to school;
- Possible need for sound reduction measures at the school. Noise walls could generate negative visual, safety and vandalism issues;
- Increase in traffic conflict points due to revised Faunce Street/ Thurralilly Street Junction; and
- Signalised pedestrian crossing in Yass Road to be relocated to new traffic signal site at Yass Road and Thurralilly Street intersection.

Site 1 - Design Option C: Left in / left out only at Bungendore Road.

Advantages

- Reduction in traffic volumes in Thurralilly Street;
- Two lanes are provided northbound in Bungendore Road at the junction allowing traffic turning left to decelerate clear of the through traffic; and
- An acceleration lane is provided for traffic turning left out of Thurralilly Street.

Disadvantages

- Increased travel time for traffic that currently turns right into or out of Thurralilly Street at the Bungendore Road junction;
- Does not address the objectives of the Northern Route proposal; and
- May sustain or increase heavy vehicle usage of the existing route through the CBD.

Site 1 - Design Option D: Left in / left out only at Bungendore Road plus new junction.

Advantages

- Reduction in traffic volumes in Thurralilly Street;
- Two lanes are provided northbound in Bungendore Road at the junctions allowing traffic turning left to decelerate clear of the through traffic;
- An acceleration lane is provided for traffic turning left out of both junctions:

- All movements are provided for at the new junction; and
- A right turn bay is provided at the new junction.

Disadvantages

- Increased construction cost;
- Additional property acquisition;
- Possible public utility relocation;
- Increased travel time for traffic that currently turns right into or out of Thurralilly Street at the Bungendore Road junction; and
- Increase in traffic conflict points due to the additional junction.

Following public consultation (see Section 4.2), Design Option A was determined to be the preferred design option for the junction of Bungendore Road and Thurralilly Street (Site 1).

6.6 Statutory Planning

6.6.1 Zoning

Queanbeyan

The Queanbeyan City Council LEP details the zoning of the areas potentially affected by the proposed works for the sites within NSW (refer Section 2.3.3). All the sites within NSW involve upgrades to existing road intersections or traffic management measures along existing roads.

Sites 1, 2 and 3 located on the eastern section of the route are adjoined by areas zoned for either residential, industrial or open space. Sites 8 and 9 on the western section of the route adjoin land with similar zoning.

ACT

Under the Territory Plan, Sites 4, 6 and 7 are located in areas designated as land use policy B10 (Broadacre. Under this designation, there are several land uses possible for Sites 4, 6 and 7, which include agriculture, nature conservation and community facilities. A road is also designated as a purpose for which the land may be used.

Site 5 is located at the junction of two different land use designations under the Territory Plan, land use policy B10 (Broadacre) and land use policy B13 (River Corridors. Land management facilities (i.e. roads) are designated as a purpose for which the land may be used under this designation. The land may also be used for agriculture and nature conservation areas.

Pialligo Avenue, from the ACT/NSW border to Morshead Road, is defined as an Approach Route under Section 2.1 of the National Capital Plan, and is therefore specified as a Designated Area (under Section 10 (1) of the ACT *Planning and Land Management Act* 1988). Site 4, located at the junction of Pialligo Road with Oaks Estate Road, incorporates this Approach Route. Therefore, development at Site 4 is subject to Works Approval and would conform to Development Control Plans agreed to by the NCA.

Part of the proposed route (along Oaks Estate Road) is within the Molonglo River Corridor and requires consideration of Special Requirement 8.6.4 of the National Capital Plan. Any works at this site would be carried out in consultation with the NCA, in general accordance with a Development Control Plan agreed to by the NCA.

The four sites located in the ACT require the submission of Development Applications (DA) to PALM to gain approvals. The ACT Environmental Impact Assessment process begins with the determination of whether a proposal requires a Preliminary Assessment (PA). A PA is a preliminary analysis of sufficient scope and detail to determine whether or not potential impacts exist, and the nature of those potential impacts. In relation to the proposed Queanbeyan Northern Route Upgrade, the four ACT sites do not require the preparation of a PA as none of these site improvements involve the widening of any existing road by one or more lanes or fit any of the criteria that trigger a PA.

6.6.2 State Environmental Planning Policies (SEPP)

SEPP 4 – Development without Consent

SEPP No. 4 (Development without Consent and Miscellaneous Complying Development) stipulates that work related to classified or main roads, which would normally require consent, might be carried out without the consent of Council.

6.6.3 Regional Environmental Plans

There are no Regional Environmental Plans (REPs) relevant to the proposed area.

6.6.4 Relevant Approvals, Permits and Licenses

The RTA is responsible for obtaining all necessary permits and approvals relating to NSW and ACT legislation.

The legislation includes:

NSW

- *Environmental Planning & Assessment Act* 1979;
- *Environmental Planning & Assessment Regulation* 2000;
- *Protection of the Environment Operations Act* 1997;
- *National Parks and Wildlife Service Act* 1974; and
- *Heritage Act* 1977.

ACT

- *Land (Planning & Environment) Act* 1991;
- *Environment Protection Act* 1997;
- *Environment Protection Regulation* 1997; and
- *Road Transport Act (Safety & Traffic Management)* 2000.

Commonwealth

- *ACT Planning & Land Management Act* 1988.

7. DETAILED ASSESSMENT STAGE

7.1 Design Considerations

7.1.1 Description of Site

The proposed Queanbeyan Northern Route Upgrade for a heavy vehicle alternate route begins at the intersection of Thurralilly Street and Bungendore Road, north east of the Queanbeyan CBD. The route then continues to form a northern ring road around the city, finishing north west of the CBD in Kendall Avenue North (refer Figure 1.1). The proposed upgrade is comprised of nine sites, involving mostly intersection improvements.

Site 1 – Bungendore Road and Thurralilly Street Junction

Description of Existing Site

Site 1 is at the junction of Bungendore Road and Thurralilly Street. The site is located on the incline of a hill, which rises in a northerly direction along Bungendore Road. From the site, Thurralilly Road declines to the west. Bushland is dominant on the eastern side of Bungendore Road, while residences occupy the land on the southeastern side of the road. A large section of land has been cleared to develop the Carwoola Industrial Subdivision, starting at the northern corner of Bungendore Road and Thurralilly Street and extending north along Faunce Street. A motel is located on the southern corner of Bungendore Road and Thurralilly Street. Heading west along Thurralilly Street, residences can be found on the south side of the road, while light industry occupies the north side of the road. There are three streetlights overlooking the site. There appears to be no utility lines at the site itself, however they can be found on Bungendore Road and Thurralilly Street, some distance away from the site.

Description of Proposed Changes

It is proposed to add an acceleration lane on the left turn from Thurralilly Street to assist light vehicles in passing any heavy vehicles as they travel up the grade on Bungendore Road.

It is further proposed that traffic be diverted into Faunce Street, which becomes Aurora Avenue, immediately west of the junction. To facilitate this, kerb lines would be relocated to deny westbound traffic access to Thurralilly Street. Eastbound traffic in Thurralilly Street would still be able to turn left into Faunce Street. A section of the existing raised median at the eastern end of Thurralilly Street would be replaced with a painted median, which would allow heavy vehicles, entering and leaving businesses in Thurralilly Street, to readily access Yass Road and Mulloon Street.

Impacts On Access

For the existing configuration, traffic moving westbound along Thurralilly Street cannot turn right into Faunce Street. In addition, traffic travelling south along Faunce Street is unable to turn right into Thurralilly Street. There are currently no other access restrictions.

The proposed intersection upgrade would deny westbound traffic access to Thurralilly Street, channelling all traffic into Faunce Street. Eastbound traffic in Thurralilly Street would still be able to turn left into Faunce Street, but access to Bungendore Road would not be possible. Traffic travelling along south along Faunce Street would be able to turn left into Thurralilly Street and would have full access to Bungendore Road. However, turning right into Thurralilly Street from Faunce Street would still not be possible. A section of the existing raised median at the eastern

end of Thurralilly Street would be replaced with a painted median, which would allow heavy vehicles, entering and leaving businesses in Thurralilly Street, to readily access Yass Road and Mulloon Street. Access to Mulloon Street is only possible from Yass Road. Traffic originating from Bungendore Road or Faunce Street cannot access Mulloon Street.

Site 2 – Aurora Avenue

Description of Existing Site

The site is located along Aurora Avenue. There is a slight decline in the road as it travels toward Yass Road. Carwoola Industrial Subdivision development lies on the northeastern side of the road, while the construction offices for the development lie on the southwestern side of the road. Light industry can be found a small distance from the site on both sides of Aurora Avenue as it travels toward Yass Road. There are no streetlights at the site but utility lines can be found on one side of the road.

Description of Proposed Changes

Faunce Street has recently been sealed. Parking restrictions would apply where required in Faunce Street and Aurora Avenue to provide for safe passage of heavy vehicles. The improvements to Aurora Avenue are proposed so as to provide sufficient widths for heavy vehicles to pass. This involves the exclusion of parking on the southern edge of Aurora Avenue, which may impact on both customer and employee parking and access. However, improvements proposed for Site 3 at the intersection of Aurora Avenue and Yass Road would improve the access to businesses in Aurora Avenue with the provision of traffic signals.

Impacts on Access

The proposed parking restrictions may limit the access of employees and patrons to the industrial and retail premises in the general vicinity of the site. This would assist in offsetting any negative impacts experienced as a result of the proposed parking restrictions.

Site 3 – Aurora Avenue and Yass Road Junction

Description of Existing Site

The site is located at the intersection of Yass Road and Aurora Avenue. Yass Road has two lanes of traffic in each direction. Aurora Avenue is wide enough to carry two lanes of traffic in both directions however the lanes are unmarked. The site is fully developed, with the majority of premises surrounding the site being retail outlets. A motel is located on the corner of Yass Road and Shropshire Street, a short distance northwest of the site. Four streetlights adorned the intersection and utility lines run along both sides of Yass Road

Description of Proposed Changes

Installation of traffic signals is proposed for this junction (when required).

Impacts on Access

For the existing configuration, street parking is available on both sides of Aurora Road and Yass Road in the vicinity of the intersection. There are currently no access restrictions.

Business located on the southwestern side of Yass Road, directly across from Aurora Road, can currently be accessed easily, with parking provided outside their premises on Yass Road. With the installation of traffic lights, parking restrictions in this area are likely. If this were the case,

employees and patrons of these businesses would be denied the level of access that they currently enjoy. In addition, access to the two driveways directly across from Aurora Avenue would become restricted. The RTA propose to undertake further consultation with potentially affected businesses prior to proceeding with this upgrade.

With parking restrictions in place around the intersection, access to the other light industrial and retail premises in the immediate vicinity would also be a restriction for the employees and patrons of these businesses.

Current traffic access conditions for Yass Road, Shropshire Street and Aurora Avenue would be unchanged following the proposed works.

Site 4 – Pialligo Avenue/Oaks Estate Road Junction

Description of Existing Site

Site 4 is located at the intersection of Oaks Estate Road with Pialligo Avenue, which both accommodate one lane of traffic in each direction. From the site, Pialligo Avenue declines to the northwest in one direction and to the southeast in the other, while Oaks Estate Road declines from the site in a southerly direction. The land to the south of Pialligo Avenue and bordering Oaks Estate Road is undeveloped and appears to be farmland. The Canberra Speedway lies a short distance to the north of the site. A high tree covered embankment runs along the northern side of Pialligo Avenue, effectively shielding the speedway from view. A high-pressure gas line runs along the southern side of Pialligo Avenue, while utility lines run along the northern side of the road. Underground optic cables run parallel with the gas line along Pialligo Avenue. There are no streetlights at the site

Description of Proposed Changes

An upgrade of the junction is proposed to provide safe turning for vehicles moving into and out of Oaks Estate Road. This would require widening of Pialligo Avenue. It is also proposed that street lighting would be installed at the junction.

Impacts on Access

There are currently no access restrictions in place at this site.

Current traffic access conditions for Pialligo Avenue and Oaks Estate Road would be unchanged following the proposed works. The proposed upgrade at this intersection would improve traffic access to the Canberra Speedway and associated sports facilities.

Site 5 – Oaks Estate Road and Railway Street Junction

Description of Existing Site

Site 5 is located at the intersection of Oaks Estate Road and Railway Street. The site is located on the incline of a hill, which rises in a westerly direction along Railway Street. From the site, Oaks Estate Road declines to the north. The site is not heavily developed. An abandoned construction site is located on the southern side of Railway Street directly opposite Oaks Estate Road. Light industry can be found neighbouring this construction site, with a fuel depot east of the site a small distance from the intersection of interest. To the northeast of the site, a nursery and residences can be found, while the Oaks Estate showground and sports field are located to the northwest. High embankments run along Railway Street to the west of the site, effectively shielding the industry and showground from view. There are no streetlights at the site but utility lines are located along both sides of the road.

Description of Proposed Changes

In order to improve safety at this intersection, the T-junction would be upgraded and the give way signs relocated to both legs of Railway Street. The upgrade would include the permanent closure of Nimrod Road, which currently provides access to the Queanbeyan Sewage Treatment Plant (STP). Access to the STP is available via Mountain Road, approximately 500 m west of this site. Traffic volumes utilising both Nimrod and Mountain Roads are minimal. Improved safety is seen to outweigh the impact of the added distance to the low traffic levels to the STP currently using Nimrod Road.

Impacts on Access

There are currently no access restrictions in place at this site. Both Nimrod Road and Mountain Road are used to access the Queanbeyan Sewage Treatment Plant. Queanbeyan City Council recognises the safety concerns relating to the access via Nimrod Road and have there would be no objection to its proposed closure.

The upgrade would include the closure of Nimrod Road, hence forcing all traffic to use Mountain Road, the safer and preferred access road. Current traffic access conditions for Oaks Estate Road and Railway Street would be unchanged following the proposed works.

Site 6 – Railway Street and Mountain Road Junction, including new bridge over railway

Description of Existing Site

Site 6 is located at the railway crossing bridge in Railway Street. The existing bridge was constructed in the 1920's and is owned by RoadsACT. From the site, Railway Street declines to the east and Mountain Road declines to the northwest. The Transgrid Electricity Substation is located on the corner of Railway Street and Mountain Road. Neighbouring the substation, a small distance down Mountain Road, is Gibbs Sale Yards. The land to the west and on both sides of the railway is ACT public land, which is not used extensively. An area of open space can be found to the southeast of the site, some of which is used as a horse paddock. The railway crossing bridge is a single lane sealed bridge. There are no streetlights at the site but utility lines are located along Railway Street.

Description of Proposed Changes

The existing rail overbridge is single lane and is adjacent to a sharp bend. In order to improve safety and access for heavy vehicles it is proposed to provide a new rail bridge and realign the existing route on Railway Street. A new bridge would be built to the west of the existing bridge. The new bridge would provide access for pedestrians and cyclists and would be approximately 100mm higher than the existing bridge.

Impacts on Access

For the existing configuration, traffic crossing the single lane bridge must give way to cars crossing from the other direction. Furthermore, heavy vehicle movements are restricted and safe passage is not provided for pedestrians or cyclists. There are currently no other access restrictions.

The proposed construction of a new concrete bridge would allow heavy vehicles travelling in both directions to pass. A shared pedestrian pathway would also be provided on the eastern side of the bridge, improving pedestrian access. The proposed upgrade at this site would improve traffic

access to the bridge, the electricity substation and Mountain Road. Current traffic access conditions for Railway Street would be unchanged.

Site 7 – Railway Street and Uriarra Road Junction

Description of Existing Site

Site 7 is located at the intersection of Norse Road with Railway Street, both of which have one lane of traffic in each direction. The site lies at the apex of a hill. From the site, Norse Road declines in both directions, while Railway Street declines from the site in a northeasterly direction. A shared pedestrian/bike path runs parallel with Norse Road and crosses Railway Street a short distance north of the intersection. The railway line also runs parallel to Norse Road but is on the opposite side of the road to the bike path. Beyond the railway line is an area of light industry. This area is somewhat shielded from view by the embankment that runs along the railway line. Embankments can also be found on the north side of Norse Road where bushland is dominant. Directly across from the intersection is an access road leading to the abattoirs. The area between the old access road and Railway Street has been proposed for industrial development. There are eight streetlights around the site, but there appears to be no utility lines in the immediate vicinity.

Description of Proposed Changes

It is proposed to upgrade this junction to suit turning B-doubles by widening the pavement in Railway Street and providing a right turn bay in Uriarra Road. The traffic island in Railway Street would be relocated and enlarged, providing improved safety for pedestrians and cyclists. The relocation of the old access road to the abattoirs is also proposed to improve the safety and operation of the junction. The location for a new access point to the north east of the junction would be determined in consultation with affected property holders and be included in the development application to the ACT government for this site.

Impacts on Access

The closure of the old access road to the abattoirs is proposed. Currently, this access road does not allow heavy vehicles to safely enter Railway Street. A new access road would be provided at a location to be determined northeast along Railway Street. This would give traffic safer access to the area, as well as, improving the operation of the junction. A gravel road linking the new access with the existing internal road would also be subject to further investigations.

The traffic island in Railway Street would be relocated and enlarged, providing improved and safer access for pedestrians and cyclists crossing at the intersection.

Current traffic access conditions for Norse Road, Railway Street and Uriarra Road would be unchanged following the proposed works.

Site 8 – Uriarra Road and Kendall Avenue Intersection (Roundabout)

Description of Existing Site

The site is located in a fully developed area, at the roundabout intersection of Uriarra Avenue, Kendall Avenue North and Richard Avenue. A vet and residences are located on the western corner, while residences, a petrol station and a car yard can be found on the northern corner. To the south lies light industry, while retail outlets can be found to the east. Four streetlights adorned the intersection and utility lines run along one side of all three roads. A utility pole is located on the proposed site.

Description of Proposed Changes

At this intersection heavy vehicles have difficulty negotiating the left turn into Uriarra Avenue from Kendall Avenue North, often mounting the kerb. To overcome this limitation to heavy vehicles, it is proposed to adjust the roundabout central island width, widen the pavement on the northwest corner and adjust the roundabout entry widths where required to suit B-Double turns. To facilitate these improvements public utility adjustments and property acquisition on the northwest corner are required. To improve safety it is proposed to increase the width of the turning lane by relocating the kerb line. It is also proposed that the collar of the roundabout be increased by reducing the landscaped area.

Impacts on Access

There are currently no access restrictions at this site. Current traffic access conditions for Uriarra Road, Richard Avenue and Kendall Avenue would be unchanged following the proposed works.

Site 9 – Kendall Avenue North

Description of Existing Site

Site 9 is located along a relatively straight stretch of Kendall Avenue North, running between Lorn Road and Stephens Road. The railway line runs along the northern side of Kendall Avenue. This area is somewhat shielded from view by a steep embankment. There are no residences or industrial premises, in the vicinity of the proposed works, on the northern side of Kendall Avenue. A waste management centre and various light industry premises can be found on the southern side of Kendall Road. There is one streetlight at the site, and utility lines are located running along the northern side of the road.

Description of Proposed Changes

It is proposed to widen this carriageway by reducing the width of the existing median and or moving the median towards the other carriageway (southward).

Impacts on Access

There are currently no access restrictions at this site. Current traffic access conditions for Kendall Avenue would be unchanged following the proposed works.

7.1.2 Existing and Forecast Traffic

Future traffic volumes for roads on the route have been based on the RTA's estimates and are detailed in Table 7.1.

Table 7.1
Traffic - Average Daily Volumes (ADV)

Location	200		2010			
	Existing		Do Nothing		Northern Upgrade	
	ADV	% Trucks	ADV	% Trucks	ADV	% Trucks
Uriarra Rd	12,425	6	13,500	6	* some increase	6
Oaks Estate Rd	5,000	7	6,700	7	10,300	7
Yass Rd	14,449	6	15,500	6	* 12,700	6
Thurralilly St	2,300	8	2,600	8	* significant reduction	2

Note : * denotes that further study needs to be undertaken to estimate the traffic associated with the Northern Upgrade.

It was assumed that the peak hourly traffic volumes and night time volumes would be represented by 10% and 2.5% of the average daily traffic respectively.

At present, only Yass Rd is classed as an arterial road. Oaks Estate Rd and Uriarra Rd are currently collector roads and Thurralilly Street is a local council street. The existing Oaks Estate Road and Railway Street east to Florence Avenue is a gazetted B Double route. The June 2002 traffic volumes, Vehicles Per Day (vpd) shows about 7% heavy vehicles along the Oaks Estate Road. The proposed alternative route is forecasted to increase the total traffic in 2010 from 6700 Average Daily Volumes to 10,300, thus increasing the light and heavy vehicles traffic. The proposed improvement to the junctions and replacement of Railway Bridge is expected to cater for the increased traffic. The sealed width of the Oaks Estate Road is generally an average of 9m except at Molongolo Bridge that is 7m maximum (no safety guardfence and the bridge floods occasionally). The average sealed width on Railway Street is about 7m and this is the minimum requirement for the 2 way traffic (refer Table 7.2). The pavement investigation would be required to identify the requirements of strengthening required on the Oaks Estate Road and Railway Street due to expected increased traffic.

Table 7.2
Sealed and Formation Widths Along The Roads Within ACT

Section of the road	Sealed width			Formation width		
	Max	Min	Average	Max	Min	Average
Oaks Estate from Pialligo Av to Railway Street	9.1m	7.0m	7.42m	13.8m	9.6m	11m
Culvert at Molonglo River	7m		7.m	7m		7m
Railway Street from Oaks Estate to Mountain	6.8m	7.1	7m	8.3m	9.4m	8.9m
Railway Street to Uriarra Road	7m	7m	7m	8.7m	9.5m	9.1m

Some increases in traffic volumes are expected to occur on Uriarra Rd and Yass Rd between 2000 and 2010 as these routes are already used regularly by heavy vehicles. The Oaks Estate Rd would experience an increased percentage of heavy vehicles travelling on it as well as an increase in light vehicles due to future development in the area.

The proposed upgrades at the Thurralilly St / Bungendore Rd intersection would restrict the present 'through' traffic on Thurralilly St. Vehicles would not be able to travel eastbound along Thurralilly and enter Bungendore Rd, and thus Thurralilly St would only accommodate 'local' traffic after the upgrade. The percentage of heavy vehicles using Thurralilly St is also expected to reduce from eight percent to two percent.

7.1.3 Design Parameters

All design work would be carried out in accordance with the RTA's Road Design Guide and would be based on the preliminary designs shown in Figures 3.1 to 3.7.

7.1.4 Construction Activities

The intersection upgrades and the associated roadworks would start in December 2002 at Bungendore Road/Thurralilly intersection and other works would follow depending on the availability of approvals and funds. Construction activities would take place between the hours of

7:00 a.m. to 5:00 p.m. Mondays to Fridays, and 7:00 a.m. to 1:00 p.m. on Saturdays. No construction activities are proposed on Sundays. These timings are in accordance with the NSW EPA *Environmental Noise Control Manual*.

The rail overbridge would continue to be used while the construction of the new bridge and approaches is undertaken. On-site personnel would place appropriate signage near the construction site and direct traffic along this section of Railway Street.

7.1.5 Waste Disposal

Waste material would be recycled where possible or otherwise disposed of in a responsible manner. Waste material generated from the bridge replacement and preparation of the approaches and other intersection upgrades would generally comprise three types of materials that are:

- General refuse generated by personnel;
- Excess soil material from changes in landscape surfaces; and
- Vegetative matter resulting from clearing of vegetation from roadside verges.

In general, waste would either be recycled or disposed of at Mugga Lane. Trees that are removed would be mulched and the mulch used in landscaping. Cleared vegetation and other materials would not be burned.

General refuse would be stored in rubbish bins with heavy, lockable lids at the site. This would ensure that no rubbish is blown out of the bins or animals scavenge any food scraps. Bins would be regularly emptied. All rubbish loads would be covered when transported away from the site.

Temporary toilets at the site would be serviced on a regular basis.

Although there is likely to be very little chemical material generated as waste from the replacement of the bridge and intersection improvements, the proper disposal of chemicals according to appropriate NSW EPA Guidelines would occur. Recycling or disposal of waste oils would occur at licensed sites. Licences and approvals would be obtained for the disposal of any contaminated waste and the operators of the waste disposal site would be notified in advance. Any storage of materials in the vicinity of the site would be bunded and placed away from the river. The *Soil Erosion and Sediment Control Plan* also addresses waste control (Appendix C).

The above strategies would ensure that environmental impact from waste disposal is negligible at the sites.

7.1.6 Demand on Resources

Resources used in the construction of the new bridge and intersection improvements would include materials such as concrete, fill material, base and sub-base gravels, asphalt, steel reinforcement, steel, fuels and oils, etc.

Pre-cast concrete sections, steel reinforcement, asphalt, fill material behind the abutments, etc would be used in the bridge construction.

The project would require water for spraying during construction and concrete curing. Spraying would assist in compacting the road and reduces the dust levels (e.g. spraying roadwork).

Demand on resources also occurs during the operational life of the bridge. These resources include personnel to maintain the road, bridge and fuel resources for vehicles.

The replacement of the bridge and other improvements would result in increased safety and increased savings in travel time for all vehicles, but particularly an alternative route for heavy vehicles.

7.2 Existing Environment and Potential Impacts

7.2.1 Regional Landform

General Area

Queanbeyan's most defining and valuable natural assets are the Queanbeyan River, the Eastern Escarpment and Mount Jerrabomberra.

Queanbeyan lies in two main valleys separated by a series of hills and ridgelines. To the east and along the City's boundary is a major series of hills and ridges, locally known as the Eastern Escarpment, which are timber covered and relatively undeveloped. Mount Jerrabomberra forms the backdrop to the second major valley within the City of Queanbeyan, which contains the major urban area of Jerrabomberra. This residential area is currently physically separated from the City of Queanbeyan.

Queanbeyan itself lies in a valley to the west of the Eastern Escarpment, dropping to 565 m at its lowest point on the Queanbeyan River. Much of the older part of Queanbeyan was developed in areas adjoining the river and lies within the 565-600 m contour.

The Queanbeyan River, which provides a major focal point for much of the city's development, runs from the south to the northwest of the city, adjoining the Molonglo River across the ACT border.

There are defined large open space areas or corridors many of which contain remnant vegetation. Additional open spaces are found throughout the City, though tend to be developed playing fields and ovals.

Environmental Impacts

Site 1 - Bungendore Road and Thurralilly Street Junction

The proposed improvements would extend into the southern boundary of Carwooola Industrial Estate. The proposal at this site would remove vegetation and increase the impermeable surface area, therefore increasing the level of runoff. This in turn increases the amount of stormwater to be accommodated in the table drains either side of Bungendore Road.

The proposed acceleration lane to extend 150 m north along Bungendore Road from Thurralilly Street would impede on the existing table drains which at present experience heavy flows as evidenced by the presence of grass matting and depressed grass.

These flows would have to be accommodated via the construction of new table drains, thus impeding further into Carwoola Industrial Estate on the southeast boundary. Therefore immediate stabilisation of these areas via grass matting, straw bales and plantings is important in reducing the likelihood of sediment movement. (refer Appendix C)

Site 2 - Aurora Avenue

The improvements to Aurora Avenue are proposed so as to provide sufficient widths for heavy vehicles to pass. This involves the exclusion of parking on the southern edge of Aurora Avenue.

The improvements to this intersection would have no effect on the regional landform.

Site 3 - Aurora Avenue and Yass Road Junction

The improvements to this intersection involving the inclusion of traffic signals would have no effect on the regional landform.

Site 4 - Pialligo Avenue/Oaks Estate Road Junction

Apart from minor changes associated with the widening of the existing road, the improvement of the intersection would have no effect on the regional landform. The natural drainage line along the south side of Pialligo Avenue would require a shift south by approximately 3.5 m. The new drainage line would be formed and vegetated.

Site 5 - Oaks Estate Road and Railway Street Junction

Apart from minor changes associated with the widening of the existing road, the improvement of the intersection would have no effect on the regional landform.

Site 6 - Railway Street and Mountain Road Junction, including New Bridge Over Railway

Replacement of the bridge would have no effect on the regional landform apart from minor changes associated with the road realignment in the vicinity of the bridge. The existing road and bridge approaches would be removed after demolition of the rail overbridge.

Site 7 - Railway Street and Uriarra Road Junction

Apart from minor changes associated with the widening of the existing road, the improvement of the intersection would have no effect on the regional landform.

Site 8 - Uriarra Road and Kendall Avenue Intersection (Roundabout)

The improvements to this intersection would have no effect on the regional landform.

Site 9 - Kendall Avenue North

The improvements at this site would have no effect on the regional landform.

7.2.2 Geology and Soils

Queanbeyan

Soils within Queanbeyan tend to be relatively infertile (SoE, 1997). Physical disturbances, such as land clearing, can cause soils to become unstable leaving them vulnerable to both water and wind erosion. The infertile soils present on the high ridges and upper slopes tend to be shallow and of stony consistency. The soils that cover the flats and valleys are generally deeper and promote better drainage, particularly the naturally sandy and silty soils (river sediment formed from alluvium) that lie along the banks of the Queanbeyan River. While these soils are relatively fertile and favourable for good vegetation growth, they are particularly vulnerable in environments where increased urbanisation occurs.

Most of the terrain in the region is hilly to undulating and covered with thin gravely soils and outcrop, with colluvium accumulating at the base of the steeper slopes. The less undulating areas have a thicker development of residential podsolic soils and earths. Alluvium can be found on terraces and benches adjacent to the rivers.

The geological structure of the area comprises middle to upper Ordovician current bedding, marine deposition, sandstone, siltstone, shale and radiolarian chert (Pittman formation) with outcropping of black siliceous graptolitic shale (Acton Shale member) occurring near the western boundary. The formation is strongly folded with a moderate to strong fracture cleavage, including some slaty cleavage. Two significant fault lines bound it: the Sullivan's fault and the Queanbeyan fault.

Oaks Estate

Oaks Estate lies within the valley created by the Cullarin Horst and the Canberra Rift. Two significant fault lines run through the valley, Sullivan's Fault to the east and the Queanbeyan Fault further to the west of the Queanbeyan City area. Sullivan's Fault traverses the abattoir site.

Like Queanbeyan, the parent rock within Oaks Estate comprises of middle Ordovician sediments from the Pittman Formation. Outcropping of black siliceous Acton Shale occurs near the western boundary of the study area with Middle Silurian sandstone found to the west of Sullivan's Fault. The landscape is dominated by gently undulating hills and rises. The floodplain adjacent to the Molonglo River is relatively narrow with steep slopes declining to the plain.

The resulting soils range from alluvial sands along the river, to red earths and podsols with lithosols found on the steeper slopes. Podsols contain clay loams, which have the potential to erode quite badly once exposed.

Environmental Impacts and Mitigation Measures

Given that the sites are mostly paved, the potential for soil erosion is low. However, the sites are located in the vicinity of stormwater drains or natural drainage lines. As a result, suitable erosion and sediment control measures would be implemented to ensure that the environmental impact of the construction works is minimised.

Construction works in the vicinity of Molonglo River (Site 4 and Site 5) would increase the possibility of sediment migrating from the site into the water.

Soil erosion control measures would be implemented as outlined in the *Soil Erosion and Sediment Control Plan* shown in Appendix C.

7.2.3 Climate

The region experiences four distinct seasons with a wide range of temperatures. Canberra is located in a rain shadow area and therefore experiences a relatively low annual rainfall. The Bureau of Meteorology has several weather stations in the ACT, the closest one to the proposed sites is located at Canberra International Airport.

The average annual rainfall at the Airport weather station is approximately 630 mm, a large proportion of which falls over the warmer months between October and March. Rainfall can vary across the Territory, and therefore, the reading at the Airport is only an indication of the rainfall across the whole of the ACT.

The average statistics for various climatological parameters are outlined in Table 7.3. These statistics have been taken from the Airport recording station (Bureau of Meteorology: www.bom.gov.au).

Table 7.3
Mean Canberra Airport Climatological Data to 2001

Parameter	January	April	July	October	Annual
Temperature					
- Mean daily maximum (°C)	27.7	19.8	11.2	19.2	19.5
- Mean daily minimum (°C)	13.0	6.6	- 0.2	6.0	6.4
Mean Rainfall (mm)	61.5	49.5	42.0	65.6	630.5
Mean Daily Evaporation (mm)	8.1	3.6	1.7	5.1	4.6
Mean Clear Days (days)	9.0	8.1	8.4	8.0	98.0
Mean Cloudy Days (days)	10.3	9.8	11.2	11.0	129.1
Mean Rain Days (days)	7.7	7.4	9.9	10.5	105.9
Mean Daily Sunshine (hrs/day)	9.3	7.1	5.6	8.5	7.6

The Bureau of Meteorology carried out a wind frequency analysis (seasonal, all hours combined) for data from the Airport. Detailed information provided by the Bureau is provided in Table 7.4. All values listed in Table 7.4 are percentage frequencies.

Table 7.4
Wind Frequency Analysis

Km/h	N	NE	E	SE	S	SW	W	NW	All
Summer (Calm 33)									
1-10	3	4	6	5	2	1	2	3	26
11-20	2	3	6	3	1	*	3	5	24
21-30	1	1	3	1	1	*	3	4	14
>30	*	*	*	*	*	*	1	1	4
All	6	8	15	8	4	2	11	13	100
Autumn (Calm 44)									
1-10	3	3	4	4	3	1	2	4	23
11-20	2	1	3	2	2	*	2	6	19
21-30	1	*	1	1	1	*	2	5	11
>30	*	*	*	*	*	*	1	2	3
All	7	4	7	7	6	1	7	16	100
Winter (Calm 41)									
1-10	4	2	1	3	2	1	2	3	17
11-20	4	1	1	1	2	*	2	8	19
21-30	2	*	*	*	1	*	3	9	16
>30	*	*	*	*	*	*	1	4	6
All	10	2	2	5	6	1	8	25	100
Spring (Calm 32)									
1-10	4	3	3	3	2	1	2	4	21
11-20	4	2	2	2	1	*	3	8	23
21-30	2	*	1	1	1	*	4	8	17
>30	*	*	*	*	*	*	2	3	7
All	10	5	6	5	5	1	11	24	100

(Source: Bureau of Meteorology, March 2000)
* Indicates the range occurred but with a frequency of less than 0.5%.

The analysis revealed the following trends:

- Prevailing winds at the site in autumn, winter and spring are northwesterly. These winds occur 16% of the time in autumn, 25% of the time in winter and 24% of the time in spring; and
- In summer, the winds are predominantly easterly, and occur 15% of the time. Westerly and northwesterly winds occur 11% and 13% of the time, respectively, in summer.

7.2.4 Landform Stability and Erosion Hazard

The nature and locations of the proposed works means that the chance of erosion and sedimentation is low. The RTA proposes to adopt measures to control erosion and sedimentation and would seek advice from the Department of Land and Water Conservation (DLWC) for appropriate procedures.

Any modifications made to ground surfaces at the sites would be restored to their former state after completion while ensuring the stability of the soil.

Environmental Impacts and Mitigative Measures

The proximity of works to the Molonglo River at two sites (4 and 5) means that care would need to be taken during construction. Potential impacts include soil disturbance and sedimentation, however, in order to minimise these impacts, the following mitigation measures would be implemented:

- Soil disturbance would be minimised as far as possible in order to reduce erosion;
- Channels leading to and from culverts and drainage lines would be lined, if necessary, to prevent scouring from high flow velocities;
- The table drain formed on either side of the road that would flow into the Molonglo River would be vegetated and maintained;
- Cleared areas would be revegetated with native species that are local to the area (refer Section 7.2.8); and
- Revegetated areas would be protected from disturbance using barriers during and after construction works. These areas would be inspected to ensure revegetation has been successful.

More detail is provided in the *Soil Erosion and Sediment Control Plan* (Appendix C).

7.2.5 Air Quality

General Area

The ACT and Queanbeyan City enjoys generally clean air, and a pleasant climate. Their position inland ensures a wider temperature range than coastal areas. The lack of concentrated heavy industry helps to ensure that pollutant loadings are relatively low and is usually dispersed. However, higher concentrations of pollutants may occur briefly in certain areas, such as close to busy roads during peak periods. Inversions can occur on some clear winter nights, trapping pollutants (such as wood smoke from domestic fireplaces and stoves) close to the ground.

Ambient Air Quality

Given the nature of surrounding land uses, the ambient air quality in the area results from a range of industrial and rural activities. The main air pollutants are nitrogen oxides and carbon monoxide (from traffic emissions), sulfur dioxide (from fossil fuel burning) and particulates (from domestic fires in residential areas).

Site 8 - Uriarra Road and Kendall Avenue Intersection

Stormwater runoff at the intersection of Uriarra Avenue and Kendall Avenue North enters the stormwater system through large concrete drains along the side of both Uriarra Avenue and Kendall Avenue North.

Site 9 - Kendall Avenue North

Stormwater runoff in Kendall Avenue North enters the stormwater system through concrete drains along the sides of the road.

Environmental Impacts

The current drainage system at Sites 1, 4, 5, 6 and 7 would require revision, while those at Sites 2, 3, 8 and 9 would remain unchanged.

At Site 4 the table drain present on the western edge of Bungendore Road (Site 1) would have to be reformed further to the west following the inclusion of the acceleration lane, extending 150 metres north. Stormwater flow would remain in a southerly direction towards the drain on the northern corner of Thurralilly Street and Bungendore Road. Following the widening of this corner, the drain would be relocated but stormwater would still be collected at this point. The other stormwater drains in Thurralilly Street would remain unchanged.

The existing table drains along both the northern and southern edges of Pialligo Road east of Oaks Estate Road would require relocation further towards the road reserve boundaries due to the proposed widening of the road. Increasing the road width would facilitate deceleration and acceleration lanes as well as the proposed seagull treatment. This would not dramatically change stormwater flow, which would continue to flow east towards the Molonglo River.

The impermeable surface area at Site 5 would be increased by the proposal, thus resulting in greater stormwater flow. The upgrade also proposes to level the rise to the west on Railway Street. This would reduce the velocity of stormwater flow. Stormwater would be collected in the existing drains located on either side of Oaks Estate Road.

The rail overbridge at Site 6is the high point of this location. Stormwater on the bridge would flow through channel drains located on either side of the bridge onto the railway. Stormwater flow below the bridge abutment heights would flow either north along Mountain Road, east along Railway Street or south along south Railway Street. Stormwater flow, following the improvements, would duplicate the current local drainage environment.

The increase in road widths at Site 7 would result in stormwater drainage extending further south along Uriarra Road/ Norse Road, and further east and west along Railway Street. The improvements proposed would not require the relocation of any drains. An increase in impermeable surface area would increase the level of stormwater flows, however this amount would be negligible.

During construction activities would be undertaken in accordance with the Erosion and Sediment Control Plan (refer Appendix C).

7.2.7 Water Quality

The major legislative control for water quality in NSW is the *Protection of the Environment Operations Act 1997* (NSW), administered by the NSW EPA, while water quality in ACT is by Environment ACT in accordance with the *Environment Protection Act 1997* (ACT) and *Environment Protection Regulations* 1997 (ACT).

Schedule 3 *Environment Protection Regulations* 1997 (ACT) describes the pollutants that enter waterways, while Schedule 4 outlines the water quality standards, specifically accepted limits. Any pollutant specified in Schedule 3 or above the value specified in Schedule 4 is taken to cause environmental harm.

General Area

The main source of waters discharged legally into Queanbeyan streams are treated wastewaters derived from treated sewage generated in Queanbeyan City. Approximately 99.8% of premises are connected to the sewers. Sewage is treated at the Queanbeyan Sewage Treatment Works before being discharged into the Molonglo River. The Sewage Treatment Plant is located in the ACT just across the ACT/NSW border.

The potential for pollution from septic systems is very low since only 0.2% of premises rely on septic systems for effluent removal.

Stormwater is managed through a network of stormwater drains that feed into the Queanbeyan River and its tributaries. Approximately 90% of premises are connected to the stormwater system. The majority of these drains carry runoff from urban areas. However, closer to the ACT border runoff from the Queanbeyan Industrial Area is carried through the stormwater drains. Queanbeyan City Council has monitored this area closely with the aim of reducing stormwater pollution generated in industrial areas to improve the quality of stormwater entering the waterways.

In addition to licensed discharges, there have been a number of pollution incidents. These are generally related to soil erosion and oil contamination of drains.

The majority of water quality monitoring has been undertaken in the vicinity of the sewage treatment works in the ACT section of the Queanbeyan/Molonglo River (SoE Report 1997 Australian Capital Region). The average turbidity level on the Molonglo River at the ACT/Queanbeyan border was 5.8 NTU (nephelometric turbidity units), which is well below the guideline value of 10 NTU.

The little data available for dissolved oxygen (DO) show concentrations in the order of 8 to 9 mg/L. This is in excess of the 4 mg/L stipulated by the guidelines. Increased DO levels indicate that the treatment works is effectively removing contaminants from effluent prior to discharge in the Molonglo River.

Median phosphorous levels (measured as phosphates (PO_4^{3-})) both upstream and downstream of the Sewage Treatment Works are below the guideline value of 0.1 mg/L. Very occasionally, the phosphorus levels at the Sewage Treatment Works exceed the guidelines indicating the impact of the discharge on the aquatic system. High levels of phosphorus are usually accompanied by reduced DO when this occurs.

As part of the Queanbeyan River Corridor Management Plan, the Council began monitoring the Queanbeyan River in June 2000. Prior to 2000, very little water quality monitoring has been undertaken in the Queanbeyan River or the Molonglo River below the Sewage Treatment Works.

Site Specific Water Quality

The potential sources of surface water (and subsequent river, creek and drain line) pollution that currently exist at each site are described below.

Site 1 – Bungendore Road and Thurralilly Street Junction

Precipitation is the main source of surface water runoff. It is possible that accumulated oils and grease from the road may pollute the surface water. Sediment from the unsealed shoulders and the industrial subdivision being developed on the northern corner of Bungendore Road and Thurralilly Street may also pollute surface water. Hay bales are present near the drains on Bungendore Road, possibly in place as a result of the industrial subdivision. Other incidental sources of pollution of the stormwater system are from domestic activities (car washing, watering of gardens, spills and cleaning). Spills could enter the stormwater system through the drains.

Site 2 – Aurora Avenue

It is possible that accumulated oils and grease from the road may pollute the surface water. Sediment from the unsealed shoulders and the industrial subdivision being developed along Faunce Street may also pollute surface water. There appears to be no other incidental sources of pollution. Spills could enter the stormwater system through the drains.

Site 3 – Aurora Avenue and Yass Road Junction

Accumulated oils and grease from the road may pollute the surface water. Other incidental sources of pollution of the stormwater system are from domestic activities (car washing, watering of gardens, spills and cleaning). Spills could enter the stormwater system through the drains.

Site 4 – Pialligo Avenue/Oaks Estate Road Junction

Apart from the possibility of any accumulated oils and grease from the road polluting the surface water, there appear to be no other incidental sources of pollution of the stormwater system. Spills, if contained, have no immediate mechanism of entering the stormwater system.

Site 5 – Oaks Estate Road and Railway Street Junction

It is possible that accumulated oils and grease from the road may pollute the surface water. Sediment from the unsealed shoulders along the roads may also pollute the surface water. The natural swales in the open drains act to control the movement of sediment. There appears to be no other incidental sources of pollution. Spills or incidents from the traffic or industry in the area could enter the stormwater system through the drains.

Site 6 – Railway Street and Mountain Road Junction, including new bridge over railway

Accumulated oils and grease from the road may also pollute the surface water at this site. Sediment movement may be generated from the unsealed shoulders of Railway Street and the unsealed Mountain Road. The natural swales in the open drains along the roads control the movement of sediment. There appears to be no other incidental sources of pollution. Spills, if contained, have no immediate mechanism of entering the stormwater system, as there appears to be no stormwater drains in the vicinity of this intersection.

Site 7 – Railway Street and Uriarra Road Junction

Accumulated oils and grease, as well as sediment from the unsealed shoulders of Norse Road may be problematic for this site. The natural swales in the open drains along the roads control the movement of sediment. There appears to be no other incidental sources of pollution. Spills, if contained, have no immediate mechanism of entering the stormwater system, as there appears to be no stormwater drains in the vicinity of this intersection.

Site 8 – Uriarra Road and Kendall Avenue Intersection

Apart from the possibility of any accumulated oils and grease from the road polluting the surface water, other incidental sources of pollution of the stormwater system are from domestic activities (car washing, watering of gardens, spills and cleaning). The petrol station on the east corner of Uriarra Avenue and Kendall Avenue North Spills has potential of pollution if an incident were to occur. Spills could enter the stormwater system through the drains.

Site 9 – Kendall Avenue North

Apart from the possibility of any accumulated oils and grease from the road polluting the surface water, there appear to be no other incidental sources of pollution of the stormwater system. Spills could enter the stormwater system through the drains.

Environmental Impacts and Mitigation Measures

The construction of roads and associated works can alter catchment hydrology, ecology and the quality of the stormwater generated from catchments. Measures would be implemented to offset these effects as outlined in Appendix C with the aim of ensuring for each site:

- No contaminated water, including that containing sediments, would leave the site;
- Stormwater runoff from the site reflects patterns, volumes and quality that exists prior to development, as far as is reasonably practicable; and
- Naturalised drainage lines are maintained, as far is practicable, in order to enhance ecological values and recreational or amenity opportunities.

Implementation of the *Soil Erosion and Sediment Control Plan* (Appendix C) would be used to address these issues. The plan has taken into account the Technical Report, prepared by the Cooperative Research Centre for Catchment Hydrology, entitled *Water Sensitive Road Design – Design Options for Improving Stormwater Quality of Road Runoff*).

Construction activities close to the Molonglo River have the potential to affect water quality if sediment or spillages reach the river. The installation of sediment fences using geo-textile at the end of any drain leading to the river would act as a permeable siltation basin and minimise sediment pollution in the river. The early installation of this measure prior to commencement of construction would help reduce any effects of sediment on water quality in the river.

Water quality may also be impacted as a result of the spillage of materials as a result of accidents from vehicles along the route. Increased heavy vehicle traffic volumes on the route would be expected to result in the increased risk of accidents. The route crosses the Molonglo River at two locations and spills at these locations could directly enter the river. Both bridges are in the ACT. There is no drainage containment arrangement on the Molonglo River Bridge and surface water directly enters into the river from the bridge deck. The situation is not expected to change with the proposed improvement of junctions.

Spills on the bridge could impact on the water quality of the river as no spill containment arrangement exists at present and the bridge floods occasionally. The river flows into Lake Burley Griffin at the East Basin and contaminants could enter the lake at this location. Deterioration in water quality, even if only temporary, could adversely effect the ecology of the river and the lake.

Only small increases in total traffic and the proportion of heavy vehicles are expected on Yass Road. The level of risk should consequently not increase substantially at that bridge location. Oaks Estate Road would experience an increased percentage of heavy vehicles as well as an increased percentage of light vehicle traffic due to future developments in the area. Over the

period 2002 to 2012 total traffic is predicted to increase from 5500 to 10300 vehicles. Heavy vehicle movements over the same period are predicted to increase from 170 to 620.

Of the heavy vehicles, petrol tankers transporting hazardous materials would amount to 1% of total heavy vehicles. Consequently the level of risk of an accident involving these vehicles would be low to very low.

In the event of an accident, the Yass Road crossing poses less risk than the approaches and bridge on the Oaks Estate Road. The road and bridge design on the Yass Road provide some opportunity to contain a spill. The low-level bridge and relatively steep approaches on the Oaks Estate Road provide little opportunity for containment.

Prior to construction of the route upgrade, an emergency procedure plan would be developed, which would be implemented in the event of an accident or spill at both bridge locations. The plan would include containment and clean-up measures on the bridge and roadway, as well as in the river.

7.2.8 Flora

General Area

Diversity of species in the region is considered to be high, with Queanbeyan City LGA being the home of the second largest known population of the grassland and woodland species, Button Wrinklewort *Rutidosis leptorrhynchoides* in NSW – the third largest in Australia. In a study area of 1065 hectares in forests, woodlands and grasslands of the Queanbeyan City LGA, 270 native species and 80 introduced species were recorded (Barrer). This study formed the basis of the Queanbeyan Bushland Management Plan (GHD, 1994).

The natural vegetation in the area is broadly classified as dry sclerophyll forest/woodland and savanna woodland, with areas of native grasslands occurring in west Queanbeyan and near the Queanbeyan River to the southeast of the city.

Two main bushland tree cover communities are evident in the area:

- Red Stringybark *Eucalyptus macrorhyncha* – Scribbly Gum *Eucalyptus rossii;* and
- Yellow Box *Eucalyptus melliodora* – Blakely's Red Gum *Eucalyptus blakelyi.*

Examples of understorey or independent scrublands in the area are:

- Branching Grevillea *Grevillea ramosissima;*
- Small-fruited Hakea *Hakea microcarpa;*
- River Lomatia *Lomatia myricoides;*
- Silky Hakea *Hakea sericea;*
- Creek Tea-tree *Leptospermum obovatum;*
- Swamp Paperbark *Melaleuca parvistaminea;*
- River Bottlebrush *Callistemon sieberi;*
- Bushy Curved Rice-flower *Pimelia curviflora spp. Gracilis;*
- Pomaderris *Pomaderris eriocephala;* and
- Hempbush *Gynatrix pulchella.*

Other abundant and characteristic species of grassy woodlands in the Queanbeyan City LGA include:

- Golden *Wattle Acacia pycnantha;*

- Hoary Sunry *Leucochrysum albicans var tricolour;*
- Clustered Everlasting *Chrysocephalum semipapposum;* and
- Yellow Buttons *Chrysocephalum apiculatum.*

Grassland species include:

- *Stipa spp;*
- *Danthonia spp;*
- *Aristida ramosa;*
- *Panicum effusum;*
- *Themeda triandra;* and
- *Chronochloa pallida*

Oaks Estate

The original vegetation of the Oaks Estate area was grassy woodland of Yellow Box and Red Gum. This is an open woodland community, in which Yellow Box (*Eucalyptus melliodora*) and Blakely's Red Gum (*Eucalyptus blakelyi*) are usually present and commonly dominant or co-dominant. Apple Box (*Eucalyptus bridgesiana*) is a frequent associate species. Typically the trees form an open canopy above a species-rich understorey of native tussock grasses, herbs and scattered shrubs. The combination results in a variegated mosaic of vegetation groupings that is transitional between forest and grassland. Yellow Box/Red Gum Grassy Woodlands are inhabited by a wide variety of animal species, including birds, bats, reptiles, ground dwelling and arboreal mammals as well as invertebrates (ACT Government, 1999).

Human impact has been significant in altering the environment through land clearing and stock grazing, the introduction of non-native flora, particularly willow (*Salix spp.*) influencing river flows and river sediment deposition. Tree and shrub planting in the urbanised area's public spaces has included both native and exotic species.

Site Specific Flora

Site 1 – Bungendore Road and Thurralilly Street Junction

The native vegetation at this site is dominated in the tree stratum by Red Box (*Eucalyptus polyanthemos*), however, Red Stringybark (*Eucalyptus macrorhyncha*) also occurs within this area. Australian Blackthorn (*Bursaria spinosa*), Spreading Wattle (*Acacia genistifolia*), Poverty Wattle (*Acacia dawsonii*) and Spiny Bitter Pea (*Daviesia genistifolia*) dominate the shrub stratum. Ground cover is dominated by a variety of native and introduced grasses and other exotics. Species include Kerosene Grass (*Aristida ramosa*), Kangaroo Grass (*Themeda triandra*), Lamb's Tongue (*Plantago lanceolata*), Blackberry (*Rubus fruiticosus*), Canary Grass (*Phalaris aquatica*), Wallaby Grass (*Danthonia spp.*), Quaking Grass (*Briza maxima*), Cocksfoot (*Dactylis glomerata*) and Barley Grass (*Hordeum spp.*).

A complete list of all the species identified in this area is located in Table 7.5.

Table 7.5
Flora Species Recorded at Site 1

Species	Common Name	Habit
Acacia dawsonii	Poverty Wattle	Shrub
Acacia genistifolia	Spreading Wattle	Shrub
Acacia mearnsii	Late Black Wattle	Small Tree
Acacia rubida	Red-stem Wattle	Small Tree
Aristida ramosa	Kerosene Grass	Grass
Amyema miquelii	Mistletoe	Parasitic Shrub

Species	Common Name	Habit
Briza maxima *	Quaking Grass	Grass
Bursaria spinosa	Australian Blackthorn	Shrub
Cassinia arcuata	Drooping Cassinia	Shrub
Cheilanthes austrotenuifolia	Rock Fern	Fern
Cotoneaster spp. *	Cotoneaster	Shrub
Dactlis glomerata *	Cocksfoot	Grass
Danthonia spp.	Wallaby Grass	Grass
Daviesia genistifolia	Spiny Bitter Pea	Shrub
Dodonaea viscosa subsp. spatulata	Narrow-leaf Hop-bush	Shrub
Eucalyptus macrorhyncha	Red Stringybark	Tree
Eucalyptus polyanthemos	Red Box	Tree
Hordeum spp. *	Barley Grass	Grass
Juncus filicaulis	Pinrush	Rush
Leucochrysum albicans	Hoary Sunray	Forb
Lepidosperma gunii		Sedge
Lissanthe strigosa	Peach Heath	Shrub
Lomandra multiflora	Many-flowered Mat-rush	Sedge
Malva spp. *	Mallow	Forb
Phalaris aquatica *	Canary Grass	Grass
Plantago lanceolata *	Lamb's Tongue	Forb
Rosa rubiginosa *	Sweet Briar	Shrub
Rubus fruiticosus *	Blackberry	Climber
Themeda triandra	Kangaroo Grass	Grass
Trifolium repens *	White Clover	Forb

* Exotic Species

Development at this site would require the removal of the vegetation that exists on the eastern corner of the Bungendore Road and Thurralilly Street intersection. The vegetation that is to be removed as a result of this proposed option consists of a total of 4 Red Box trees, 1 Spreading Wattle shrub and 1 Drooping Cassinia shrub. Details of these species are located in Table 7.6. Ground cover in this area consists of exotic and native grasses and a variety of weeds as previously mentioned.

Table 7.6
Species to be removed from the Eastern Corner of the Bungendore Road and Thurralilly Street Intersection

Species	Habit	Height (m)	Circum. (cm)	Adult/Juvenile	Comments
Red Box	Tree	6	51	J	Dieback
Red Box	Tree	8	60	J	Dieback
Red Box	Tree	15	175	A	Dieback, Possible Hollows – None Visible
Red Box	Tree	16	225	A	Dieback, Mistletoe
Spreading Wattle	Shrub	2		A	
Drooping Cassinia	Shrub	0.5		J	

In addition to the removal of this section of vegetation, the vegetation that exists along the northern side of Bungendore Road stretching 200m east of Thurralilly Street would also be removed. Within this section of vegetation a total of 8 trees exist. Details of these trees are located in Table 7.7. The shrub stratum within this section of vegetation contains a variety of species including Australian Blackthorn, Poverty Wattle, Narrow-leaf Hop-bush (*Dodonaea viscosa subsp. spatulata*), Drooping Cassinia, Spiny Bitter Pea, Spreading Wattle and Late Black Wattle (*Acacia mearnsii*). These shrubs range in height from 0.5 – 2m. The ground cover stratum is comprised of a mixture of native and exotic grasses and also a variety of weed species

as previously mentioned. Other native species also occur in the area and include Many-flowered Mt-rush (*Lomandra multiflora*), Rock Fern (*Cheilanthes austrotenuifolia*) and Hoary Sunray (*Leucochrysum albicans*) also occur within this area.

Table 7.7
Trees to be removed from the Northern Side of Bungendore Road

Species	Habit	Height (m)	Circum. (cm)	Adult/Juvenile	Comments
Red Box	Tree	14	137	A	Dieback, Mistletoe
Red Box	Tree	11	150	A	Dieback
Red Stringybark	Tree	11	210	A	Dieback, Reshooting
Red Stringybark	Tree	15	156	A	Dieback
Red Stringybark	Tree	13	190	A	Dieback
Red Stringybark	Tree	13	80	J	Dieback
Red Stringybark	Tree	14	86	J	Dieback
Red Box	Tree	10	188	A	Dieback, Possible Hollows – None Visible

Site 1 occurs within NSW and as such the relevant NSW legislation was considered as a part of this assessment. Particular consideration was given in regards to the *Threatened Species Conservation (TSC) Act, 1995*. However, no species, populations or ecological communities as listed under this Act were recorded within Site 1. Consequently it was determined that an eight-part test under the *TSC Act, 1995* was not required for this assessment.

The proposed compound area would involve no disturbance to native vegetation (refer Figure 3.1).

Site 2 – Aurora Avenue

No native vegetation exists at this site. Therefore no negative impacts upon native vegetation would occur at this site as a result of this proposal.

Site 3 – Aurora Avenue and Yass Road Junction

No native vegetation exists at this site. Therefore no negative impacts upon native vegetation would occur at this site as a result of this proposal.

Site 4 – Pialligo Avenue/Oaks Estate Road Junction

This site is dominated by exotic grasses and a variety of other weed species including Lamb's Tongue), White Clover (*Trifolium repens*), Onion Grass (*Romulea rosea*), Canary *Grass*), African Boxthorn (*Lycium ferocissimum*) and Paterson's Curse (*Echium plantagineum*). Native remnant trees including Red Box trees are also scattered throughout this area. No native remnant understorey is present at this site. The area to the west of Oaks Estate Road and Pialligo Avenue junction has been identified as Yellow Box/Red Gum Grassy Woodland which is an Endangered Ecological Community (EEC) under the *Nature Conservation Act, 1980*. According to the ACT Action Plan No. 10 this section of Yellow Box/Red Gum Grassy Woodland has been identified as having moderate conservation value (ACT Government, 1999). The proposed works for this site would have no impact upon this section of Yellow Box/Red Gum Grassy Woodland.

The proposed works at this site would require the removal of a section of vegetation that exists to the east of Oaks Estate Road, along Pialligo Avenue. Within this section of vegetation a total of 1 Red Box) tree exists. This tree is a mature tree, 16 m in height and has a trunk circumference of 358 cm. This tree has the potential to contain hollows suitable for fauna habitat although none were visible. This tree also suffers greatly from dieback and the base of the tree is densely

surrounded by African Boxthorn. The rest of the area to be removed at this site consists of bare ground and exotic species including those already mentioned above.

The area proposed for the compound (refer Figure 3.3) has four juvenile eucalpyts which would be protected from disturbance in accordance with the measures outlined in Section 8.

Site 5 – Oaks Estate Road and Railway Street Junction

No native remnant vegetation exists at this site. This area has been highly disturbed in the past and as a result the vegetation at this site is dominated by exotic grasses and a variety of weeds including White Clover, Lamb's Tongue, Sheep's Burr (*Acaena ovina*), Cocksfoot and Canary Grass).

Site 6 – Railway Street and Mountain Road Junction, including new bridge over railway

Vegetation at this site consists of a number of scattered remnant Eucalypt trees and regenerating saplings, predominantly Apple Box (*Eucalyptus bridgesiana)* and (Red Box species. The shrub/small tree stratum is dominated by the environmental weed Cootamundra Wattle (*Acacia baileyana*), however a few Late Black Wattle species also occur. The ground cover in this area consists of a variety of introduced grasses and other weed species, including, White Clover), Cocksfoot), Wild Oat Grass), Canary Grass), Mallow (*Malva spp.*), Sheep's Burr (*Acaena ovina*), African Lovegrass (*Eragrostis curvula*) and Lamb's Tongue (*Plantago lanceolata*).

The proposed works at this site would require the removal of a section of vegetation running along the western side of Railway Street. Within this section of vegetation a total of 11 Eucalypt trees exist. These trees are described in detail in Table 7.8. Additionally, approximately 20 Cootamundra Wattle (*Acacia baileyana*) small trees and a few Eucalypt saplings also occur. The ground cover is dominated by a variety of weeds and exotic grasses and includes those species as mentioned above. Many of the trees and shrubs within this section of vegetation show evidence of a recent fire, with many of the plants retaining very little pre-fire foliage and as a result are resprouting heavily.

Table 7.8
Trees to be Removed from the Western Side of Railway Street

Species	Habit	Height (m)	Circum. (cm)	A/J	Comments
Eucalyptus ridgesiana	Tree	12	105	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	8	48	J	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	16	147	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	16	127	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	16	129	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	16	95	J	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	14	148	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	14	100	A	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	13	55	J	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	12	39	J	Burnt, Resprouting.
Eucalyptus ridgesiana	Tree	12	70	J	Burnt, Resprouting.
Eucalyptus olyanthemos	Tree	15	317	A	

Site 7 – Railway Street and Uriarra Road Junction

Vegetation at this site is dominated in the tree stratum by Apple Box). In addition, however, small trees/shrubs such as Cootamundra Wattle (*Acacia baileyana*), Cotoneaster (*Cotoneaster spp.*) and Late Black Wattle also occur. Exotic species such as Onion Grass), Lamb's Tongue), African Lovegrass), Canary Grass) and Sheep's Burr are prevalent in this area, however, native species

such as Many-flowered Mat-rush, Blue Flax Lily (*Dianella revoluta*), and Kangaroo Grass) also occur within this area.

As a result of the proposed works that are to be conducted at this site, a section of vegetation would be removed from along the southern side of Norse Road. This section of vegetation contains a total of 2 Apple Box) trees and approximately 8 saplings. The two trees are 10m and 14 m in height and have a trunk circumference of 80 cm and 275 cm. Both trees suffer varying degrees of dieback and are of moderate condition. The shrub stratum in this section of vegetation consists of Eucalypt saplings, as already mentioned, and range in height from 2-4 m. A few Late Black Wattle) shrubs also occur within this area. The ground cover within this area includes species as mentioned above. The presence of exotic species in this section of vegetation is attributed to disturbances such as fragmentation and stormwater runoff. Due to the removal of such a small section of vegetation from this area, it is expected that impacts resulting from the proposed works would have minimal impact on the state of the overall vegetation occurring at this site.

The proposed compound site would not involve removal of any vegetation (refer Figure 3.6).

Site 8 – Uriarra Road and Kendall Avenue Intersection

No native vegetation exists at this site. Therefore no negative impacts upon native vegetation would occur at this site as a result of this proposal.

Site 9 – Kendall Avenue

No native vegetation exists at this site. Therefore no negative impacts upon native vegetation would occur at this site as a result of this proposal.

7.2.9 Fauna

Due to the proposed sites being located along existing roadways and the limited disturbance associated with the proposed works no impact on habitat value or fauna is expected as a result of either the construction works or the final works. Table 7.9 lists the threatened fauna of the Queanbeyan City LGA (SoE Report 2000/2001).

Table 7.9
Threatened Fauna of the Queanbeyan City LGA

Common Name	Scientific Name	Status/Location
Common Bent-Winged Bat	*Miniopteris Schreibersii*	Vulnerable / Trapped in LGA, likely to be using most of the native vegetation in the area.
Grassland Earless Dragon	*Tympanocryptis lineata pinguicolla*	Endangered / Poplars.
Pink-Tailed Legless Lizard	*Aprasia parapulchella*	Vulnerable / Barracks Flat Drive.
Heath Monitor	*Varanus rosenbergi*	Vulnerable / Queanbeyan Escarpment Gale Precinct.
Striped Legless Lizard	*Delmar impar*	Vulnerable / Not recorded in Queanbeyan LGA, but is a possible habitat. Nearest sites are in ACT.
Regent Honeyeater	*Xanthomyza phrygia*	Endangered / Not recorded in Queanbeyan LGA, but may be a visitor.
Painted Honeyeater	*Grantiella picta*	Vulnerable / Not recorded in Queanbeyan LGA, but may be a visitor.

Common Name	Scientific Name	Status/Location
Swift Parrot	*Lathamus discolor*	Endangered / Not recorded in Queanbeyan LGA, but may be a visitor.
Glossy Black Cockatoo	*Calyptorhynchus lathami*	Vulnerable / Not recorded in Queanbeyan LGA, but may be a visitor.
Koala	*Phascolarctos cinereus*	Vulnerable / Yarrowlumla Shire, no records in Atlas for Queanbeyan City however an individual was reported on the southern slopes of Mt. Jerrabomberra in late 1999.
Tiger Quoll	*Dasyurus maculatus*	Vulnerable / Yarrowlumla Shire, unlikely to be any resident individuals in Queanbeyan LGA.

There are few fauna studies associated with the Oaks Estate area. In general, studies have been carried out focussing on suitability of habitat for fauna species and birds have been recorded incidentally with vegetation studies.

Fifty-four bird species were recorded over six visits within the Oaks Estate area in November 1996 (Crawford 1996) and an additional five species had been recorded at the abattoir site in February 1994. These results can be compared with a similar study carried out in relatively good quality woodland at Campbell Park in December 1993 (Howard 1994) when 54 species were recorded within two hours. The most common birds were the Common Starling *Sturnus vulgaris*, Common Myna *Acridotheres tristis*, the Galah *Cacatua roseicapill*, Feral Pigeon *Colombia livia*, and the House Sparrow *Passer domesticus*. Birds that use the habitat provided by natural temperate grasslands includes common species such as the Australian Magpie and the Willy Wagtail (ACT Government, 1997) both of which are present within the study area. In a study of the larger area including all the Majura Holding Paddocks undertaken in 1994, 74 bird species were recorded (Abel et al 1996).

Disturbance to Site 7 would involve the removal of some vegetation including two trees and some shrubs along the edge of Norse Road. No fauna was observed during site investigations and due to the modified nature of the area and the level of traffic the site would have limited habitat value.

7.2.10 Matters of National Significance

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* 1999 identifies six matters of national environmental significance:

- World Heritage properties;
- Ramsar Wetland of international significance;
- Listed threatened species and ecological communities;
- Listed migratory species;
- Commonwealth marine areas; and
- Nuclear actions.

Under the EPBC Act actions that are likely to have a significant impact on a matter of national significance are subject to the Commonwealth assessment and approval process.

The proposed works are not expected to adversely affect any threatened species, population or ecological community due to extent and nature of works proposed. In addition, the proposal does not involve nuclear actions. Hence the proposed works does not require a Referral under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

7.2.11 Socio-Economic Considerations

NSW

With a population of over 30 000 persons concentrated within the city limits, Queanbeyan City has one of the highest population densities in the Australian Capital Region.

Several factors contribute to the nature of Queanbeyan City population growth, including:

- Limited supply of available land due to the ACT and Shire borders; and
- The largest proportion of existing housing stock is medium density or above.

Since its settlement in 1828, Queanbeyan has evolved from being a rural based economy to one that now provides a variety of services, retail, tourism and light manufacturing which is characteristic of a modern economy. The city is well served by parks, sport, recreation and cultural facilities.

ACT

Oaks Estate is a semi-rural community on the outskirts of the ACT, separated from the NSW City of Queanbeyan by the railway line. Although small, with approximately 300 residents, Oaks Estate shares a rich local history associated with settlement in the Queanbeyan and Canberra region. It lies adjacent to the confluence of the Molonglo and Queanbeyan Rivers.

Environmental Impacts

The proposed upgrade would provide a more efficient and safer route around Queanbeyan, thus improving the amenity and ease of access for local traffic and visitors. The proposal would also provide an improvement to five individual sites in Queanbeyan and four within the ACT. Whether these are utilised as a route or individually, the proposal would improve safety on the region's roads.

The proposed northern route upgrade would be particularly important for heavy vehicles, providing safe passage around Queanbeyan and between industrial areas. The improvements made to the intersections would permit the use of the route by B-Double vehicles.

The proposal is consistent with land use policy for the proposed sites and is providing a major utility.

The proposed Queanbeyan Northern Route Upgrade would involve the permanent closure of Nimrod Road and the partial closure of Thurralilly Street.

The proposal to partially close Thurralilly Street to westbound traffic would affect access to the Rainbow Motel located on the corner of Thurralilly Street and Bungendore Road. Access to the Motel would remain from Thurralilly Street and safety would be improved as a result of an increased sight distance to the east, afforded by the widening of the southwest corner of the intersection.

Nimrod Road provides access to the Queanbeyan Sewage Treatment Plant and the Council Nursery. There are no commercial premises located on either Nimrod or Mountain Road that would be impacted on by this proposal. Access to these facilities is available via Mountain Road, approximately 500 m west of this site. Queanbeyan City Council recognises the safety concerns associated with the location of Nimrod Road and has no objections to its proposed closure. The volume of traffic utilising Nimrod Road is minimal and the improved safety of the closure is seen to outweigh any impacts the added distance would have to the few affected.

The parking restrictions proposed along Aurora Avenue would impact on customer parking and access, for businesses adjacent to the restrictions. The restrictions would occur on the southern side of Aurora Avenue only, and the northern side of the road would be available for parking. This may mean that to gain access to south side businesses, customers and employees may have to cross the road.

The impact of the proposed improvements at the intersection of Yass Road and Aurora Avenue on the Airport Motor Inn, located less than 100 m north, would be negligible. The impacts on local noise levels would be minimal. Access to the Motor Inn would be improved as a result of the traffic signals, allowing for breaks in the traffic.

The Yass Road Takeaway located directly opposite Aurora Avenue on Yass Road would be directly affected as a result of the proposal. The inclusion of traffic signals would impact on access to the business and affect customer parking.

The construction and operation of the bypass would provide a variety of job opportunities including, truck drivers, machinery operators and site personnel.

The RTA would undertake direct liaison with property owners/lessees affected by the proposed works in relation to property acquisition and noise impacts if any.

7.2.12 Non-Indigenous Heritage

In 1999 Queanbeyan City Council initiated a "Community Based Heritage Study' that covered cultural, indigenous and natural heritage.

The Non-Indigenous Heritage sites and items, as listed in the Queanbeyan LEP are shown in Table 4.1.

Within the ACT the Oaks Estate Village Precinct is listed on the ACT Interim Heritage Register, which includes the total residential area. However the locations listed in Table 4.2 have been nominated for their individual significance but have yet to be fully assessed. Their placement on the Interim Heritage Places Register provides legal protection under the *Land (Planning and Environment) Act 1991*.

Environmental Impacts

There would be no impact on non-indigenous heritage sites as a result of the proposed works. All the proposed works involve upgrade of existing infrastructure.

7.2.13 Indigenous Heritage

Navin Officer heritage consultants were commissioned to assess the potential impact of the project on Aboriginal sites and to identify as appropriate management strategies and mitigation measures (refer Attachment A and Section 4).

Taking account of previous landscape disturbance and known site location patterns it was concluded that intersections 4, 5, 6, and 7 should be subject to archaeological field survey. The other intersections had negligible archaeological potential due to major landscape disruption and disturbance and urbanisation.

Survey of intersections 4, 5, 6, and 7 was then conducted by archaeologist Kerry Navin and field assistant Rebecca Powell in November 2002. Ms Suzanne Malligan (Aboriginal Liaison Officer, RTA) and Mr Percy Knight (Buru Ngunawal Aboriginal Corporation) and Mr Bruce Merritt (Ngunnawal Aboriginal Corporation) also participated in the survey.

Survey involved comprehensive inspection on foot of each intersection and the road easements (reserves) within 100 m of each intersection. All areas of ground surface exposure were inspected and an assessment of the archaeological sensitivity was made for each survey area.

Environmental Impacts

Site 4 at the intersection of Oaks Estate Road and Pialligo Road has been previously disturbed as a result of road cuttings and construction, and the placement of numerous services in the road reserve (eg. Optus, AGL, electricity lines and very recently, NextGen). The top of the road batters is well grassed, however ground surface visibility was provided by recent cable easements, fence lines, and discrete devegetated areas.

Site 5 at the intersection of Oaks Estate Road and Railway Street includes a deep road cutting on either side of Railway Street. The area has been previously disturbed as a result of the road cuttings and construction, and the placement of services. The top of the road batters was well grassed, however ground surface visibility was provided by the batters and discrete devegetated areas.

Site 6 at Railway Street and Mountain Road has been previously disturbed as a result of road cuttings and construction, a deep rail cutting, rail bridge works and the placement of services. Ground surface visibility was provided by recently burnt areas and discrete devegetated areas.

Site 7 at the intersection of Uriarra Road/Norse Road and Railway Street has been previously disturbed as a result of road construction and the placement of services. The area to the east of the road appeared to be original ground surface. Rubbish was ubiquitous in this area. Ground surface visibility was provided by the small tracks and discrete devegetated areas.

No Aboriginal relics or areas of archaeological potential (PADs) were identified in the course of the field inspections at Sites 4, 5, 6 and 7.

Background research indicates that three previously recorded Aboriginal sites are located in close proximity to the western boundary of the Oaks Estate Road reserve boundary/fenceline in the vicinity of Sites 6 and 7. The sites, A4, A5 and IF2 and their locations and the areas included in the Act Heritage Listing for the sites are provided in Attachment A. Site A4 is located several metres inside the abattoir boundary fence. The ACT Heritage Council listing for the site includes a buffer zone that covers a radius of approximately 20 m around the known location of the artefacts. The majority of the proposed roadworks at Site 7 are located south of Norse Road and on the eastern side of the existing Oaks Estate Road. There are no heritage constraints to roadworks in these areas.

However there is some potential for disturbance to site A4 if land surface disturbance occurs within the abattoir property when/if the old abattoir access road is closed. In this case, the works would be occurring within the defined Heritage Council listing area for the site.

The known extent of Site A5 is located approximately 25 m south of, and inside, the northern abattoir boundary fence. The site is approximately 60 m south of the railway cutting. The ACT Heritage Council listing for the site includes a buffer zone that covers a radius of approximately 100 m around the known location of the artefacts. It is unlikely that roadworks would impact the known extent of the site. However any road/bridgeworks conducted south of the northern railway line cutting would occur within the defined Heritage Council listing area for the site.

Site IF2 is located 10 m inside the abattoir boundary fence. The Act Heritage Council listing area for this site includes a buffer zone that covers a radius of approximately 5 m around the known

location of the artefact. No roadworks are planned in the vicinity of Site IF2. There are no heritage constraints to roadworks in this area.

There is some potential for works at Site 5 to fall within an 'Area of Archaeological Potential' as defined by the Act Heritage Council in the Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra.

Although Sites 4, 5, 6 and 7 fall within general zone of archaeological sensitivity associated with the Molonglo River corridor, the disturbed context of each intersection and the adjacent road reserve limits the possibility of significant archaeological material remaining in the areas. The intersections have been assessed in the context of this present study as low archaeological sensitivity.

Legislative Requirements

ACT Heritage Unit/Heritage Council Requirements

The following requirements have been provided specifically for 'Areas of Archaeological Potential' defined by the *ACT Heritage Council in the Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra*.

C1. Places of archaeological potential require further investigation of their Aboriginal and archaeological significance prior to development.

C2. Proponents of development within the place are to be alerted to the potential for development constraints and the development application is to be referred to the Heritage Council for advice regarding appropriate further investigation.

C3. Should further investigation determine that there are no significant Aboriginal archaeological materials present in the identified place of archaeological potential then the Interim Heritage Places Register entry for the place will be amended appropriately following consultation with the Heritage Council and relevant Aboriginal organisations.

C4. Should further investigation determine that there are no significant Aboriginal archaeological materials present in the identified place of archaeological potential then the Interim Heritage Places Register entry for the place will be updated, and the Heritage Council and relevant Aboriginal organisations are to be consulted for advice regarding the appropriate management of the place.

The following requirements have been provided specifically for sites A4, A5 and A9 by the ACT Heritage Unit.

'In order to ensure that the artefacts at A4, A5 and A9 are protected:

- *all heritage places including their buffer zones are to be fenced during the relevant construction phase with all workers to have the heritage significance and any penalties that would relate to the disturbance, damage or destruction of any Aboriginal place explained to them prior to work beginning in the area;*
- *there is to be no storage of waste or any other materials within the fenced area, which will include site plus buffer zone;*
- *There is to be no parking of any vehicle, especially heavy vehicles and earth moving equipment within the fenced areas, which includes site plus buffer zone'.*

If any construction activities are going to occur within the Canberra Abattoir 4 (A4) Registered Place or Canberra Abattoir 5 (A5) Registered Place then the following requirements must be met as defined in Schedules 1 and 2 of the *Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra*.

A2. The proponent of the development within the place is to be provided with information regarding the location, nature and significance of the Aboriginal site/s and alerted to the potential for development constraint.

A3. Disturbance to the place/s should be considered a controlled activity and any interventions that will disturb their soil or significant fabric must be referred to the ACT Heritage Council and relevant Aboriginal community groups for consideration and formulation of advice.

A6. The surface artefacts that are currently on site are to be conserved in situ, unless a decision to the contrary is considered and agreed to by the Heritage Council and relevant Aboriginal community groups.

A8. Surface artefacts from the site may be collected by a qualified archaeologist in consultation with the relevant Aboriginal organisations, if advised by the Heritage Council following consultation with the relevant Aboriginal groups.

A9. Artefacts that are collected from the place are to be archived at the Heritage Unit pending establishment of an Aboriginal Heritage Keeping Place.

A13. Ground disturbance related to development activity in the location of the place must either be preceded by a program of archaeological research or be accompanied by a program of archaeological monitoring, according to the advice of the Heritage Council in consultation with the relevant Aboriginal organisations. The program of archaeological research should be designed to determine the extent and significance of the deposit and should make recommendations regarding the appropriate management and/or conservation of the place. It may include subsurface testing of deposits, at a scale and in locations recommended by the Heritage Council, in consultation with the relevant Aboriginal organisations. Monitoring must be undertaken by a qualified archaeologist on in consultation with the relevant Aboriginal organisations.

A14. The significance of any cultural deposits discovered are to be assessed following the program of research or during monitoring and if required, appropriate management actions or new specific requirements for the place are to added to the entry for the place in the Register.

Mitigation Measures

1. There is some possibility that works at Site 5 may impact the *defined 'Areas of Archaeological Potential'*.

   With regard to *ACT Heritage Council* requirements for the 'Areas of Archaeological Potential' this report has alerted the RTA to the potential for the requirement for further investigation and possible development constraints. This report would accompany the DA for Site 5 when it is referred to the Heritage Council for advice regarding appropriate further investigation (C1, C2). It was considered by Navin Officer Heritage Consultants that an adequate level of further investigation relative to intersections 4, 5, 6 and 7 had been conducted in the context of this study and that no further assessment was required (C3). This conclusion would be put to the Heritage Council for their review.

2. The ACT Heritage Unit's specific requirements for sites A4, A5 and A9 would be implemented as necessary.

3. The *ACT Heritage Council* requirements for the Canberra Abattoir 4 (A4) Registered Place and Canberra Abattoir 5 (A5) Registered Place would be implemented.

7.2.14 Landscape and Visual Considerations

The proposed upgrade to the heavy vehicle alternative route, the subject of this REF, is located to the north of the Queanbeyan CBD. Presently, heavy vehicles pass through the main street (Monaro Street) of Queanbeyan which impacts upon the amenity of the City.

The intersection upgrades proposed would create a safe alternative route for the heavy vehicles out of the CBD, thus improving the visual character of Queanbeyan.

Site Specific Landscape and Visual Considerations

The landscape and visual considerations that currently exists at each site is described as follows.

Site 1 - Bungendore Road and Thurralilly Street Junction

A motel is located on the corner of Bungendore Road and Thurralilly Street. There are also several houses and the East Queanbeyan Primary School located on the southern side of Thurralilly Street. The northern side of Thurralilly Street is characterised by business and industry. Those in Thurralilly Street would have direct view of the construction from the street frontage of their properties. There are residences on the eastern side of Bungendore Road that would have direct views to the site from their properties.

Site 2 – Aurora Avenue

Parking restrictions are proposed on the southern side of the street. This would in turn improve the amenity and safety of this street.

Site 3 - Aurora Avenue and Yass Road Junction

Site 3, at the intersection of Aurora Avenue and Yass Road, is surrounded by retail and light industry. The businesses along Yass Road would have direct views to the site, as would a small number of businesses in Aurora Avenue.

Site 4 - Pialligo Avenue/Oaks Estate Road Junction

The land to the south of Pialligo Avenue and bordering Oaks Estate Road is undeveloped and appears to be farmland. The Canberra Speedway lies a short distance to the north of the site. A high tree covered embankment runs along the northern side of Pialligo Avenue, effectively shielding the speedway from view. Road users are currently the only persons with a direct view of the site.

Site 5 - Oaks Estate Road and Railway Street Junction

There are currently two residences and nursery present at the corner of Oaks Estate Road and Railway Street. These are screened from view of the site by a hedge. Road users are currently the only persons with a direct view of the site.

Site 6 - Railway Street and Mountain Road Junction, including new bridge over railway

Site 6 is located at the railway crossing bridge in Railway Street. The Transgrid Electricity Substation is located on the corner of Railway Street and Mountain Road. Neighbouring the substation, a small distance down Mountain Road, is Gibbs Sale Yards. The land to the west and on both sides of the railway is ACT public land, which is not used extensively. An area of open space can be found to the southeast of the site, some of which is used as a horse paddock. The railway crossing bridge is a single lane sealed bridge. Road users and the very occasional workers at theTransgrid Electricity Substation have a direct view of the site.

Site 7 - Railway Street and Uriarra Road Junction

Uriarra Road has residential properties extending to the east. These houses do not have direct views to the site. Road users are currently the only persons with a direct view of the site.

Site 8 - Uriarra Road and Kendall Avenue Intersection

A Veterinary Clinic, a number of residences and businesses, as well as, road users have direct views to this site.

Site 9 - Kendall Avenue North

Site 9 is located along a flat straight stretch of Kendall Avenue North. The railway line runs parallel with the road on the north side but is shielded from view by an embankment. On the south side of the road is the Waste Minimisation Centre and assorted light industry, which have direct view of the site.

Environmental Impacts

While the visual amenity of the sites would be disturbed during the construction phase of this proposal, the proposed improvements would not considerably change the visual character of the sites once construction is complete. Nearby residents, industry and businesses, as well as, road users would those most likely impacted upon by the temporary disturbance to the visual amenity of the areas.

While construction activities would result in the removal of small amounts of vegetation at some of the sites, revegetation and landscaping would be undertaken in the road reserve once construction activities are completed. These plantings would augment the existing vegetation and lessen the extent of disturbance.

7.2.15 Noise and Vibration Effects

A noise impact study has been undertaken by Scott Wilson Nairn Pty Ltd. The report of the study is attached at Attachment B. This section summarises the results of the study.

Noise monitoring was undertaken at five locations along the proposed Queanbeyan Northern Route Upgrade to record existing conditions along areas that were deemed "noise sensitive". These measurements were taken over seven consecutive days.

The locations are:

1. Near the roundabout at Uriarra Road and Kendall Avenue North at the Veterinary Clinic, 2 m from façade.
2. At the Airport Motel on Yass Road, 1 m from façade.
3. Within the grounds of the Queanbeyan East Primary School.
4. At the residence located at 164 Uriarra Road, 1 m from façade.
5. At the intersection of Oaks Estate Road and Railway Street, 1 m from façade.

An ARL EL215 noise logger was placed at each monitoring location and left in location for a week. The logger was programmed to store the data for the various noise level descriptors for each 15 minutes of the placement.

The noise level descriptors for each location are presented in Attachment B.

Existing Conditions

Veterinary Clinic

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times, which indicates that the noise from road traffic is the dominant noise in the area. It is estimated that the data for this location includes a reflected component from the façade at 2 m of approximately 1 dB(A). It was not possible to locate the logger safely at the normal 1 m from façade where the component for reflection from the façade is considered to be 2.5 dB(A). The weekday daytime L_{Aeq} (1hr) ranges from 67 to 70 dB(A) and drops to 66 dB(A) on Sunday. The nighttime L_{Aeq} (1hr) values range from 50 to 58 dB(A).

Airport Motel

At this location the noise level is more consistent during the day and does not show higher noise levels during the morning and afternoon peak periods. The noise levels are quite constant throughout each day with L_{Aeq} (15 hr) ranging from 59 to 62 dB(A). The nighttime L_{Aeq} (9hr) values range from 50 to 59 dB(A).

Primary School

At this location the noise level shows a number of peaks during the day which are likely to be related to schoolyard activities. The weekday daytime L_{Aeq} (1hr) ranges from 54 to 56 dB(A). The nighttime L_{Aeq} (1hr) values range from 34 to 39 dB(A).

Corner of Oaks Estate Road and Railway Street

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times, which indicates that the noise from road traffic is the dominant noise in the area. The data for this location includes a reflected component from the façade at 1 m. The weekday daytime L_{Aeq} (18hr) ranges from 55 to 61 dB(A) and drops to 55 dB(A) on Sunday. The typical nighttime values range from 36 to 43 dB(A).

164 Uriarra Road

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times, which indicates that the noise from road traffic is the dominant noise in the area. The data for this location includes a reflected component from the façade at 1 m. The weekday daytime L_{Aeq} (1hr) ranges from 61 to 67 dB(A) and drops to 61 dB(A) on Sunday. The typical nighttime L_{Aeq} (1hr) values range from 47 to 51 dB(A).

Assessment

Uriarra Rd was assessed in two sections; the vet clinic at the roundabout and the house located at 164 Uriarra Rd. Noise calculations for the vet clinic assumed that traffic speed would reduce to 45 kphr at the roundabout, which would consequentially reduce vehicle noise, although some increase in truck noise emissions due to gearing up and down could be expected.

Veterinary Clinic

Existing noise conditions were monitored at the vet from the base of the clinic on Uriarra Rd. when in fact the point of interest – the residence, is on the top floor. Predicted noise levels were also estimated for this ground floor location so as to maintain continuity. The proportional increase experienced at the ground floor location from the increase in traffic would be the same, or very similar, to that experienced on the top floor.

The residence at the Vet clinic, as determined by the monitoring station, is already experiencing high noise levels ($L_{Aeq(1hr)}$ 69.1 dB) and with the proposed northern upgrade route, is predicted to increase minimally to 69.4 dB. Because the existing daytime levels are already above the recommended noise volumes specified by the NSW EPA guidelines ($L_{Aeq(1hr)}$ 60 dB), and the predicted noise levels for the daytime do not exceed the allowance of an extra 2 dB, it is deemed satisfactory. The night time noise levels only increase by 0.4 dB with the upgrade and therefore also satisfy this criteria. Thus the Vet clinic does not require noise mitigation measures at this stage, although, future noise monitoring would need to be completed to reassess the noise levels present in future years.

Airport Motel

The Airport Motel on Yass Rd is expected to experience only a small increase in daytime traffic noise levels between existing ($L_{Aeq(15hr)}$ 62.5 dB) and predicted (63.0 dB). The motel's position is set back 33 m from the road and acts as a buffer zone from the direct traffic noise. The existing noise levels at the motel are already above the recommended $L_{Aeq(15hr)}$ 60 dB limit for an arterial, so the NSW EPA's 2 dB allowance is applied. The predicted increase in daytime noise levels of 0.5 dB and 0.3 dB at night time, therefore suggests that mitigation measures are not required. Due to the nature of Yass Rd (arterial road linking Canberra and Queanbeyan) ongoing monitoring should be undertaken to ensure that noise levels do not increase excessively.

Primary School

The East Queanbeyan Primary School is classed as a sensitive land use and therefore requires that existing noise levels do not exceed $L_{Aeq(1hr)}$ 55 dB in the school playground. The main buildings are set back quite far from Thurralilly St, so are not effected greatly by the relatively small amount of traffic that currently use the road. Monitoring of the site showed that existing day time noise levels were marginal at $L_{Aeq(1hr)}$ 55.3 dB and with the closure of the eastern end of Thurralilly St and subsequent reduction in heavy vehicle usage, daytime noise levels were predicted to actually decrease to 54.2 dB in 2010. The night time noise levels were also predicted to reduce from 36.7 dB to 36.6 dB. Both the existing and predicted levels (daytime and night time) are within the NSW EPA's guidelines, so it is envisaged that no noise mitigation measures are required for the school, although ongoing monitoring should be conducted in the future.

Corner of Oaks Estate Road and Railway Street

The Oaks Estate site is the only location for this study situated within the ACT, so as such is governed by different noise criteria to the other sites. The ACT guidelines (refer Attachment B) are predominantly similar to those set out by the NSW EPA.

Oaks Estate Road at present does not experience high volumes of traffic, but with the planned northern route upgrade the traffic volumes are expected to almost double by 2010. The existing day time noise levels at the house on the corner of Oaks Estate Rd and Railway Rd was found to be $L_{A10(18hr)}$ 59.3 dB. With the inclusion of the expected extra traffic along Oaks Estate Rd, the predicted daytime noise levels for this site in 2010 was deemed to be $L_{A10(18hr)}$ 64.7 dB. The night time traffic noise volumes were predicted to increase from $L_{Aeq(1hr)}$ 40.7 dB to 43.0 dB.

The predicted levels are marginally within the ACT guidelines, so no noise mitigation measures are expected to be required for this site, although it is recommended that future monitoring be undertaken so as to ensure that the daytime noise levels do not reach levels exceeding $L_{A10(18hr)}$ 65 dB.

164 Uriarra Road

The house at 164 Uriarra Rd also experiences only a marginal increase in daytime noise levels – from $L_{Aeq(1hr)}$ 65.2 dB (existing) to 65.7 dB (predicted). This increase is slightly higher than that experienced by the Vet, due to the higher speeds at this point (vehicles decelerating as they approach the Vet). The night time volumes increase by 0.8 dB, but still lies within the NSW EPA guidelines. This increase in traffic noise levels for both daytime and night time renders the need for noise mitigation strategies unnecessary, although ongoing monitoring would need to be undertaken to ensure the levels do not get too high in the future.

Construction Noise and Vibration

The range of construction equipment that would be used for most of the upgrades along the by-pass would include grader, vibrating smooth drum roller, rubber tyred roller, vibrating padfoot roller, backhoe, excavator, water cart and a variable number of trucks. The portions of the route where consideration of the noise impact needs particular consideration are:

- The extension of Aurora Avenue near the school;
- The intersection of Oaks Estate Road and Railway Street;
- Along Railway Street; and
- Along Uriarra Road.

During the construction phase of the proposed works there would be noise from earthmoving equipment, truck movements, pile driving and other construction activities. These would be restricted to between 7:00 a.m. and 5:00 p.m. Mondays to Fridays and 7:00 a.m. to 1:00 p.m. on Saturdays. Noise from those sources may impact on the nearest buildings at the Public School and businesses and residences in the localities. The effect would be temporary over the construction period.

Control of hours of operation and work practices designed to minimise excess noise should be adequate to minimise the noise impact. The sound from reversing alarms often causes annoyance as it is designed to draw attention. The alarms on each of the items of plant should be positioned as close to the ground as possible and not on the upper section of the plant. The volume level on the alarm should be as low as possible while still drawing attention to the item of plant.

The work on the bridge at the junction of Railway Street and Mountain Road would involve pile driving. This has the potential to produce excessive noise for the nearby residential areas, in particular on the southern edge of the railway line. Attention should be given to minimising the noise from this work.

The use of vibrating equipment and pile driving has the potential to produce excessive vibration in the nearby areas. Some vibration may be experienced within 150m of the pile driving activities. The Transgrid Depot is located immediately to the north of this Site (6) but there are no residences within 150 m of the bridge location. It would be necessary to consider the potential impact from vibration on the buildings in the vicinity of Oaks Estate once the extent of the work has been established.

7.3 Cumulative Impacts

Consultation with the Queanbeyan City Council and a review of current development applications indicated that there are existing and proposed developments in the vicinity of Sites 1, 2, and 7.

Sites 1 and 2 are located adjacent to the Carwoola Industrial Development Estate. Earthworks are presently taking place on the Estate site. The proposed works at Site 1 and 2 are of short duration and it is unlikely that there would be any cumulative impacts.

Site 7 is located near a planned industrial area however there are no construction activities currently being undertaken at that site.

There are no other construction activities being undertaken in areas adjacent to the other sites.

Consequently, there would be cumulative impacts associated with the improvements proposed at these upgrades.

8. IMPLEMENTATION STAGE

8.1 Summary of Proposed Safeguards

In order to manage the development of the sites so that the impact on the surrounding environment and local businesses in Queanbeyan and the ACT are minimised, environmental management safeguards are discussed below. These safeguards cover both the construction and operational phases of the proposed developments and would form the basis of an EMP for the project. These safeguards are:

- Licences, Permits and Approvals
    - The Contractor carrying out the construction work in the ACT would either have an Environmental Protection Agreement or would need to seek an environmental authorisation in terms of the ACT *Environment Protection Act 1997*; and
    - Consultation with service providers concerning relocation of infrastructure.
- Waste Disposal
    - Utilisation of excavated soil won on the site for backfill and landscaping purposes as much as possible;
    - Utilisation of recycled material in the construction of roadways and landscaping, where possible;
    - Trees and shrubs which need to be removed would be mulched and the material used on site for landscaping; and
    - Waste collection bins and facilities for sorting garbage would be provided on site. Bins would be available for recyclable materials.
- Works Compound and Storage Site
    - Any works compound sites and stockpiles of gravel or topsoil would be located on cleared land as far as possible within the road reserves;
    - The sites would be fenced prior to its use for any purpose;
    - A bunded area would be established for storage of any chemicals or hazardous materials;
    - Erosion control and sediment retention measures would be put in place; and
    - The sites would be self-contained for fire fighting.
- Molonglo River
    - Soil erosion control measures would be implemented as outlined in the Soil Erosion and Sediment Control Plan (refer Appendix C); and
    - Emergency Plan would be prepared for accidental spills of hazardous materials.
- Water Quality, Erosion and Sedimentation
    - Conduct work in stages to restrict the exposed areas susceptible to erosion;
    - Delineate areas of vegetation adjacent to the works and not subject to disturbance by earthworks;
    - Initiate stabilisation of finished areas and formation as soon as possible to reduce amount of exposed area;
    - Stockpiles must be located well away from drainage lines and stabilised if not used within four weeks;

- Install temporary drains and utilise straw bale sediment traps, silt fences, swales or spreader banks to reduce sediment laden runoff from reaching stormwater drains;
- A street sweeper or equivalent would be utilised when appropriate to remove any accumulated mud tracked onto the public roads;
- Refuelling of plant would generally be carried out using minitankers;
- Maintenance of plant and equipment is to be carried out within the Contractor's site compound;
- Ensure oil drained from construction plant is captured in suitable containers and temporarily and appropriately stored prior to recycling;
- Clean up and report spills and dispose of contaminated soils as hazardous waste; and
- An erosion and sediment control plan would be prepared in accordance with NSW and Environment ACT requirements. This would include daily visual checks of erosion control devices and weekly compliance checks utilising an erosion and sediment control checklist.

- Air Quality

  - Dust would be suppressed during construction activities. The construction site and approaches would be watered regularly in order to minimise dust and any soil stockpiles on the site would be stabilised;
  - Exposed areas would be progressively revegetated and stabilised against erosion;
  - Limit the area of earthworks undertaken at any one time and undertake in stages if possible to minimise the area exposed to wind effects;
  - Restrict area of vegetation cleared to a minimum to accommodate the works and prevent excessive dust generation;
  - Vehicles transporting fill would cover loads;
  - No vegetation would be burnt. It would be mulched for use in landscaping;
  - Water exposed surfaces and stockpiles of topsoil or fill regularly during earthworks or spread grass seed on stockpiles; and
  - Ensure equipment is properly serviced, with records provided. If excessive exhaust fumes are observed to be emitted for a period of ten seconds or more, vehicles would be shut down and a maintenance check undertaken.

- Vegetation

  - Stockpiled materials, plant and equipment would not be stored near trees nominated for retention or within areas nominated for tree preservation;
  - Trees to be retained and which are located near the proposed works would be taped as soon as possible after approval of the development;
  - Individual trees or areas nominated for tree preservation, which are close to construction areas should be fenced wherever possible, preferably at a minimum of four metres from the trunk;
  - No building/earthworks should occur within four metres of trees to be retained, as far as practical;
  - Access for plant and machinery would utilise designated routes on the site to avoid damage to trees nominated for retention;
  - Trees that are removed would be mulched and the mulch used for landscaping at the site; and
  - Landscape works would be in accordance with government agency requirements.

- Heritage
    - Recommendations outlined in Section 7.2.13 would be implemented;
    - If sub-surface archaeological material were located during construction activities, work would cease immediately in that area and the NSW/ACT authorities would be contacted immediately. No work would resume at the site until a clearance is given to do so by relevant NSW/ACT authority; and
    - Staff on site to be advised of their responsibilities under NSW/ACT heritage legislation.
- Noise
    - Ensure contractors conform with the recommendations of Australian Standards AS2436 (Noise Control – Building sites) and AS1055 (Acoustics – Environment);
    - All equipment would be silenced in accordance with manufacturer's recommendations;
    - Equipment would be properly maintained and serviced;
    - Hours and days of operation for construction are restricted; and
    - Liaise regularly with local businesses and residents to discuss any complaints.

8.2 Implementation Process

The proposed safeguards outlined in this REF, including the *Soil Erosion and Sediment Control Plan* (Appendix C), provide the basis for environmental management of the construction operations.

SECTION C – FINALISATION

9. SUMMARY OF KEY ISSUES

9.1 Major Beneficial Effects

The potentially beneficial impacts of the proposed upgrade are:

- Provision of safer passage through Queanbeyan for local traffic;
- Provision of easier access to Queanbeyan CBD for local traffic;
- Provision of a link road between the two industrial areas of Queanbeyan;
- Provision of safer passage for heavy vehicles;
- Improvement to the overall amenity of Queanbeyan;
- Reduction of noise within the Queanbeyan CBD;
- Improvement to the air quality within the Queanbeyan CBD;
- Provision of safer intersections for both ACT and Queanbeyan residents;
- Improved safety and condition of intersections in the Australian Capital Region;
- Management of heavy vehicles would be more effective and consistent;
- Employment opportunities; and
- The new rail overbridge would be wider and stronger than the existing bridge, therefore, heavy vehicles would no longer have to avoid this route.

9.2 Major Adverse Effects

The potentially adverse effects of the proposed upgrade are:

- Nearby residents would experience a temporary reduction in local amenity during construction works as a result of noise and visual impacts;
- Traffic movements would be affected during the construction phase of the project;
- Some residences could be affected by increased traffic noise;
- Some businesses may be affected by parking restrictions and limitations on access as a result of the proposed upgrades.

9.3 Characteristics

Vegetation may need to be removed in areas where roadways are widened. Erosion and sediment control measures would be implemented during the construction phase in order to prevent sedimentation and any deterioration of the quality of the water entering the waterways.

The visual character of the sites would experience minor changes as a result of the construction of the proposed works. The form, scale and size of the proposal would not significantly change the visual character of the area.

9.4 The Extent and Nature of the Impacts

Table 9.1 summarises the extent and nature of the environmental impacts resulting from the proposed works for the Queanbeyan Northern Route Upgrade.

Table 9.1
Extent and Nature of Impacts

Parameter	Impacted Site	Construction Impact	Operational Impact
Physical Environment			
Land Use	None	None	Compatible with Queanbeyan LEP, Territory Plan, Land use policies are B10 Broadacre and B11 Rural.
Topography, Geology and Soils	Sites 1, 4, 5, 6 and 7	Soil erosion, unless erosion and sediment control measures implemented.	Soil contamination would be minimised as sites would be sealed and emergency spill response procedures in place.
Air Quality	All sites	Dust from earthworks and construction to be controlled as outlined in Appendix C.	Dust would be minimised as areas would be sealed.
Water	Sites 5 and 6	Implementation of soil erosion and sediment control plan would minimise impact on water quality.	Spillages to be treated in accordance with emergency spill response procedures.
Waste/Litter	All sites, except Site 2	Reuse of fill wherever possible, maximising recycling of materials and correct disposal of any site generated waste.	Signs concerning covering loads and illegal dumping.
Human Environment			
Cultural Features	Sites 5, 6 & 7	Archaeological sites located near the proposed works would need to be protected.	None
Noise	Sites 1, 5, 6, 7 & 8	Construction noise would be minimised by implementation of measures outlined in Section 7 with regard to working hours and noise emissions from equipment.	Traffic noise would increase due to increased vehicle movements. Noise attenuation measures may be required at Site 5.
Facilities and Services	All sites, except Site 2	Relocation of existing infrastructure services for power and telephone services, and links to existing service facilities.	Link to existing service facilities.
Visual Impacts	All sites	Direct views to sites would be temporary during construction.	None
Socio-economic Impacts	All sites	Increased employment	Increased efficiency in travel times and an increase in the amenity of the Queanbeyan CBD.

Non-Human Biological Environment			
Flora and Fauna	Sites 1, 4, 6 & 7.	Removal of some remnant trees and shrubs. Measures outlined in Section 4 to protect retained trees.	None

Overall, the construction impacts of the proposed upgrades and impacts from the operation of the route could be minimised if the controls and mitigation measures outlined in this REF are implemented. On this basis the beneficial effects of this proposal are seen to outweigh the potential impacts.

The proposal is consistent with the zoning of the Queanbeyan LEP and the Territory Plan. In addition, the proposal is consistent with the Land Use policies of the National Capital Plan.

10. ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically Sustainable Development (ESD) consists of four principles that are to some extent inter-related:

- The Precautionary Principle;
- Inter-generational Equity;
- Conservation of Biological Diversity and Ecological Integrity; and
- Improved Valuation and Pricing of Environmental Resources.

10.1 The Precautionary Principle

This Principle is defined as "*that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*".

The proposed Northern Route Upgrade is in accordance with the Precautionary Principle in that action would be taken to improve safety and amenity in Queanbeyan through the provision of an alternative heavy vehicle route with minimal environmental impacts. The major cause of possible degradation is the effect of the proposed upgrade activities on water quality. A *Soil Erosion and Sediment Control Plan* has been prepared so that these impacts are minimised (Appendix C).

10.2 Inter-generational Equity

Inter-generational Equity is defined as *"that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations*".

The removal of a small number of remnant trees and shrubs at a number of the sites would not impact on biodiversity of the region. The improvement in safety and amenity in Queanbeyan afforded by the upgrade would result in a major community benefit.

10.3 Conservation of Biological Diversity and Ecological Integrity

This is a key component of ESD and a minimal requirement of Inter-generational Equity.

There would be no reduction in biological diversity as a result of the removal of the small number of remnant trees and shrubs at a number of the sites.

10.4 Improve Valuation and Pricing of Resources

The need to determine proper values for the utilisation of natural resources is the basis for the "user-pays" and "polluter-pays" principles. Prices for natural resources use are to cover the associated full social and environmental costs.

Social and environmental costs associated with heavy vehicle traffic through Queanbeyan CBD would continue to rise. The short term costs associated with increased natural resource use in the construction of the proposed upgrades would be outweighed by the long term advantages associated with improved safety and amenity in Queanbeyan and a more efficient route for heavy vehicle movements.

11. CLAUSE 228 CHECKLIST

Table 11.1
Clause 228 Checklist

FACTOR	REFERENCE IN REF
Community impact	4.2, 4.3, 7.2.10, 7.2.14
Transformation of locality	7.2.1
Impact on ecosystems	7.2.8, 7.2.9
Reduction of environmental quality	7.2.2, 7.2.4, 7.2.7
Effect on locality, place or building	4.1.1, 4.1.2, 7.2.14
Impact on habitat of fauna	7.2.9
Endangering of species of animals, plants or others	7.2.8, 7.2.9, 7.2.10
Long-term effects on the environment	7.2.8, 7.2.14
Degradation of the environment	7.2.2, 7.2.5, 7.2.7, 7.2.14
Risk to safety of the environment	7.2.4, 7.2.7
Reduction of beneficial uses	7.2.14
Pollution of the environment	7.2.5, 7.2.7
Waste disposal problems	8.1
Demands on resources	2.6, 3.15
Cumulative effects	7.3

12. DECLARATION

This Review of Environmental Factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Signed .....

13. APPENDICES AND ATTACHMENTS

The following appendices are attached to this REF.

- Appendix A Land Acquisition;
- Appendix B Consultation; and
- Appendix C Erosion and Sediment Control Plan.

The following attachments are included:

- Attachment A Aboriginal Archaeological Report; and
- Attachment B Road Traffic Noise Impacts.

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Appendix A
LAND ACQUISITION

Land Acquisitions

Roads and Traffic Authority
www.rta.nsw.gov.au

2nd Edition
3 February, 1999

Policy Statement

Land Acquisitions

The Roads and Traffic Authority (RTA) is responsible for providing a safe and efficient road transport system in NSW.

Often it is necessary to acquire land to upgrade existing roads or construct new roads.

This document is a general guide to the procedures that are followed when the RTA acquires land and while it provides a comprehensive overview of the essential elements of the RTA's acquisition policy is not intended as a complete statement on the subject.

Throughout this document the term "affected" means affected by the acquisition or proposed acquisition of land. Payment of compensation only takes place where land is acquired.

Owners of property, that is affected by the acquisition of land required for roadworks, are generally aware of road proposals either through enquiries made when purchasing the property, from proposals shown on Local Planning Schemes or through the RTA's community consultation for new projects.

(New road proposals are made public as soon as possible. It should be noted that the RTA is not required to acquire more land than is necessary for roadworks).

The Roads Act 1993 authorises the RTA to acquire land and payment for land is assessed in accordance with the provisions of the Land Acquisition (Just Terms Compensation) Act 1991.

The Roads Act 1993 and other legislation allows the RTA to enter land to carry out investigations. Consideration of those powers is outside the scope of this document.

One objective of the Land Acquisition (Just Terms Compensation) Act 1991, referred to throughout this document as the Act, is to encourage the acquisition of land by negotiated purchase in preference to compulsory process. The RTA fully supports this objective.

The RTA generally purchases property as an owner initiated acquisition either under the "hardship" provisions of the Act or its "preferred option" policy (explained on page 2) or as an RTA initiated acquisition in preparation for immediate roadworks. When agreement is reached the purchase is completed by contract and transfer takes place similar to a sale in the open market, however it should be noted that the RTA's solicitor will prepare contracts.

Owner Initiated Acquisition under the provisions of the Act

Owners may experience difficulty in selling their property if part or the whole is designated for acquisition for roadworks. If an owner is unsuccessful in attempting to sell a designated property and is experiencing hardship, then a written application can be made to the RTA requesting acquisition under the "hardship" provisions of the Act. To be eligible for consideration for "hardship" acquisition a property must be designated for acquisition within the meaning of the Act. Land is designated for acquisition if:

(a) the RTA has, in connection with an application for development consent or building approval, given written notice that the land has been designated for road and future acquisition by the RTA ; or

(b) the land is reserved for a public purpose (road) indicated in an environmental planning instrument and the RTA is specified as the body responsible for acquiring the property.

To meet the Act's criteria for "hardship" acquisition an owner must demonstrate that it has become necessary to sell for pressing personal, domestic or social reasons or to avoid a loss in income and that attempts to sell the property have been unsuccessful because of the designation for acquisition by the RTA. If an owner meets the hardship criteria to the RTA's satisfaction, the RTA will agree to purchase the property and in effect becomes the purchaser that cannot be found in the market place. While it is the RTA's preference to complete hardship acquisitions by negotiated agreement, the compulsory process is also available to the land owner.

The RTA's basis of assessing payment in hardship matters is market value unaffected by road proposals. No other payments in addition to the unaffected market value are made as the owner's willingness to sell the property in the market place is taken as a preparedness to accept the normal costs associated with selling a property. It should be noted that in most circumstances an owner will not be responsible for a sales commission that would otherwise be payable if the property had been successfully marketed and sold through a real estate agent.

Owner Initiated Acquisition under the "Preferred Option" Policy

In the process of considering the location of a new road the RTA may examine several possible routes and a preferred option may be selected from those routes for further environmental impact study. As a result of community consultation the location of the preferred option will become known. This public knowledge could frustrate attempts

by owners to sell properties potentially affected by the taking of land. Properties potentially affected by a preferred option proposal are not designated land because the actual route has not been finalised. Consequently the owners of such properties are not eligible for consideration to have their property acquired under the owner initiated acquisition provisions of the Act. The RTA is however prepared to consider the acquisition of such property outside the provisions of the Act.

The RTA will consider a request for acquisition if an owner can demonstrate hardship using the criteria specified in the Act. The acquisition will be at the discretion of the RTA and subject to the availability of funds with each party being responsible for all their own costs. The basis of the purchase price will be the assessment of market value unaffected by the road proposal.

Where an acquisition is proceeding on this basis, compulsory acquisition is not an option. Where an agreement cannot be reached on the purchase price, the following procedure is available:

- The offer is withdrawn
- The owner to choose a valuer from a panel of independent valuers nominated by the Australian Property Institute and referred to the owner by the RTA for selection. In this way the valuer chosen is mutually acceptable to both the owner and the RTA.
- The selected valuer will act as an independent expert and will be commissioned by the RTA to carry out a valuation of the subject property.
- Each party is to be responsible for the payment of 50% of the valuation fee.
- The owner or the RTA may make written submissions to the valuer within the first seven (7) calendar days after the valuer is instructed.
- The independent expert's determination will be binding on both parties if the owner wishes to proceed.
- No further valuations will be obtained and the offer to acquire at the determined value will remain open for a period of three (3) months, after which time the offer will lapse.

If the offer lapses and a subsequent decision is made to proceed with the preferred option and the property remains affected, the RTA will recommence negotiations to acquire that part of the property required for roadworks when road construction is imminent.

Programmed Acquisition (RTA initiated)

When land is required for road construction the RTA will initiate acquisition by way of a letter to owners of property affected by the taking of land. The letter will advise the owner that a valuer representing the RTA will make arrangements to inspect the property and carry out a valuation for the purpose of submitting a formal offer for the owner's consideration. The letter invites land owners to submit an asking price, if that is desired, and also advises, that if the owner engages a registered valuer to value the property, the RTA will reimburse fees to the maximum amount specified in the letter.

Reimbursement of valuation fees is subject to the conditions contained in Appendix "A". The valuation report is to be in accordance with the "Basic Content of Valuation Reports" contained in Appendix "B". It is expected that the valuer will act as an expert and not an advocate.

Division 3 of Part 4 of the Act, in particular Section 55, details the relevant matters to be considered when assessing payment and can be summarised as follows:

- Market Value. (unaffected by road proposals)
- Special Value.
- Severance.
- Disturbance.
- Solatium, and
- Any increase or decrease in the value of adjoining or severed land.

For a fuller understanding, refer to Sections 55 - 62 of the Act which are reproduced in Appendix "C". The heads of compensation to be considered are the same whether the acquisition is a negotiated purchase or is completed by compulsory process.

Following assessment, the RTA will submit written conditions of acquisition to owners for their consideration. One of those conditions will specify the maximum amount that the RTA is prepared to reimburse in respect to conveyancing costs. If the conditions of acquisition are acceptable, the matter will proceed to exchange of contracts and settlement. If the RTA's offer is not acceptable, it is suggested that the services of a registered valuer be engaged to carry out an assessment on the owner's behalf. If there is a difference between valuations, negotiations will take place in an attempt to resolve the matter. Every effort will be made to negotiate a mutually acceptable agreement.

Depending on the RTA's requirements it may be necessary to acquire the whole of a property or only part of a property. The terms "total" or "partial" are used to describe these situations.

Total Acquisition

There are additional considerations peculiar to total acquisitions:

It is strongly recommended to the property owner, that no commitment be made to purchase a replacement property until contracts are exchanged on the sale to the RTA.

If a deposit on a replacement property is required, the RTA will make an advance payment of up to 10% of the value of the property being acquired by the RTA. The advance payment will be made at the time of or after the exchange of contracts and will be subject to conditions required by the RTA's solicitor.

The market value of the property will be assessed having regard to the prime cost items and inclusions at the time of inspection. If it is the owner's intention to retain any item, it is necessary to indicate to the valuer at the time of inspection that an item is to be excluded so that a correct assessment can be made. Requests made after the valuation inspection may be refused or the valuation reduced by the value of the item.

The property must be left in a clean and tidy condition. In accordance with standard real estate transactions, vacant possession will be required on the date of settlement. The RTA will carry out an inspection on the date of settlement to ensure compliance and that all inclusions are intact.

Swimming pools should be clean on the day of settlement and should comply with any relevant statutory or Council requirements including fencing and signage.

Partial Acquisition

If only part of a property is required by the RTA, the letter opening negotiations will include a plan showing the new road boundary and the area and dimensions of that part of the property to be acquired.

The method of assessing the amount to be paid for the land is the "Before and After" method which requires two valuations to be carried out. The first valuation is of the property unaffected by road proposals. The second valuation, as at the same date, is of the residue land on the basis that the new road construction has been completed and the road in use. The difference between the two valuations is the payment for the land to be acquired.

The RTA will, at its own cost prior to or during roadworks, adjust services and public utilities as required, relocate fencing and reinstate access to the new road boundary. It should be noted that fencing will be relocated to the new road boundary to a standard similar to that existing. If considered necessary, the RTA will prepare a plan detailing property adjustments for consideration by the land owner and if acceptable that plan may form part of the contract for sale.

On occasion, the RTA may acquire the whole of a property if the effect of roadworks on the residue land is considered to warrant total acquisition. This applies if the owner purchased the property prior to the RTA formally indicating that the property is to be affected by the acquisition of land, or if the already affected property is to be further adversely affected by the acquisition of additional land. All relevant elements of compensation within section 55 of the Act will be considered.

Where an owner purchased the property in knowledge of the RTA's requirement, the RTA may acquire only that part required for road. If an owner purchased in knowledge of a road affectation and has requested the RTA to acquire the whole property the RTA may agree to total acquisition. However, if a decision is made to acquire the whole property, compensation will be limited to market value unaffected by road proposals together with reasonable conveyancing and valuation costs. If an agreement cannot be reached on conditions of total acquisition, the RTA may elect to proceed with only the acquisition of the land required for road.

Entry for Roadworks

Once an acquisition has been settled, entry for roadworks can take place. On occasion, the RTA's road construction program requires entry prior to completion of the acquisition and in such matters the RTA relies on the owner's cooperation. If required and the owner is agreeable, the RTA may arrange formal right of entry on exchange of contracts or, entry by way of lease.

If an agreement cannot be reached to ensure the RTA's timely entry onto the required land for roadworks, the Minister may approve the issue of a written Proposed Acquisition Notice to compulsorily acquire the land.

Compulsory Acquisition

Compulsory Acquisition is a statutory process under the Act available to the RTA to acquire land. It also provides the means for resolving disputes about the amount of compensation payable if an agreement cannot be reached in a negotiated purchase. Generally the process is as follows:

The RTA seeks the Minister's approval to compulsorily acquire land.

- If the Minister approves, the RTA issues a Proposed Acquisition Notice to each party with a known legal or equitable interest in the land, (eg a registered proprietor, mortgagee, lessee, trustee) or with a right or privilege over the land, or in connection with it (eg, easement beneficiary, occupant, licensee). The Notice advises of the RTA's intention to acquire the land after 90 days. However, a shorter period can be agreed by the owner and RTA, or can be approved by the Minister. A Proposed Acquisition Notice is accompanied by a Compensation Claim Form.
- The issue of a Proposed Acquisition Notice is recorded on the relevant Title registers at the Land Titles Office.
- During the 90 day (or shortened) period after the issue of the Proposed Acquisition Notice, negotiations may continue in an effort to purchase the land.
- During the 90 day (or shortened) period after the issue of the Proposed Acquisition Notice, the RTA seeks the Governor's approval to compulsorily acquire the land.
- If contracts for purchase have not been exchanged within the minimum Notice period and if the Governor approves, an Acquisition Notice is published in the Government Gazette within 120 days of the issue of the Proposed Acquisition Notice unless a longer period is agreed to in writing by the owner and the RTA.
- An extract of the Acquisition Notice is also published in a local newspaper.
- The RTA owns the land from the date of publication of the Acquisition Notice in the Gazette. The former owner's legal and equitable interests in the land are converted to an entitlement to compensation.

Advance Payment

Following the publication of the Acquisition Notice the RTA advises affected owners of the acquisition. It is generally prepared to offer to pay 90% of the RTA's purchase offer, in return for vacant possession of the land.

Terms of Continued Occupation

The RTA is entitled to charge rent for the land from the date of notification in the Gazette until possession is obtained. The terms of rental are, in the absence of an agreement, such reasonable terms as the RTA may determine. Unpaid rent may be deducted from compensation payable. Parties entitled to compensation are paid statutory interest on the amount of compensation such interest being calculated from the date of gazettal up until the date of payment.

Compensation

Each recipient of a Proposed Acquisition Notice is entitled to lodge a claim for compensation with the RTA. Also, anyone else who considers that they are entitled to compensation but did not receive a Proposed Acquisition Notice may lodge a claim Claims must be on the prescribed form. Compensation is not paid until a properly completed claim has been lodged. If agreed, compensation may comprise land or works in whole or part settlement of a claim.

The Valuer General determines the amount of compensation (including legal and valuation costs) to be offered by the RTA in a Compensation Notice.

A Compensation Notice is issued within 30 days after notification of the compulsory acquisition in the Gazette. This Notice is issued whether or not a claim for compensation has been lodged. However, the Minister may approve delay in the issue of a Compensation Notice by up to an extra 60 days. In the case of competing claims the RTA may not issue a Compensation Notice until entitlement is resolved.

If the amount of compensation is accepted, and the necessary settlement papers and claim form are returned to the RTA properly completed, the RTA will pay the compensation within 28 days of receipt of those papers. Interest is paid on the compensation from the date of acquisition to the date of payment.

If the amount of compensation is not accepted, the claimant may lodge an objection with the Land and Environment Court. The objection should be lodged within 90 days of receiving the Compensation Notice. This ensures that the Court will hear the objection and determine the amount of compensation to be paid. Within 28 days after it is given notice of the institution of proceedings, the RTA will pay the claimant 90% of the compensation offered in the Compensation Notice as an advance on account of compensation, if that is acceptable to the claimant. Interest is also paid on the advance for the period from gazettal to the date that the advance is made. If it is not accepted, the advance and interest will be deposited into a trust account pending the Court decision.

If, within 90 days of a Compensation Notice issuing, the amount offered in that Notice has not been accepted and an objection has not been lodged with the Land and Environment Court, the offer is deemed to have been accepted. The RTA then deposits the amount offered plus interest into the trust account where it is held until it

is accepted or until an objection is lodged with the Court. Money earned by the trust account deposit becomes part of the compensation.

If compensation is in the trust account six years after the date of acquisition and a claim has not been received, the compensation is paid to the State Treasurer and held in the Treasury until paid to an entitled claimant. Interest is not paid on the compensation for the time that it is held in the Treasury.

Occupation

People in lawful occupation of land compulsorily acquired and to whom compensation is payable are entitled to remain in occupation as tenants of the RTA until:

(a) the compensation is paid; or

(b) an advance payment of not less than 90% of the amount offered in the Compensation Notice is paid; or

(c) not less than 90% of the amount offered in the Compensation Notice is deposited into the trust account due to a deemed acceptance, Court action, or competing claims;

whichever occurs first.

Furthermore, people lawfully occupying any building which is their principal place of residence or place of business are entitled to remain in occupation as tenants of the RTA for three months after it is compulsorily acquired, regardless of whether any of the abovementioned payments have been made. However, the Minister may shorten that period.

The terms of occupancy, including rent, in the absence of an agreement with the claimant are determined by the RTA on reasonable terms and any unpaid rent can be offset against any compensation payable by the RTA.

Once the RTA is entitled to vacant possession, it may request the Sheriff to deliver possession of the land to the RTA. The Sheriff's costs may be recovered as a debt or deducted from any compensation payable.

Appendix "A"

Reimbursement Of Valuation Fees — Conditions Of Payment

The purpose of the reimbursement of valuation fees is to provide the owner with the opportunity to obtain an independent valuation report from a Registered Valuer. The role of the Valuer is to provide a valuation report as to the owner's entitlement to compensation in accordance with the Land Acquisition (Just Terms Compensation) Act 1991. In some cases the valuation will form the owners claim to the Roads and Traffic Authority (RTA) and in other cases the valuation report may act to verify that the compensation offered by the RTA is fair and reasonable. The Valuer is to act as an expert not as an advocate for the owner. The valuation must comply with professional standards.

The RTA is prepared to reimburse a fee incurred in obtaining a valuation report up to the maximum amount specified in the letter opening negotiations and subject to the following conditions:-

1. The Valuer engaged must be registered to carry out valuations for that particular type of property and preferably be a current member of the Australian Property Institute.

2. The Valuation Report shall be in accordance with Appendix "B" Basic Contents of Valuation Reports. The Valuer should be prepared to support the valuation in discussions with the RTA's Valuers.

3. A copy of the report in its final form signed by the valuer is to be supplied with and in support of the asking price.

4. Reimbursement will take place upon settlement of the acquisition, however the RTA will, under direction from the land owner, make a payment of 50% of the fee directly to the valuer following the valuation report being made available to the RTA.

Owners are advised to ensure that the Valuer is prepared to provide the valuation in accordance with the conditions outlined above and is also prepared to accept a fee to the maximum amount specified in the letter opening negotiations.

In the event that it is considered necessary to engage some other consultants such as Accountants, Town Planners, Surveyors, etc., prior approval in writing must be obtained if it is intended to seek reimbursement of these fees from the RTA.

Appendix "B"

Basic Content Of Valuation Reports

1. Evidence that the valuation was undertaken by the valuer who signed the report and disclosed his/her registration number together with a statement that he/she is registered to value the subject class of property.
2. Date of valuation and date of inspection.
3. Areas/dimensions and legal particulars of the land. Any legal constraints which would restrict development should be noted.
4. A description of the improvements.
5. A site plan showing position of improvements in relation to boundaries.
6. A floor plan showing accurate areas, date and the north point.
7. Specific list of inclusions
8. An outline of permitted land use under current relevant environmental planning instrument and/or local government codes.
9. A description of the class of land valued and the current or potential use of the land together with its location.
10. Details of the sales/rental information relied upon to arrive at the valuation, together with analysis and calculations.
11. Photographs of sales evidence.
12. Valuation rationale
13. Assessment of all individual Heads of Compensation as detailed in Land Acquisition (Just Terms Compensation) Act 1991.
14. The rental value of the property

Appendix "C"

Extract From The Land Acquisition (Just Terms Compensation) Act 1991

Relevant matters to be considered In determining amount of compensation.

55.

In determining the amount of compensation to which a person is entitled, regard must be had to the following matters only (as assessed in accordance with this Division):

(a) the market value of the land on the date of its acquisition;

(b) any special value of the land to the person on the date of its acquisition;

(c) any loss attributable to severance;

(d) any loss attributable to disturbance;

(e) solatium;

(f) any increase or decrease in the value of any other land of the person at the date of acquisition which adjoins or is severed from the acquired land by reason of the carrying out of, or the proposal to carry out, the public purpose for which the land was acquired.

Market value

56.

(1) In this Act:

"market value" of land at any time means the amount that would have been paid for the land if it had been sold at that time by a willing but not anxious seller to a willing but not anxious buyer, disregarding (for the purpose of determining the amount that would have been paid):

(a) any increase or decrease in the value of the land caused by the carrying out of, or the proposal to carry out, the public purpose for which the land was acquired; and

(b) any increase in the value of the land caused by the carrying out by the authority of the State, before the land is acquired, of improvements for the public purpose for which the land is to be acquired, and

(c) any increase in the value of the land caused by its use in a manner or for a purpose contrary to law.

(2) When assessing the market value of land for the purpose of paying compensation to a number of former owners of the land, the sum of the market values of each interest in the land must not (except with the approval of the Minister responsible for the authority of the State) exceed the market value of the land at the date of acquisition.

Special value

57. In this Act:

"special value" of land means the financial value of any advantage, in addition to market value, to the person entitled to compensation which is incidental to the person's use of the land.

Loss attributable to severance

58. In this Act:

"Loss attributable to severance" of land means the amount of any reduction in the market value of any other land of the person entitled to compensation which is caused by that other land being severed from other land of that person.

Loss attributable to disturbance

59. In this Act:

"loss attributable to disturbance" of land means any of the following:

(a) legal costs reasonably incurred by the persons entitled to compensation in connection with the compulsory acquisition of the land;

(b) valuation fees reasonably incurred by those persons in connection with the compulsory acquisition of the land;

(c) financial costs reasonably incurred in connection with the relocation of those persons (including legal costs but not including stamp duty or mortgage costs);

(d) stamp duty costs reasonably incurred (or that might reasonably be incurred) by those persons in connection with the purchase of land for relocation (but not exceeding the amount that would be incurred for the purchase of land of equivalent value to the land compulsorily acquired);

(e) financial costs reasonably incurred (or that might reasonably be incurred) by those persons in connection with the discharge of a mortgage and the execution of a new mortgage resulting from the relocation (but not exceeding the amount that would be incurred if the new mortgage secured the repayment of the balance owing in respect of the discharged mortgage);

(f) any other financial costs reasonably incurred (or that might reasonably be incurred), relating to the actual use of the land, as a direct and natural consequence of the acquisition.

Solatium

60. (1) In this Act:

"solatium" means compensation to a person for non-financial disadvantage resulting from the necessity of the person to relocate his or her principal place of residence as a result of the acquisition.

(2) The maximum amount of compensation in respect of solatium is:

(a) except as provided by paragraph (b) $15,000, (*see note at end of Extract*) or

(b) such higher amount as may be notified by the Minister by notice published in the Gazette.

(3) In assessing the amount of compensation in respect of solatium, all relevant circumstances are to be taken into account, including:

(a) the interest in the land of the person entitled to compensation; and

(b) the length of time the person has resided on the land (and in particular whether the person is residing on the land temporarily or indefinitely); and

(c) the inconvenience likely to be suffered by the person because of his or her removal from the land; and

(d) the period after the acquisition of the land during which the person has been (or will be) allowed to remain in possession of the land.

(4) Compensation is payable in respect of solatium if the whole of the land is acquired or if any part of the land on which the residence is situated is acquired.

(5) Only one payment of compensation in respect of solatium is payable for land in separate occupation.

(6) However, if more than one family resides on the same land, a separate payment may be made in respect of each family if

(a) the family resides in a separate dwelling house; or

(b) the Minister responsible for the authority of the State approves of the payment

(7) If separate payments of compensation are made, the maximum amount under subsection (2) applies to each payment, and not to the total payments.

Special provision relating to market value assessed on potential of land

61. If the market value of land is assessed on the basis that the land had potential to be used for a purpose other than that for which it is currently used, compensation is not payable in respect of:

    (a) any financial advantage that would necessarily have been forgone in realising that potential; and

    (b) any financial loss that would necessarily have been incurred in realising that potential.

Special provision relating to acquisition of easements or rights, tunnels etc.

62. (1) If the land compulsorily acquired under this Act consists only of an easement, or right to use land, under the surface for the construction and maintenance of works (such as a tunnel, pipe or conduit for the conveyance of water, sewage or electrical cables), compensation is not payable except for actual damage done in the construction of the work or caused by the work.

    (2) If land under the surface is compulsorily acquired under this Act for the purpose of constructing a tunnel, compensation is not payable (subject to subsection (1)) unless:

    (a) the surface of the overlying soil is disturbed, or

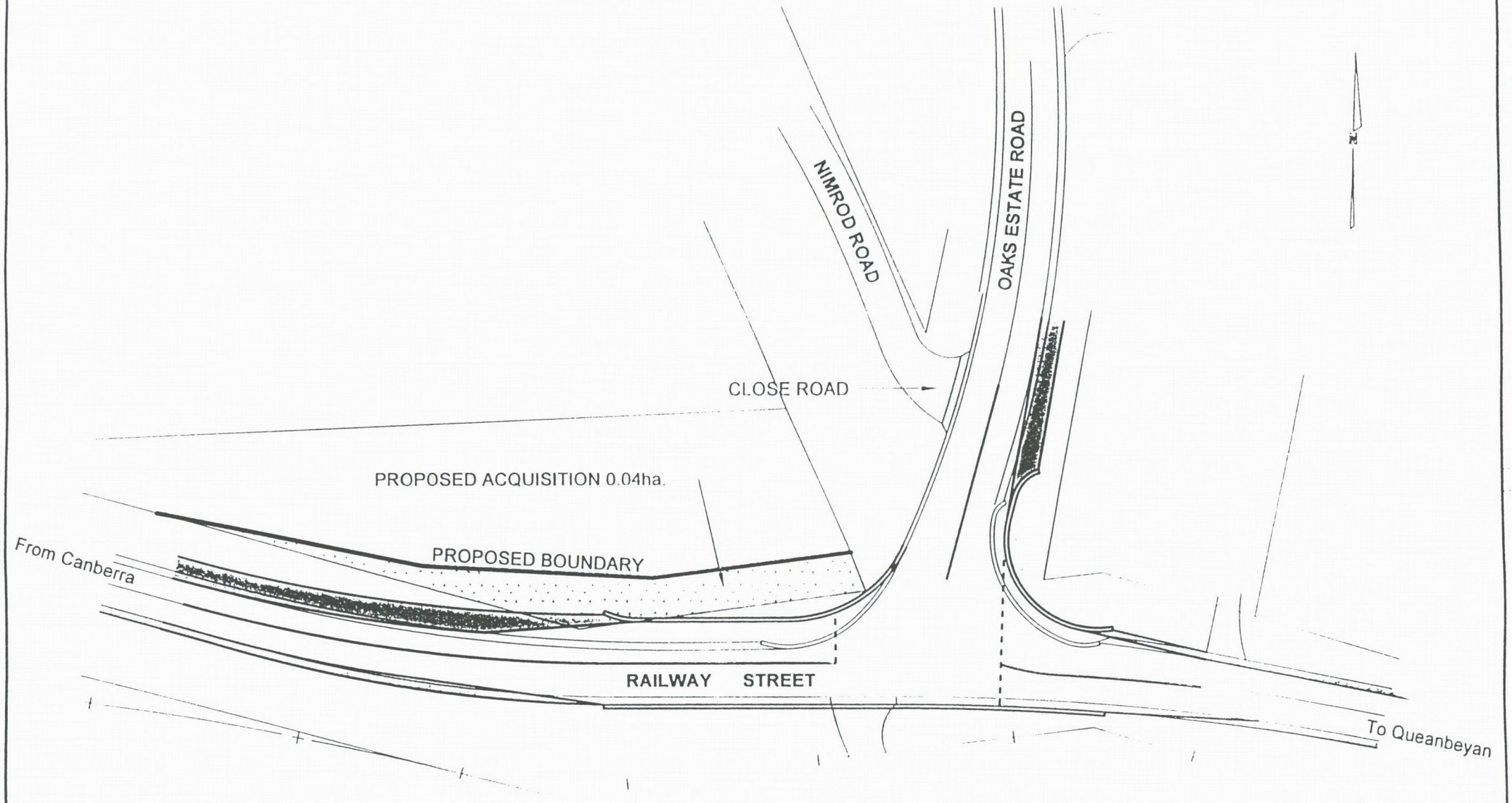
    (b) the support of that surface is destroyed or injuriously affected by the construction of the tunnel; or

    (c) any mines or underground working in or adjacent to the land are thereby rendered unworkable or are injuriously affected.

    (3) If the land compulsorily acquired under this Act consists of or includes an easement or right to use the surface of any land for the construction and maintenance of works (such as canals, drainage, stormwater channels, electrical cables, openings or ventilators), the easement or right is (unless the acquisition notice otherwise provides) taken to include a power, from time to time, to enter the land for the purpose of inspection and for carrying out of any additions, renewals or repairs. Compensation under this Part is payable accordingly.

Note in respect to Solatium

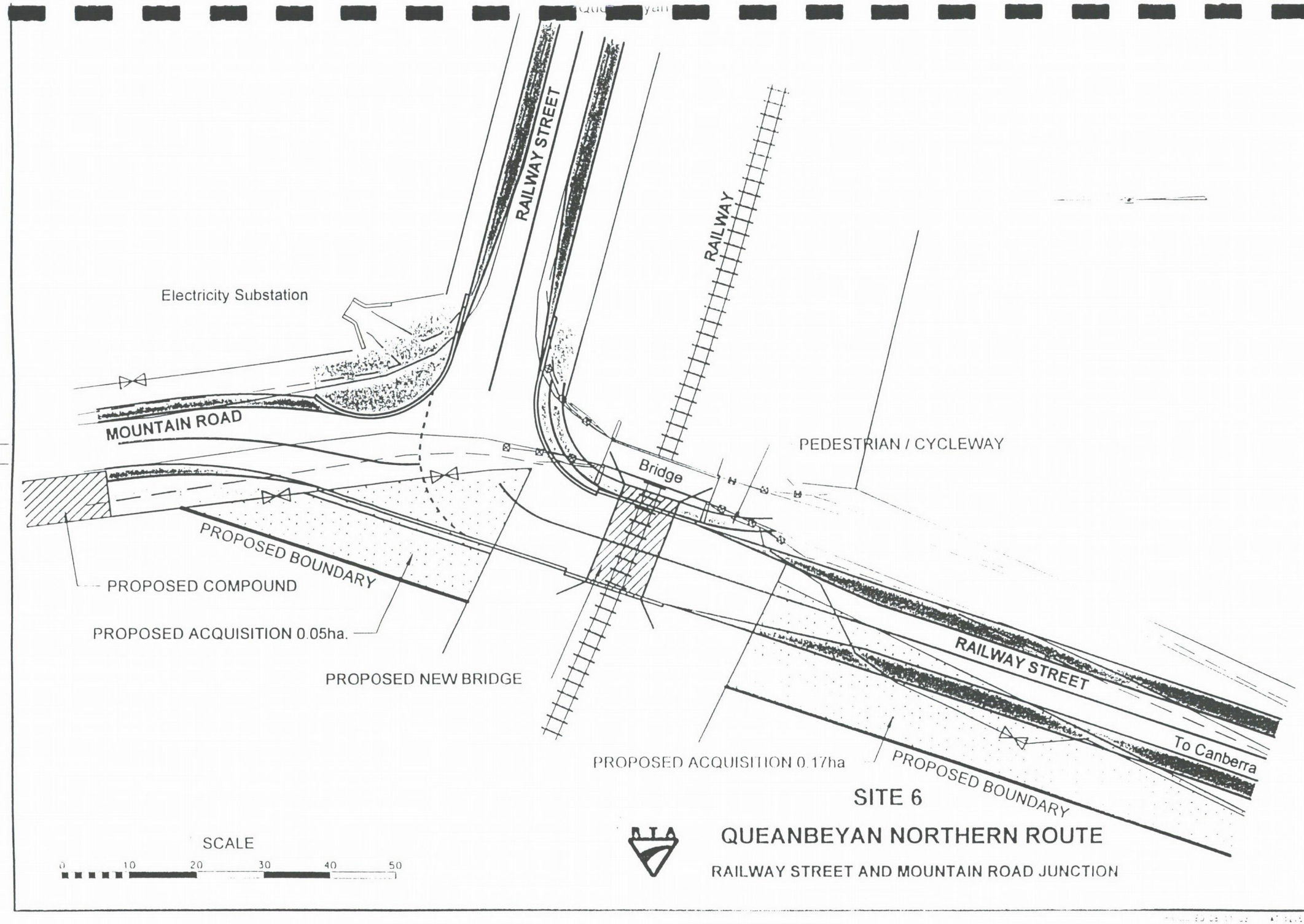
In accordance with Section 60(2)(b) the maximum amount of Solatium was increased to $16,821 effective from the 1 July 1998. There may be further increases in the maximum amount of Solatium from time to time and it is suggested that you speak with the RTA's Property Acquistion staff for the latest information.



SITE 5

QUEANBEYAN NORTHERN ROUTE

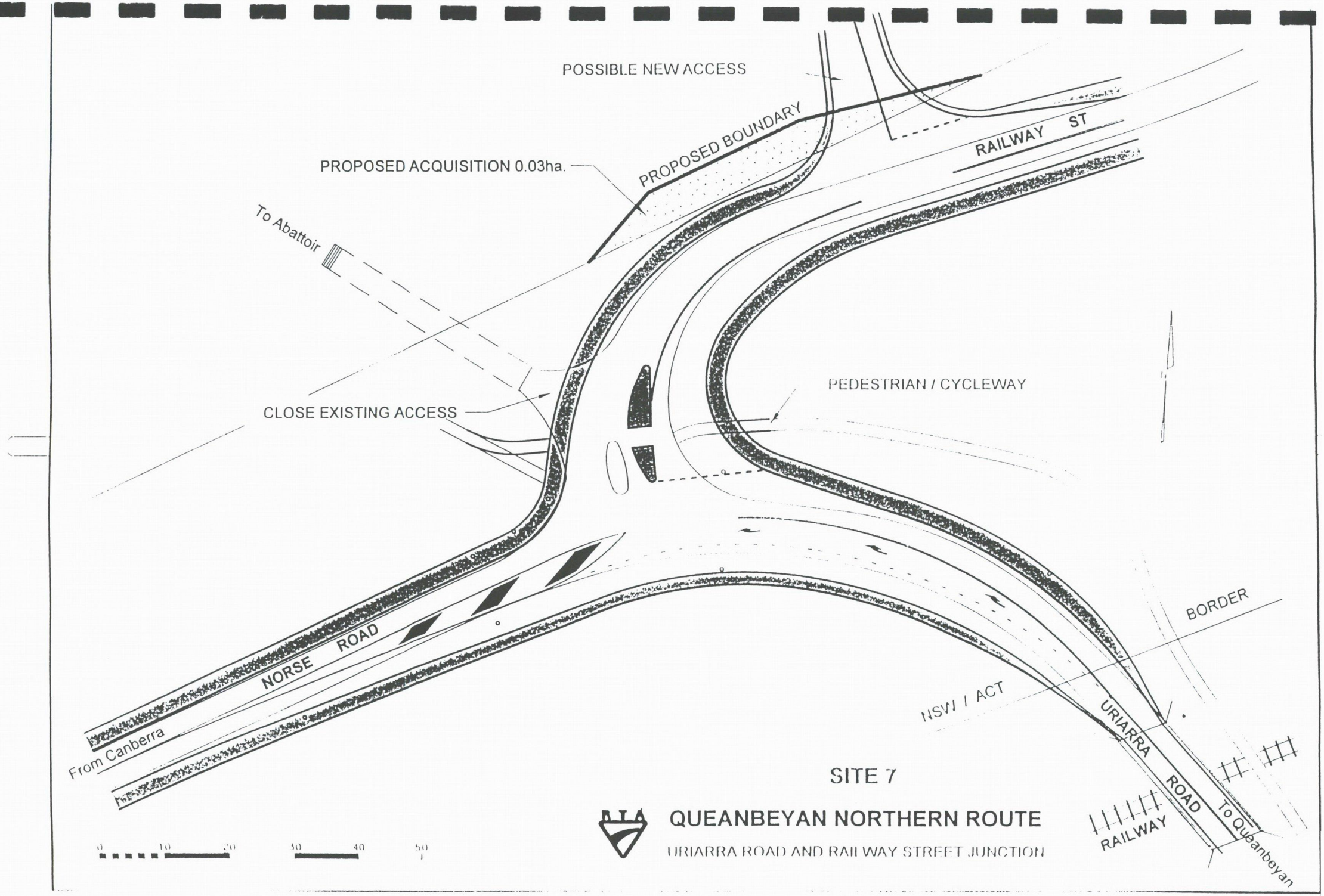
OAKS ESTATE ROAD AND RAILWAY STREET JUNCTION



SITE 6

QUEANBEYAN NORTHERN ROUTE

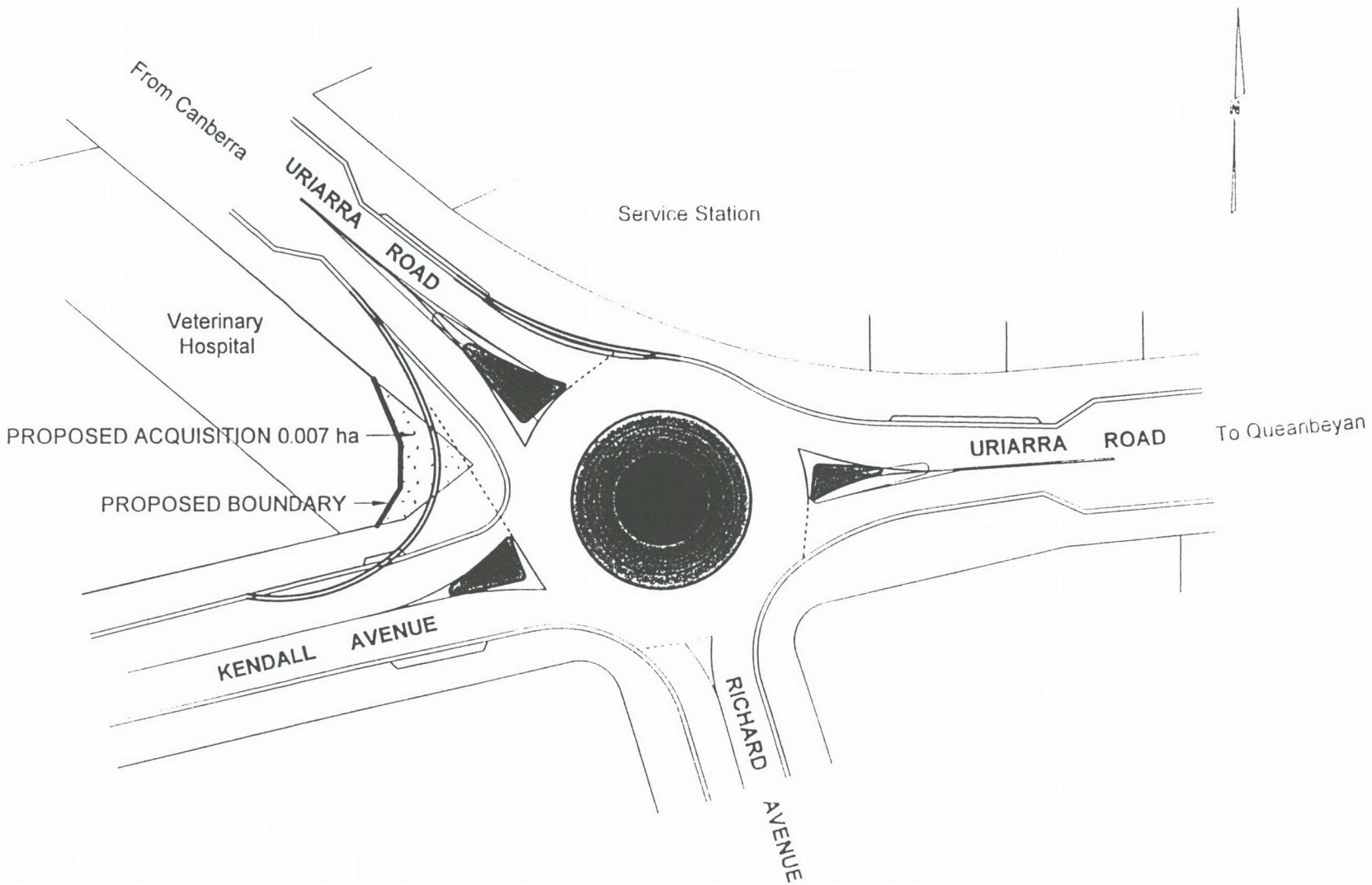
RAILWAY STREET AND MOUNTAIN ROAD JUNCTION



SITE 7

QUEANBEYAN NORTHERN ROUTE

URIARRA ROAD AND RAILWAY STREET JUNCTION



SITE 8

QUEANBEYAN NORTHERN ROUTE

URIARRA ROAD AND KENDALL AVENUE JUNCTION

SCALE

0 10 20 30 40 50

Appendix B
CONSULTATION

Roads and Traffic Authority
www.rta.nsw.gov.au

Dear Member of the Community,

RE: Roads and Traffic Authority – Queanbeyan Northern Route Upgrade – Bungendore Road and Thurralilly section of route

Information Session Tuesday 24th September 4.30 pm at East Queanbeyan Public School

The Roads and Traffic Authority (RTA) is currently developing a route around the Queanbeyan CBD to reduce the number of heavy vehicles on Monaro Street, improving traffic efficiency, CBD amenity and safety within Queanbeyan.

A Review of Environmental Factors (REF) for this route is being prepared by the RTA and National Environmental Consulting Services (NECS). This REF will consider the likely environmental impact of the proposal and its significance. It will be on display for public comment later this year.

In the meantime improvements have also been proposed for the intersection of Bungendore Road and Thurralilly Street. Various upgrade options for the intersection, including the preferred option, will be displayed during a Public Information Session to be held at the East Queanbeyan Public School on Tuesday 24th September from 4:30 pm until 7 pm.

Members of the community are invited to attend this display and provide comments on the proposal. Representatives of the RTA and National Environmental Consulting Services (NECS) the study team working on preparation of the REF will be available to discuss the project.

If you have any queries, please contact Ms Sue Just of NECS on 6247 4600.

Kali Gupta
Project Manager

WE WOULD LIKE YOU TO HAVE YOUR SAY

Please complete the following comment sheet and provide it to the NECS representative at the Information Session or as an alternative return it to NECS, PO Box 97, Watson ACT 2602 (Fax 02 6247 4680) by 30 September 2002.

Do you have any concerns and/or issues about existing heavy vehicle traffic in the area (please describe)?

.....

.....

Are you a local resident: ☐ Yes ☐ No

Are you a local business operator: ☐ Yes ☐ No

Do your children attend the school: ☐ Yes ☐ No

How do rate the following options:

OPTION A

Kings Highway –Thurralilly Street intersection upgrade with no access to Thurralilly Street

☐ Poor ☐ Fair ☐ Good ☐ Very Good

Will this option have an impact on you? : ☐ Yes ☐ No

Will the impact be related to:

☐ Amenity ☐ Noise ☐ Access ☐ Safety ☐ Other

Please describe .....

.....

.....

OPTION B

Kings Highway –Thurralilly Street intersection upgrade with trucks diverted along Faunce Street

☐ Poor ☐ Fair ☐ Good ☐ Very Good

Will this option have an impact on you? : ☐ Yes ☐ No

Will the impact be related to:

☐ Amenity ☐ Noise ☐ Access ☐ Safety ☐ Other

Please describe .....

.....

.....

OPTION C

Prevent right turn from Kings Highway into Thurralilly Street

☐ Poor ☐ Fair ☐ Good ☐ Very Good

Will this option have an impact on you? : ☐ Yes ☐ No

Will the impact be related to:

☐ Amenity ☐ Noise ☐ Access ☐ Safety ☐ Other

Please describe .....

.....

.....

OPTION D New access from Kings Highway and Option C

☐ Poor ☐ Fair ☐ Good ☐ Very Good

Will this option have an impact on you? : ☐ Yes ☐ No

Will the impact be related to:

☐ Amenity ☐ Noise ☐ Access ☐ Safety ☐ Other

Please describe .....

.....

.....

Do you have any other comments?

.....

.....

.....

.....

.....

.....

.....

Appendix C
EROSION AND SEDIMENT CONTROL PLAN

EROSION AND SEDIMENT CONTROL PLAN

QUEANBEYAN NORTHERN ROUTE UPGRADE

Table of Contents

EROSION AND SEDIMENT CONTROL PLAN

1.0 INTRODUCTION

This plan has been prepared to describe the measures to be undertaken at the construction sites for the proposed Queanbeyan Northern Route Upgrade, which would mitigate soil erosion and control pollution of sediment, nutrients and other pollutants to the land and water. This plan is of particular importance to the sites in the vicinity of the Molonglo River.

In general, the risk of erosion is directly proportional to how much soil is exposed to erosive elements through loss of vegetative cover. Rainfall is another major factor affecting erosion risk.

2.0 EROSION CONTROL

Roadworks and excavation at the proposed sites would generate sediment loads, which must be controlled so that water quality is not affected. Sediment fences consisting of geotextile or hay bales should be placed downslope of the proposed works. It should be placed as close as possible to parallel to the contours of the site. The fence should be regularly inspected and reviewed following rain events greater than 15 millimetres (mm).

It is unlikely that large amounts of topsoil would be removed during construction, however, it should be stored and stabilised with a cover crop or surrounded by a silt fence to capture any soil moving from the pile. Trees and shrubs to be removed should be mulched.

3.0 SEDIMENT AND WASTE CONTROL

Sediment Control

Avoidance of pollution of receiving waters is a high priority for these construction works because of the proximity of the works natural and man made drains leading to the Queanbeyan and Molonglo Rivers. A review of water quality data for the river shows that it is already affected by stormwater runoff.

Silt fences would reduce the possibility of sediment entering the waterways and stabilisation of disturbed surfaces should be carried out as soon as practicable after works are completed.

Works being undertaken during the warmer months would require watering of the approach roads to the bridge to prevent dust generation.

Waste Control

Safe waste disposal practices of materials such as concrete slurry, toilet effluent, cleared vegetation and garbage, should be applied. The *Protection of the Environment Operations Act 1997* makes it an offence to allow any of the above materials to leak, spill or escape from the site where it might harm the environment.

All possible pollutant materials should be stored should be stored in a designated area, under cover where possible and well clear of any flood-prone areas. Containment bunds should be constructed with provision for collection and restorage of any spilt material.

Removed vegetation should be disposed of by chipping or mulching for use in future landscaping.

Waste collection bins with facilities for sorting the garbage should be provided on site. Bins for food waste should have secure lids to prevent scavenging from birds and animals or infestation by vermin.

Vehicle and equipment maintenance should be undertaken off-site if possible or if on-site in a designated, bunded area. Regular checks should be undertaken to ensure leaks and spills are rectified and cleaned immediately.

4.0 HYDROLOGY, WATER QUALITY AND ECOLOGY

The construction of roads and other related transport surfaces significantly increases impervious areas and can alter catchment hydrology, ecology and the quality of the stormwater generated from the catchments (Cooperative research Centre for Catchment Hydrology 2002). Measures would be implemented to offset these effects with the aim of achieving resultant accessions to the waterways that are equivalent to the existing flows. For high quality and sustainability, the proposed works would:

- Ensure that no contaminated water, including that containing sediments, is likely to leave the site during development and during on-going operation of the site;
- Incorporate measures and/or operating procedures that ensure that stormwater runoff from the site reflects patterns, volumes and quality that exists prior to development, as far as is reasonably practicable; and
- Remain or incorporate naturalised drainage lines, as far is practicable, in order to enhance ecological values and recreational or amenity opportunities.

5.0 REVEGETATION

Temporary revegetation may be necessary to stabilise bare areas before more substantial landscaping can be undertaken.

6.0 MAINTENANCE

Proper maintenance of erosion and sediment control structures plays an important part in their management. The sediment control fences should be checked regularly and always after a rain event of greater than 15 mm. Any catch drains that have become blocked with sediment should be cleared to enable water to drain away from the road to flatter areas for absorption.

The quality of runoff water from the site must be of an acceptable standard under law and the proximity of the works to the river make regular inspection and maintenance of controls imperative.

Temporary groundcover should be watered if necessary, particularly soon after planting to ensure a quick and effective temporary cover.

Dust should be controlled on unsealed roads and other exposed surfaces, such as unprotected earth or soil stockpiles, by watering. Surfaces should be kept moist rather than wet.

All erosion and sediment control measures should be maintained until all earthwork activities are completed and the site stabilised. Additional erosion and/or sediment control works may become necessary as works progress, so ongoing changes to this plan may be necessary.

7.0 REVIEW

A check sheet should be developed for the site. This would list the works to be checked, the condition of the works on inspection and remarks which would include maintenance requirements or improvements.

www.rta.nsw.gov.au

REVIEW OF ENVIRONMENTAL FACTORS

ATTACHMENT A

QUEANBEYAN NORTHERN ROUTE UPGRADE

Roads and Traffic Authority

NOVEMBER 2002

PREPARED BY:

NECS

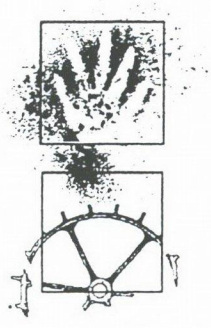
NATIONAL ENVIRONMENTAL CONSULTING SERVICES

Queanbeyan Northern Route Upgrade

Archaeological Assessment

November 2002

A Report to NECS



Navin Officer

heritage consultants Pty Ltd

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Deakin ACT 2600

ph 02 6282 9415
fx 02 6282 9416

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1. INTRODUCTION

Monaro Street through Queanbeyan is currently the main route for heavy vehicle traffic from the coast to Canberra and further inland. Monaro Street also provides the only link between heavy vehicle origins and destination within Queanbeyan because of the restricted bridge crossings of the Queanbeyan River. Consequently most heavy vehicle traffic passes through the Queanbeyan CBD.

The NSW Roads and Traffic Authority (RTA) proposes to develop a heavy vehicle route through Queanbeyan to reduce the number of heavy vehicles on Monaro Street. To improve traffic efficiency, CBD amenity and safety within Queanbeyan it is proposed to divert heavy vehicles from the main thoroughfare of the CBD. Upgrading roads north of the Queanbeyan CBD and creating a bypass will achieve this. (Figure 1).

To facilitate a safe passage for heavy vehicles the upgrading of nine sites is proposed, four of which are located within the ACT.

The sites and the proposed works are described below.

- Site 1: *the intersection of Bungendore Road and Thurralilly Street/Faunce Street (NSW)* – major changes to the intersection configuration.
- Site 2: *Aurora Avenue (NSW)* - possible widening of the road to accommodate any parking that maybe required.
- Site 3: *the intersection of Aurora Avenue and* Yass *Road (NSW)* – installation of traffic lights.
- Site 4: *the intersection of Oaks Estate Road and Pialligo Avenue (ACT)* – improvement involving a seagull treatment requiring widening of the road, possibly extending beyond the current road reserve boundary on the eastern side.
- Site 5: *the intersection of Oaks Estate Road and Railway Street (ACT)* – closure of Nimroo Road.
- Site 6: *the railway bridge on Railway Street/Mountain Road (ACT)* – possible replacement of bridge.
- Site 7: *the intersection of Uriarra Road/Norse Road and Railway Street (ACT)* – additional lane on the south side of Norse Road and removal of much of the corner on the left into Uriarra Road from Kendall Avenue. Possible removal of the old access road to the abattoirs. Move traffic island closer to the left turn corner.
- Site 8: *the roundabout at the intersection of Uriarra Road and Kendall Avenue North (NSW)* – removal of 1200 mm from the gutter and reduction ion level of landscaping.
- Site 9: *Kendall Avenue North between Lorn Road and Stephens Road (NSW)* – removal of a median strip.

This report documents an Aboriginal archaeological assessment of all nine intersections, and a field inspection of intersections 4, 5, 6 and 7. The report was commissioned by NECS for the RTA and forms the indigenous heritage component of the Review of Environmental Factors (REF) for the proposed Queanbeyan Heavy Vehicle Bypass.

1.1 Scope of the Investigation

The consultants were required to:

- Update local and regional archaeological data by reviewing site cards, reports and associated documents held by the NSW NPWS in the Register of Aboriginal Sites and at the ACT Heritage Unit.
- Conduct field inspection of intersections 4, 5, 6, and 7 with representatives of local Aboriginal groups.
- Prepare a report that documents the results of the investigation and provides management strategies and mitigation measures for any identified cultural heritage sites or features.

2. ABORIGINAL PARTICIPATION AND CONSULTATION

There are three Aboriginal community groups in the ACT/Queanbeyan district which have been recognised as having an interest in cultural heritage issues, and which are registered with the ACT Heritage Unit. These are:

- Buru Ngunawal Aboriginal Corporation (formerly the Ngunawal ACT and District Aboriginal Council of Elders Association Incorporated;
- Ngunnawal Aboriginal Corporation (formerly the Ngunnawal ACT and District Indigenous Peoples Association); and
- Ngunnawal Local Aboriginal Land Council (formerly represented by the Ngunnawal Elders Council Incorporated).

Faxes were sent to each of the three groups prior to the field inspection of the intersections and a representative was invited to participate in the fieldwork. Phone calls were made subsequent to the faxes and arrangements were made to meet at Oaks Estate Road on November 11, 2002 to conduct the survey.

Mr Percy Knight represented the interests of the Buru Ngunawal Aboriginal Corporation in the project and participated in the field inspections at Queanbeyan.

Mr Bruce Merritt represented the interests of the Ngunnawal Aboriginal Corporation in the project and participated in the field inspections at Queanbeyan.

The Ngunnawal Local Aboriginal Land Council could not be contacted by phone and a representative did not arrive at the appointed meeting place, consequently the LALC did not participate in the field survey.

The field representatives did not express any concerns with regard to the proposed upgrade project.

A report from the Buru Ngunawal Aboriginal Corporation is included as Appendix 1.

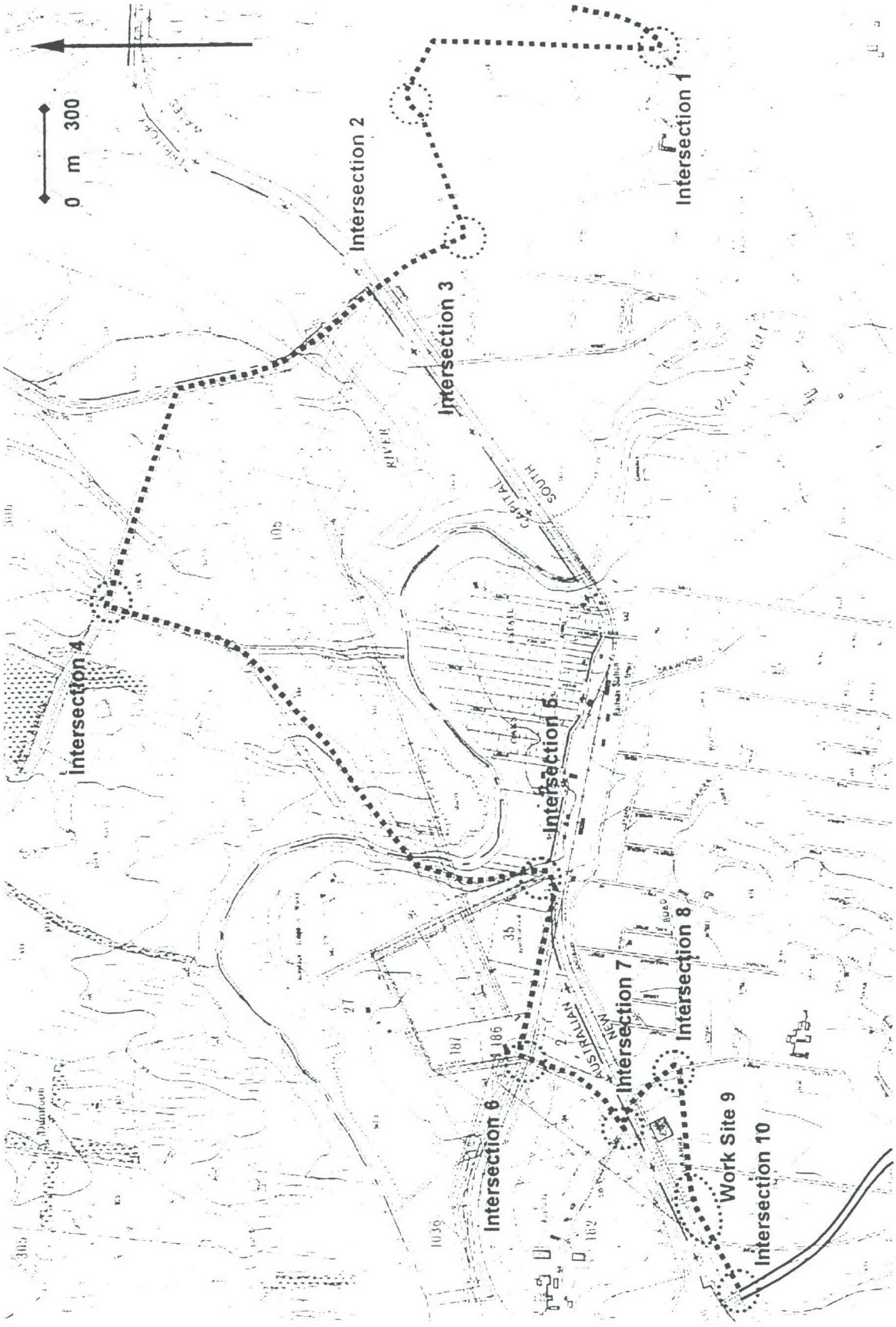

Figure 1 Location of intersections and work sites relevant to this assessment (.1:10,000 ACT Planning Series 216-594 1st Ed 1977[reduced]).

3. STUDY METHODOLOGY

3.1 Review of Existing Documentation

A range of documentation was used in assessing the state of archaeological knowledge for the Queanbeyan/Oaks Estate area and the surrounding region. Literature sources included the NSW National Parks and Wildlife Service Register of Aboriginal Sites and associated files and catalogue of archaeological reports, and the heritage database of the Act Heritage Unit and associated files and heritage reports.

This background research was used to determine if known Aboriginal sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and research management context.

3.2 Field Survey

A reconnaissance field inspection of the intersections relevant to the Queanbeyan Heavy Vehicle Bypass was conducted in October 2002 to ascertain the archaeological sensitivity of the various areas.

Taking account of previous landscape disturbance and known site location patterns it was concluded that intersections 4, 5, 6, and 7 should be subject to archaeological field survey. The other intersections had negligible archaeological potential due to major landscape disruption and disturbance and urbanisation.

Survey of intersections 4, 5, 6, and 7 was then conducted by archaeologist Kerry Navin and field assistant Rebecca Powell in November 2002. Ms Suzanne Malligan (Aboriginal Liaison Officer, RTA) and Mr Percy Knight (Buru Ngunawal Aboriginal Corporation) and Mr Bruce Merritt (Ngunnawal Aboriginal Corporation) also participated in the survey.

Survey involved comprehensive inspection on foot of each intersection and the road easements (reserves) within 100 m of each intersection. All areas of ground surface exposure were inspected and an assessment of the archaeological sensitivity was made for each survey area.

4. ARCHAEOLOGICAL CONTEXT

4.1 Tribal and Linguistic Boundaries

Tribal boundaries within Australia are based largely on linguistic evidence and it is probable that boundaries, clan estates and band ranges were fluid and varied over time. Consequently 'tribal boundaries' as delineated today must be regarded as approximations only, and relative to the period of, or immediately before, European contact. Social interaction across these language boundaries appears to have been a common occurrence. A reconstruction of clan boundaries based on Tindale (1940, 1974) indicates that the south Canberra/Queanbeyan area was close to the tribal boundaries of the Ngunnawal and Walgalu people. Horton's (1999) map shows a Ngarigo tribe in the southern Canberra area.

There is some uncertainty as to which language it was that was spoken by the Aborigines of Canberra/Queanbeyan. The area appears to have been close to the linguistic boundary between the Gundungurra and Ngunnawal languages. Eades (1976) notes that published grammars for these two languages (Mathews 1900, 1901, 1904) are virtually identical. However according to Eades' boundaries, the Ngunnawal of Canberra/Queanbeyan probably spoke the Gundungurra language.

References to the traditional Aboriginal inhabitants of the Canberra/Queanbeyan region are rare and often difficult to interpret (Flood 1980, Huys 1993). The consistent impression however is one of rapid depopulation and a desperate disintegration of a traditional way of life over little more than fifty years from initial white contact (Officer 1989). The disappearance of the Aborigines from the tablelands was probably accelerated by the impact of European diseases which may have included the smallpox epidemic of 1830, influenza, and a severe measles epidemic by the 1860's (Flood 1980, Butlin 1983).

By the 1850's the traditional Aboriginal economy had largely been replaced by an economy based on European commodities and supply points. Reduced population, isolation from the most productive grasslands, and the destruction of traditional social networks meant that the final decades of the region's indigenous culture and economy was centred around white settlements and properties (Officer 1989).

By 1856 the local 'Canberra Tribe', presumably members of the Ngunnawal or Ngarigo, were reported to number around seventy (Schumack 1967) and by 1872 recorded as only five or six 'survivors' (Goulburn Herald 9 Nov 1872). In 1873 one 'pure blood' member remained – she was known to the white community as Nelly Hamilton or 'Queen Nellie'.

Early accounts of Aboriginal lifestyles in areas comparable with the study locality describe aspects of a successful hunting and gathering economy, an eventful social life, and inter-group contacts. The material culture, which is partly reflected in the surviving archaeological record, included stone and wooden artefacts, skin clothing and bark and bough temporary dwellings (Flood 1980, Huys 1993).

4.2 Regional Overview

Stone artefact scatters are the most frequently occurring residue of prehistoric activity in the region. They may range considerably in size and density, factors that are often interpreted as an indication of intensity of the Aboriginal landuse. As well, they provide insight into stylistic and technological behaviours. Such scatters are representative of one or more stages in what is termed a 'reduction sequence'. That is, the entire process from obtention of stone raw material, to manufacture of stone tools and to eventual discard or loss and incorporation into the archaeological record. Isolated finds are artefacts that occur without any apparently associated archaeological materials or deposit. Open scatters are defined as spatially concentrated occurrences of two or more flaked stone artefacts.

Broad distinctions may be made between sites formed as a result of general living and habitation activities and sites located in response to the fixed locations of specific resources. Occupation sites relating to the former activities are most commonly recognised by the discard of flaked stone

materials in sedimentary deposits. Subsequent processes of erosion or landuse may deflate or section these sediments to reveal surficial or embedded (sometimes stratified) materials. Sites formed as a result of resource location may be recognised by a range of features including the proximity of discarded stone materials to source stone materials and characteristic extraction and use marks upon stone or wood materials, ie. quarries, hatchet grinding grooves and scarred trees.

The wider regional pattern of Aboriginal occupation site occurrence within the Queanbeyan/ACT region is one of higher site size and frequency in areas proximate to major permanent creeklines with a reduction in site size and frequency around less permanent water sources. Whilst sites have been found to occur throughout topographic and vegetational zones, there is a tendency for more of the larger sites to be located in proximity to creeks, wetlands and proximate parts of valley floors. A trend for larger sites to be near major water sources, but avoiding frost drainage hollows, was noted at a regional level by Flood (1980). Elsewhere in the Canberra/Queanbeyan region high site and artefact frequencies have also been correlated with the geographic occurrence of specific resources particularly, stone procurement outcrop locations (Access Archaeology 1990; Heffernan and Klaver 1995; Kuskie 1992a, 1992b).

Scarred trees may be the result of Aboriginal uses of bark and/or wood materials. Various other activities, including the retrieval of honey and other foodstuffs may also result in distinctive 'toe hold' and extractive scars. Scarred trees are sparsely documented in the wider Canberra/Queanbeyan region where suitable mature woodland has been retained (Officer 1992). The identification of scars as Aboriginal in origin is problematic for a number of reasons. A variety of natural processes such as fire damage, lightning strike and branch tears may mimic the scars formed by Aboriginal bark removal. In addition, bark was also a building material favoured by early European settlers, and there are instances where Aboriginal people were employed to strip bark for European buildings. The distinction between Aboriginal and historic scarred trees is therefore often difficult.

4.3 Previous Archaeological Investigations

Numerous archaeological investigations have been carried out in the general region in which the Queanbeyan Heavy Vehicle Bypass study area is located. Larger scale, research-orientated projects that have been carried out in the region and/or included the region in wider analyses/syntheses include Flood (1980) - the southern uplands, English (1989) along the Molonglo River near Kowen, Kuskie (1989) at Jumping Creek, Queanbeyan, and Trudinger (1990) at Pialligo. However most investigations have involved relatively small area surveys, necessitated by proposed developments. These studies provide local contextual and site location data for the Bypass study area.

A survey of the proposed *'Jerrabomberra Park'* housing subdivision near Queanbeyan located two sites in an area of 400 ha. Both sites contained 'multi-purpose artefacts' (hammer/anvil/grindstone) and waste flakes. One of these sites was situated on a hillslope and had been exposed as a result of the construction of a contour bank. It was noted that thick groundcover prevented a reliable assessment of the extent of the sites, or the existence of other sites in the area (Lewis 1984:2).

A survey of a 48 ha subdivision, south of the Kings Highway near Queanbeyan was carried out by Lance in 1984. The area comprised crests and steep slopes that bordered three north/south-orientated ridges. No Aboriginal sites were located.

Williams (1992) carried out a survey as part of a proposal to lay an underground optic fibre cable from Hall in the ACT to Twin Bridges, near Bungendore. The route followed the southern edge of the Pialligo Avenue road easement. Williams recorded two sites in the general vicinity of the present study area. The first of these, originally identified by the Canberra Archaeological Society (CAS) as Site 1815 (Williams' site HTB-3), was located just to the west of the New Line Quarry Road. The site consisted of at least 100 artefacts and was located on the upper terraces of the Molonglo River. This site was subsequently subsurface tested by Williams (nd). The second site, an isolated find, was located 100 metres south of Pialligo Avenue on the edge of a pine hedge.

Based on his research and analysis Williams (pers comm 2000) has considered the possibility that there may be a source of stone raw materials somewhere in the Pialligo-Airport-Oaks Estate area. To date such a source has not been identified.

Navin (1993) surveyed several parcels of land comprising elevated slopes and minor spurlines adjacent to the western edge of the alluvial flats and fluvial corridor of the Molonglo River in the vicinity of Fyshwick, ACT. No sites were located in these areas, however ground surface visibility was uniformly poor.

Navin and Officer (1994) conducted a survey of the Canberra Abattoir site, comprising approximately 34 ha of undulating land located northwest of Queanbeyan, south of the Molonglo River, and immediately west of Oaks Estate Road. The area was situated between 250 m and 750 m from the Molonglo River and formed part of the immediate catchment and landscape corridor of the river. Due to the intensive use of the area as stockyards, ground surface visibility within the study area was excellent, generally 80-100%. Seven Aboriginal sites - open artefact scatters - and two isolated finds were located within the Abattoir study area. Sites ranged in size from 4 artefacts to 100+ artefacts.

The results of the field survey indicated a site density for the study area of 1 site per 4.8 ha. This was comparable to the site density recorded for Jumping Creek (Queanbeyan River) - 1 site/5 ha (Kuskie 1989). It was considered that this site density reflected the importance of the Molonglo River corridor as a resource zone in prehistory. The results of the investigation were significant in a scientific context in that they provided a site density for the Molonglo River corridor which was relatively unbiased by ground exposure factors, and was likely to reflect the real order of site occurrence in similar southern tableland contexts.

Three of the sites recorded in the 1994 abattoir survey are located close to Oaks Estate Road (Mountain Road). The sites are listed on the (ACT) Heritage Places Register (see Section 6 and Appendix 2 for the implications of site registration). These registered places are inclusive of the site and buffer zones of various radii around a defined point.

The sites were described in Navin & Officer (1994:11-12) as follows:

Site A4 - Low Density Artefact Scatter (Grid Reference: 70091.608645 Canberra 1:25,000)

This site comprises four stone artefacts and is located on a section of ridgetop crest. From 5-10 cm of surface soil has been lost from this area. Visibility in the area was 100%. The site probably extends into adjacent road reserve [Oaks Estate Road] where soil loss is less apparent. Fragments of C19th and early C20th glass are also present in this area.

[The site is registered as site '*Canberra Abattoir 4*' by the Act Heritage Council].

Artefacts

1. milky quartz bipolar flake; 5% cortex; 14 x 12 x 6 mm
2. milky quartz flake fragment; 14 x 11 x 3 mm
3. milky/translucent quartz flake or core fragment; 25 x 22 x 13 mm
4. milky quartz flaked piece; 16 x 7 x 3 mm

Site A5 - Artefact Scatter (Grid Reference: 70114.608668 Canberra 1:25,000)

This site comprises an estimated 100+ stone artefacts and is located on the upper slopes of a spurline shoulder facing northwest. Artefacts are located on a deflated soil surface and are eroding out of a soil scald. Visibility in the area was between 70-100%.

The area appears to include a 'flaking floor', which consists of the discarded flaked material generated by a single tool making event using a dark grey chert. Some of these flakes exhibit secondary flaking and retouch. There may be some spatial integrity within the site, in spite of obvious disturbance from stock trampling. It is probable that subsurface material exists in sediments presently held together with grass cover.

The predominant raw material is fine-grained dark grey, black and green chert. The greatest artefact density is c.40 artefacts/m^2. The total site area is c60 x 40m (?).

[The site is registered as site '*Canberra Abattoir 5*' by the Act Heritage Council].

Isolated Find 2 (Grid Reference: 70110.608659 Canberra 1:25,000)

This artefact was located on NE top slopes of knoll, 10 m from fence corner - milky quartz backed blade; secondary retouch along both blade margins; 17 x 7 x 5 mm.

[The artefact is registered as site '*Canberra Abattoir 9*' by the Act Heritage Council].

Moffitt (1997) conducted a survey of Blocks 597, 598 and 599 in the District of Majura. Moffitt's study area was located immediately to the east and west of Oaks Estate Road south from Pialligo Avenue and extended almost to the Molonglo River in some locations. The survey was carried out as part of the development application for the proposed Harcourt Ridge Vineyards. Moffitt recorded 'four Aboriginal scarred trees, (T1-T4), two Aboriginal archaeological sites S1 and S2, one isolated Aboriginal artefact (I1), one historic European scarred tree, and four places of 'European land use interest' in the course of his survey of the area (Moffitt 1997:3).

In 1999 Navin Officer Heritage Consultants was commissioned to prepare a Conservation Management Plan for artefact scatters S1 and S2 and those surviving scarred trees which were of Aboriginal heritage significance within the broader Harcourt Ridge Vineyards Estate. Included in the Management Plan was a fifth tree a 'foothold tree' recorded by Dowling in 1998 (Dowling 1998). The study determined that two of the Harcourt Ridge Estate scarred trees were considered not to be Aboriginal in origin - T1 (the 'canoe' tree) and the 'foothold' tree. Three of the trees were considered not to be as rare as originally thought based on the reasons provided by Moffitt in 1997. The scarred trees that were eventually identified as possibly Aboriginal in origin are not located close to the Oaks Estate road reserve.

Two low density Aboriginal artefact scatters (HRE2 and HRE3) and one Isolated Find (HRE1) were recorded in the course of the field survey of a supplementary area under consideration for use in the Harcourt Ridge Vineyards (Navin Officer Heritage Consultants 2000). This area is located some distance west of Oaks Estate Road.

Saunders carried out a study as part of the process for establishing an underground gas pipeline from Fyshwick to the ACT border. The initial survey resulted in no new or previously recorded sites being noted (Saunders 1999). During construction of the pipeline a site was uncovered adjacent to Pialligo Avenue in the general area of the Williams' site HTB 13 (CAS 1816). The site extended from the junction of New Line Quarry Road 250 metres west towards a drainage line that crosses Pialligo Avenue via a culvert (Saunders 2000). The site consisted of 11 artefacts made from a grey tuff material. The site has been destroyed by the pipeline construction. This site and Williams' HTB 13 may be near the boundaries of a site complex located on the river flats/terraces beside the Molonglo River. The complex may extend as far as the junction of the Molonglo River and Woolshed Creek at Pialligo.

Several significant sites have been recorded on the extensive river flats to the west of the present study area. Three sites clustered between Pialligo Avenue and the river, identified as CAS 1810, 1811 and 1812, contain several thousands artefacts. A second cluster of sites (CAS 1735, 1736, 1737) located to the south near the Molonglo River contain fewer artefacts, however it is considered that these smaller sites are probably a product of visibility within the area, rather than a lack of artefacts.

5. STUDY RESULTS & CONCLUSIONS

Intersection 4, the intersection of Oaks Estate Road and Pialligo Road, has been previously disturbed as a result of road cuttings and construction, and the placement of numerous services in the road reserve (eg. Optus, AGL, electricity lines and very recently, NextGen). The top of the road batters was well grassed, however ground surface visibility was provided by recent cable easements, fence lines, and discrete devegetated areas.

Intersection 5, the intersection of Oaks Estate Road and Railway Street, includes a deep road cutting on either side of Railway Street. The area has been previously disturbed as a result of the road cuttings and construction, and the placement of services. The top of the road batters was well grassed, however ground surface visibility was provided by the batters and discrete devegetated areas.

Intersection 6, Railway Street and Mountain Road, has been previously disturbed as a result of road cuttings and construction, a deep rail cutting, rail bridge works and the placement of services. Ground surface visibility was provided by recently burnt areas and discrete devegetated areas.

Intersection 7, the intersection of Uriarra Road/Norse Road and Railway Street, has been previously disturbed as a result of road construction and the placement of services. The area to the east of the road appeared to be original ground surface. Rubbish was ubiquitous in this area. Ground surface visibility was provided by the small tracks and discrete devegetated areas.

No Aboriginal relics or areas of archaeological potential (PADs) were identified in the course of the field inspections of intersections 4, 5, 6 and 7.

Background research indicates that three previously recorded Aboriginal sites are located in close proximity to the western boundary of the Oaks Estate Road reserve boundary/fenceline in the vicinity of Intersections 6 and 7. The sites, A4, A5 and IF2, are described in section 4.3 (above). Their locations and the areas included in the Act Heritage Listing for the sites are shown on Figure 2.

Site A4 is located several metres inside the abattoir boundary fence. The ACT Heritage Council listing for the site includes a buffer zone that covers a radius of approximately 20 m around the known location of the artefacts. The majority of the proposed roadworks at intersection 7 are located south of Norse Road and on the eastern side of the existing Oaks Estate Road. There are no heritage constraints to roadworks in these areas.

However there is some potential for disturbance to site A4 if land surface disturbance occurs within the abattoir property when/if the old abattoir access road is closed. In this case, the works would be occurring within the defined Heritage Council listing area for the site.

The known extent of Site A5 is located approximately 25 m south of, and inside, the northern abattoir boundary fence. The site is approximately 60 m south of the railway cutting. The ACT Heritage Council listing for the site includes a buffer zone that covers a radius of approximately 100 m around the known location of the artefacts. It is unlikely that roadworks will impact the known extent of the site. However any road/bridgeworks conducted south of the northern railway line cutting will occur within the defined Heritage Council listing area for the site.

Site IF2 is located 10 m inside the abattoir boundary fence. The Act Heritage Council listing area for this site includes a buffer zone that covers a radius of approximately 5 m around the known location of the artefact. No roadworks are planned in the vicinity of Site IF2. There are no heritage constraints to roadworks in this area.

There is some potential for works at intersection 5 to fall within an '**Area of Archaeological Potential**' as defined by the Act Heritage Council in the **Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra.**

Although intersections 4, 5, 6 and 7 fall within general zone of archaeological sensitivity associated with the Molonglo River corridor, the disturbed context of each intersection and the adjacent road reserve limits the possibility of significant archaeological material remaining in the areas. The intersections have been assessed in the context of this present study as low archaeological sensitivity.

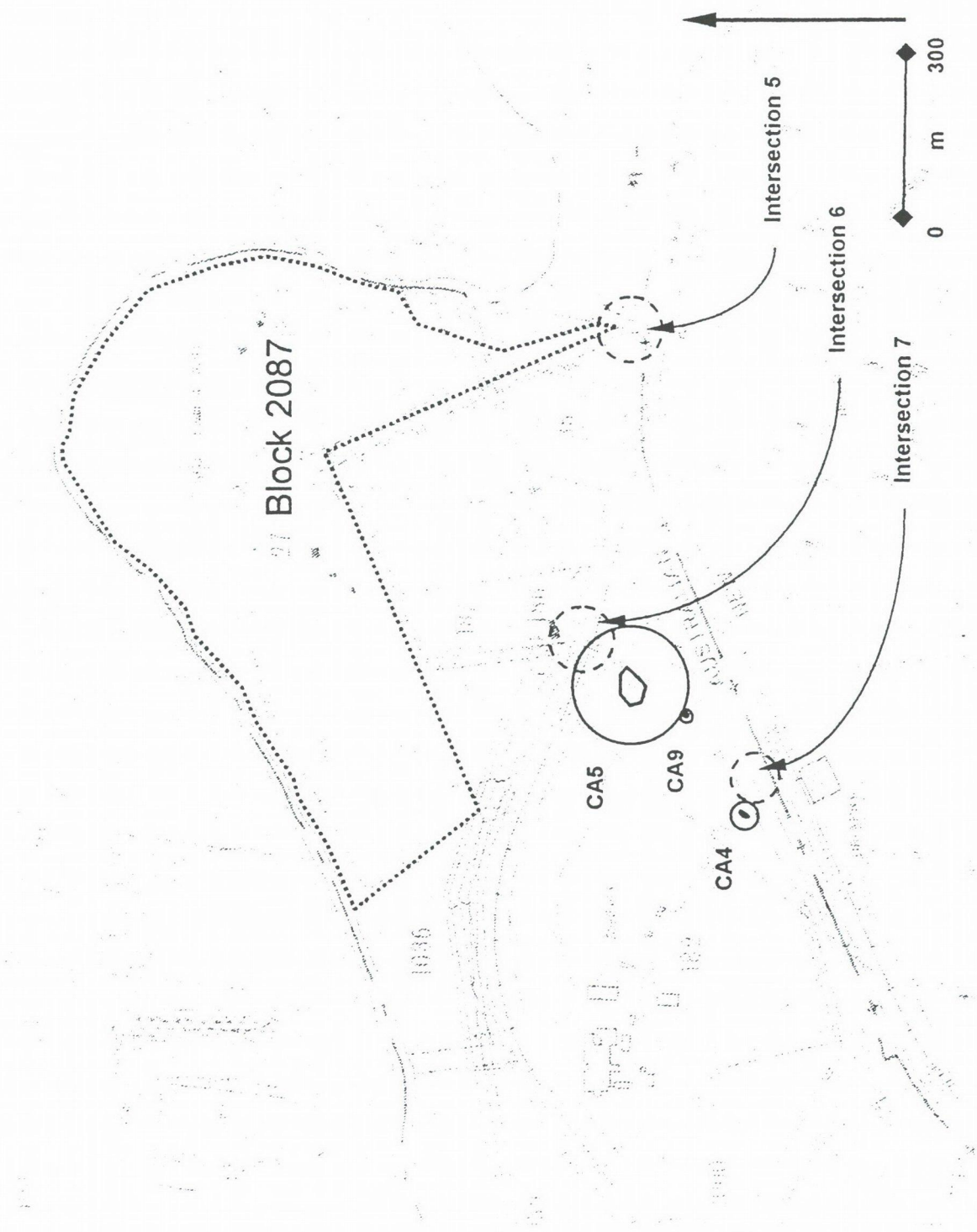

Figure 2 Location of previously recorded sites and defined buffer zones and 'Areas of Archaeological Potential' as defined by the Act Heritage Council (1:10,000 ACT Planning Series 216-594 1st Ed 1977).

6. LEGISLATIVE REQUIREMENTS & RECOMMENDATIONS

6.1 ACT Heritage Unit/Heritage Council Requirements

The following requirements have been provided specifically for **'Areas of Archaeological Potential'** defined by the *ACT Heritage Council in the Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra*. These areas are shown on Figure 2.

C1. Places of archaeological potential require further investigation of their Aboriginal and archaeological significance prior to development.

C2. Proponents of development within the place are to be alerted to the potential for development constraints and the development application is to be referred to the Heritage Council for advice regarding appropriate further investigation.

C3. Should further investigation determine that there are no significant Aboriginal archaeological materials present in the identified place of archaeological potential then the Interim Heritage Places Register entry for the place will be amended appropriately following consultation with the Heritage Council and relevant Aboriginal organisations.

C4. Should further investigation determine that there are no significant Aboriginal archaeological materials present in the identified place of archaeological potential then the Interim Heritage Places Register entry for the place will be updated, and the Heritage Council and relevant Aboriginal organisations are to be consulted for advice regarding the appropriate management of the place.

The following requirements have been provided specifically for sites **A4, A5 and A9** by the ACT Heritage Unit.

'In order to ensure that the artefacts at A4, A5 and A9 are protected:

- all heritage places including their buffer zones are to be fenced during the relevant construction phase with all workers to have the heritage significance and any penalties that would relate to the disturbance, damage or destruction of any Aboriginal place explained to them prior to work beginning in the area;
- there is to be no storage of waste or any other materials within the fenced area, which will include site plus buffer zone;
- there is to be no parking of any vehicle, especially heavy vehicles and earth moving equipment within the fenced areas, which includes site plus buffer zone' (correspondence from Metro Planning to NECS 1.11.02).

If any construction activities are going to occur within the **Canberra Abattoir 4 (A4) Registered Place** or **Canberra Abattoir 5 (A5) Registered Place** (see Figure 2) then the following requirements must be met as defined in Schedules 1 and 2 of the *Interim Heritage Places Register for Aboriginal Places in the District of Jerrabomberra*.

A2. The proponent of the development within the place is to be provided with information regarding the location, nature and significance of the Aboriginal site/s and alerted to the potential for development constraint.

A3. Disturbance to the place/s should be considered a controlled activity and any interventions that will disturb their soil or significant fabric must be referred to the ACT Heritage Council and relevant Aboriginal community groups for consideration and formulation of advice.

A6. The surface artefacts that are currently on site are to be conserved *in situ*, unless a decision to the contrary is considered and agreed to by the Heritage Council and relevant Aboriginal community groups.

A8. Surface artefacts from the site may be collected by a qualified archaeologist in consultation with the relevant Aboriginal organisations, if advised by the Heritage Council following consultation with the relevant Aboriginal groups.

A9. Artefacts that are collected from the place are to be archived at the Heritage Unit pending establishment of an Aboriginal Heritage Keeping Place.

A13. Ground disturbance related to development activity in the location of the place must either be preceded by a program of archaeological research or be accompanied by a program of archaeological monitoring, according to the advice of the Heritage Council in consultation with the relevant Aboriginal organisations. The program of archaeological research should be designed to determine the extent and significance of the deposit and should make recommendations regarding the appropriate management and/or conservation of the place. It may include subsurface testing of deposits, at a scale and in locations recommended by the Heritage Council, in consultation with the relevant Aboriginal organisations. Monitoring must be undertaken by a qualified archaeologist on in consultation with the relevant Aboriginal organisations.

A14. The significance of any cultural deposits discovered are to be assessed following the program of research or during monitoring and if required, appropriate management actions or new specific requirements for the place are to added to the entry for the place in the Register.

6.2 Recommendations

1. There is some possibility that works at intersections 5 may impact the *defined 'Areas' of Archaeological Potential'*.

   With regard to *ACT Heritage Council* requirements for the **'Areas of Archaeological Potential'** this report has alerted the development proponents to the potential for the requirement for further investigation and possible development constraints. This report should accompany the DA when it is referred to the Heritage Council for advice regarding appropriate further investigation (C1, C2). It is considered by the project archaeologists that an adequate level of further investigation relative to intersections 4, 5, 6 and 7 has been conducted in the context of this study and that no further assessment is required (C3). This conclusion should be put to the Heritage Council for their review.

2. The ACT Heritage Unit's specific requirements for sites **A4, A5 and A9** should be implemented as necessary.

3. The *ACT Heritage Council* requirements for the **Canberra Abattoir 4 (A4) Registered Place** and **Canberra Abattoir 5 (A5) Registered Place** should be implemented.

4. A copy of this report should be provided to the ACT Heritage Unit at the following address:

   ACT Heritage Unit
   Environment ACT
   PO Box 144
   LYNEHAM ACT 2602

5. A copy of this report should be provided to the following Aboriginal organisations:

Mr Don Bell
Buru Ngunawal Aboriginal Corporation
4 Gasking Close
DUNLOP ACT 2904

Mr Bruce Merritt
Ngunnawal Aboriginal Corporation
22 Yeo Crescent
YASS NSW 2582

Mr Arnold Williams
Ngunnawal Local Aboriginal Land Council
PO Box 150
QUEANBEYAN NSW 2620

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APPENDIX 1

REPORT FROM THE BURU NGUNAWAL ABORIGINAL CORPORATION

BURU NGUNAWAL ABORIGINAL CORPORATION

4 GASKING CLOSE
DUNLOP ACT 2904
TEL/FAX: 62598852

Ms Kerry Navin
Archeologist
Navin Officer
Heritage Consultants Pty Ltd
102 Jervois Street,
Deakin Act 2600

13th NOVEMBER 2002

Dear Ms Navin

Re: Aboriginal Cultural Heritage Monitoring of Intersections on the Queanbeyan By-Pass Project.

As you are aware our representative Mr Percy Knight inspected the above intersections on Monday 11th November 2002. Mr Knight has informed me that on conclusion of the Aboriginal Cultural and Heritage inspection of five intersections proposed for the Queanbeyan bypass road, no artefacts were found and no visible evidence of sights of Indigneous significants to report.

We recommend that construction on the land inspected by our representative for the development of the Queanbeyan bypass route continue to proceed. As per your recent e-mail advice, our representative invoice for this work will be submitted to Ms Sue Just of NECS for processing. Thank you for the opportunity of being involved in the above project.

Yours truly

Don Bell
Don Bell Snr
Chairperson

APPENDIX 2

STATUTORY INFORMATION

Development approval processes within the ACT can be summarised as follows:

- work carried out on National Land in Designated Areas is subject to the approval of the National Capital Authority
- work carried out on Territory Land in Designated Areas is generally subject to approval by the National Capital Authority but Territory requirements may also apply to development where the Territory is the approving Authority
- work carried out on National Land outside of Designated Areas must be in accordance with a Development Control Plan agreed by the National Capital Authority that reflects the requirements of the Territory Plan
- work carried out on Territory Land outside Designated Areas is subject to the Territory Plan and Territory Approval processes.

New South Wales Legislation

The following summary is based on:

- the provisions of the current National Parks and Wildlife Act 1974 (as amended). It should be noted that amendments to this Act were passed by both houses of the NSW State Government in 2001 (no.130, assented 19/12/2001). A small number of these amendments were proclaimed on 1 July 2002. It is anticipated however, that the majority of the amendments will become law sometime in 2003.
- NPWS policy as presented in the 1997 Standards and Guidelines Kit for Aboriginal Cultural Heritage provided by the NSW NPWS, and as communicated orally to the consultants on a periodic basis; and

The guideline documents presented in the 1997 Standards and Guidelines Kit were stated to be working drafts and subject to an 18 month performance review. The Standards Manual was defined not to be a draft and subject to periodic supplements. To date, no formal amendments or further drafts have been provided by the NPWS.

The National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (as amended) provides the primary basis for the legal protection and management of Aboriginal sites within NSW. The implementation of the Aboriginal heritage provisions of the Act is the responsibility of the NSW National Parks and Wildlife Service.

The rationale behind the Act is the prevention of unnecessary, or unwarranted destruction of relics, and the active protection and conservation of relics which are of high cultural significance.

With the exception of some artefacts in collections, or those specifically made for sale, the Act generally defines all Aboriginal artefacts to be 'relics' and to be the property of the Crown. The Act then provides various controls for the protection, management and destruction of these relics.

A 'relic' is defined as

> 'any deposit, object or material evidence (not being a handicraft made for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction' [Section 5(1)].

In practice, archaeologists tend to subdivide the legal category of 'relic' into different site types which relate to the way artefacts are found within the landscape. The archaeological definition of a site may vary according to survey objectives, however a site is not recognised or defined as a legal entity in

ACT Legislation

The Land (Planning and Environment) Act 1991

The Land (Planning and Environment) Act 1991 provides for the protection of heritage places in the ACT. Under the Act, the Minister is the main statutory authority regarding heritage places and can cause assessments to be made, the registration or deregistration of places, and make orders relating to unregistered Aboriginal sites. The Act establishes the ACT Heritage Council to function as the main advisory body to the Minister on heritage issues. The Council receives administrative support from the ACT Heritage Unit, Environment ACT, Department of Urban Services. The Council has the power to enter places on an Interim Heritage Places Register and to set out the function of the Heritage Places Register.

Under section 70 of the Act it is an offence to disturb, damage or destroy an unregistered Aboriginal Place 'without reasonable excuse' unless that place has been registered and that registration has been cancelled. The interpretation of section 70 remains problematic, particularly given that 'reasonable excuse' is undefined and its potential demonstration has no defined process other than through the courts.

The only provision for legally sanctioned disturbance to an Aboriginal site or place, (except to a formerly registered and now cancelled place), is to register the site or place on the Heritage Places Register and to allow for the proposed disturbance within the specific conservation requirements of the site of place, as provided for under section 54(1) of the Act. Development related disturbance to an Aboriginal site or place can only take place if the following conditions have been met:

- the site or place has been registered and is listed on the Interim Heritage Places Register or the Heritage Places Register; and
- the proposed disturbance is compatible with, or has been allowed for within the specific requirements for the conservation of that site or place as provided for under section 54(1) of the Act.

The Act provides no legal protection for places of historic significance that are not listed on either the Interim Heritage Places Register or the Heritage Places Register.

A major provision of the Act is the Territory Plan, which defines planning principles and policies for all Territory land other than Commonwealth controlled Designated Areas. The Act allows for the nomination by individuals, organisations or heritage experts, of Aboriginal or historic places to an Interim Heritage Places Register (IHPR). Following processes of review and public comment, places may be listed on the Interim Heritage Places Register (IHPR), and subsequently on the Heritage Places Register (HPR). The HPR constitutes part of the Territory Plan. Inclusion on the IHPR affords the same legal protection as the HPR. Both the IHPR and the HPR define the legal boundaries of the registered place as well as legally defined conservation management requirements. Any actions affecting these requirements are controlled activities under Part VI of the Act.

Prior to preparing citations for registration, places may first be listed on the Heritage Place Indicative List. Although undefined in the Act, this list serves as an official listing of places that are being considered for nomination. Listing ensures that these places are not unrecognised in planning and development decisions.

Heritage recordings which occur on National Land under the National Land Ordinance 1989 (or subsequent amendments), or which occur in Designated Areas under the National Capital Plan are subject to development approval processes which may be in addition to, or instead of requirements identified as management requirements under s.54(1) of the Land (Planning and Environment) Act 1991.

Development approval processes within the ACT can be summarised as follows:

- work carried out on National Land in Designated Areas is subject to the approval of the National Capital Authority
- work carried out on Territory Land in Designated Areas is generally subject to approval by the National Capital Authority but Territory requirements may also apply to development where the Territory is the approving Authority
- work carried out on National Land outside of Designated Areas must be in accordance with a Development Control Plan agreed by the National Capital Authority that reflects the requirements of the Territory Plan
- work carried out on Territory Land outside Designated Areas is subject to the Territory Plan and Territory Approval processes.

New South Wales Legislation

The following summary is based on:

- the provisions of the current National Parks and Wildlife Act 1974 (as amended). It should be noted that amendments to this Act were passed by both houses of the NSW State Government in 2001 (no.130, assented 19/12/2001). A small number of these amendments were proclaimed on 1 July 2002. It is anticipated however, that the majority of the amendments will become law sometime in 2003.
- NPWS policy as presented in the 1997 Standards and Guidelines Kit for Aboriginal Cultural Heritage provided by the NSW NPWS, and as communicated orally to the consultants on a periodic basis; and

The guideline documents presented in the 1997 Standards and Guidelines Kit were stated to be working drafts and subject to an 18 month performance review. The Standards Manual was defined not to be a draft and subject to periodic supplements. To date, no formal amendments or further drafts have been provided by the NPWS.

The National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (as amended) provides the primary basis for the legal protection and management of Aboriginal sites within NSW. The implementation of the Aboriginal heritage provisions of the Act is the responsibility of the NSW National Parks and Wildlife Service.

The rationale behind the Act is the prevention of unnecessary, or unwarranted destruction of relics, and the active protection and conservation of relics which are of high cultural significance.

With the exception of some artefacts in collections, or those specifically made for sale, the Act generally defines all Aboriginal artefacts to be 'relics' and to be the property of the Crown. The Act then provides various controls for the protection, management and destruction of these relics.

A 'relic' is defined as

> 'any deposit, object or material evidence (not being a handicraft made for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction' [Section 5(1)].

In practice, archaeologists tend to subdivide the legal category of 'relic' into different site types which relate to the way artefacts are found within the landscape. The archaeological definition of a site may vary according to survey objectives, however a site is not recognised or defined as a legal entity in

the Act. It should be noted that even single and isolated artefacts are protected as relics under the Act.

Generally it is an offence to do any of the following without a Permit from the Director-General of the NPWS under Section 87: disturb or excavate any land for the purpose of discovering a relic; disturbing or moving a relic; take possession of or removing a relic from certain lands; and erecting a building or structure to store relics on certain land (Section 86). The maximum penalty is $11,000 for individuals and $22,000 for corporations. Section 175B outlines circumstances where corporation directors may be taken to have contravened these provisions, based on the acts or omissions of that Corporation.

Consents regarding the use or destruction of relics are managed through a NPWS system of Permits and Consents under the provisions of Sections 87 and 90 of the Act. The processing and assessment of Permit and Consent applications is dependent upon adequate archaeological review and assessment, together with an appropriate level of Aboriginal community liaison and involvement (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

The Minister may declare any place which, in his or her opinion, is or was of special Aboriginal significance with respect to Aboriginal culture, to be an Aboriginal place (Section 84). The Director-General has responsibility for the preservation and protection of the Aboriginal place (Section 85). An area declared to be an Aboriginal place may remain in private ownership, or be acquired by the Crown by agreement or by a compulsory process (Section 145).

The Director General may make an interim protection order and order that an action cease where that action is, or is likely to, significantly affect an Aboriginal object of Aboriginal place. Such an order is current for 40 days (Section 91AA, Schedule 3[10]). Such an order does not apply to certain actions, such as where they are in accordance with development consents or emergency procedures.

The National Parks and Wildlife Amendment Bill 2001

The National Parks and Wildlife Amendment Bill 2001 is expected to pass into law with its gazettal sometime in 2003. The Bill will include the following provisions with regard to Aboriginal cultural heritage:

- The term 'relic' will be replaced with 'Aboriginal object' (Schedule 1[1]). An Aboriginal object is defined as:

  > 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal occupation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons or non-Aboriginal extraction, and includes Aboriginal remains.'

- The requirement for a 'Consent to Destroy' from the Director General will be replaced by a 'heritage impact permit' (Schedule 3[1], 3[3-8]).

- The offence under section 90 of the Principal Act of 'knowingly' destroying, defacing or damaging Aboriginal objects and Aboriginal Places without Consent will be changed so that the element of knowledge will be removed (Schedule 3 [2]). The amended section 90, subsection 1 will read:

  > 'A person must not destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of, an Aboriginal object or Aboriginal place.'

- Section 90 subsection 1 will not apply when an Aboriginal object or Aboriginal place is dealt with in accordance with a heritage impact permit issued by the Director-General (Schedule 3[3] Section 90(1B) in amended Act).

- It will be a defence to a prosecution for an offence against subsection 1 if the defendant shows that:

  (a) 'he or she took reasonable precautions and exercised due diligence to determine whether the action constituting the alleged offence would, or would be likely to, impact on the Aboriginal object of Aboriginal place concerned, and

  (b) the person reasonably believed that the action would not destroy, deface, damage or desecrate the Aboriginal object or Aboriginal place.' (Schedule 3[3], Section 90(1C) in amended Act)

- A court will be able to direct a person to mitigate damage to or restore an Aboriginal object or an Aboriginal place in appropriate circumstances when finding the person guilty of an offence referred to in section 90 of the Principal Act (Schedule 3[9]).

Schedule 4[8] of the Bill provides for the Director-General to withhold in the public interest specified documents in the possession of the NPWS which relate to the location of Aboriginal objects, or the cultural values of an Aboriginal place or Aboriginal object.

R T A

www.rta.nsw.gov.au

REVIEW OF ENVIRONMENTAL FACTORS

ATTACHMENT B

QUEANBEYAN NORTHERN ROUTE UPGRADE

Roads and Traffic Authority

NOVEMBER 2002

PREPARED BY:

NECS

NATIONAL ENVIRONMENTAL CONSULTING SERVICES

1. INTRODUCTION

This report has been prepared by Scott Wilson Nairn for the National Environmental Consulting Services and the NSW RTA. This report provides an assessment of the existing exposure to road traffic noise at noise sensitive areas and predicted levels of noise for 2010 around the proposed Queanbeyan Northern Route Upgrade. Noise and vibration levels throughout the construction phase were also examined.

The proposed northern upgrade route around Queanbeyan is aimed to provide an alternate route for heavy vehicles on Monaro Street and Farrer Place. The proposed route circulates the town centre by travelling along Kendall Avenue, Uriarra Street, Railway Street, Oaks Estate Road, Yass Road and Aurora Avenue.

As part of this study five areas were identified as noise sensitive, four of which lie within New South Wales and the fifth within the boundary of the Australian Capital Territory. These include :

- Near the roundabout at Uriarra Road and Kendall Avenue at the Veterinary Clinic (NSW)
- At the Airport Motel on Yass Road (NSW)
- Within the grounds of the Queanbeyan East Primary School (NSW)
- At the residents located at 164 Uriarra Road (NSW)
- At the intersection of Oaks Estate Road and Railway Street (ACT)

Each of these areas was assessed for existing noise levels. This was undertaken using noise monitoring stations for a period of seven consecutive days.

Traffic noise levels for 2010 were then estimated, based upon the approximated traffic volumes along the route.

2. ROAD TRAFFIC NOISE

2.1 INTRODUCTION

Noise may be defined as unwanted sound. Road traffic noise is often a major source of noise and complaint in residential areas. It emanates from vehicle engines, exhausts, tyres on pavements, transmissions, wind and body or load rattles.

The problem of road traffic noise for the receiver (in their house or backyard) can be addressed at the source (road/vehicle), the reception point (home) or in between. Measures to reduce traffic noise include:

- At the source:
  - Improved vehicle standards or technology
  - Quieter pavement types
  - Speed controls
  - Road design and alignment
- At the reception point:
  - Building design, form and construction
  - Building setback and siting
- Between the source and reception point:
  - Natural barriers
  - Specially constructed noise barriers

Noise barriers are commonly used to address traffic noise problems in residential areas. However, barriers generally have an adverse impact on the aesthetic quality of the road and its surrounds, both for road users and residents bordering the road.

Due to the proposed northern upgrade route traversing two states (NSW and ACT), different criteria for noise assessment is required. Both NSW and ACT have their own noise management guidelines, so a blanket standard cannot be used for all sites of this study. The Oaks Estate location is required to meet ACT standards while the other four sites need to satisfy NSW EPA guidelines.

Detailed below are the recommended road traffic noise criteria for each state.

Table 2.1 outlines the ACT's maximum traffic noise levels resulting from a road upgrade. The guidelines are set for an existing road network that is being upgraded.

2. ROAD TRAFFIC NOISE

2.1 INTRODUCTION

Noise may be defined as unwanted sound. Road traffic noise is often a major source of noise and complaint in residential areas. It emanates from vehicle engines, exhausts, tyres on pavements, transmissions, wind and body or load rattles.

The problem of road traffic noise for the receiver (in their house or backyard) can be addressed at the source (road/vehicle), the reception point (home) or in between. Measures to reduce traffic noise include:

- At the source:
  - Improved vehicle standards or technology
  - Quieter pavement types
  - Speed controls
  - Road design and alignment

- At the reception point:
  - Building design, form and construction
  - Building setback and siting

- Between the source and reception point:
  - Natural barriers
  - Specially constructed noise barriers

Noise barriers are commonly used to address traffic noise problems in residential areas. However, barriers generally have an adverse impact on the aesthetic quality of the road and its surrounds, both for road users and residents bordering the road.

Due to the proposed northern upgrade route traversing two states (NSW and ACT), different criteria for noise assessment is required. Both NSW and ACT have their own noise management guidelines, so a blanket standard cannot be used for all sites of this study. The Oaks Estate location is required to meet ACT standards while the other four sites need to satisfy NSW EPA guidelines.

Detailed below are the recommended road traffic noise criteria for each state.

Table 2.1 outlines the ACT's maximum traffic noise levels resulting from a road upgrade. The guidelines are set for an existing road network that is being upgraded.

Table 2.1 Maximum traffic noise levels resulting from upgraded roads in existing areas, expressed as $L_{A10\ (18\ hour)}$ dB(A)

Existing traffic noise at adjacent buildings (dB)	Maximum traffic noise level at adjacent buildings after road works completed (dB)
> 63	Equal to existing level
58 – 63	63
< 53	Not more than 5 db(A) above existing level

Source: 'Noise Management Guidelines', ACT Planning Authority

Although this criteria is suitable for the upgrading of existing roads, the investigated site in the Oaks Estate will not require a new road nor a significant addition (ie. extra lane). As such, the noise criteria to be used is the former NCDC (National Capital Development Commission) guidelines which stipulates that the noise level should not exceed **$L_{A10\ (18\ hour)}$ 65 dB(A).**

The NSW EPA's criteria for road traffic noise define the following guidelines for redevelopment of existing arterials, collectors and local roads.

Table 2.2 NSW road traffic noise criteria for redevelopment of existing roads

Type of development	Daytime road traffic noise criteria	Night time traffic noise criteria
Redevelopment of existing arterial road	$L_{Aeq(15hr)}$ 60	$L_{Aeq(9hr)}$ 55
Redevelopment of existing collector road	$L_{Aeq(1hr)}$ 60	$L_{Aeq(1hr)}$ 55
Redevelopment of existing local road	$L_{Aeq(1hr)}$ 55	$L_{Aeq(1hr)}$ 50
Sensitive Land Use	**Daytime road traffic noise criteria**	**Night time traffic noise criteria**
Passive recreation and school playground	$L_{Aeq(1hr)}$ 55	Not Applicable

Source: 'Environmental criteria for road traffic noise', NSW EPA, 2001

The NSW guidelines stipulate that where existing traffic noise already exceeds the criteria detailed in Table 2.2, the marginal noise allowance of 2 dB (for road redevelopment) should be applied before mitigation measures are recommended. In all cases the road redevelopment should be designed so as not to increase existing noise levels by more than 2dB.

The brief for this study requires investigation for noise attenuation structures, design and siting options which limit noise levels around the proposed Queanbeyan Northern Upgrade Route to the levels specified in Tables 2.1 and 2.2, one metre from the building facade. This noise level should be viewed as a target to be sought, recognising that it is not always practical to achieve.

The Road Traffic Authority of NSW Environmental Noise Management Manual (RTA, 2001) requires that forcast traffic flows used for noise estimation in NSW are those expected in ten years time

Traffic noise estimates in this study were based on traffic forecasts for 2010 from the RTA's estimates in the "Queanbeyan – Heavy Vehicle usage of Monaro Street"

2.2 DATA, ASSUMPTIONS AND PROCEDURES

2.2.1 *Noise Impact Model (NIM)*

The United Kingdom Department of Transport (UK DoT) "Calculation of Road and Traffic Noise" (CORTN 1988) is the preferred method for predicting noise calculations and this has been incorporated into Scott Wilson Nairn's Noise Impact Model (NIM), so as to estimate noise levels. The prediction method takes into account vehicle volume, vehicle speed, vehicle type, road configuration, intervening topography and receiver location.

The accuracy of the CORTN method has been identified under Australian conditions via an exhaustive study undertaken by a NAASRA Working Group (Samuels and Saunders, 1982; Saunders et. Al., 1983) and more recently by the ACT Government (1995). The major finding of the Australian studies was that the method tended to slightly overpredict the $L_{10\,(18\ hour)}$ noise levels.

2.2.2 *Data and Assumptions*

Existing traffic volumes (2000) were found from the RTA's "Traffic Volume Data for the Southern Region". For locations that did not have any existing traffic volume data available a small traffic survey was completed to estimate the daily traffic using the road over an average day.

Noise predictions for the year 2010 were based upon the RTA's traffic volume estimates (for both light and heavy vehicles), expected to frequent the area in the future. Such estimates are based on the expected land use development around the area as well as variables such as population growth.

Vehicle speeds were approximated and input to NIM along with relevant topographical and geometric data, to estimate noise levels at different carriageway offsets and barrier heights.

3. EXISTING NOISE CONDITIONS

Noise monitoring was undertaken at five locations along the proposed Queanbeyan heavy vehicle route to record existing conditions along areas that were deemed "noise sensitive". These measurements were taken over seven consecutive days.

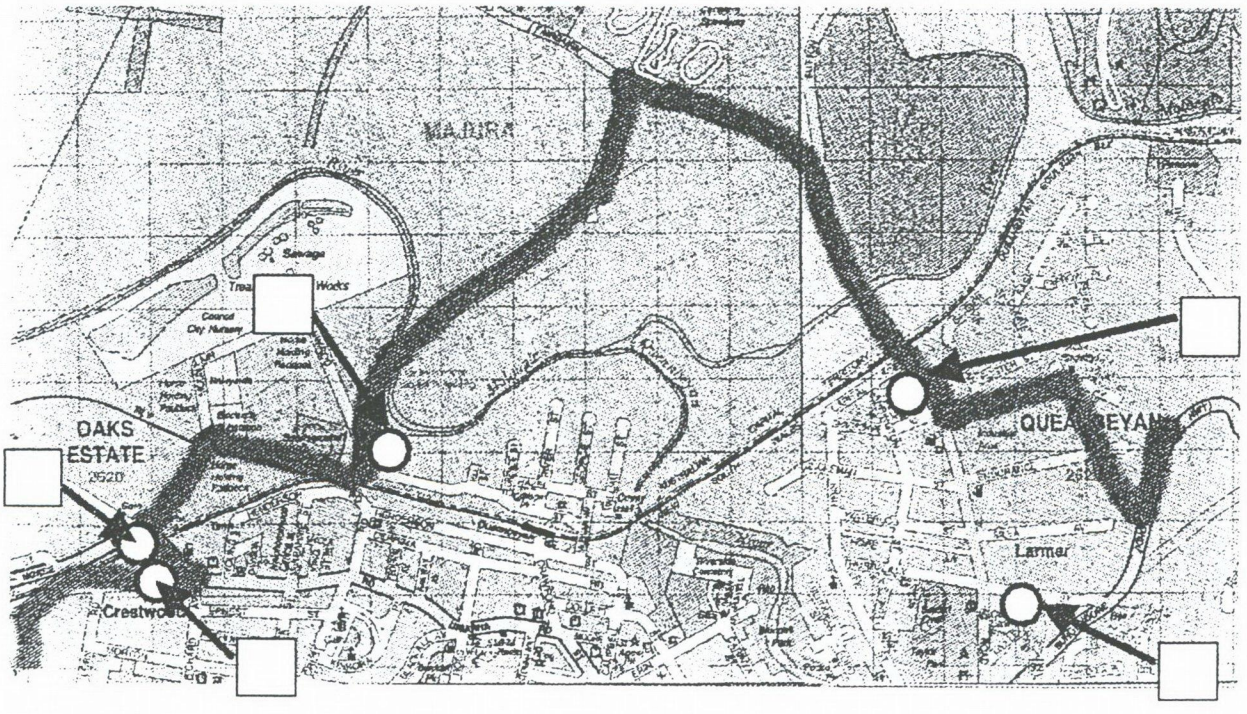
The locations are identified in Figure 3.1 and summarised below :

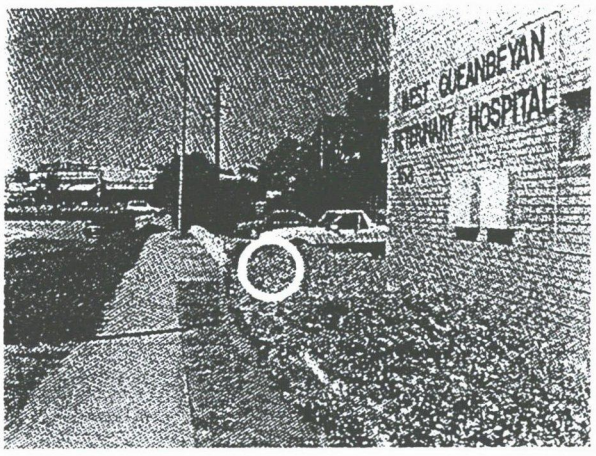
1. Near the roundabout at Uriarra Rd and Kendall Ave at the Veterinary Clinic, 2m from façade.
2. At the Airport Motel on Yass Road, 1m from façade.
3. Within the grounds of the Queanbeyan East Primary School.
4. At the residents located at 164 Uriarra Rd, 1m from façade.
5. At the intersection of Oaks Estate Rd and Railway St, 1m from façade.

Only site no. 5 is within the ACT, all other sites are located in NSW.

Each location is detailed in Figures 3.2 to 3.6.

Figure 3.1 Locations of noise monitoring stations





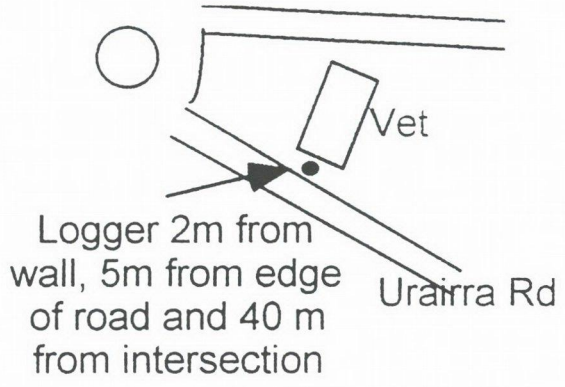
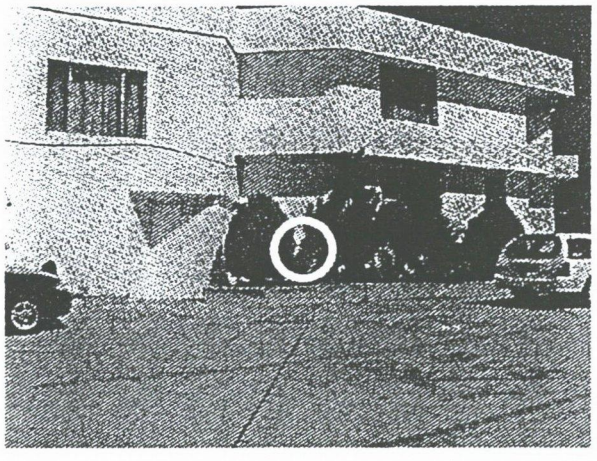


Figure 3.2 Near the roundabout at Uriarra Rd and Kendall Ave at the Veterinary Clinic



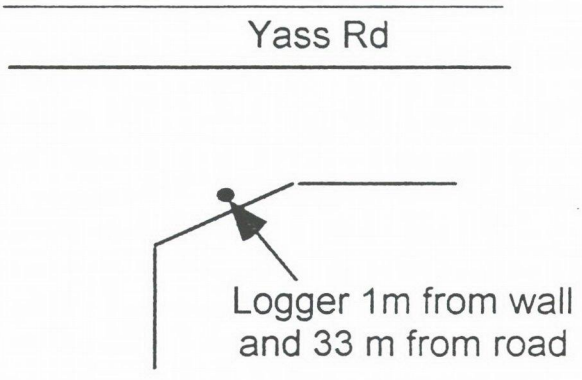
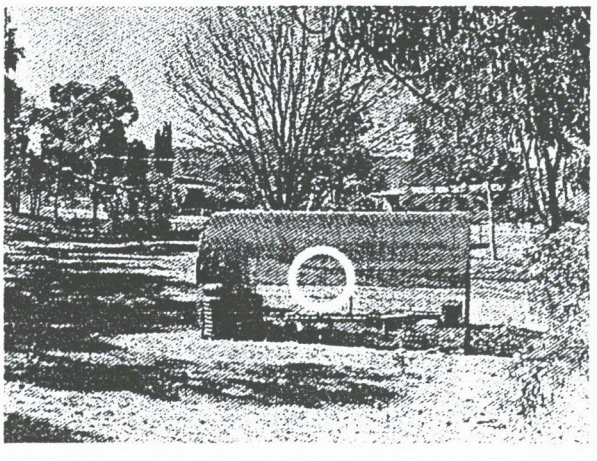


Figure 3.3 Airport Motel on Yass Road



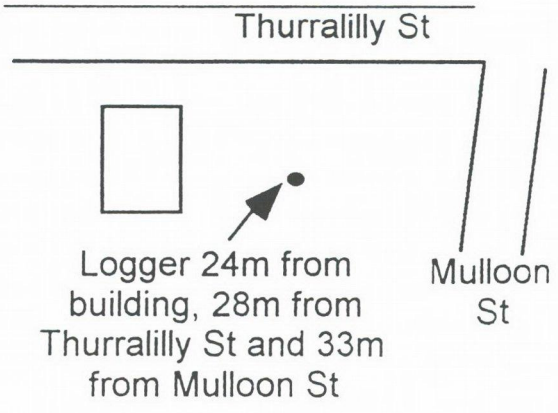
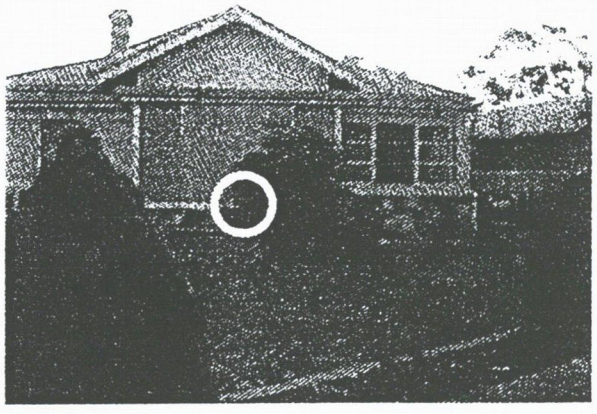


Figure 3.4 Queanbeyan East Primary

School



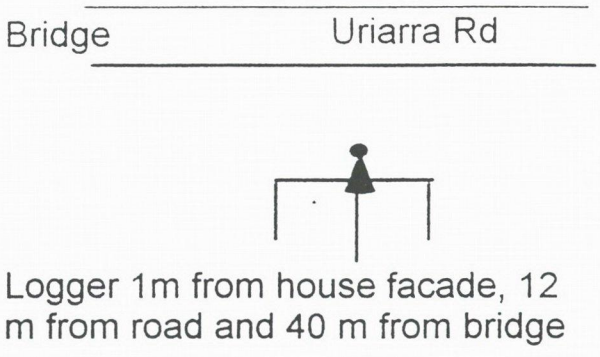
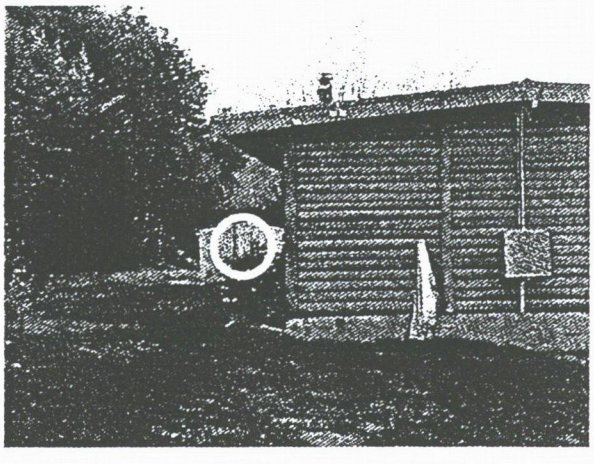


Figure 3.5 House at 164 Uriarra Rd



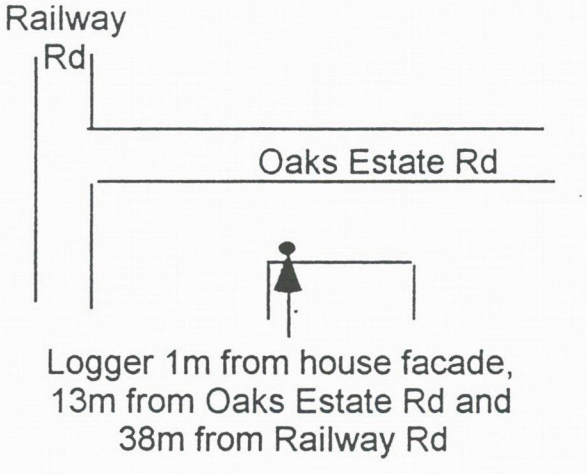


Figure 3.6 Intersection of Oaks Estate Rd and Railway St

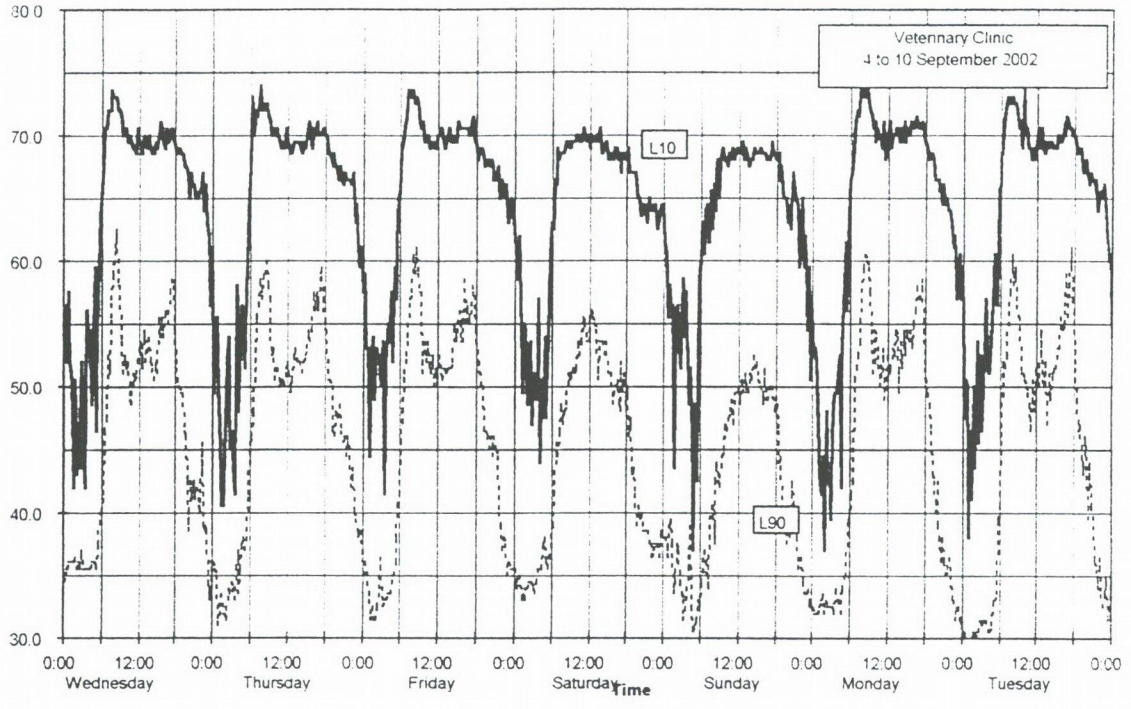
An ARL EL215 noise logger was placed at each monitoring location and left in location for a week. The logger was programmed to store the data for the various noise level descriptors for each 15 minutes of the placement.

Some criteria for assessing traffic noise impact are currently based on the L_{A10} , which is the level exceeded for 10% of the time period. This is measured over 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. Other criteria are based on the L_{Aeq} which is the equivalent energy level. The night time L_{Aeq} is from 2201 - 0700 and the daytime L_{Aeq} is from 0701 – 2200. These data are shown in the following tables and Figures.

Table 3.1 Noise level descriptors for each location for each day of the placement. Note that day is from 0701 – 2200 and night from 2201 - 0700.

Date	Day	L_{A10}18 hr	L_{Aeq}24 hr	L_{Aeq}day (15hr)	L_{Aeq}night (9hr)	Daytime L_{Aeq}1 hr	Nighttime L_{Aeq}1 hr
Veterinary Clinic, 2m from façade							
04-Sep-02	Wed	68.7	62.7	65.5	57.1	69.9	50.9
05-Sep-02	Thur	68.9	62.7	65.7	56.9	69.6	49.4
06-Sep-02	Fri	69.2	63.4	66.8	57.5	70.3	52.4
07-Sep-02	Sat	67.5	61.8	64.6	56.9	67.6	52.4
08-Sep-02	Sun	65.8	60.7	63.2	57.0	66.3	53.0
09-Sep-02	Mon	68.6	62.4	65.7	55.8	70.3	50.0
10-Sep-02	Tue	68.8	62.6	66.1	57.5	69.8	49.5
Average		**68.2**	**62.3**	**65.4**	**57.0**	**69.1**	**51.1**
Airport Motel, Yass Road, 1m from façade							
04-Sep-02	Wed	62.4	56.8	59.0	51.3	62.9	47.3
05-Sep-02	Thur	63.2	56.8	60.1	50.6	62.8	45.1
06-Sep-02	Fri	64.3	58.6	61.7	53.3	63.9	48.3
07-Sep-02	Sat	61.7	56.5	59.2	52.4	63.8	48.6
08-Sep-02	Sun	61.3	55.3	59.1	59.3	63.5	45.4
09-Sep-02	Mon	62.5	57.1	59.1	52.3	64.4	48.3
10-Sep-02	Tue	62.4	56.5	59.6	52.7	62.5	47.3
Average		**62.5**	**56.8**	**59.7**	**51.7**	**63.4**	**47.2**
Queanbeyan East Primary School, in grounds							
04-Sep-02	Wed	54.2	49.3	52.3	43.1	56.0	39.0
05-Sep-02	Thur	53.5	49.3	51.2	42.8	54.3	37.4
06-Sep-02	Fri	53.2	48.1	51.7	42.0	54.6	37.5
07-Sep-02	Sat	54.4	48.9	53.1	42.0	56.4	37.4
08-Sep-02	Sun	50.1	46.1	49.1	42.0	55.8	36.6
09-Sep-02	Mon	52.9	47.7	50.9	40.4	55.4	34.8
10-Sep-02	Tue	51.6	46.5	50.1	40.9	54.6	34.4
Average		**52.8**	**48.0**	**51.2**	**41.9**	**55.3**	**36.7**
Intersection of Oaks Estate Rd and Railway St, 1m façade							
15-Sep-02	Sun	55.3	50.9	53.1	47.7	56.1	43.4
16-Sep-02	Mon	60.9	50.9	58.6	45.4	64.0	37.9
17-Sep-02	Tue	60.3	55.4	58.0	52.0	61.4	45.0
18-Sep-02	Wed	61.6	54.9	59.6	46.0	64.9	39.0
19-Sep-02	Thur	59.8	55.6	58.3	52.0	61.5	44.3
20-Sep-02	Fri	59.9	53.9	57.4	46.1	60.5	35.9
21-Sep-02	Sat	57.1	52.2	55.1	46.5	58.4	39.6
Average		**59.3**	**53.4**	**57.2**	**48.0**	**61.0**	**40.7**
164 Uriarra Rd, 1m façade							
15-Sep-02	Sun	62.5	57.1	59.2	54.0	61.5	49.6
16-Sep-02	Mon	66.0	57.1	62.6	52.8	65.8	46.5
17-Sep-02	Tue	66.8	60.6	63.8	55.7	67.3	50.4
18-Sep-02	Wed	66.3	59.5	63.3	53.1	66.9	47.6
19-Sep-02	Thur	65.7	59.7	62.6	54.9	65.9	51.5
20-Sep-02	Fri	66.3	60.0	62.8	54.2	65.4	49.4
21-Sep-02	Sat	64.2	58.4	61.0	53.5	63.5	49.9
Average		**65.4**	**58.9**	**62.2**	**54.0**	**65.2**	**49.3**

Figure 3.7 Variation in L_{10}, L_{eq} and L_{90} over seven days at the location near the roundabout at Uriarra Rd and Kendall Ave and 2 m from the wall of the Veterinary Clinic.



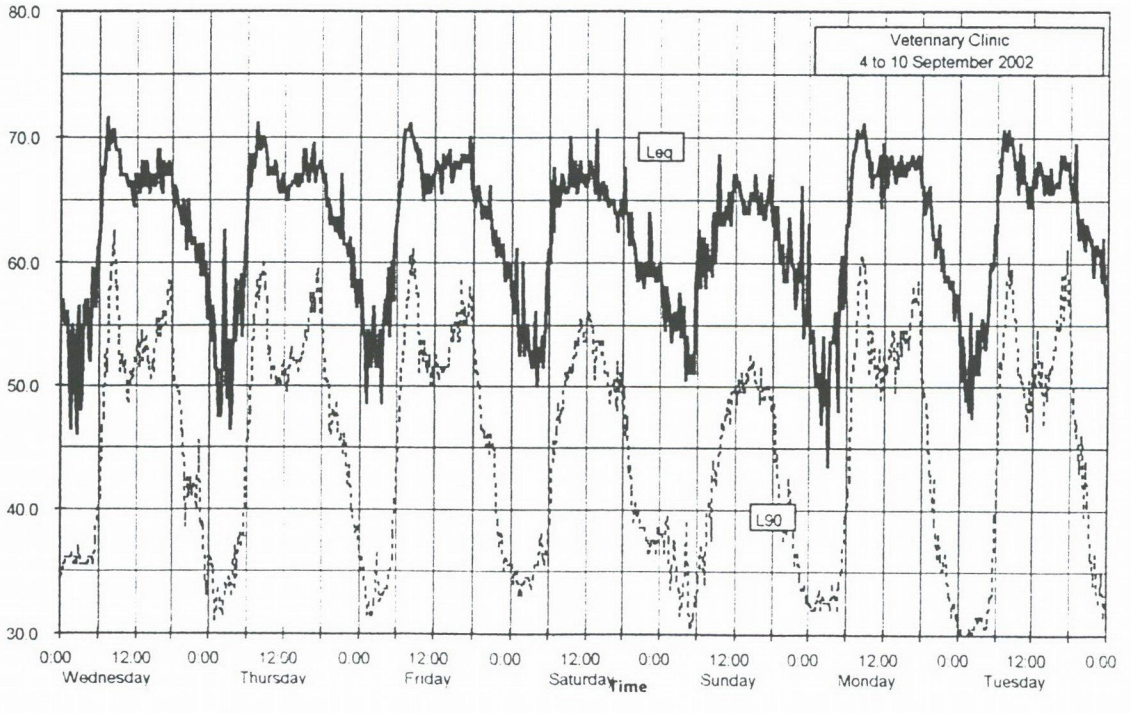
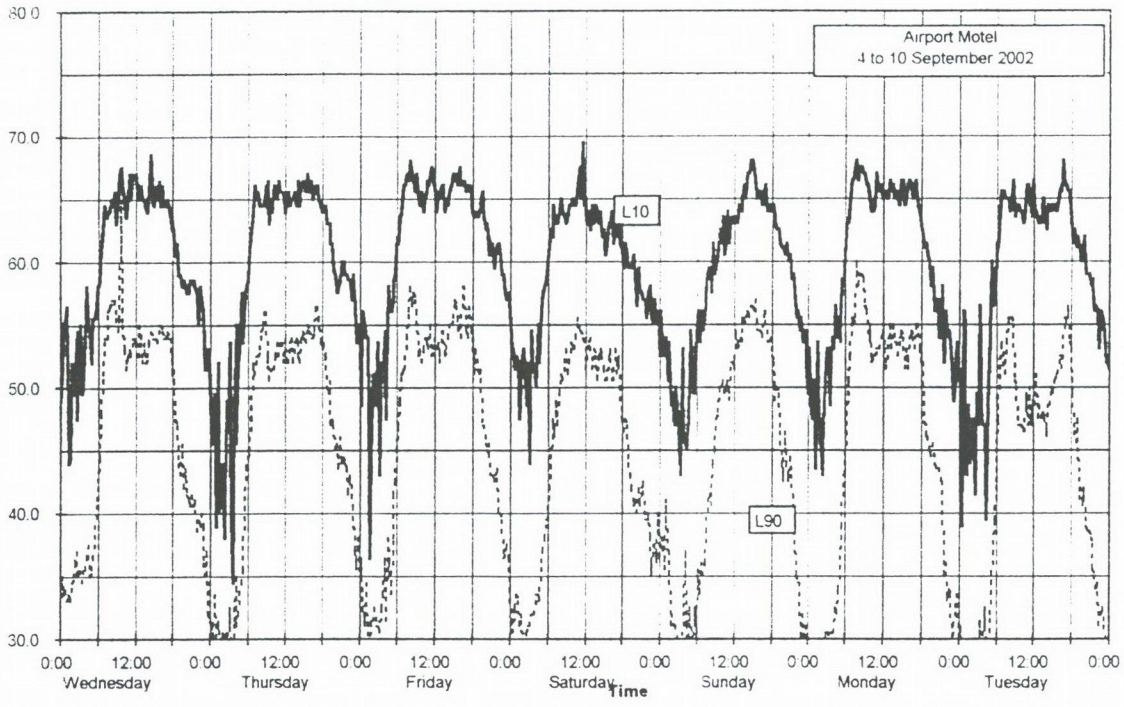


Figure 3.8 Variation in L_{10}, L_{eq} and L_{90} over seven days at the location on Yass Rd at 1 m from the wall of the Airport Motel.



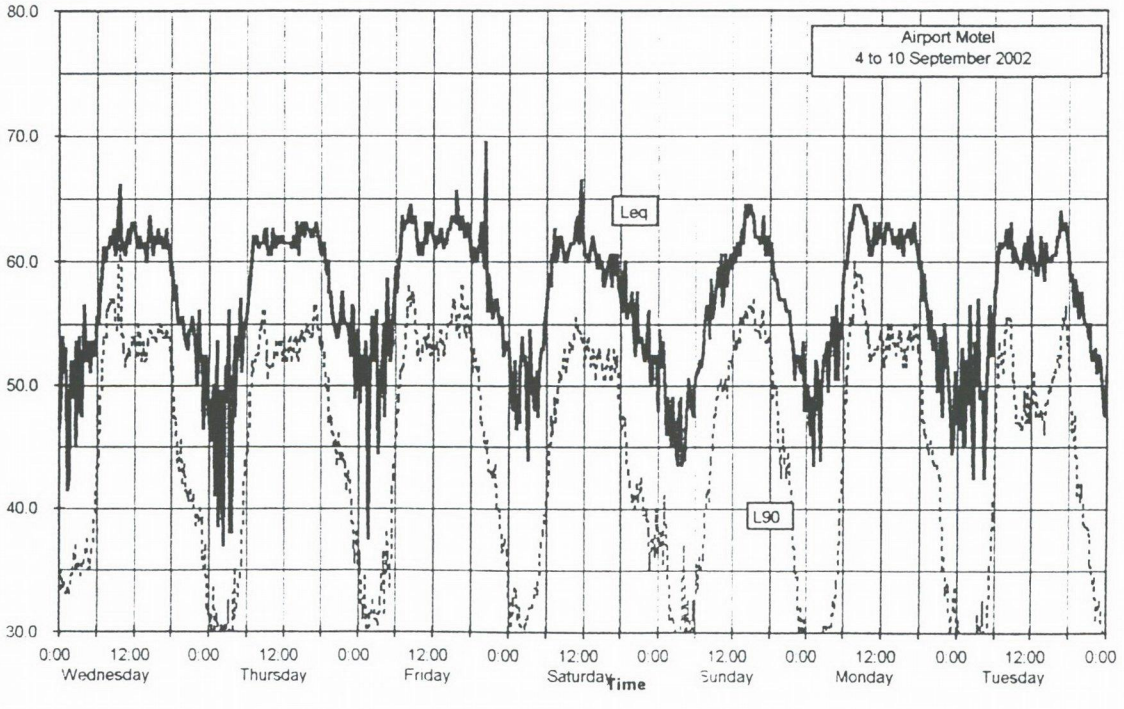
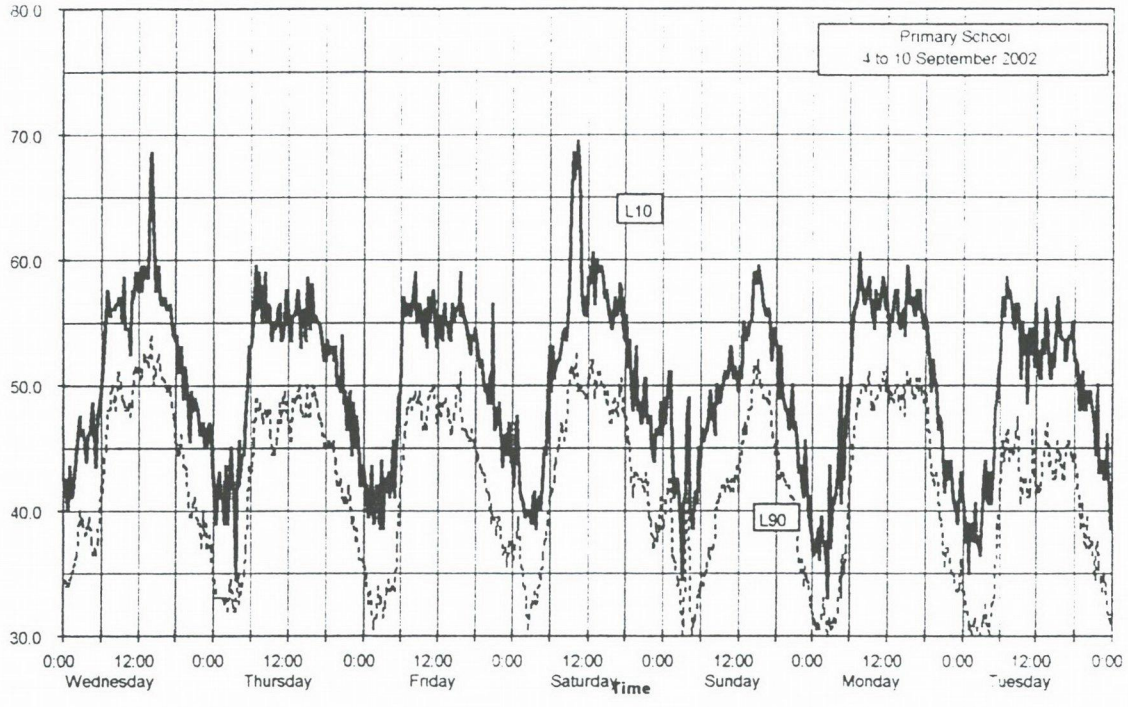


Figure 3.9 Variation in L_{10}, L_{eq} and L_{90} over seven days at the location in the grounds of the Queanbeyan East Primary School.



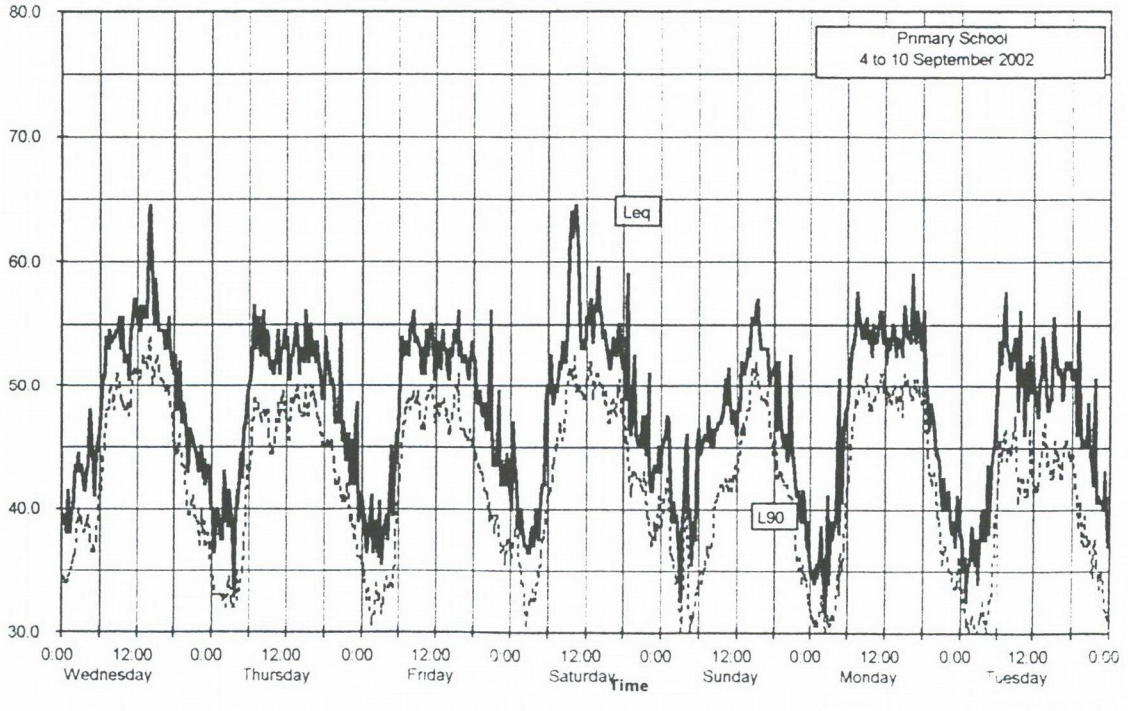
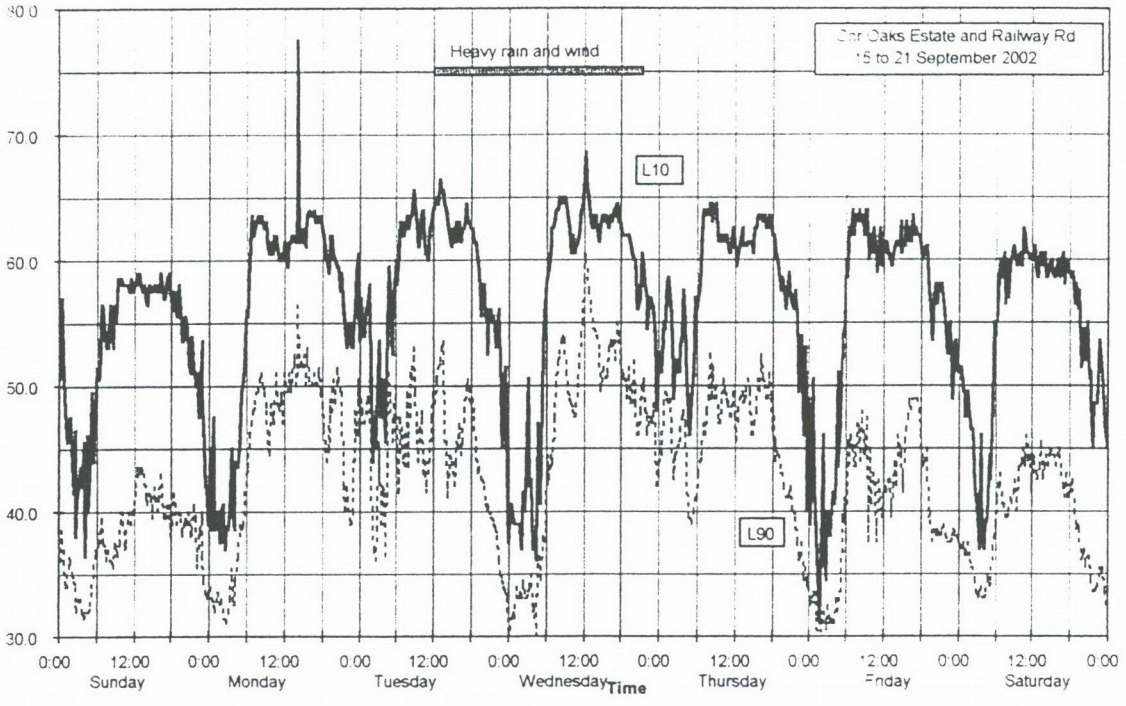


Figure 3.10 Variation in L_{10}, L_{eq} and L_{90} over seven days at 1 m from the façade of the house at the corner of Oaks Estate Rd and Railway Rd.



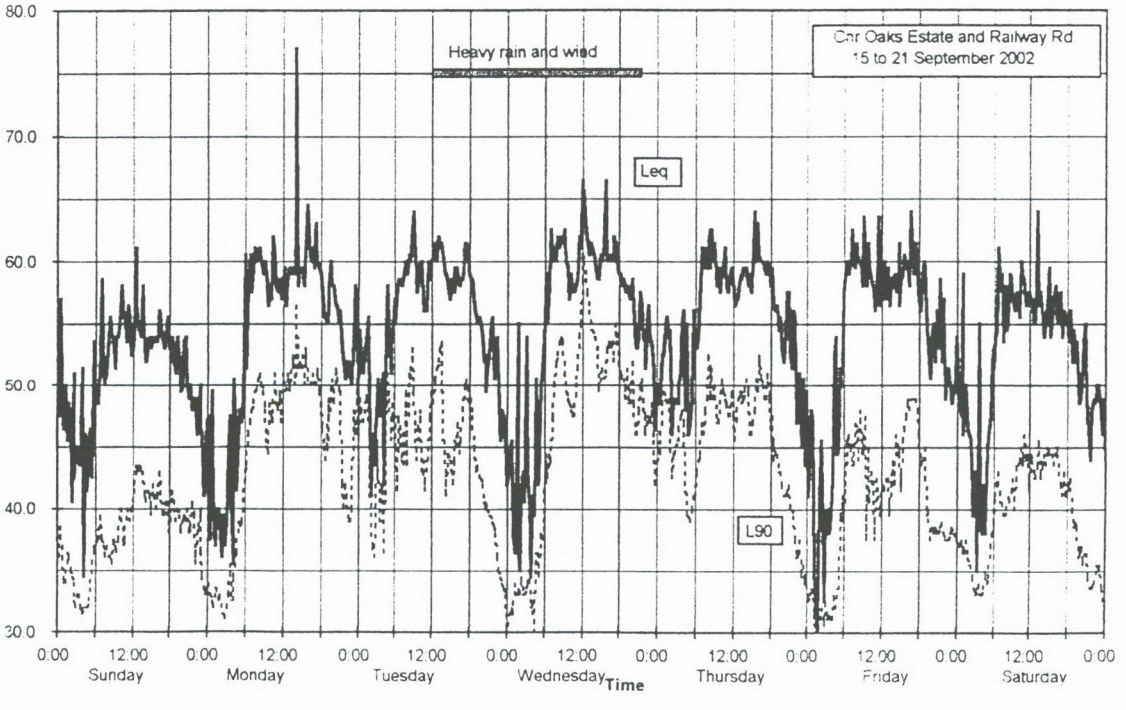
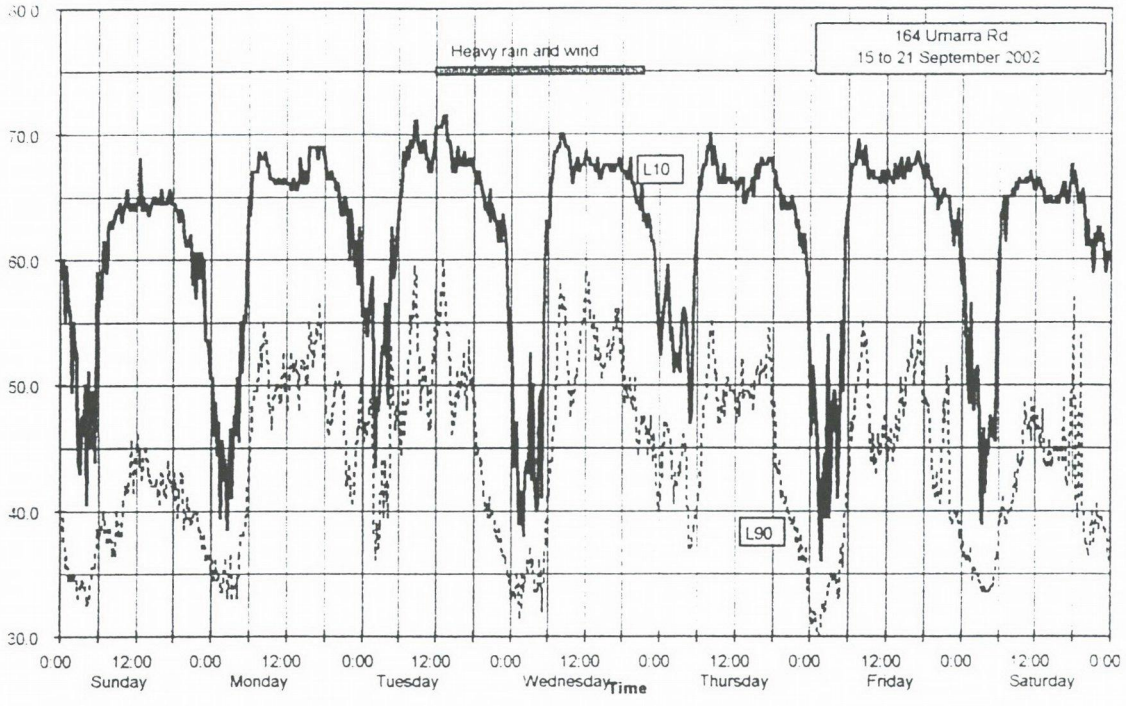
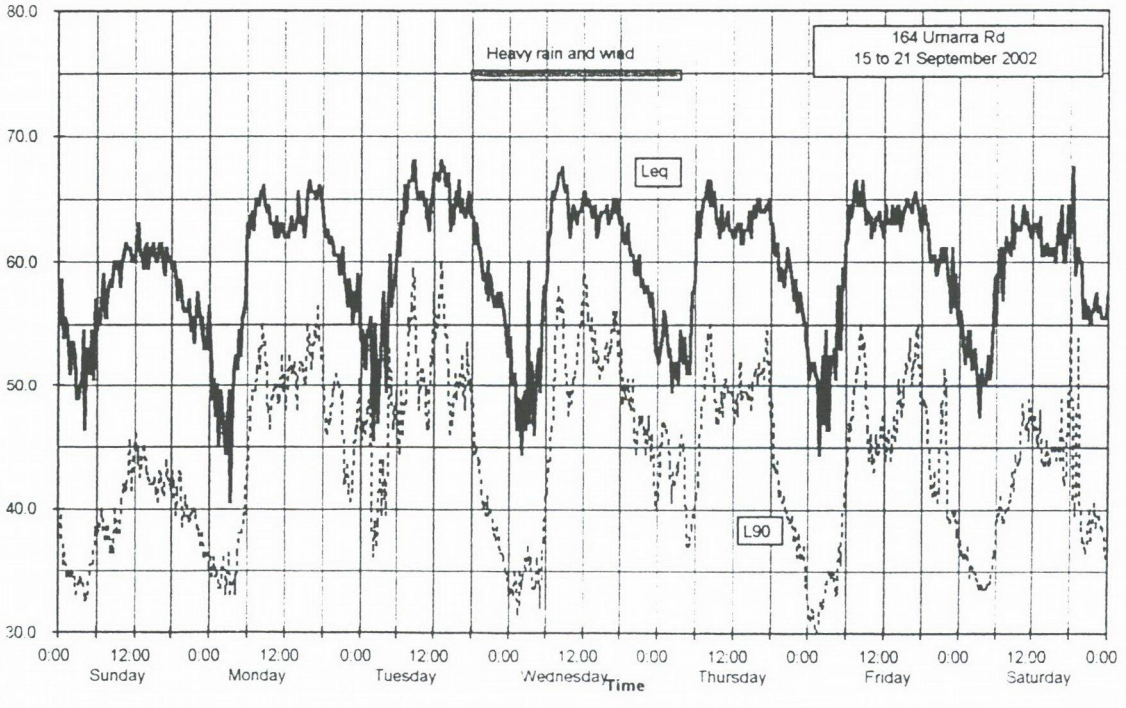


Figure 3.11 Variation in L_{10}, L_{eq} and L_{90} over seven days at 1 m from the façade of 164 Uriarra Rd.





3.1 Discussion on Existing Noise Conditions

3.1.1 Veterinary Clinic

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times which indicates that the noise from road traffic is the dominant noise in the area. It is estimated that the data for this location includes a reflected component from the facade at 2 m of approximately 1 dB(A). It was not possible to locate the logger safely at the normal 1 m from façade where the component for reflection from the façade is considered to be 2.5 dB(A). The weekday daytime $L_{Aeq(1\ hr)}$ ranges from 67 to 70 dB(A) and drops to 66 dB(A) on Sunday. The night time $L_{Aeq(1\ hr)}$ values range from 50 to 58 dB(A).

3.1.2 Airport Motel

At this location the noise level is more consistent during the day and does not show higher noise levels during the morning and afternoon peak periods. The noise levels are quite constant throughout each day with $L_{Aeq(15hr)}$ ranging from 59 to 62 dB(A). The nightime $L_{Aeq(9hr)}$ values range from 50 to 59 dB(A).

3.1.3 Primary School

At this location the noise level shows a number of peaks during the day which re likely to be related to school yard activities. The weekday daytime $L_{Aeq1\ hr}$ ranges from 54 to 56 dB(A). The night time L_{Aeq1hr} values range from 34 to 39 dB(A).

3.1.4 Corner of Oaks Estate Rd and Railway St

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times which indicates that the noise from road traffic is the dominant noise in the area. The data for this location includes a reflected component from the facade at 1 m. The weekday daytime $L_{A10(18\ hr)}$ ranges from 55 to 61 dB(A) and drops to 55 dB(A) on Sunday. The typical nightime values range from 36 to 43 dB(A).

3.1.5 164 Uriarra Rd

At this location the pattern of the noise variation over the day shows higher noise levels during the morning and afternoon peak times which indicates that the noise from road traffic is the dominant noise in the area. The data for this location includes a reflected component from the facade at 1 m. The weekday daytime $L_{Aeq(1\ hr)}$ ranges from 61 to 67 dB(A) and drops to 61 dB(A) on Sunday. The typical nightime $L_{Aeq(1hr)}$ values range from 47 to 51 dB(A).

4. PREDICTED FUTURE NOISE LEVELS

4.1 TRAFFIC ASSUMPTIONS AND VOLUMES

Future traffic volumes for each of the five sites have been based on the RTA's estimates and are detailed in Table 4.1. The estimated speeds on the roads adjacent to the sites were input into NIM as 50-60km/hr.

Table 4.1 Traffic assumptions used in NIM for each of the sites (Average Daily Volumes – ADV)

	2000		2010			
	Existing		Do Nothing		Northern Upgrade	
Location	ADV	% Trucks	ADV	% Trucks	ADV	% Trucks
Uriarra Rd (Vet and 164 Uriarra Rd)	12,425	6	13,500	6	* some increase	6
Oaks Estate Rd (House on corner)	5,000	7	6,700	7	10,300	7
Yass Rd (Airport Motel)	14,449	6	15,500	6	* 12,700	6
Thurralilly St (East Queanbeyan Primary School	2,300	8	2,600	8	* Significant reduction	2

Source : RTA's counts for 2000 and estimates for 2010

Note : * denotes that further study needs to be undertaken to estimate the traffic associated with the Northern Upgrade.

It was assumed that the peak hourly traffic volumes and night time volumes (that were used to satisfy the noise criteria at some sites) would be represented by 10% and 2.5% of the average daily traffic respectively.

At present, only Yass Rd is classed as an arterial road. Oaks Estate Rd and Uriarra Rd are currently collector roads and Thurralilly Street is a local council street.

Some increases in traffic volumes are expected to occur on Uriarra Rd and Yass Rd between 2000 and 2010 as these routes are already used regularly by heavy vehicles. The Oaks Estate Rd would experience an increased percentage of heavy vehicles travelling on it as well as an increase in light vehicles due to future development in the area.

The proposed upgrades at the Thurralilly St / Bungendore Rd intersection will restrict the present 'through' traffic on Thurralilly St. Vehicles will not be able to travel eastbound along Thurralilly and enter Bungendore Rd, and thus Thurralilly St will only accommodate 'local' traffic after the upgrade. The percentage of heavy vehicles using Thurralilly St is also expected to reduce from eight percent to two percent.

4.2 PREDICTED NOISE LEVELS FOR 2010

The estimated daytime noise levels for the sites under investigation are detailed in Figures 4.1 through to 4.5.

Table 4.2 tabulates the difference in daytime noise levels from the existing in 2000 to the predicted 2010 levels and Table 4.3 details the change in night time noise levels experienced at each site.

Table 4.2 Predicted noise levels Vs Existing noise levels (Daytime hours)

Location	Existing Noise Levels (2002)	Predicted Noise Levels (2010)	Increase in Noise Levels
Vet Clinic (NSW)	69.1 $L_{Aeq\,(1hr)}$	69.4 $L_{Aeq\,(1hr)}$	+ 0.3
Airport Motel on Yass Rd (NSW)	62.5 $L_{Aeq\,(15hr)}$	63.0 $L_{Aeq\,(15hr)}$	+ 0.5
East Queanbeyan Primary School (NSW)	55.3 $L_{Aeq\,(1hr)}$	54.2 $L_{Aeq\,(1hr)}$	- 1.1
House on corner of Oaks Estate Rd / Railway St (ACT)	59.3 $L_{A10\,(18hr)}$	64.7 $L_{A10\,(18hr)}$	+ 5.4
House at 164 Uriarra Rd (NSW)	65.2 $L_{Aeq\,(1hr)}$	65.7 $L_{Aeq\,(1hr)}$	+ 0.5

Source : Scott Wilson Nairn's NIM model

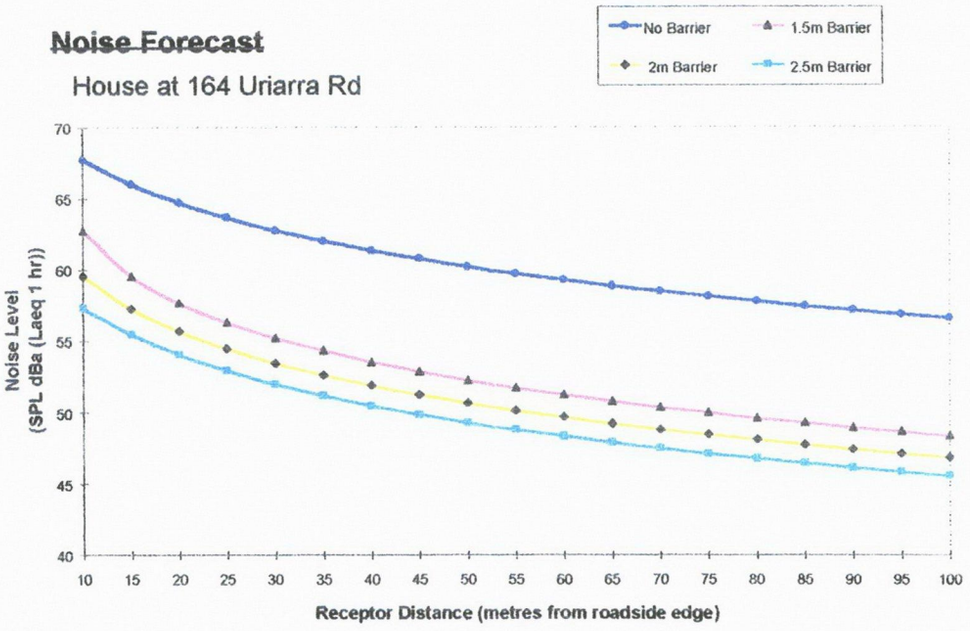
Table 4.3 Predicted noise levels Vs Existing noise levels (Night time hours)

Location	Existing Noise Levels (2002)	Predicted Noise Levels (2010)	Increase in Noise Levels
Vet Clinic (NSW)	51.1 $L_{Aeq\,(1hr)}$	51.5 $L_{Aeq\,(1hr)}$	+ 0.4
Airport Motel on Yass Rd (NSW)	51.7 $L_{Aeq\,(9hr)}$	52.0 $L_{Aeq\,(9hr)}$	+ 0.3
East Queanbeyan Primary School (NSW)	36.7 $L_{Aeq\,(1hr)}$	36.6 $L_{Aeq\,(1hr)}$	- 0.1
House on corner of Oaks Estate Rd / Railway St (ACT)	40.7 $L_{Aeq\,(1hr)}$	43.0 $L_{Aeq\,(1hr)}$	+ 2.3
House at 164 Uriarra Rd (NSW)	49.3 $L_{Aeq\,(1hr)}$	50.1 $L_{Aeq\,(1hr)}$	+ 0.8

Source : Scott Wilson Nairn's NIM model

4.2.1 Vet Clinic

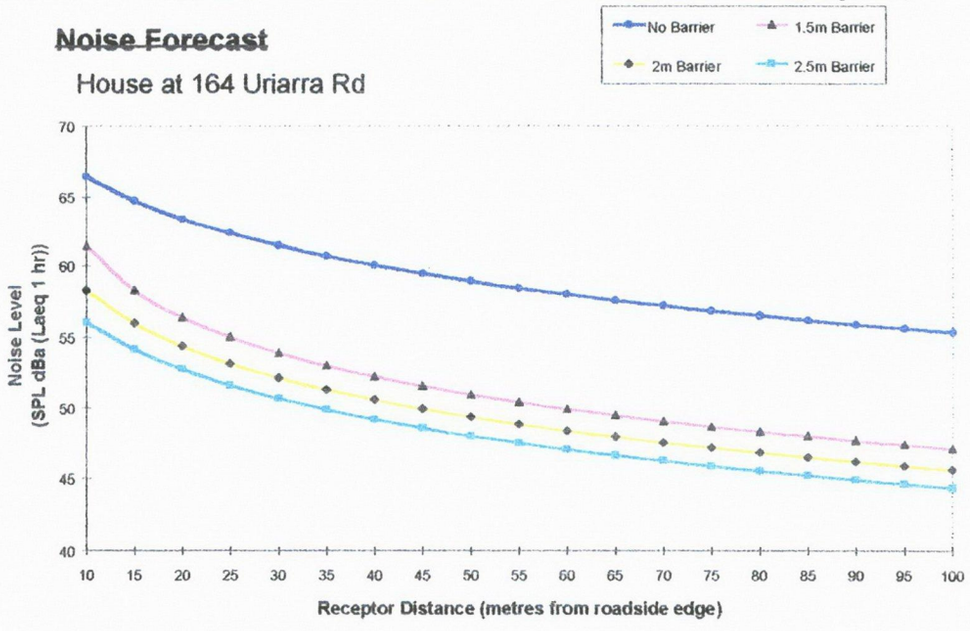
Figure 4.1 Predicted noise levels 2010 : Vet Clinic (Daytime)



The Vet Clinic is situated 5metres from the edge of the road and therefore has a predicted daytime noise level of $L_{Aeq(1hr)}$ 69.4 dB.

4.2.2 House at 164 Uriarra Rd

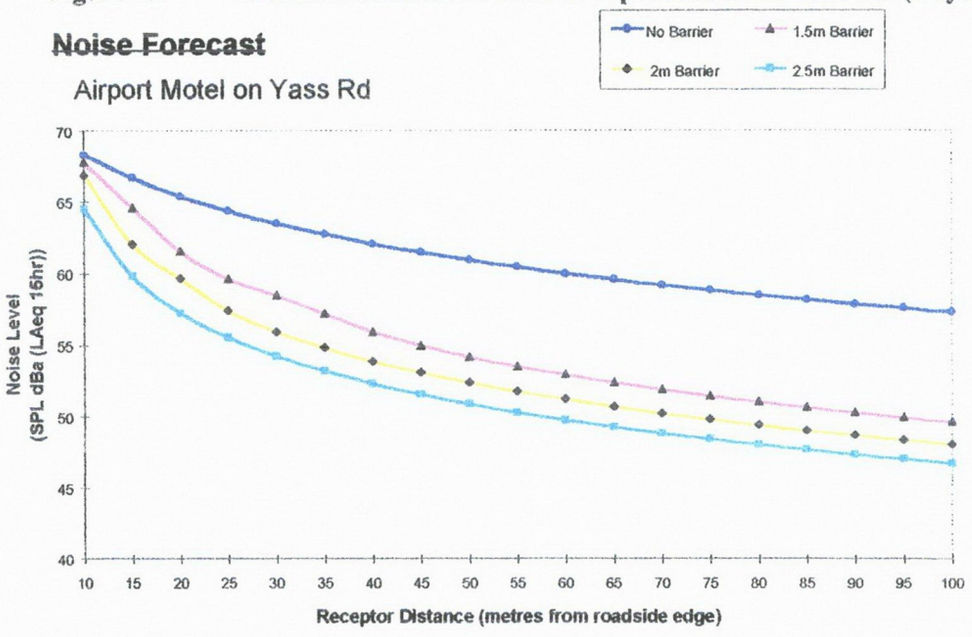
Figure 4.2 Predicted noise levels 2010 : House at 164 Uriarra Rd (Daytime)



The house is situated 12 metres from the edge of the road, so therefore has a predicted daytime noise level of $L_{Aeq(1hr)}$ 65.7 dB.

4.2.3 *Airport Motel*

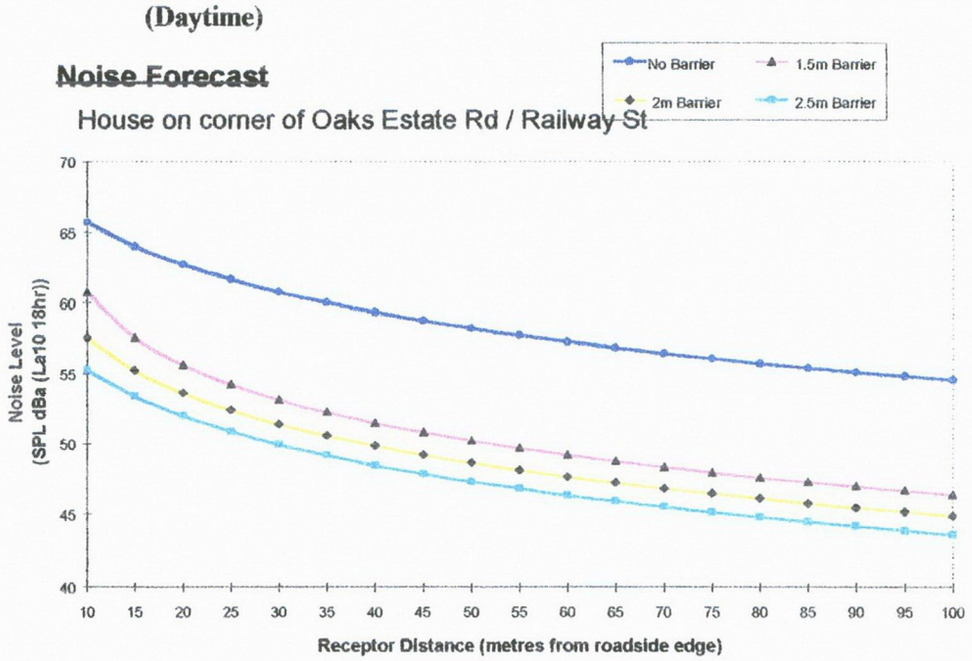
Figure 4.3 Predicted noise levels 2010 : Airport Motel on Yass Rd (Daytime)



The Motel is situated 33m from the edge of the road and has a predicted daytime noise level of L_{Aeq}(15hr) 63.0 dB.

4.2.4 *House on corner of Oaks Estate Rd*

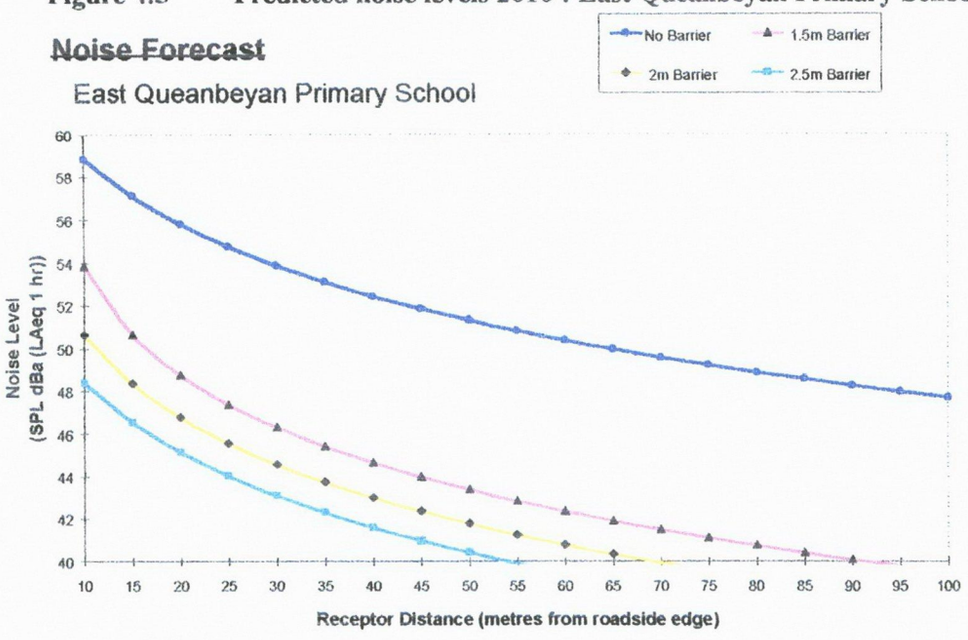
Figure 4.4 Predicted noise levels 2010 : House on corner of Oaks Estate Rd and Railway St (Daytime)



The house is situated 13 metres from the edge of the road and has a predicted daytime noise level of L_{A10}(18hr) 64.7 dB.

4.2.5 *East Queanbeyan Primary School*

Figure 4.5 Predicted noise levels 2010 : East Queanbeyan Primary School (Daytime)



The Primary School is located 28 metres from the road and is predicted to experience daytime noise levels of $L_{Aeq(1hr)}$ 54.2 dB.

4.3 DISCUSSION

Uriarra Rd was assessed in two sections; the vet clinic at the roundabout and the house located at 164 Uriarra Rd. Noise calculations for the vet clinic assumed that traffic speed would reduce to 45km/hr at the roundabout, which would consequentially reduce vehicle noise, although some increase in truck noise emissions due to gearing up and down could be expected.

Existing noise conditions were monitored at the vet from the base of the clinic on Uriarra Rd, when in fact the point of interest – the residence, is on the top floor. Predicted noise levels were also estimated for this ground floor location so as to maintain continuity. The proportional increase experienced at the ground floor location from the increase in traffic would be the same, or very similar, to that experienced on the top floor.

The residence at the Vet clinic, as determined by the monitoring station, is already experiencing high noise levels ($L_{Aeq(1hr)}$ 69.1 dB) and with the proposed northern upgrade route, is predicted to increase minimally to 69.4 dB. Because the existing daytime levels are already above the recommended noise volumes specified by the NSW EPA guidelines ($L_{Aeq(1hr)}$ 60 dB), and the predicted noise levels for the daytime do not exceed the allowance of an extra 2 dB (as detailed in Section 2.1), it is deemed satisfactory. The night time noise levels only increase by 0.4 dB with the northern upgrade and therefore also satisfy this criteria. Thus the Vet clinic does not require noise mitigation measures at this stage, although, future noise monitoring will need to be completed to reassess the noise levels present in future years.

The house at 164 Uriarra Rd also experiences only a marginal increase in daytime noise levels – from $L_{Aeq(1hr)}$ 65.2 dB (existing) to 65.7 dB (predicted). This increase is slightly higher than that experienced by the Vet, due to the higher speeds at this point (vehicles decelerating as they approach the Vet). The night time volumes increase by 0.8 dB, but still lies within the NSW EPA guidelines. This increase in traffic noise levels for both daytime and night time renders the need for noise mitigation strategies unnecessary, although ongoing monitoring will need to be undertaken to ensure the levels do not get too high in the future.

The Airport Motel on Yass Rd is expected to experience only a small increase in daytime traffic noise levels between existing ($L_{Aeq(15hr)}$ 62.5 dB) and predicted (63.0 dB). The motel's position is set back 33m from the road and acts as a buffer zone from the direct traffic noise. The existing noise levels at the motel are already above the recommended $L_{Aeq(15hr)}$ 60 dB limit for an arterial, so the NSW EPA's 2 dB allowance is applied. The predicted increase in daytime noise levels of 0.5 dB and 0.3 dB at night time, therefore suggests that mitigation measures are not required. Due to the nature of Yass Rd (arterial road linking Canberra and Queanbeyan) ongoing monitoring should be undertaken to ensure that noise levels do not increase excessively.

The East Queanbeyan Primary School is classed as a sensitive land use and therefore requires that existing noise levels do not exceed $L_{Aeq(1hr)}$ 55 dB in the school playground. The main buildings are set back quite far from Thurralilly St, so are not effected greatly by the relatively small amount of traffic that currently use the road. Monitoring of the site showed that existing day time noise levels were marginal at $L_{Aeq(1hr)}$ 55.3 dB and with the closure of the eastern end of Thurralilly St and subsequent reduction in heavy vehicle usage, daytime noise levels were predicted to actually decrease to 54.2 dB in 2010. The night time noise levels were also predicted to reduce from 36.7 dB to 36.6 dB. Both the existing and predicted levels (daytime and night time) are within the NSW EPA's guidelines, so it is envisaged that no noise mitigation measures are required for the school, although ongoing monitoring should be conducted in the future.

The Oaks Estate site is the only location for this study situated within the ACT, so as such is governed by different noise criteria to the other sites. The ACT guidelines can be seen in Table 2.1 and are predominantly similar to those set out by the NSW EPA.

Oaks Estate Rd at present does not experience high volumes of traffic, but with the planned northern route upgrade the traffic volumes are expected to almost double by 2010. The existing day time noise levels at the house on the corner of Oaks Estate Rd and Railway Rd was found to be $L_{A10(18hr)}$ 59.3 dB. With the inclusion of the expected extra traffic along Oaks Estate Rd, the predicted daytime noise levels for this site in 2010 was deemed to be $L_{A10(18hr)}$ 64.7 dB. The night time traffic noise volumes were predicted to increase from $L_{Aeq(1hr)}$ 40.7 dB to 43.0 dB.

The predicted levels are marginally within the ACT guidelines, so no noise mitigation measures are expected to be required for this site, although it is recommended that future monitoring be undertaken so as to ensure that the daytime noise levels do not reach levels exceeding $L_{A10(18hr)}$ 65 dB.

The residential Oaks Estate will experience lower levels of traffic noise than the two houses situated on the corner of Oaks Estate Rd and Railway Rd due to the estate being located approximately 200 metres from Oaks Estate Road. This 'buffer zone' should help to maintain the noise levels below the maximum specified in the ACT guidelines.

It is expected that the extra traffic and noise generated from the Northern Route Upgrade along Oaks Estate Road will have minimal adverse effects on the Oaks Estate. The improved geometry from intersection upgrades should improve safety and amenity for local users as well as heavy vehicle operators.

5. ALTERNATE NOISE CONTROL SOLUTIONS

There a number of alternate noise control solutions. These can be located at the source, receiver or in between, as discussed in Section 2.1. Some further details follow.

5.1 BARRIERS

While noise screens are normally installed on roadways to combat undesirable levels of noise nuisance, they are not conceived as enhancements to the aesthetic quality of the road, nor are they the sole means for achieving noise attenuation. They should be seen as a first line of defence to be supplemented by other noise-reducing design and building measures incorporated in the façade and other parts of the building.

Noise barriers, in the path between the source and the receiver have limitations. For a barrier to be fully effective, the line of sight between the source and receiver must be cut by the barrier. The greater the height of the barrier above the sight line, the more effective will be the barrier in reducing the noise impact at the receiver. Obviously, barriers do very little for homes overlooking a road, or for building which rise above the barrier.

The most effective location for a barrier is either close to the source or the receiver. The least effective position is in the middle between the source and the receiver.

Factors which influence what type of noise barrier is suitable for a particular property and location include: space, cost, aesthetics and the level of sound reduction required.

Barriers may be constructed from a number of different materials, for example – earth, wood, metals, concrete, masonry and composites. When choosing materials for fences or walls, the factors to consider are appearance, durability, cost and thickness. Brick and concrete blocks have the best sound-reducing properties, though lighter materials, such as 20 millimetre pine planking, 1 millimetre steel sheeting, fibre cement and thin (0.5 millimetre) steel sheeting can be effective. Barriers should generally have a mass density of at least 7.5 or 20 kg per square metre.

To form effective noise barriers, fences must be solidly built. There must be no clearance gap under the fence and planks or sheeting must be tight-fitting and without openings. Timber fences must be designed so that gaps do not emerge as the material ages or warps. Attention must be paid to the quality and durability of construction at all times to ensure that gaps do not appear. Holes or openings in a barrier wall (including at the foot of a fence) can severely compromise the noise reduction capability of the barrier. For example, if 2% of a barrier surface is open (by holes) in a 50mm thick timber wall, then a sound transmission increase of up to 8 dB(A) can occur. In the case of timber fences, the risk of openings occurring by warping of planks should be minimised.

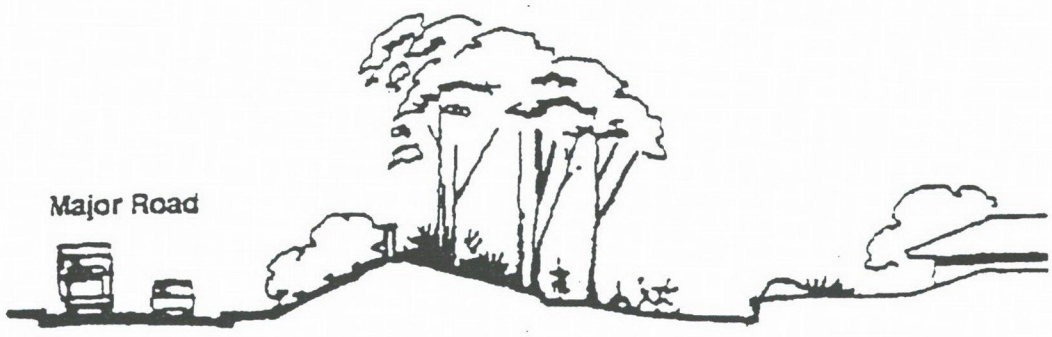
There are a number of barrier forms suitable for this study. For urban design and aesthetic reasons a landscaped earth mound is preferable where possible. The height of this mound can quickly be developed using retaining walls, minimising land take and ensuring the crest of the mound is as close as practical to the roadway. Earth mounds minimise noise reflections especially when the sides of the mound are grassed or planted. The actual design of the mound structure can be made to be aesthetically pleasing by use of appropriate materials and varying the alignment and shape of the structure.

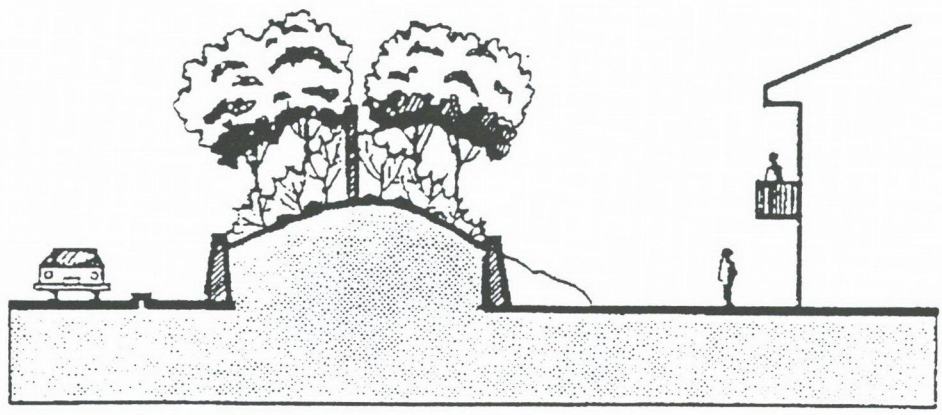
Combining different types of noise barriers can be another effective option. Vegetation can conceal and soften the appearance of fences and walls and present a more attractive street frontage. Fencing on top of the mound can save the space a larger mound might take and reduce the amount of fencing material required. Figure 5.1 illustrates some possible combinations.

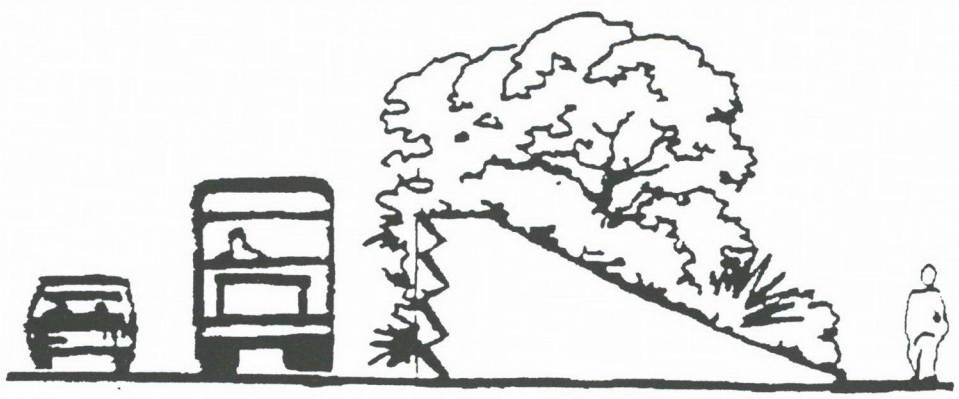
A common error is to assume that a clump of trees or a thin line of undergrowth is an effective barrier. The amount of sound attenuation obtained by a 50 metre thick, dense, evergreen forest with foliage down to the ground level may only be between 3 and 5 dB(A). However, the psychological effect of visually screening traffic with moderately dense vegetation is generally beneficial and cost effective. Trees and shrubs have positive values – they are pleasant to look at, reduce awareness of the traffic, and filter dust and fumes. Landscaping should therefore be considered as an integral component of any noise barrier treatment.

Figure 5.1 Barrier Treatments


Road


Major Road





5.2 BUILDINGS

Barriers do not provide the total solution for attenuating noise. However, barriers in combination with special building design and siting measures can greatly improve traffic noise attenuation. When planning a new home in an area affected by traffic noise, it is important to incorporate acoustic design into traditional design approaches.

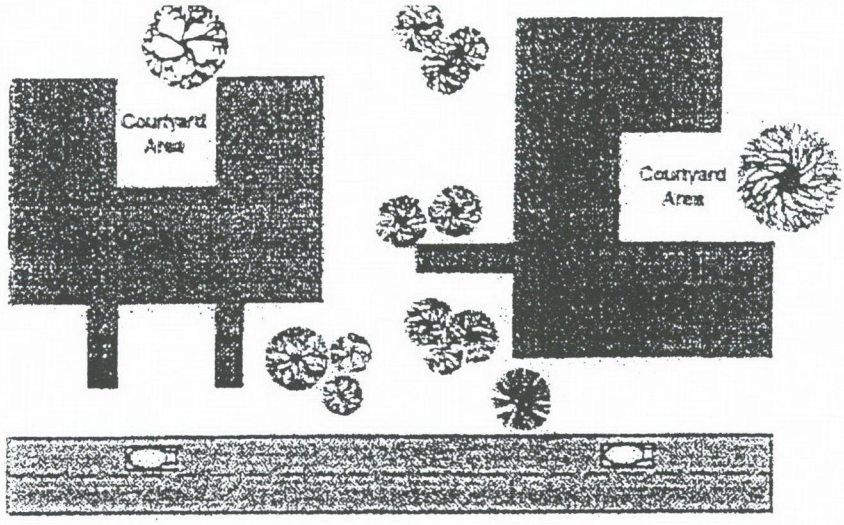
Excessive levels of road traffic noise received within dwellings can be effectively mitigated by the installation of appropriately designed building treatments and by well-considered room layouts. Figure 5.2 shows some examples of good acoustic site plannings. The layout of the building can also be used to mitigate traffic noise intrusion by placing kitchens, bathrooms and the like between noise sensitive rooms as bedrooms and the road, as shown in figure 5.3.

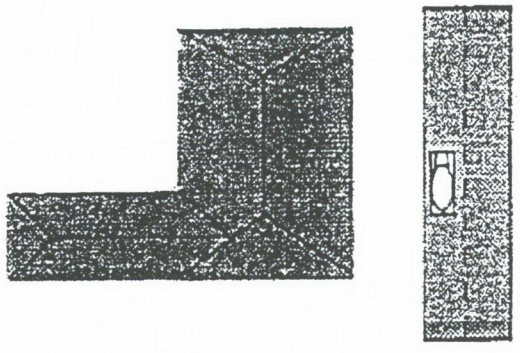
A combination of building construction methods can be used to reduce road traffic noise intrusion by specified amounts, potentially allowing buildings to be located close to the road and/or reducing the need for noise barriers. Australian Standards (AS 2017 and AS 3671) provide a number of different construction standards for private residences in areas with different road traffic noise levels (Standards Australia 1987, 1989).

The following points should be borne in mind when planning a new residence to attain good acoustic reduction:

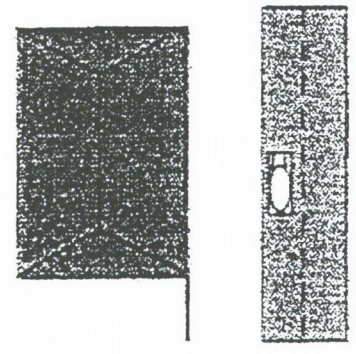
- Rate rooms according to noise sensitivity. Locate less noise-sensitive rooms closer to the noise source, using them to shield the more noise-sensitive areas.
- Locate noise-sensitive rooms such as bedrooms at the rear of the house or as far as possible from the source of the noise.
- Locate garage and parking areas, and noise-tolerant rooms such as the laundry, bathroom and even the kitchen, closest to the noise source.
- Noise barriers are most effective at ground floor level. Single-storey dwellings are easier to shield from noise than two-storey dwellings. However, the use of sound-absorbing materials placed on reflecting surfaces of upper-storey, as shown in Figure 5.4, can reduce reflected noise in two-storey dwellings.
- Use the house to shield the backyard from traffic noise, as shown in Figure 5.2.
- Keep to a minimum the number of doors and windows (particularly openable windows) at the front of the house.

Figure 5.2 Acoustic Site Planning

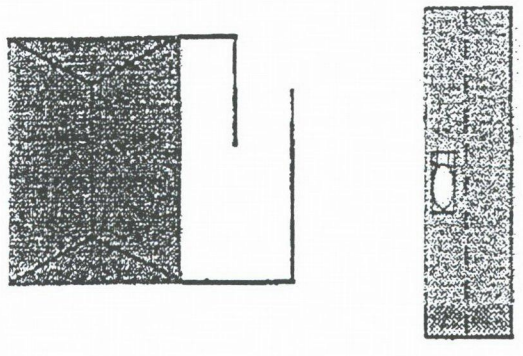




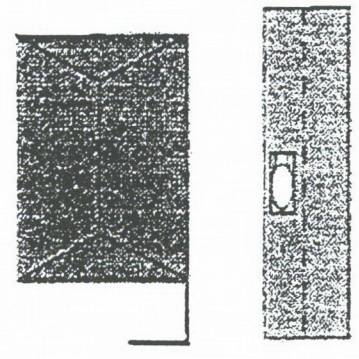
Some protection may be possible even if certain views or sun penetration are important.



Protection for windows at the side or back is easier and less expensive. This design is not as good as the one below.



This type of patio screen wall reduces views but affords good protection without excluding too much sun. Privacy and wind protection are a bonus



A small right angle return of the tin wall significantly increases the protection to this side window.

Figure 5.3 Acoustic Housing Design

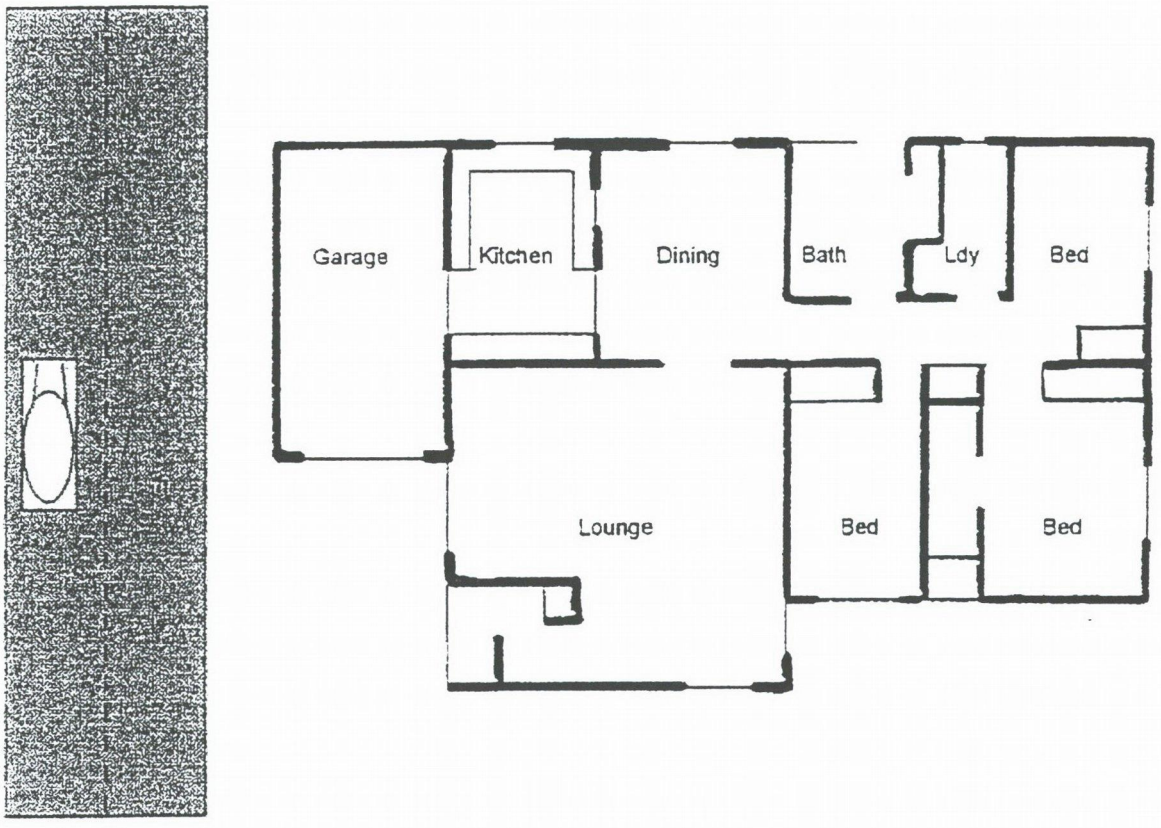
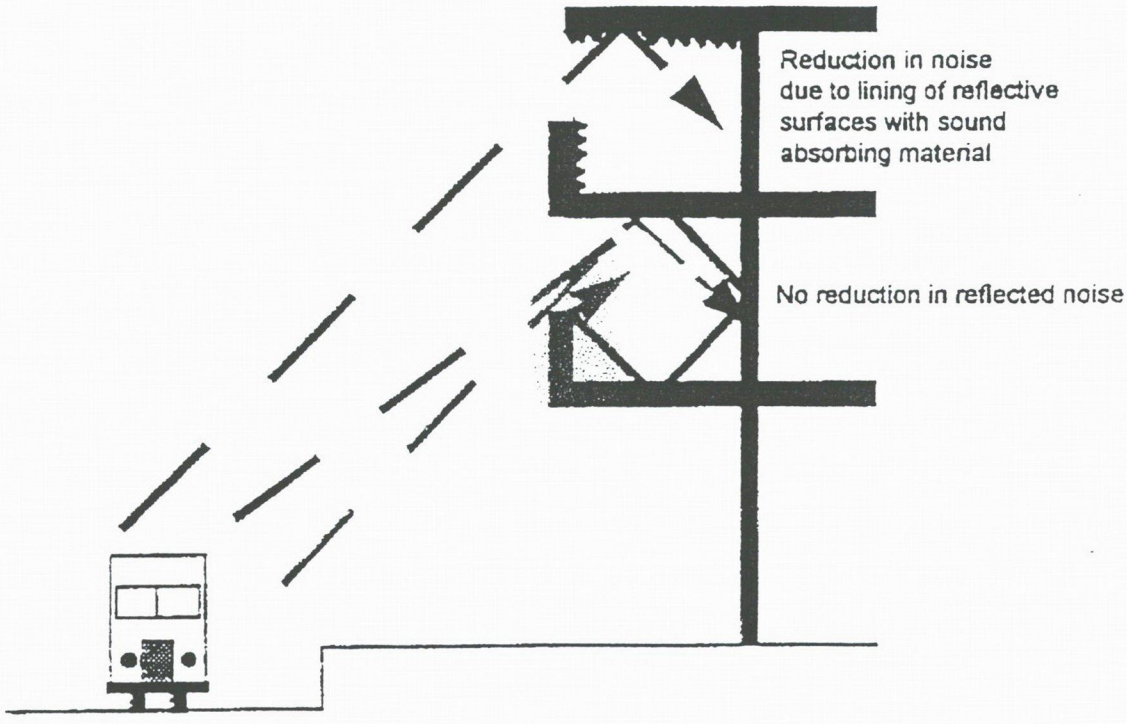


Figure 5.4 Noise Reflection on multi-storey dwellings


Reduction in noise due to lining of reflective surfaces with sound absorbing material
No reduction in reflected noise

6. CONSTRUCTION NOISE AND VIBRATION

It is understood that the range of construction equipment that would be used for most of the upgrades along the by-pass would include grader, vibrating smooth drum roller, rubber tyred roller, vibrating padfoot roller, backhoe, excavator, water cart and a variable number of trucks. The portions of the route where consideration of the noise impact needs particular consideration are:

- the extension of Aurora Ave near the school;
- the intersection of Oaks Estate Rd and Railway St;
- along Railway St; and
- along Uriarra Rd.

Control of hours of operation and work practices designed to minimise excess noise should be adequate to minimise the noise impact. The sound from reversing alarms often causes annoyance as it is designed to draw attention. The alarms on each of the items of plant should be positioned as close to the ground as possible and not on the upper section of the plant. The volume level on the alarm should be as low as possible while still drawing attention to the item of plant.

It is understood that the work on the bridge at the junction of Railway St and Mountain Rd will involve pile driving. This has the potential for producing excessive noise for the nearby residential areas, in particular on the other side of the railway line. Attention should be given to minimising the noise from this work and alternatives to pile driving should be considered.

The use of vibrating equipment and pile driving has the potential to produce excessive vibration in the nearby areas. It will be necessary to consider the potential impact from vibration on the buildings in the vicinity of Oaks estate once the extent of the work has been established.

It is recommended that RTA monitor both vibration and noise levels during the construction phases.

7. CONCLUSIONS AND RECOMMENDATIONS

As a result of this investigation it was found that all five sites studied should not require noise mitigation measures prior to 2010. The Oaks Estate site is that only location where the predicted noise levels are very close to the stipulated maximum guidelines and as such may require future monitoring of noise levels.

The Vet clinic, the Airport Motel (L_{Aeq}15hr) and the house at lot 164 Uriarra Rd are all currently experiencing existing traffic noise levels higher than the recommended NSW EPA guidelines ($L_{Aeq(1hr)}$ or $L_{Aeq(15hr)}$ 60 db). With the proposed Queanbeyan Northern Route Upgrade put in place it is predicted that all three will be subjected to minor increases in noise levels by 2011. These increases are less than the maximum increase of 2 dB set out by the NSW EPA, so noise mitigation strategies are not expected to be required at these sites. Ongoing monitoring of the traffic noise levels at these areas should be periodically carried out to assess if the noise levels begin to adversely affect the surrounding areas.

The East Queanbeyan Primary School on Thurralilly St is classified as a sensitive area, and as such is required to meet more stringent noise criteria. The existing noise level is currently under the recommended daytime maximum for a school ($L_{Aeq(1hr)}$ 55 dB) and with the closure of the east end of Thurralilly St traffic volumes are expected to decrease before 2010. This reduction in traffic is expected to further reduce the noise volumes experienced by the school. The night time noise levels are also expected to reduce slightly and are well below the night time criteria set for local roads ($L_{Aeq(1hr)}$ 50 dB). It is therefore recommended that no noise mitigation strategies are expected to be required prior to 2010.

The Oaks Estate site is governed by ACT noise criteria and is the only location where the predicted noise levels for 2010 will be close to the defined maximum. The site is expected to experience a large increase in traffic volumes and as such is estimated to increase from an existing noise level of $L_{A10(18hr)}$ 59.3 dB to 64.7 dB in 2010. ACT noise management guidelines suggest that noise levels should not exceed $L_{A10(18hr)}$ 65 dB, therefore the resultant extra traffic will still satisfy ACT guidelines, but will require future monitoring to ensure these noise limits are not exceeded.

If in the future any mitigation measures are required, such as barrier treatments or fences, the required fences must be erected to strict building requirements whereby no gaps are allowed to occur particularly along the base of the fence where it meets the ground. A lapped and capped timber fence would be suitable, although their expected life-time is only 15-20 years. Concrete fences have a longer life of 30-40 years plus. Cracks or openings caused by warping (timber), improper joints, poor fixing methods of posts etc must be avoided to eliminate leakage of noise through the fence. The design and construction methods must ensure this, for optimum performance of any walls of whatever material.

Control of hours of operation and work practices designed to minimise excess noise should be adequate to minimise the noise impacts during the construction of the intersection upgrades.

Attention should be given to minimising the noise and vibration effects from the pile driving that is required for the bridge overhaul on Railway St. Alternatives to pile driving should be considered so as not to impact too heavily on the nearby residential areas.

It is recommended that RTA monitor both vibration and noise levels during the construction phases.

It is expected that the even though the traffic will increase on a number of roads defined in the Northern Upgrade Route (such as Oaks Estate Road and Uriarra Rd), the enhanced geometry from intersection upgrades should improve road safety and amenity for both heavy vehicle operators and local residents.

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