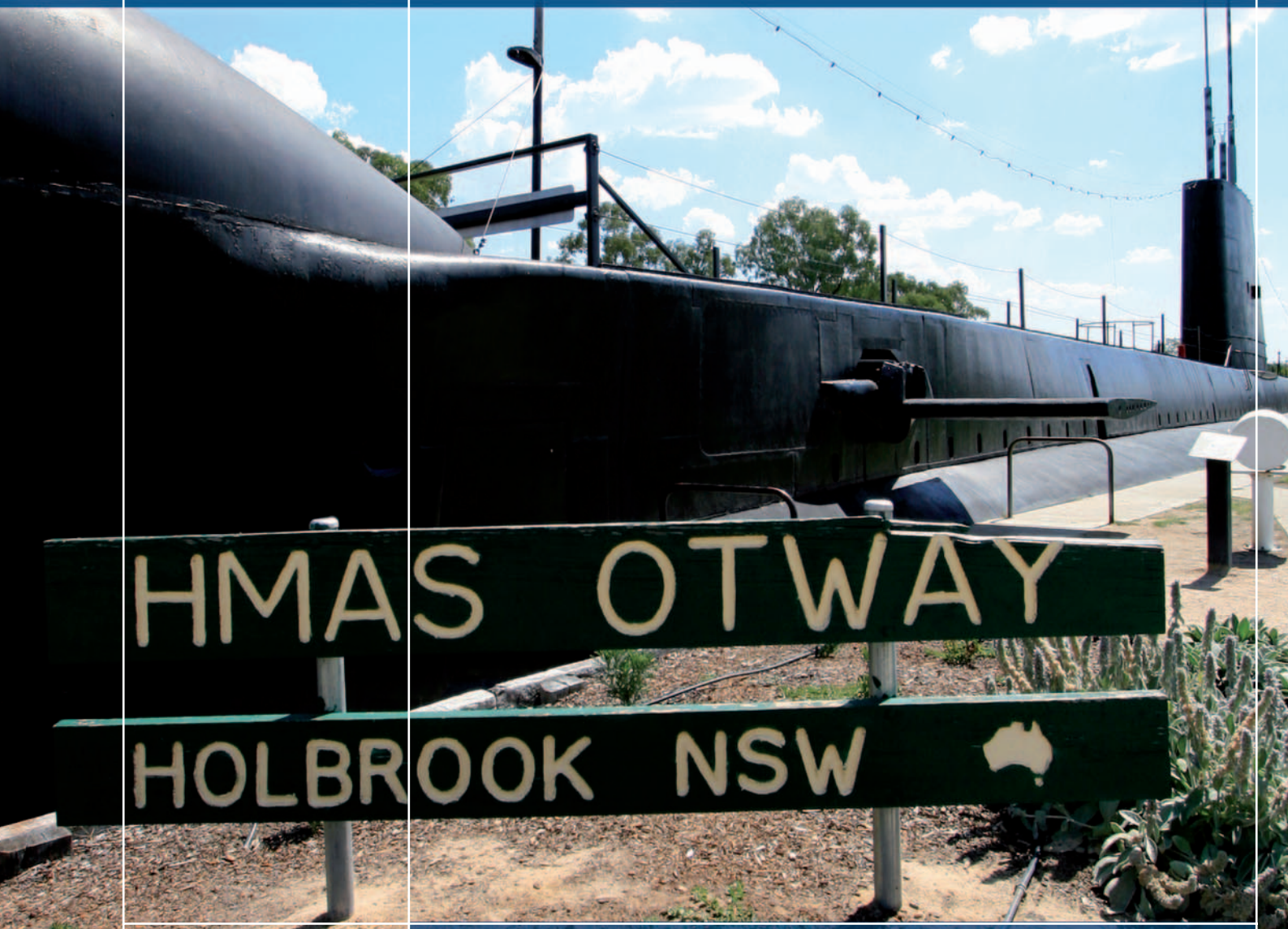
Australian Government

RTA



Hume Highway Upgrade

Holbrook bypass

Preliminary environmental assessment

October 2008

Hume Highway Upgrade
Holbrook Bypass

Preliminary Environmental Assessment

October, 2008

NSW Roads and Traffic Authority

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Introduction and need

The Hume Highway is the main road freight route between Sydney and Melbourne, carrying over 20 million tonnes of road freight every year. It is also a vital transport link for communities and industries in southern NSW. The Hume Highway is 807 kilometres in length from Sydney to Melbourne. Within Victoria, the highway is completely dual carriageway. Within NSW, dual carriageway conditions exist on approximately 80 per cent of the total highway length, leaving 101 kilometres yet to be duplicated. Of this, 81 kilometres is contained within projects currently under construction to dual carriageway, all of which are due to be completed by 2009. The 20 kilometres of single carriageway remaining on the Hume Highway pass through the towns of Tarcutta, Holbrook and Woomargama.

The *AusLink White Paper: Building Our National Transport Future* is the Australian Government's formal policy statement on land transport. It identifies national objectives for the AusLink investment program, which promotes sustainable national and regional economic growth, development and connectivity by contributing to the development of an integrated national land transport network. Under AusLink, the Australian Government established a National Land Transport Plan and a defined National Transport Network that includes the Hume Highway.

The previous Australian Government committed to completion of full duplication of the Hume Highway by 2012. Funding has been provided to complete planning activities to be in a position to commence construction from July 2009 (the second tranche of AusLink funding).The Hume Highway duplication program and its component sub-projects, including the Holbrook bypass, are included as major projects to be undertaken, requiring federal funding for completion, in the *State Infrastructure Strategy – New South Wales 2006-07 to 2015-16*.

The Roads and Traffic Authority of NSW (RTA) proposes to construct a bypass of Holbrook on the Hume Highway. Holbrook is located approximately 60 kilometres north of Albury. The project would comprise the bypass of seven kilometres of existing single carriageway highway through Holbrook and would consist of a dual carriageway highway arrangement to the west of the town. The bypass would deviate to the west of the existing Hume Highway approximately five kilometres to the north of Holbrook, traversing a variety of land uses, including cleared agricultural land, Crown Reserve, travelling stock route/reserve, and industrial land. The preferred route crosses Main Road (MR) 211 (Wagga Road), the non-operational Culcairn-Holbrook rail line, MR 331 (Culcairn Road) and Ten Mile Creek before rejoining the existing Hume Highway approximately three kilometres south of Holbrook. The crossings at MR 211 and MR 331 would require grade separated crossings as part of the proposed bypass.

Planning and assessment process

In accordance with section 75B(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), by Order dated 20 December 2007 and published in the NSW Government Gazette (No. 4 of 2008), the Minister for Planning has declared that the proposed Hume Highway bypass of Holbrook is a project to which Part 3A of the EP&A Act applies.

Preliminary findings

Preliminary environmental investigations have been undertaken for the proposed Hume Highway bypass at Holbrook. These investigations identified the following key environmental issues:

- Biodiversity — threatened species and ecological communities are present in the project area, and there is the potential for an additional 14 threatened species to be present within or adjacent to the preferred route corridor. Other likely biodiversity impacts include potential severance of habitat for threatened (and other) species, and loss of habitat.
- Aboriginal heritage — one significant Aboriginal cultural heritage location has been identified along the preferred route, as well as numerous Aboriginal cultural trees. The preferred route has been assessed as having moderate archaeological heritage potential.
- Noise and vibration — construction and operation of the bypass along the preferred route may result in noise exceedances at a number of houses, particularly those located directly west of the existing highway.
- Socio-economic — impacts may relate to property acquisition, property access, business impacts and changes in amenity for sensitive receptors.

Proposed scope of the environmental assessment

A comprehensive environmental assessment will be undertaken for the Hume Highway Holbrook bypass project. The assessment will examine all relevant environmental matters, and will continue to involve all relevant community and government stakeholders. The proposed scope of the environmental assessment is summarised below:

- General — the assessment will: consider all planning and statutory requirements; identify the strategic justification for the project; discuss the project and the options considered; and outline the construction activities.
- Stakeholder and community consultation — a detailed description of consultation activities, and issues identified through consultation, will be provided. The assessment will outline the stakeholder consultation and communication strategy to be implemented during the project.
- Environmental risk analysis — this will build on the environmental risk analysis undertaken during the preliminary investigations to identify the key environmental issues associated with the project. If any additional key environmental impacts are identified, an appropriately detailed impact assessment will be undertaken and included in the environmental assessment.
- Key environmental issues — detailed environmental investigations will be undertaken to assess the potential impacts of the project associated with biodiversity, Aboriginal heritage, noise and vibration, socio-economic and any other key issues identified in the Director-General of the Department of Planning's environmental assessment requirements.
- Statement of Commitments — a draft list of the measures to avoid, minimise, manage, mitigate, offset and/or monitor impacts identified in the impact assessment sections of the environmental assessment will be provided.

- Conclusion — a conclusion that justifies the project, taking into consideration the environmental, social and economic impacts of the project, the suitability of the preferred route and whether the project is in the public interest.

1. Introduction

1.1 Background

The Hume Highway is the main road freight route between Sydney and Melbourne, carrying over 20 million tonnes of road freight every year. In addition, it is a vital transport link for communities and industries in southern NSW. The Hume Highway is 807 kilometres in length from Sydney to Melbourne — 517 kilometres in NSW and 290 kilometres in Victoria. Within Victoria, 100 per cent of the highway is dual carriageway, mostly of freeway standard. Within NSW, dual carriageway conditions exist on approximately 80 per cent of the total length of the highway.

Of the 101 kilometres of the Hume Highway in NSW yet to be duplicated, 81 kilometres is contained within projects currently under construction, including the Coolac bypass, the Sheahan Bridge duplication, and the Hume Highway duplication between the Sturt Highway junction and Table Top (north of Albury). All of these works are due to be completed by 2009, which will leave only 20 kilometres of single carriageway remaining on the sections of the Hume Highway through the towns of Tarcutta, Holbrook and Woomargama.

The previous Australian Government committed to completion of full duplication of the Hume Highway by 2012. Funding has been provided to complete planning activities to be in a position to commence construction from July 2009 (the second tranche of AusLink funding).The Hume Highway duplication program and its component sub-projects, including the Holbrook bypass, are included as major projects to be undertaken, requiring federal funding for completion, in the *State Infrastructure Strategy – New South Wales 2006-07 to 2015-16*.

In accordance with the above strategies, the Roads and Traffic Authority of NSW (RTA) proposes to construct a dual carriageway highway bypass of Holbrook. The scope of this project, which is the subject of this Preliminary Environmental Assessment, comprises the bypass of seven kilometres of existing single carriageway highway through the town of Holbrook. For the purposes of the report, the scope of works is referred to as ‘the project’ hereafter.

Holbrook is located on the Hume Highway approximately 60 kilometres north of Albury and 77 kilometres south of the Sturt Highway junction (see Figure 1-1).

1.2 Purpose of this report

This preliminary environmental assessment has been prepared by Parsons Brinckerhoff (PB) on behalf of the RTA to support a major project application under Section 75E of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (see Chapter 2). The report:

- Describes the project.
- Outlines the findings of the preliminary environmental investigations and identifies a number of environmental management measures.
- Lists and discusses the key environmental issues associated with the project, which were identified through a preliminary environmental risk assessment.
- Proposes the scope of the subsequent environmental assessment for the project.
- Informs the development of the environmental assessment requirements by the Director-General of the Department of Planning under Section 75F(2) of the EP&A Act.

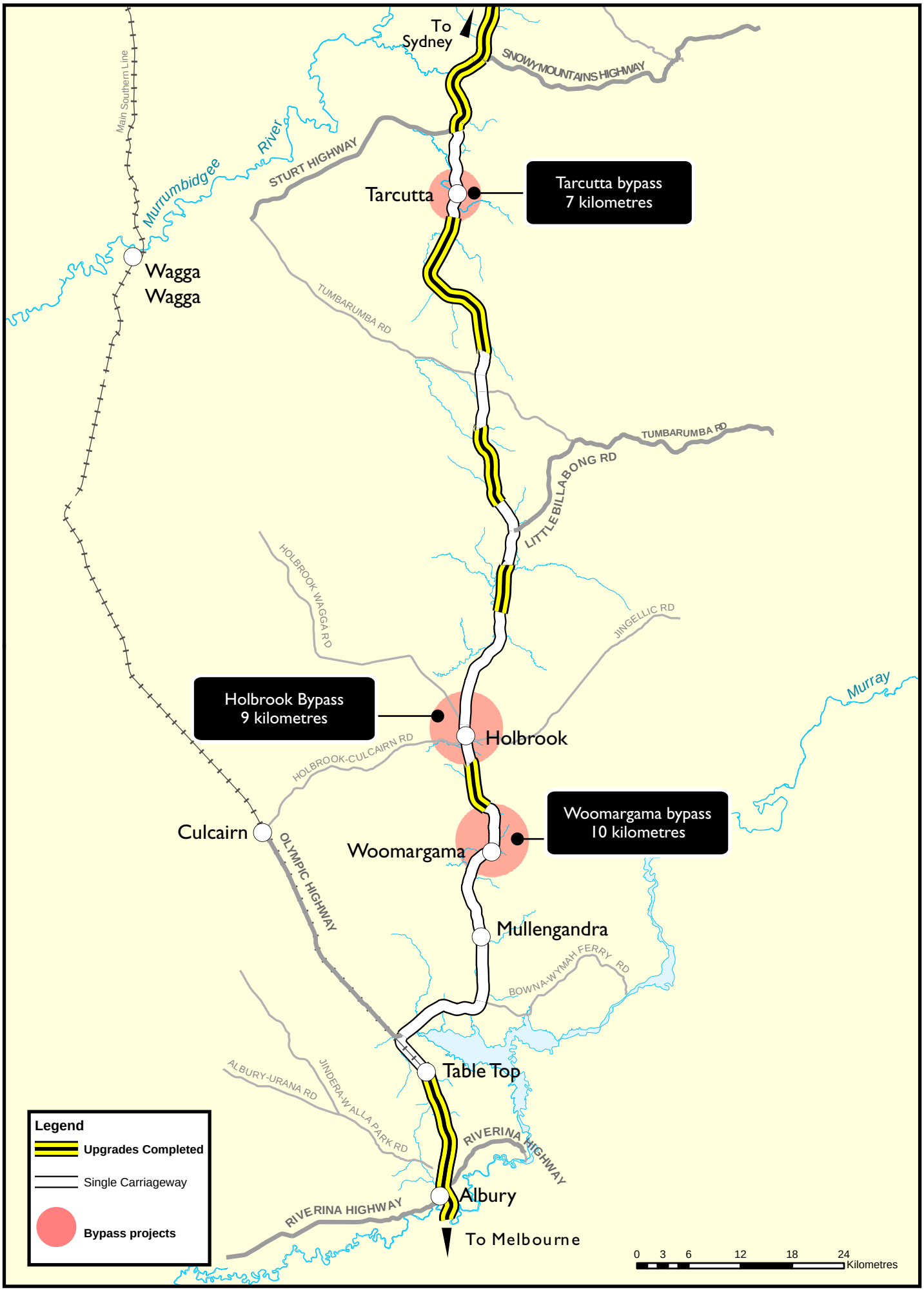

Figure 1-1 Regional context

2. Planning and assessment process

2.1 The Part 3A assessment and approvals process

Section 75B (2) of the EP&A Act provides that:

> The following kind of development may be declared to be a project to which this Part applies:
>
> (a) major infrastructure or other development that, in the opinion of the Minister, is of State or regional environmental planning significance.

In accordance with the above provision, by Order dated 20 December 2007 and published in the NSW Government Gazette (No 4 of 2008), the Minister for Planning has declared that the Hume Highway bypass of Holbrook is a project to which Part 3A of the EP&A Act applies. A copy of the Order is provided in Appendix A.

The Part 3A approval process is shown in Figure 2-1.

2.2 Statutory planning

2.2.1 Local environmental planning controls

The project is located within the Greater Hume local government area (LGA). The Greater Hume LGA was formed through the amalgamation of three former council areas — Holbrook, Culcairn and Hume. The planning instruments for each of the former Councils in force prior to the amalgamation continue to regulate land use in the LGA. The local council planning instrument of relevance to the project is the *Holbrook Interim Development Order 1970* (IDO).

Under the IDO, land use zonings applicable to the project include land zoned 1(a) non-urban and 1(b) non-urban. Under each of these zonings, development for the purposes of the project would be permissible with the consent of Council.

The consent of the Greater Hume Shire Council is not required, as the project is subject to assessment under Part 3A of the EP&A Act, which prevails over the IDO.

2.2.2 Other environmental planning instruments

Other NSW planning instruments that may be relevant to the project include, but are not limited to:

- State Environmental Planning Policy No. 44 – Koala Habitat Protection.
- State Environmental Planning Policy No. 55 – Remediation of Land.
- State Environmental Planning Policy (Major Projects) 2005.
- State Environmental Planning Policy (Infrastructure) 2007.

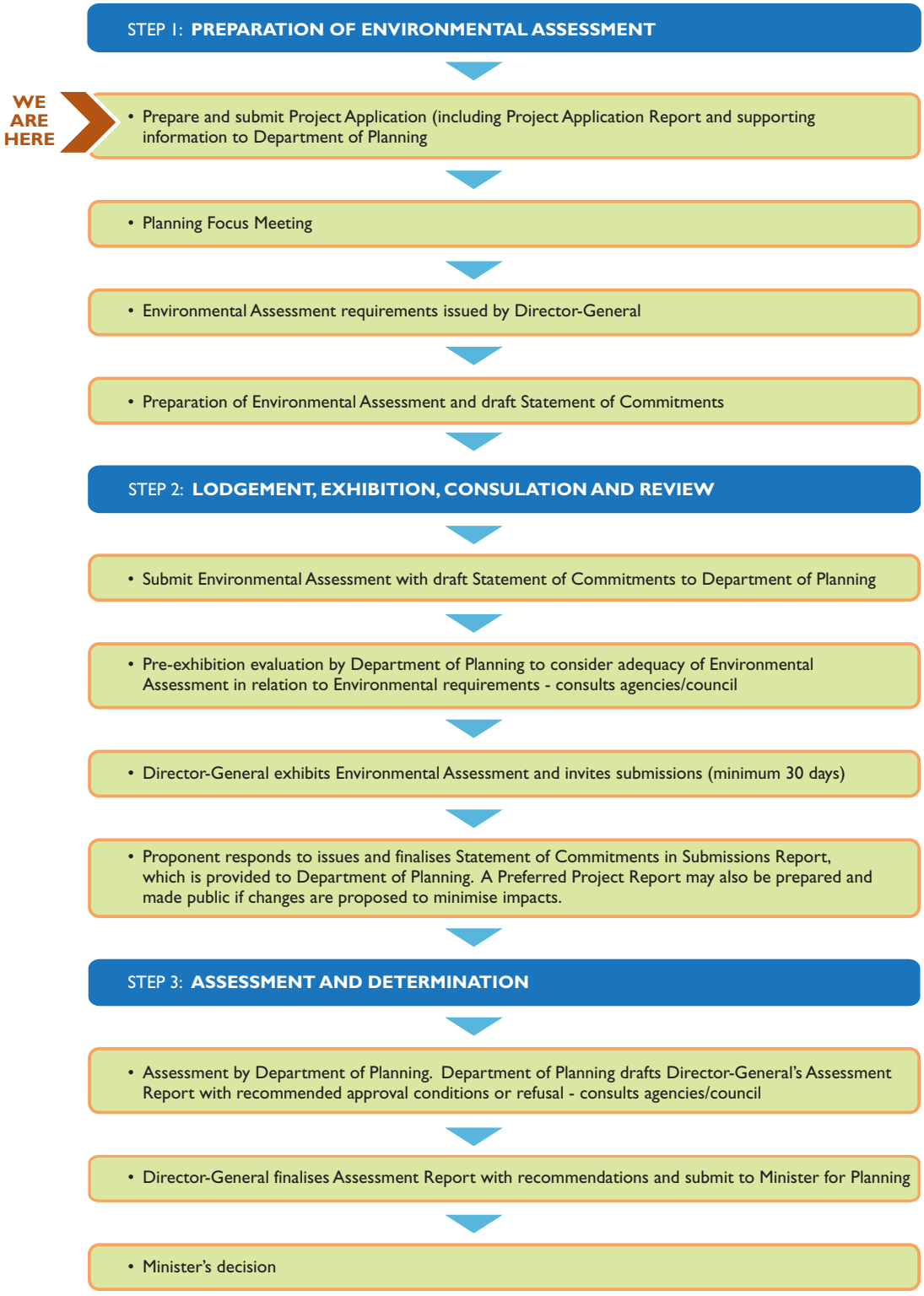

Figure 2-1 The Part 3A approval process

2.3 Other State legislation

Other NSW legislation that will be considered in the environmental assessment includes, but is not limited to:

- *Contaminated Land Management Act 1997.*
- *Fisheries Management Act 1994.*
- *Heritage Act 1977.*
- *National Parks and Wildlife Act 1974.*
- *Native Title (New South Wales) Act 1994.*
- *Native Vegetation Act 2003.*
- *Occupational Health and Safety Act 2000.*
- *Protection of the Environment Operations Act 1997.*
- *Roads Act 1993.*
- *Rural Fires Act 1997.*
- *Threatened Species Conservation Act 1995.*
- *Waste Avoidance and Resource Recovery Act 2001.*
- *Water Act 1912.*
- *Water Management Act 2000.*
- *Crown Lands Act 1989.*

It should be noted that Part 3A of the EP&A Act overrides the need for certain additional approvals/permits/licences/authorisations under certain acts of legislation (including some of those listed above). This includes approvals under sections 89, 90 and 91 of the *Water Management Act 2000*.

2.4 Commonwealth legislation

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides controls for impacts on:

- Matters of national environmental significance.
- The 'environment', where a proposal would be undertaken by the Commonwealth or a Commonwealth agency or on Commonwealth land.

If the proponent considers that there is likely to be a significant impact on any of the above matters (or it is unclear whether a significant impact would occur), a referral to the Commonwealth Minister for the Environment, Heritage and the Arts is required in order to determine if the proposal is considered a 'controlled action'. Should the proposal be deemed a controlled action, then approval to undertake the proposal is required from the Commonwealth Minister in addition to the necessary State approval(s).

Matters of national environmental significance of potential relevance to the project include nationally threatened species and ecological communities, and migratory species protected under international agreements (see Section 6.3). Based on investigations to date, a referral is under preparation for submission to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) to determine whether the project constitutes a controlled action.

A bilateral agreement is in place between the Commonwealth of Australia and the State of NSW under Section 45 of the *Environment Protection and Biodiversity Conservation Regulations 2000* relating to environmental impact assessment. Under the bilateral agreement, the preparation of an Environmental Assessment under Part 3A of the EP&A Act is a recognised form of environmental impact assessment.

The bilateral agreement also establishes the mechanism for the assessment requirements of DEWHA to be incorporated into the environmental assessment requirements issued by the Director-General of the NSW Department of Planning. However, if the EPBC Act is triggered, the approval of the Commonwealth Minister for the Environment, Heritage and the Arts would be required in addition to the approval of the NSW Minister for Planning.

Additional Commonwealth legislation that may also have relevance to the project will be addressed in the environmental assessment, including, but not limited to:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*
- *Protection of Movable Heritage Act 1986.*
- *Native Title Act 1993.*

3. Strategic context and objectives of the project

The Hume Highway is the main freight corridor between Sydney and Melbourne, carrying over 20 million tonnes of road freight every year. In addition, the corridor is an important part of the NSW state and regional road network. The Hume Highway is 807 kilometres in length from Melbourne to Sydney — 517 kilometres in NSW and 290 kilometres in Victoria. The section of the highway in Victoria is entirely dual carriageway; within NSW dual carriageway conditions are over 80 per cent complete.

The existing single carriageway sections of the Hume Highway are all located between Coolac and Albury, and with the exception of the sections through Tarcutta, Holbrook and Woomargama, dual carriageways are under construction. Completion of the final 20 kilometres to dual carriageway — comprising the proposed town bypasses of Tarcutta, Holbrook and Woomargama — would provide consistent dual carriageway conditions along the entire Hume Highway from Sydney to Melbourne.

Two key government policy documents set the context for the project. These documents, and the consistency of the project with them, are discussed in Section 3.1 and Section 3.2.

3.1 AusLink White Paper

The *AusLink White Paper: Building Our National Transport Future* (the White Paper) is the Australian Government's formal policy statement on land transport. It identifies national objectives for the AusLink investment program.

The AusLink investment program promotes sustainable national and regional economic growth, development and connectivity by contributing to the development of an integrated national land transport network that would provide:

- Improved national and inter-regional connectivity for people, communities, regions and industry.
- Improved national, inter-regional and international logistics.
- Enhanced national, inter-regional and international trade.
- Enhanced health, safety and security.
- Consistency with obligations to current and future generations to sustain the environment.
- Consistency with viable, long-term economic and social outcomes.
- An effective link to the broader transport network.

Under AusLink, the Australian government established a National Land Transport Plan and a defined National Transport Network that includes the Hume Highway.

The National Land Transport Plan outlines eight strategic directions, including improving capacity and performance of the vital eastern seaboard north-south interstate corridors through the upgrade of critical road links. The White Paper identifies these corridors as the most heavily trafficked in Australia, and that continuing strong growth in freight and passenger traffic, fuelled by economic and population growth is likely to further increase existing heavy demand on these corridors. Further, the White Paper identifies that these corridors are critical to Australia's international competitiveness and include the three most significant container ports and airports in the country — in Sydney, Melbourne and Brisbane.

The AusLink strategic priorities for the Hume Highway are to improve performance, capacity and safety, with an objective of achieving dual carriageway conditions along the entire highway by 2012. As previously discussed, the 20 kilometres of the highway through Tarcutta, Holbrook and Woomargama remain the only single carriageway sections not under construction for duplication. As such, the completion of the Hume Highway Holbrook bypass is critical to achieving the objectives of the AusLink program.

3.2 State Infrastructure Strategy

The *State Infrastructure Strategy – New South Wales 2006-07 to 2015-16* (the Strategy) provides strategic direction for planning and delivery of infrastructure in NSW. Projects identified for inland NSW include projects to complete the duplication of the Hume Highway (including the Holbrook bypass). The Strategy acknowledges that the delivery of some major roadwork initiatives will require Federal government funding. Investment priorities for transport identified in the Strategy include major improvements to the Hume Highway, including the Holbrook bypass.

The project will contribute to previously announced Government transport infrastructure objectives to improve access for rural communities and increase freight competitiveness.

3.3 Project objectives

At Holbrook, completion of the Hume Highway duplication project will leave seven kilometres of single carriageway through the township linking to dual carriageway on the northern and southern approaches. It is proposed to bypass the township of Holbrook on its western side to dual carriageway standard. It is not considered feasible to use the existing highway corridor through the township as dual carriageways through the town would require significant widening of the existing road corridor, requiring the removal/relocation of much of the existing town centre businesses and services and resulting in greater amenity (air quality, noise and visual), traffic, road user and pedestrian safety and social (community cohesion, severance etc.) impacts in the town than under any of the bypass options.

Additionally, as planning for the proposed Holbrook bypass has been underway since the 1980s, there is community expectation of a bypass of the town, as well as Council expectation, with planning for the growth of Holbrook over the last 20 years undertaken with the expectation of a bypass to the west of the town. As such, provision of a bypass of the town will meet community and Council expectation and facilitate the planned residential growth of Holbrook.

The primary objective of the project is to provide a dual carriageway town bypass of Holbrook by 2012. The project contributes to the objectives for the AusLink National Network, which support national economic growth by developing sustainable transport solutions that:

- Increase infrastructure handling capacity and efficiency.
- Improve safety and security.
- Improve transport productivity on nationally strategic and export-oriented freight corridors.
- Improve the reliability of travel on interstate and interregional corridors.
- Are consistent with viable and long-term economic and social outcomes, and with the obligation to current and future generations to sustain the environment.

4. Route options development and assessment

4.1 Options development

Investigations into the bypass of the Hume Highway around Holbrook began in the late 1980s. Three route options were investigated for the provision of dual carriageways to bypass the town (see Figure 4-1):

- *Option A* — a bypass to the west of the town.
- *Option B* — a bypass to the east of town.
- *Option C* — a bypass to the east of town, similar to Option B, but avoiding a major cutting in a ridgeline.

4.2 Assessment of options

In 1990, investigations of the three options were undertaken, involving public consultation that included displays of the three route options and an information and response brochure. Following assessment of submissions received from this public consultation, Option A was adopted and announced as the preferred route. The route was also formally adopted by the (then) Holbrook Shire Council with the intent to include the corridor in Council's local environmental plan.

Road boundaries were approved for inclusion in the Holbrook local environmental plan, however, there is currently no formal local environmental plan in force for Holbrook following council amalgamations and state-wide planning reforms affecting the preparation and gazettal of local environmental plans (refer Section 2.2). At the time of the formal adoption of the western bypass route, the RTA advised Council of the approved road boundaries for the purpose of the including the western bypass route in the local environmental plan; however, a local environmental plan for the amalgamated Greater Hume Shire is yet to be prepared/formally adopted. As previously discussed, planning for the growth of the town has been undertaken by council based on an eventual bypass of the town to the west of the existing highway alignment.

The time lapse since the announcement of Option A as the preferred route in the 1990s led the RTA to commence a number of investigations along the three strategic bypass corridors exhibited in 1990 to confirm whether Option A remained the preferred route. This confirmation has given consideration to the community's issues and comments, preliminary environmental investigations commenced in mid-2007 and the outcomes of a value management workshop undertaken in February 2008. The value management workshop attendees included community members, representatives from government agencies (such as the Greater Hume Shire Council and the Department of Environment and Climate Change), the Commonwealth Government (Department of Infrastructure, Transport, Regional Development and Local Government) and the RTA.

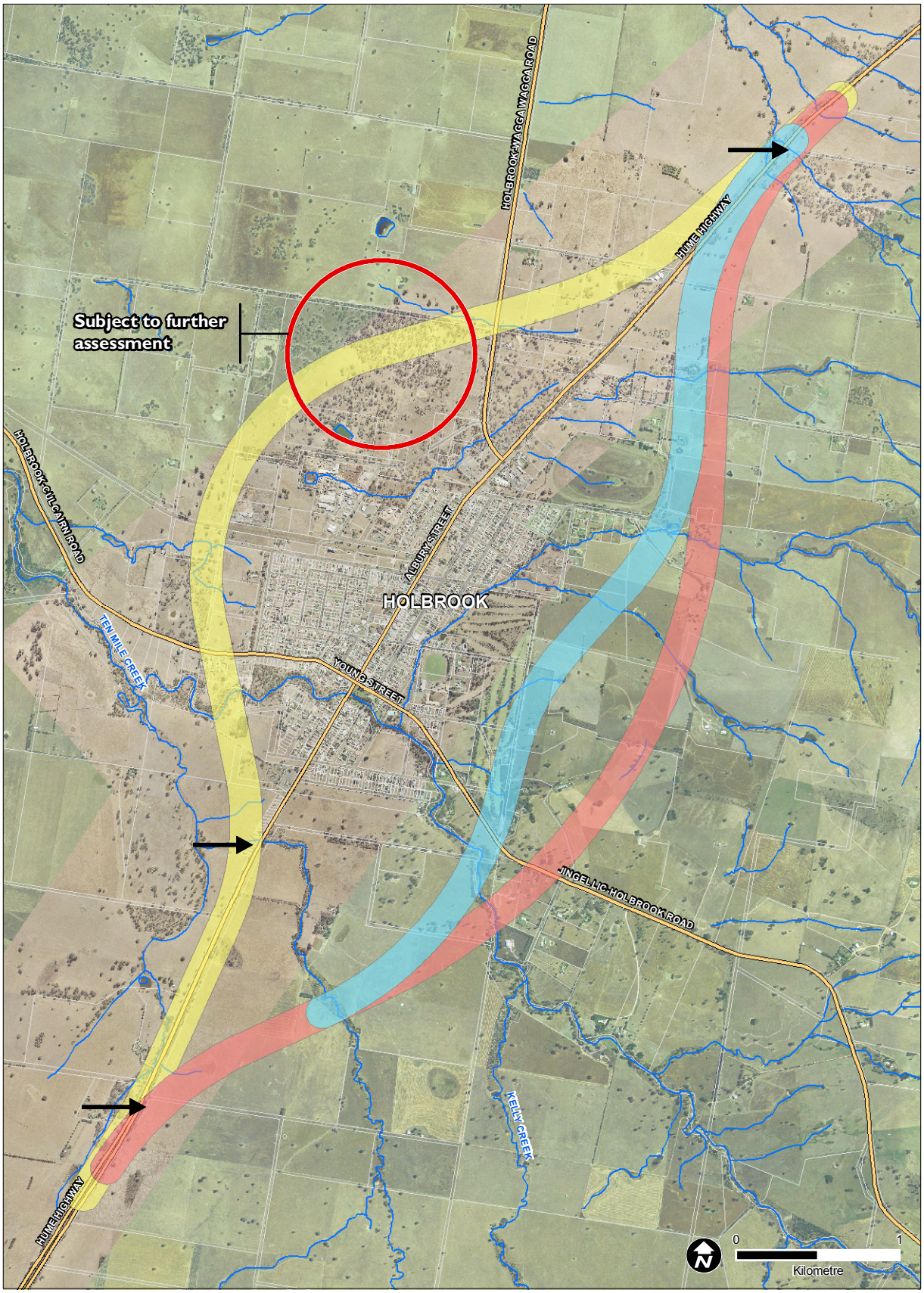

Figure 4-1 Route options

4.3 Preferred route

Since the value management workshop in February 2008, Option A has undergone further consideration regarding potential opportunities to minimise biodiversity impacts of the project, and specifically direct effects on a threatened box gum woodland ecological community in the town common area. This has resulted in an expansion of the corridor width to the west in this area to allow investigation of design opportunities to minimise clearing and severance effects on this community.

Options to move the corridor further to the west to reduce loss of the box gum woodland community were investigated. However these would result in the length of the bypass increasing by approximately 1 km resulting in additional capital cost in the order of $20 million and increased fuel use and operational costs to road users. Further, moving the alignment to the west would create additional property impacts. Increased separation from the town could also reduce the opportunity to provide a positive economic association between the town and the bypass (encouraging road users to use Holbrook as a rest stop).

Option A was announced as the preferred route for the Holbrook bypass on 15 September 2008 by the Commonwealth Minister for Infrastructure, Transport, Regional Development and Local Government. The reasons for the adoption of Option A as the preferred route include:

- Option A is supported by the Greater Hume Shire Council.
- Option A is included in the draft Strategic Land Use Plan for Holbrook, which has influenced a number of subsequent planning responses, such as future population growth, the need for future residential areas, and opportunities and potential increases in commercial and industrial activities.
- An alignment to the west of Holbrook (Option A with potential modification to minimise impact on the box gum woodland ecological community) was recommended to move forward to the next stage of planning with majority support from the value management workshop attendees.
- Option A has least impact on public facilities (hospital, racecourse, golf course and sporting complex) located on the eastern side of Holbrook.

5. Description of the project

The RTA proposes to construct a bypass of the town of Holbrook located on the Hume Highway approximately 60 kilometres north of Albury. The project would include the construction of a new dual carriageway section of the Hume Highway from approximately five kilometres to the north of Holbrook, to approximately three kilometres south of Holbrook. The bypass would be located to the west of Holbrook and would replace the seven kilometres of single carriageway highway that currently passes through the town of Holbrook.

The project would traverse a variety of different land uses, including cleared agricultural land, Crown Reserve, travelling stock route/reserve, and industrial land. The preferred route crosses Main Road (MR) 211 (Wagga Road), the non-operational Culcairn-Holbrook rail line, MR 331 (Culcairn Road) and Ten Mile Creek, before rejoining the existing Hume Highway approximately three kilometres south of Holbrook. The proposed crossings at MR 211 and MR 331 would require grade separated crossings as part of the project.

The project design would provide consistency with adjacent existing dual carriageway arrangements. The basis of the design would be to provide a dual carriageway road with controlled access provisions. Some at-grade intersections and private access points may be required along the length of the project.

The overall road corridor width would nominally be 90 metres depending on environmental and interchange requirements. The location and number of grade-separated interchanges would be subject to investigation during design development; however, connections to the existing Hume Highway would be provided north and south of Holbrook. No cuttings would be required along the preferred route; however, much of the bypass would need to be constructed on embankment due to the low lying terrain through which the preferred route passes.

The details of private property or local road access to the bypass would be determined during the next stage of design development. In general terms, such access would be minimised and only provided where essential and where an appropriate level of safety can be ensured.

The design of the project would be consistent with the general design parameters listed in Table 5-1.

Table 5-1 General design parameters for the project

Design element	Recommended criteria
Design speed	▪ 130 kilometres per hour horizontal alignment. ▪ 110 kilometres per hour vertical alignment.
Posted speed	▪ 110 kilometres per hour.
Sight distance	▪ 110 kilometres per hour sight stopping distance is desirable (2.5 second reaction time).
Horizontal alignment	▪ 110 kilometres per hour horizontal alignment sight stopping distance (2.5 second reaction time).
Grade	▪ Four per cent maximum is desirable.

Design element	Recommended criteria
	▪ Six per cent is absolute maximum.

Cross-section	▪ Basic configuration of dual carriageways, with new carriageways providing two travel lanes.
	▪ Traffic lane width:
	  ▸ 3.5 metres.
	▪ Outside shoulder width:
	  ▸ 2.5 metres (not including gutter, as required)
	  ▸ 3.0 metres minimum adjacent to safety barrier (not including gutter, as required).
	▪ Inside (median) shoulder width:
	  ▸ 1.0 metres.
	▪ Median width:
	  ▸ Generally provide a 12 metre depressed median with landscaping. Consideration to be given to the provision of safety barriers at critical locations.
	  ▸ Consider a 5 metre median with safety barriers and landscaping at locations where design provides a major cost saving (e.g. deep cuts).
	▪ All median breaks and cross overs with at-grade intersections should accommodate turning of an articulated vehicle of up to 25 metres (i.e. a B-Double).

Interchanges and road crossings	▪ Interchanges with main roads to be grade separated. ▪ Intersections with crossings of minor roads dependent on traffic volumes and warrants. Local road crossings not requiring access to the highway to be grade separated.
Cuttings/embankments	▪ Fill batter slopes will generally be 5:1. Cut batters generally to be 2:1 depending on the material.
Corridor widths	▪ Nominally, to provide minimum six metre width from top of cuts and toe of fill to Controlled Access Road boundary.
Property access	▪ Access control would apply on all sections of work when new boundaries are being established. On these sections, the number of access points would be kept to a minimum.
Bridges	▪ Width as per the RTA *Road Design Guide*. ▪ Length as per the Austroads *Bridge Design Guide (SM1600)*.

Pavement	▪ Design life:
	  ▸ New flexible pavement — 30 years.
	  ▸ Concrete and asphalt/lean-mix pavements — 40 years.

Signposting	▪ Signposting to follow the format provided in the RTA *Guide Signs Manual and Tourist Signs Manual*.

6. Preliminary environmental assessment

6.1 Description of the existing environment

Holbrook is a small, rural township with a population of 1,336 (ABS 2006). It is located on the Hume Highway approximately 60 kilometres north of Albury and 114 kilometres south of Gundagai. Wagga Wagga is some 90 kilometres to the north via the Holbrook-Wagga Wagga Road.

The Hume Highway forms the main street of Holbrook, comprising a two-lane single carriageway with an urban 50 kilometre per hour speed limit, including a 40 kilometre per hour school zone speed limit over a length of one kilometre in the centre of town.

In 2006, traffic volumes on the Hume Highway in the vicinity of the project (i.e. south of Holbrook at RTA count station 95.036) were 4,900 vehicles per day (including around 40 per cent heavy vehicles). Within the Holbrook town area, the traffic volumes are in the order of 10,500 vehicles per day (RTA count stations 95.583, 95.585 and 95.586).

The town's main residential area spreads both east and west of the existing highway. To the east are situated some rural-residential properties, and on the outskirts, the town is flanked by larger rural holdings. Also on the eastern side are the town's racecourse, golf course and public swimming pool. On the western side of town is an industrial area that includes a large sawmill. West of this area, and to the north and south, are larger rural holdings.

The landscape of the area immediately around Holbrook is relatively flat. To the east of the main town the landform becomes more undulating to hilly, with the hilliest areas east of the golf course. To the west the landform is low-lying and less hilly, with the topography of a more undulating nature beyond the main residential edge.

Generally, the native vegetation surrounding Holbrook has been extensively cleared. However, patches of native woodland exist on the western side of Holbrook in the town common and travelling stock reserves. The cleared areas are used primarily for agriculture; however, scattered paddock trees remain in most areas. The main watercourse in the area is Ten Mile Creek, which flows east to west.

6.2 Risk analysis

A preliminary environmental risk analysis was undertaken for the project to identify key environmental issues. This comprised a qualitative assessment based on information gathered during preliminary investigations. The level of environmental risk was assessed by considering the potential environmental impacts of the project and the ability to manage those impacts in a way that minimises harm to the environment.

While the approach is qualitative, it provides an important step in the process of project planning and assessment of environmental impact. In particular, the preliminary risk analysis facilitates scoping of environmental investigations and assessments, guides ongoing project design, and assists in identifying appropriate mitigation measures and management responses. The identified risks are based on the risk categories in Table 6-1.

Table 6-1 Environmental risk categories

Risk category	Description
A	May have high or moderate impacts. Detailed assessment necessary to determine the level of potential impact and to develop appropriate measures to mitigate and manage the impacts.
B	May have high or moderate impacts. These can be mitigated by the application of standard environmental management measures.
C	Low impacts. These can be managed by standard environmental management measures.

Those environmental issues that were identified as falling within the 'A' risk category were considered to be key environmental issues and are discussed in further detail in Section 6.3.

6.3 Key environmental issues

Preliminary environmental risk analysis indicates that the following key environmental issues will require further detailed assessment and may require project specific impact mitigation measures:

- Biodiversity.
- Aboriginal heritage.
- Noise and vibration.
- Socio-economic impacts, including property acquisition, property access, business impacts and changes in amenity for sensitive receptors.

The key issues are described in further detail in Sections 6.4 to 6.7. A number of other environmental issues have also been identified in the preliminary environmental assessment. These issues are outlined in Section 6.8 and are generally considered to be common issues frequently encountered in road construction projects. It is considered that the potential impact of these additional environmental issues will be able to be reduced or avoided in the concept and detailed design process or satisfactorily managed during construction using standard construction mitigation measures.

6.4 Biodiversity

The project would have a range of biodiversity impacts, including on species and ecological communities listed as threatened under the NSW *Threatened Species Conservation Act 1995* (TSC Act), the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Fisheries Management Act 1994* (FM Act) and associated with the presence of other significant environmental features, including regionally significant species or habitats of conservation significance. The results of the preliminary ecology investigations undertaken for the project are summarised below.

6.4.1 Summary of potential issues identified

The following potential biodiversity issues have been identified for the project:

- The presence of White Box, Yellow Box, Blakely's Red Gum Woodland (corresponding with the Box Gum woodland listed as a threatened ecological community under the TSC Act and EPBC Act) in the alignment corridor.
- The presence of the aquatic ecological community in the natural drainage system of the Lower Murray River catchment in the alignment corridor (endangered under the FM Act), which corresponds with Ten Mile Creek and its associated riparian vegetation.
- The presence of three threatened species within and surrounding the preferred route corridor; Barking Owl (*Ninox connivens*); Diamond Firetail (*Stagonopleura guttata*); and Grey-crowned Babbler (*Pomatostomus temporalis*).
- The likelihood of an additional 14 threatened flora and fauna species listed under the TSC Act and/or the EPBC Act occurring within or adjacent to the preferred route corridor based on habitat present.
- The potential for severance of Squirrel Glider (*Petaurus norfolcensis*) movement corridors.
- The presence of a number of habitat features important to threatened and other native fauna species, including, but not limited to, hollow bearing trees, scattered fallen timber and water sources (dams and Ten Mile Creek).
- The likelihood of impacts associated with Key Threatening Processes listed under the TSC Act, FM Act and/or EPBC Act as a result of the construction and/or operation of the project.

Key biodiversity constraints are shown on Figure 6-1.

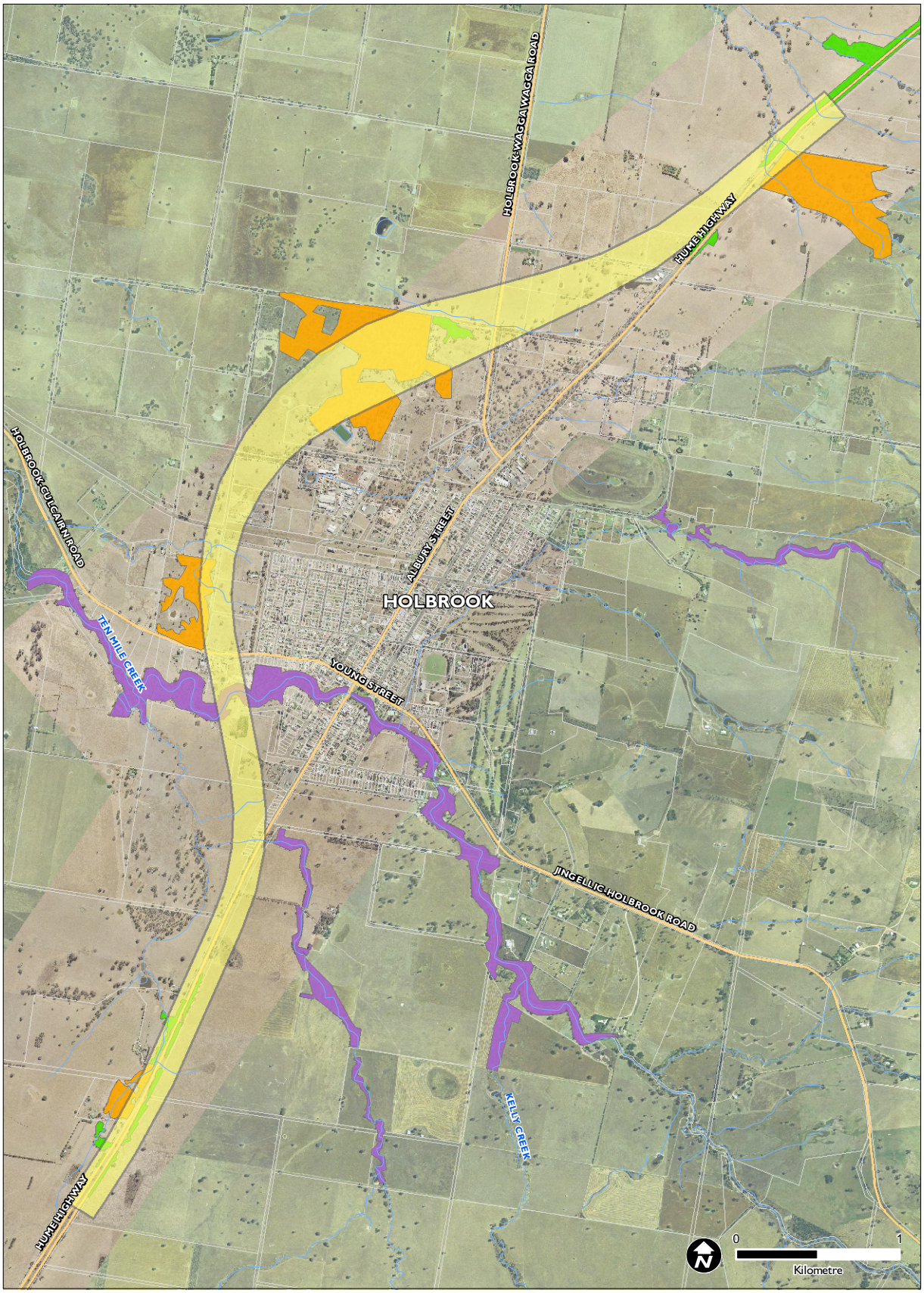

Figure 6-1 Key biodiversity constrainits for the project

6.4.2 Further assessment

Further investigations will be undertaken during the Environmental Assessment stage to assess the potential biodiversity impacts of the project and to identify appropriate impact minimisation and mitigation measures. An offset strategy would also be devised for any residual impacts. Further investigations would comprise:

- Detailed surveys to identify/confirm the biodiversity features of the preferred route and surrounding land, including but not limited to targeted surveys of potentially occurring threatened species, fauna habitat surveys, aquatic habitat surveys and floristic surveys of each vegetation community. The minimum survey effort would be determined in accordance with the Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (Department of Environment and Conservation 2004).
- Assessment of extent of clearing of native vegetation and associated loss of habitats, habitat fragmentation and barrier effects, edge effects, vehicle strike and mortality (road kills), proliferation of weeds, changes in hydrology and aquatic disturbance and impacts on fish passage.
- Significance assessments for all threatened biodiversity recorded, or with the potential to occur, in accordance with the draft *Guidelines for Threatened Species Assessment under Part 3A* (NSW National Parks and Wildlife Service 2002) for listings under the TSC Act and FM Act and the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (NSW Department of Environment and Conservation 2005) for listings under the EPBC Act.

6.5 Aboriginal heritage

No known Aboriginal heritage items/sites were identified within the 150-metre wide alignment corridor of the preferred route, however, based on the accumulated archaeological potential along the preferred route and considering the landform, proximity to resources, land disturbance and soil types, the project may impact Aboriginal objects, sites and places with regard to the provisions of the *National Parks and Wildlife Act 1974*. The results of the preliminary Aboriginal archaeological and cultural investigations undertaken for the project are summarised below.

6.5.1 Summary of potential issues identified

The following potential Aboriginal heritage issues have been identified for the project:

- The presence of one Aboriginal cultural location of medium significance and one location identified as of potential concern, depending on archaeological survey.
- The presence of five cultural trees assessed as medium to high significance and two cultural trees assessed as very high significance.
- An overall moderate archaeological heritage potential for the preferred route (refer to Table 6-2). However, there is substantial variation between the northern and southern portions of the route — the northern portion exhibits low archaeological potential, while the area just north of the creek crossing and around the property ‘Glenlogie’ represents low to moderate archaeological potential.

Cultural heritage significance describes the value(s) located by a community in a particular place, object or activity. The value(s) that create cultural heritage significance are based on the place, object or activities embodiment of an aspect of the relevant culture or its people's history.

The archaeological potential along the preferred route is shown in Figure 6-2.

Table 6-2 Archaeological heritage potential of the project corridor

Indicator	Archaeological potential of the proposed upgrade
Geologic integrity index (rating 1–5)[1]	2
Identified archaeological sites (an actual numeric value)[2]	0
Archaeological potential (rating 1–5)[3]	3
High potential areas (an actual numeric value)[4]	1
Scarred tree index (rating 1–5)[5]	4

Notes:

1. Archaeological potential was based on an assumed 150-metre corridor width for the purpose of identifying archaeological constraints.
2. The archaeological potential and suitability of the geology and soils. Higher rankings (closer to 5) indicate greater potential for artefact deposition survival.
3. This category is a measure of known entity. Numbers reflect the number of identified archaeological sites along the corridor.
4. Measures the accumulated archaeological potential of an alignment, taking into consideration all units of analysis. Higher rankings (closer to 5) indicate greater archaeological potential.
5. The number of identified areas of high archaeological potential; it is generally related to landform as the primary unit of analysis.
6. Measures the probability of scarred trees to occur within the alignment based on a statistical analysis and environment. Higher rankings (closer to 5) indicate greater probability of scarred trees occurring along the corridor.

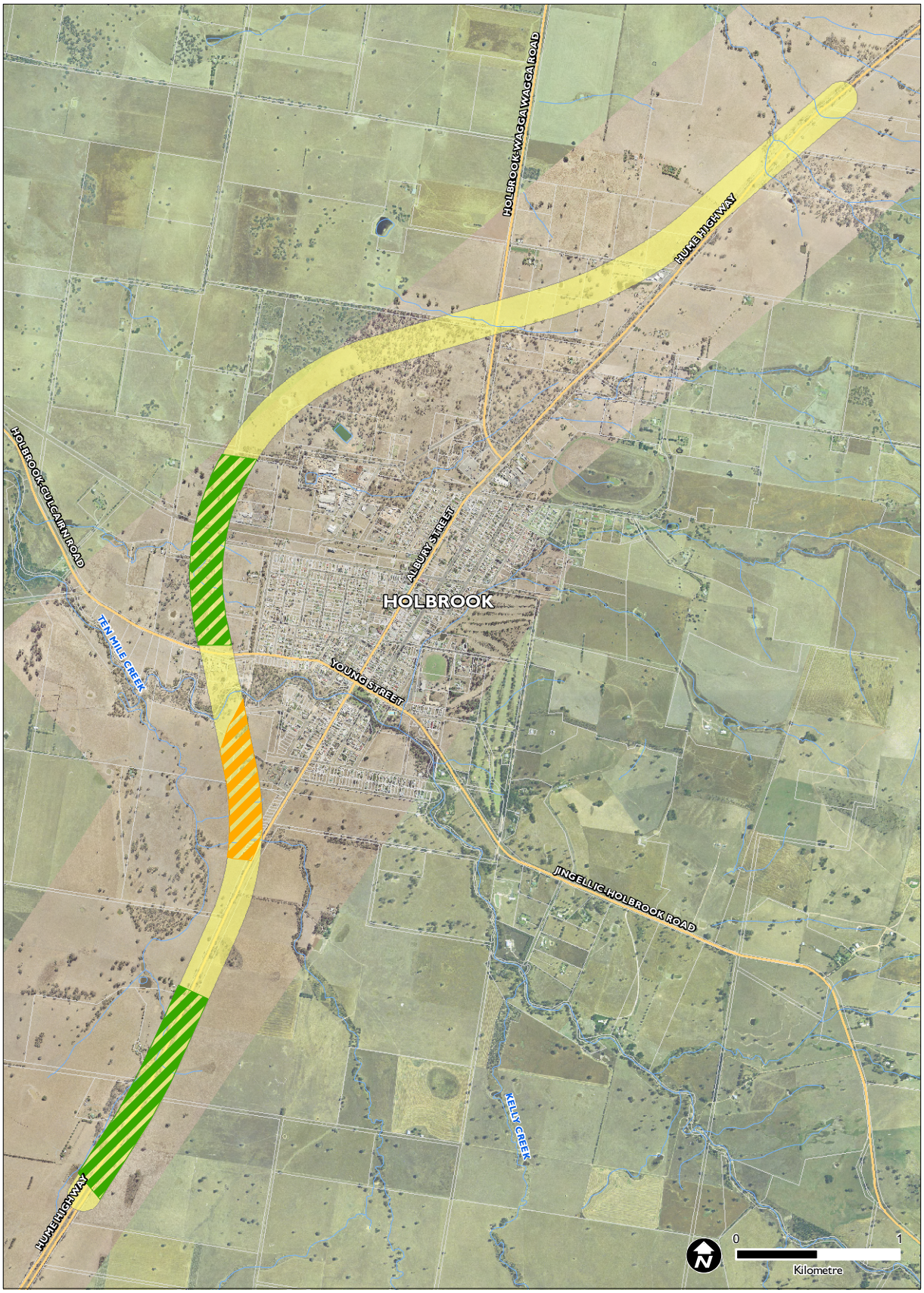

Figure 6-2 Archaeological potential of the project corridor

6.5.2 Further assessment

The following further assessment will be undertaken along the preferred route during the environmental assessment stage to assess the potential impacts of the project on Aboriginal cultural heritage and archaeology and to identify appropriate impact minimisation and mitigation measures:

- Detailed archaeological heritage assessment, including archaeological survey to determine the extent of Aboriginal occupation and land use.
- Cultural heritage assessment to identify the cultural value of the area to Aboriginal people both in the present and historically.

Consultation with the Aboriginal community would be undertaken in accordance with the *RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (2008), Department of Environment and Climate Change *Interim Community Consultation Requirements for Applicants* (2004) and the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation: Part 3A, Environmental Planning and Assessment Act* (2005).

6.6 Noise and vibration

The project would involve the construction of a new dual carriageway town bypass to the west of Holbrook. There are approximately 300 rural-residential and residential noise sensitive receivers within the noise catchments adjacent the preferred route. In addition to these noise receivers, there are three sensitive land uses within the noise catchments, as defined by the *Environmental Criteria for Road Traffic Noise* (EPA 1999) (ECRTN) — St Patrick's School, Our Lady of Sorrows Church, and the Anglican Church in Young Street. The results of the preliminary noise and vibration investigations undertaken for the project are summarised below.

6.6.1 Summary of potential issues identified

The following potential noise and vibration issues have been identified for the project:

- Noise and vibration impacts would be expected during the construction phase, particularly at nearby noise sensitive receivers.
- Based on the noise criteria in the ECRTN for a 'new freeway or arterial road corridor' the project may result in noise exceedances for a number of houses in the south-west corner of Holbrook during operation and for scattered residences to the north. Further investigations would be required regarding potential exceedances at St Patrick's School, Our Lady of Sorrows Church, and the Anglican Church.
- Interchanges for the bypass, particularly at the southern end of the project, may result in additional impacts depending on their location and design. The location and design of interchanges has not been determined at this phase of project development.
- Community concern that meteorological effects, particularly prevailing westerly winds, may result in an exacerbation of the noise impacts associated with the project.

6.6.2 Further assessment

The following further assessment will be undertaken during the environmental assessment stage of the project to assess the potential noise and vibration impacts and to identify appropriate impact minimisation and mitigation measures:

- Identification of any residential and sensitive receptors along the preferred route.
- Assessment of potential noise and vibration impacts on identified receptors.
- Recommendation of noise/vibration mitigation strategies, if required.

Assessments will be undertaken with reference to the following guidelines, as relevant: *Environmental Criteria for Road Traffic Noise* (EPA 1999), *Environmental Noise Management Manual* (RTA 2001), *Environmental Noise Control Manual* (EPA 1994), *Assessing Vibration: A Technical Guideline* (DEC 2006), and *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC 1990).

6.7 Socio-economic and land use

The project involves the construction of a new dual carriageway town bypass to the west of Holbrook. As such, the project would result in highway traffic being moved from the main street of Holbrook (the existing Hume Highway). In that context there are a range of potential socio-economic issues to be considered. The results of the preliminary assessment of social and economic issues are summarised below.

6.7.1 Summary of potential issues identified

The following potential socio-economic impacts have been identified for the project:

- Construction activity could reduce the amenity for residents along the southern part of the route through the introduction of noise and vibration, construction traffic, dust and visual impacts. Some of these amenity impacts may continue through operation of the bypass.
- Connectivity between the main residential areas and the town and community facilities would be maintained, however, residents of rural properties further to the west of the bypass may experience reduced social cohesion.
- Land use impacts would be predominantly restricted to Crown land, a Council depot, and State Rail land. However, it would be necessary to acquire some agricultural land, which may affect agricultural and farm viability. Additionally, a travelling stock route/reserve would be severed.
- Reduced value of highway-generated trade, and consequential direct and indirect effects on the economic base of the town could be experienced. Direct impacts could include reduced expenditure associated with motorists stopping and/or staying in town. Indirect impacts could arise associated with reduced value of purchases made by individual businesses from other businesses within and/or outside the community.

6.7.2 Further assessment

The following further investigations will be undertaken during the environmental assessment stage for the project to assess the potential socio-economic and land use impacts and to identify appropriate impact minimisation and mitigation measures:

- Assessment of the economic and social impacts on Holbrook, including economic impacts associated with land use, property and amenity related changes. Impacts on existing and future development will be considered.
- Consideration will be given to impacts on:
  - Agribusiness and management, including fragmentation and potential loss of agricultural and farm viability, stock diseases and the impact on quarantined properties of a revised road network, and on travelling stock reserves.
  - Social and economic outcomes for Holbrook and loss of trade for highway-dependent businesses.

6.8 Other environmental issues

Other environmental issues listed in Table 6-3 are considered to be of lesser consequence, taking into account the scope of the project, the existing environment and the implementation of standard and best practice management and/or mitigation measures.

The potential environmental issues and the proposed management and/or mitigation measures identified in Table 6-3 will be reviewed further during the preparation of the detailed environmental assessment. Any additional environmental safeguards required to minimise/mitigate impacts will be documented in the statement of commitments in accordance with section 75F(6) of the EP&A Act as part of the environmental assessment.

Table 6-3 Other environmental issues

Issue	Potential impacts	Management and mitigation measures
Non-Aboriginal heritage		
Construction of the project could impact items/sites of non-Aboriginal heritage significance.	Two potential heritage items (potential archaeological deposits (P01) and travelling stock route stock-holding pen (P02)) may be affected by the project. The heritage constraints associated with these potential heritage items would be low to moderate. Both of these potential heritage items are considered to be of local significance (P01 local scientific significance and P02 local significance).	A non-Aboriginal heritage assessment (including a Statement of Heritage Impact) will be undertaken where there is potential to impact on heritage items/sites. Recommendations from the assessment will be incorporated into the statement of commitments for the project and would include best practice procedures for managing impacts on heritage items/sites, such as archival recording following the *NSW Heritage Office - How to prepare archival records of heritage items*.
Hydrology and flooding		
Development of the project may alter the hydrology and flooding behaviour of the area's watercourses.	The project may have minor impacts on Ten Mile Creek and the several tributaries it would bisect, including redistribution of local overland runoff, ponding of water behind the embankment (in areas where water previously did not pond) and changes to potential groundwater recharge. The redistribution of the local overland runoff could affect any downstream water storage infrastructure (such as farm dams) and natural systems (such as wetlands). The redistribution would be the result of blocking the existing drainage line or not providing a sufficient waterway opening under the bypass. Hydrologic implications may also be present for the wetland adjacent to the southern section of the project, where an unnamed tributary of Ten Mile Creek is likely to be hydrologically linked to this wetland. There is, therefore, the potential for the project to affect flows into and out of the wetland, and subsequently change its wetting and drying regimes.	A hydrology assessment will be undertaken following completion of the concept design. The results of the assessment will assist in refining the design of the project so that it accounts for hydrology and flooding behaviour of the watercourses, floodplains and wetlands (i.e. adequate waterway openings, culverts).

Issue	Potential impacts	Management and mitigation measures
The project may affect both flood levels and flood characteristics in the area. The preferred route crosses Ten Mile Creek and the floodplain downstream of the main town and urban area of Holbrook.	Flood levels may increase as a result of reduced waterway openings due to the need to fix the location of the bridge and adjacent overland flow paths routes across the floodplain. The creek channel has significant meanders in the vicinity of the bypass crossing. The building of the bypass would define a permanent location for the creek channel in this section of the floodplain and may have long-term implications for the sinuosity of the creek. The change to flood behaviour relates to the change in the duration of inundation and a change to the timing of the peak water level. There is the potential for the duration of inundation of land upstream of the project to increase as a result of the road embankment and reduced waterway openings. The timing of the peak water level is not likely to be significantly affected because the preferred route is downstream of the town and it is rainfall on the upstream catchment that determines the timing of the peak.	A hydrology assessment will be undertaken following completion of the concept design. The results of the assessment will assist in refining the design of the project so that it accounts for hydrology and flooding behaviour of the watercourses, floodplains and wetlands (i.e. adequate waterway openings, culverts).

Issue	Potential impacts	Management and mitigation measures
Potential impacts of construction on groundwater, including intersection of groundwater, reduced groundwater quality and change to the recharge regime.	The preferred route is underlain predominantly by alluvial sediments, which consist mostly of clay and sand materials, and are present at depths up to 50 metres. Depth to groundwater in the alluvium is likely to be greater than three to four metres below ground level. The preferred route also intersects a small granite outcrop just north of Holbrook where weathering of the parent material is expected to at least 4.5 metres depth, and depth to groundwater is expected to be deep. Bores located in the northern area of the bypass alignment generally source water from the fractured granite aquifer, while the bore located to the south is screened in the alluvium aquifer. The groundwater vulnerability is mostly moderate along the preferred route, with some minor areas of low-moderate and moderately high. The area mapped as moderately high is associated with the granite outcrop. Creeks and ultimately groundwater could be affected by increased sediment loads, which could affect groundwater quality. The potential impacts on groundwater would include contamination caused by construction activities (such as potential oil leaks from the machinery, chemical spills and construction waste) and excess sediment and soil deposition during road construction.	Dewatering is not likely to be required during road construction as no significant cuttings would be required. Best practice management measures will be implemented during construction of the project and will be detailed in the statement of commitments. These measures will be in accordance with applicable RTA QA Specifications and *Managing Urban Stormwater: Soils and Construction, Volume 2, Book 4, Main Road Construction* (Landcom 2006). A qualified soil conservationist will be appointed to the project during concept design and construction to advise on the appropriate treatments to minimise erosion and sedimentation and flow-on effects to groundwater. Operational water quality treatments will be designed and constructed to achieve the relevant water quality criteria in the groundwater receiving environment.

Issue	Potential impacts	Management and mitigation measures
Soils, water quality and water access		
Construction and operation of the project could affect water quality. Soils in the project area are considered to be moderately to highly erodible and susceptible to sheet erosion and moderate to severe gully erosion.	Soils exposed during excavation and vegetation removal have a high potential to be subject to erosion given their moderate to high erosion susceptibility. The water quality of the existing waterways could be affected by sediment, pollutants from roads (hydrocarbons and particles from vehicle wear and tear etc.) and additional nutrients following rehabilitation of exposed surfaces. Water quality could also be affected by changed hydrologic cycle resulting from the impervious surface of the road altering groundwater recharge regimes. No cuttings would be required for the preferred route. During construction, work may need to be undertaken within the main flow paths, including Ten Mile Creek. This would potentially result in increased turbidity and sediment loads. Any impact would be short-term, but may have longer term ramifications depending on the flow behaviour within these waterways. There may also be implications for existing waterway sediments.	Best practice management measures will be implemented during construction of the project and will be detailed in the statement of commitments. These measures will be in accordance with applicable RTA QA Specifications and *Managing Urban Stormwater: Soils and Construction, Volume 2, Book 4, Main Road Construction* (Landcom 2006). A qualified soil conservationist will be appointed to the project during concept design and construction to advise on the appropriate treatments to minimise erosion and sedimentation. Operational water quality treatments will be designed and constructed to achieve the relevant water quality criteria in the receiving environment.
Construction and operation of the project could affect landholder water access rights.	Construction of the project would likely require supply of construction water for activities such as dust suppression for earthworks, pavement construction, concrete batching and landscape establishment. This may affect the overall distribution of water in the Ten Mile Creek catchment. Three bores would need to be removed for construction of the project.	Where feasible, water would be sourced from groundwater and/or surface water. If this is not feasible due to quality or availability, or is likely to create unacceptable impacts, water may need to be imported. Any bores, or other water supply infrastructure, affected by the project would be reinstated or relocated on completion of construction. Further investigation into the availability of water from existing groundwater and surface water allocations and/or installing new bores in accordance with the *Water Act 1912* and the *Water Management Act 2000* will be undertaken prior to the commencement of construction in consultation with the NSW Department of Water and Energy.
Areas of dryland salinity could affect infrastructure during construction and operation.	Hazard mapping of dryland salinity in the Holbrook area indicates that there are no areas of salinity hazard in proximity to the preferred route.	None required.

Issue	Potential impacts	Management and mitigation measures
Visual amenity and landscape		
Development of the project could have both positive and negative impacts on visual amenity and the landscape.	The project would traverse areas with medium visual amenity for an estimated five kilometres. The route would pass close to the southern part of the main urban area of Holbrook, affecting residences in two main clusters. The visual amenity of Ten Mile Creek would be affected where the project would cross the creek and require clearing of vegetation. The visual amenity of the town centre would be improved associated with removal of through traffic and reduction in heavy vehicles passing through the town. Construction activities, equipment and traffic would be visible to the local community.	An urban design/visual impact assessment will be undertaken for the project, including development of an urban design framework, objectives and principles consistent with existing projects under construction and proposed for construction on the Hume Highway. The assessment will be undertaken in accordance with RTA's *Beyond the Pavement: Urban and Regional Design Practice Notes* and its associated urban and landscape design guidelines as required. Recommendations from the assessment will be incorporated into the statement of commitments for the project.
Air quality		
Construction of the project may affect local air quality.	Dust generation from activities such as earthworks, stockpiling and vegetation removal. Emissions from heavy vehicles and construction equipment.	Best practice management measures (particularly dust suppression measures) will be implemented during construction of the project and will be detailed in the statement of commitments. These measures will be in accordance with applicable RTA QA Specifications.
Operation of the project may affect local air quality.	During operation, the traffic capacity and mix would not be materially altered from the existing situation around Holbrook. As such, potential operational impacts to air quality are likely to be limited to vehicle emissions that will potentially increase in line with future traffic volumes. No project-specific operational mitigation measures are identified as vehicle emission impacts on air quality are effectively managed at the source via vehicle fuel standards, and vehicle maintenance and emissions testing. Some air quality benefits may be experienced associated with moving the highway away from the town centre.	Not applicable

Issue	Potential impacts	Management and mitigation measures
Energy and demand on resources		
Construction of the project will require the use of water.	Extraction of water from Ten Mile Creek or adjacent drainage lines for road construction purposes will require a licence under Part 2 of the *Water Act 1912*. Currently there is an embargo on granting new licences for any commercial purpose in these catchments. However, an exemption to the embargo allows for the granting of permits (generally for 12-months) for road construction purposes. The Department of Water and Energy has indicated that due to the ongoing drought and resultant low flow conditions in local creeks and water sources, that approval of a permit is highly unlikely. Additionally, due to the ephemeral nature of Ten Mile Creek, it is not likely to be a reliable source of water for road construction.	Where feasible, water would be sourced from groundwater and/or surface water. If this is not feasible due to quality or availability, or is likely to create unacceptable impacts, water may need to be imported. Further investigation into the availability of water from existing groundwater and surface water allocations and/or installing new bores in accordance with the *Water Act 1912* and the *Water Management Act 2000* will be undertaken prior to the commencement of construction in consultation with the NSW Department of Water and Energy.
Construction of the project will require the use of a number of resources, including select and fill material, concrete cement aggregates, steel, fuel and asphalt.	The project would not require the use of any resources that are currently in short supply. There would, however, be potential for indirect impacts associated with the transportation of materials.	Detailed design and construction planning considerations for the project will include limiting the quantities of materials required and the distance of transport of materials. The design will be developed to maximise the use of materials from within the project area and the recycled content of materials.
	The design of the project would aim to achieve balanced cut and fill requirements, where feasible. General fill and select material would be extracted from within or nearby the project area. Should balanced cut and fill be unable to be achieved, additional import of general fill and select material may be required.	Existing licensed sources (e.g. quarries) will be used to supply any additional material required. Should any alternative locations suitable for sourcing additional fill or select material be required, these would be identified and assessed either as part of the environmental assessment for the project or under a separate approval.
	Hydrocarbon-based fuels would be required for construction plant, equipment and vehicles. Fuels would be largely sought from local suppliers.	Detailed design and construction planning considerations for the project will include minimising energy use and reducing fuel consumption. Consideration will be given to optimising mass haul efficiency and minimising truck movements as part of design development and construction planning.

Issue	Potential impacts	Management and mitigation measures
Greenhouse gas emissions		
Construction of the project would produce greenhouse gases.	Greenhouse gas emissions from construction plant, equipment and vehicles. Greenhouse gas emissions embodied in materials consumed in construction or impacted by the project, such as vegetation removal and soil disturbance.	A greenhouse gas emissions inventory will be prepared during the environmental assessment that includes emissions from construction plant, equipment and vehicles, and emissions attributable to construction materials, vegetation removal and soli disturbance. The net change in greenhouse gas emissions estimated to occur during construction would be analysed. Emission of greenhouse gases during construction would be managed through the implementation of best practice management measures and will be detailed in the statement of commitments for the project. These measures would include, but not be limited to, planning and implementing an efficient construction program.
Operational greenhouse gas emissions	It is considered that operational greenhouse gas emissions from vehicles are likely to be reduced from existing emissions due to improved efficiency of traffic flows.	Opportunities to decrease operational greenhouse gas emissions will be further investigated during detailed design.
Hazards and risk		
Construction of the project may expose contractors and the community to various hazards and risks.	Occupational health and safety hazards for workers, storage of hazardous materials, waste management, use of explosives, and excavation of contaminated and/or acid sulfate soils. Exposure to extreme weather events, such as flooding.	A preliminary hazard analysis would be undertaken to identify the key hazards and risks associated with the project, and to identify measures to manage those risks. These measures will be detailed in the statement of commitments for the project. The preliminary hazard analysis would be updated to a final hazard analysis during the detailed design phase of the project.

Issue	Potential impacts	Management and mitigation measures
Operational impacts	Changes to the level of hazard and risk associated with travel on the Hume Highway through the town of Holbrook, including transport of dangerous goods and spoil management. Potential design and occupational health and safety risks.	Operational and maintenance risks would be described and quantified, including transport of dangerous goods/spills and any change in risk of accidents. Measures to reduce risks to an acceptable level would be described, where required.
Site contamination		
Construction of a new road through a 'greenfield' area, including areas historically/currently used for industrial and agricultural purposes may result in exposure of areas of contaminated materials.	Soil contamination associated with current/former petrol stations, industrial and agricultural areas.	A risk assessment will be undertaken prior to the commencement of works to determine the likelihood of encountering contaminated land. Should it be required the presence and extent of contamination will be determined at potentially contaminated sites, and where required, remediation will be planned and undertaken in accordance with the RTA's *Contaminated Land Management Guide*, State Environmental Planning Policy 55 – Remediation of Land and the *Contaminated Land Management Act 1997*.
Traffic and transport		
Construction of the project could result in disruption of the existing local traffic network.	Some temporary disruptions/delays to local and highway traffic would be expected. Some temporary road closures/diversions would be required at various locations. Some temporary restrictions to private access roads may be required.	Standard traffic management measures will be employed during construction to minimise traffic disruptions on the highway and local connecting roads. These management measures will be identified in the statement of commitments and prepared in accordance with RTA QA Specifications and the RTA's *Traffic Control at Work Sites Manual*. Additionally, alternative access arrangements would be determined where private access roads require temporary closure during the construction period.

Issue	Potential impacts	Management and mitigation measures
Operation of the project would benefit the local and regional traffic network, though some negative impacts may be experienced	Significant benefits for performance of the Hume Highway, including travel efficiency and road safety would be experienced. Improved safety along the main street of Holbrook due to the removal of through traffic would also result from the project. Changed traffic patterns (both local and regional) would occur as a result of the project. However the potential negative impacts are likely to be short-term whilst road users adjust and become familiar with the changed traffic patterns. Permanent adjustment to some private access roads may be required.	Design of the project will seek to optimise traffic capacity performance. Impacts of any permanent changes to the local road network/access would be assessed during concept and detailed design phases and appropriate alternative access arrangements identified where required in consultation with the Greater Hume Shire Council and affected property owners.
Utilities		
A number of utilities are present within or adjacent to the preferred route. These are predominantly related to communications and are located above and below ground. Sewer and town water supply mains and electricity and/or gas infrastructure may also be present.	Excavations associated with the construction of the project could result in damage to existing services, inconvenience, or potentially hazardous situations. There may be a need to relocate or protect utilities where they are located within or near the project alignment.	The need for relocation and/or protection of utilities will be determined following consultation with the affected utility owners. Prior to the commencement of works, standard procedures, such as identifying the location of infrastructure will be undertaken in consultation with utility owners.
Waste minimisation and management		
The project would generate a number of waste streams and use a variety of materials during the construction phase.	Wastes generated during construction would potentially include excess unsuitable spoil material, material from the removal of sections of existing road, concrete and road base, steel, waste oils and liquids from maintenance of construction plant and equipment, waste water and general garbage and sewage. Cleared vegetation would also be generated.	Waste management would be undertaken in accordance with the resource management hierarchy principles of the *Waste Avoidance and Resource Recovery Act 2001*. Any strategies and/or procedures developed from these principles will be included in the statement of commitments for the project.

Issue	Potential impacts	Management and mitigation measures
Cumulative impacts		
Cumulative impacts associated with construction and operation of the project.	A potential exacerbation of the impacts from the project in a local and regional setting as a result of the proposed Hume Highway bypasses of Tarcutta and Woomargama, which are likely to have similar impacts.	A cumulative impact assessment would be undertaken to consider the spatial and temporal environmental effects from the project, the other Hume Highway bypass projects and other activities or potential contributing factors. Where appropriate, the development of the mitigation and management measures will address the results of the cumulative impact assessment. The measures will be included in the statement of commitments for the project.

7. Proposed scope of the environmental assessment

Table 7-1 outlines the proposed scope of the environmental assessment for the project. The proposed scope of the environmental assessment is based on the preliminary assessment of key issues discussed in sections 6.4 to 6.7. On the basis of information gathered to date, it is considered that all other issues can be managed through the detailed design stage, and with the application of best practice measures and site-specific safeguards as described in Table 6-3.

Table 7-1 Scope of the environmental assessment

Issue	Scope of environmental assessment

General	▪ Consideration of planning and statutory requirements.
	▪ Strategic justification for the project.
	▪ Description of the project.
	▪ Discussion of project options.
	▪ Outline of construction activities.
	▪ Consideration of the principles of ecologically sustainable development in the context of the project.
	▪ An assessment of the key issues outlined below, including for each key issue (where relevant):
	  ▸ Description of the existing environment.
	  ▸ Assessment of potential impacts of construction and operation of the project.
	  ▸ Identification of any planning, land use, development related assumption or modelling used in impact prediction and or developing management and mitigation commitments.
	  ▸ Description of measures proposed to avoid, minimise, manage mitigate, offset and/or monitor the impacts of the project and the residual impacts.

Stakeholder and community consultation	▪ Description of consultation activities conducted to date and issues identified. ▪ Outline of stakeholder consultation and communication strategy.
Environmental risk analysis	▪ Identification of potential environmental impacts associated with the project, proposed mitigation measures and potentially significant residual impacts after the application of proposed mitigation measures. ▪ Should any additional key environmental impacts be identified, an appropriately detailed impact assessment would be included in the environmental assessment.

Issue	Scope of environmental assessment
Key environmental issues	
Biodiversity	▪ Detailed surveys of biodiversity features of the preferred route and surrounds, including targeted surveys for threatened species, fauna habitat, aquatic habitat and floristic surveys of each vegetation community. ▪ Assessment of extent of clearing of native vegetation and associated loss of habitats, habitat fragmentation and barrier effects, edge effects, vehicle strike and mortality, weed invasion, changes in hydrology and aquatic disturbance and impacts on fish passage. ▪ Significance assessments for all threatened biodiversity recorded, or with the potential to occur in accordance with the *draft Guidelines for Threatened Species Assessment under Part 3A* (NSW National Parks and Wildlife Service 2002) for listings under the TSC Act and FM Act and the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (NSW Department of Environment and Conservation 2005) for listings under the EPBC Act.
Aboriginal heritage	▪ Detailed archaeological heritage assessment, including archaeological survey to determine the extent of Aboriginal occupation and land use. ▪ Cultural heritage assessment to identify the cultural value of the area to Aboriginal people in the present and historically.
Noise and vibration	▪ Identification of any residential and sensitive receptors along the preferred route. ▪ Assessment of potential noise and vibration impacts on identified receptors. ▪ Recommended noise/vibration mitigation strategies, if required. Assessments will be undertaken with reference to the following guidelines, as relevant: *Environmental Criteria for Road Traffic Noise* (EPA 1999), *Environmental Noise Management Manual* (RTA 2001), *Environmental Noise Control Manual* (EPA 1994), *Assessing Vibration: A Technical Guideline* (DEC 2006), and *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC 1990).

Socio-economic	▪ Assessment of the economic and social impacts on Holbrook, including economic impacts associated with land use, property and amenity related changes, impacts on existing and future development will be considered.
	▪ Consideration will be given to impacts on:
	  ▸ Agribusiness and management, including fragmentation and potential loss of agricultural and farm viability, stock diseases and the impact on quarantined properties of a revised road network, and on travelling stock reserves.
	  ▸ Social and economic outcomes for Holbrook and loss of trade for highway-dependent businesses.

Statement of commitments	▪ A draft list of the measures to avoid, minimise, manage, mitigate, offset and/or monitor impacts identified in the impact assessment sections of the environmental assessment.
Conclusion	▪ A conclusion justifying the project taking into consideration the environmental, social and economic impacts of the project, the suitability of the preferred route and whether the project is in the public interest.

8. References

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