

3 Project alternatives

This chapter describes the alternatives that were considered during the development of the project and in the selection of the preferred route. Design options for particular elements of the project are also discussed.

Director General's requirements	Where addressed
Project Justification – the Environmental Assessment must describethe alternatives considered (including an assessment of the environmental costs and benefits of the project relative to alternatives)	Chapter 3

3.1 Alternatives considered

The alternatives to the project comprise the base case or 'do-nothing' option and the route options described in the Route Options Development Report (RTA 2005). These alternatives are summarised below.

3.1.1 The base case or 'do nothing' option

The base case option involves retaining the existing Pacific Highway as the main north-south arterial route between Franklins Road and Eight Mile Lane.

The safety conditions of the section of the Pacific Highway between Franklins Road and Eight Mile Lane are deteriorating due to the poor horizontal and vertical alignment. Forecast traffic growth for the period between 2012 and 2022 would further exacerbate problems currently experienced with the existing road and traffic environment.

Without upgrading of the Pacific Highway between Franklins Road and Eight Mile Lane, the predicted traffic growth would increasingly expose the deficiencies of the existing road environment over the forecast period. Specific consequences would include:

- The deterioration of traffic conditions to unacceptable levels of service.
- At best, a likely continuation of the unacceptable accident record of this section of the highway, along with the associated social and economic accident costs. The more likely scenario is an increase in vehicle accidents.
- Increased travel times for both local and through-traffic.
- Failure to achieve the objectives of planning and transport strategies, in particular the Pacific Highway Upgrade Program.
- Ongoing limitations to economic development of the area due to deteriorating levels of access for tourists and freight.

Without the project, the RTA's safety and travel efficiency targets for the Pacific Highway Upgrade Program would not be achieved. Furthermore, the benefits of other Pacific Highway upgrade projects, including those already completed to-date, would not be fully realised.

3.1.2 Alternative route options

Overview of the route development process

The preferred route for the project was selected as an outcome of the route options development process undertaken for the Wells Crossing to Iluka Road upgrade. Options development for the Wells Crossing to Iluka Road upgrade commenced in 2004 and included:

- Initial investigations over a broad study area, focusing on data collection and commencement of community and stakeholder consultation.
- An audit of the condition of the existing highway, identification and analysis of social, environmental constraints and traffic and transport conditions leading to the development of a long list of potential route options for further assessment.
- Assessment of the long list of route options, including preliminary design investigations to address RTA design standards and multi-criteria analysis covering functional performance and potential social and environmental impacts.
- Identification of a short list of route options for community and stakeholder feedback, including agency review and comment.
- Documentation and analysis of community, stakeholder and agency feedback and submissions on the short listed route options.
- A value management workshop for the short-listed route options, involving community and agency stakeholders.
- Further assessment of the short listed route options using multi-criteria analysis and the results of specialist investigations.
- A route selection workshop, synthesising the outcomes of the preceding options development and assessment activities.

The short-listed route options were described and assessed in the *Route Options Development Report* (RTA 2005), that was made available for public and agency review and comment. More than 1500 public and agency submissions were subsequently received and addressed in the *Route Options Submissions Summary Report* (RTA 2006). These are described in Section 6.4.

The route options and issues raised in the submissions were also examined in detail through a value management workshop, held in March 2006. The outcomes of the value management workshop were documented in the publicly released *Value Management Workshop Report* (RTA 2006).

As an outcome of the value management workshop, option assessment criteria were refined, modified route options were identified and conclusions were made regarding the relative performance of each route option against the assessment criteria. Aspects requiring further investigation were also identified. The preferred route was based on workshop outcomes, stakeholder submissions and technical investigations. The preferred route for the Wells Crossing to Iluka Road upgrade was announced by the NSW Minister for Roads and placed on public display in September 2006.

Selection of the preferred route – Wells Crossing to Iluka Road

For the southern 62 km section of the Wells Crossing to Iluka Road Pacific Highway upgrade between Wells Crossing (Bald Knob Road) and Harwood Bridge, four route options were short-listed (**Figure 3-1**). The project is located within this section, specifically along the section of highway between Franklins Road and Eight Mile Lane, and is about seven kilometres in length. The four short-listed route options are described in detail in the *Route Options Development Report* (RTA 2005) and associated working papers and are summarised in **Table 3-1**. The potential impacts of the short-listed route options are summarised in **Table 3-2**.

■ **Table 3-1 Wells crossing to Iluka Road route options, Glenugie upgrade area**

Route option	Description
Orange/A	The most western of the options. Predominantly a new motorway adjacent to the existing highway, with an easterly deviation between Bom Bom State Forest and Swan Creek. The option involves consideration of bypasses of Grafton, Ulmarra and Tyndale. Offers opportunities for staged construction.
Purple/B	The option follows the existing highway from Wells Crossing to the northern end of the Glenugie State Forest. It deviates east, passing to the north of Pillar Valley and to the west of Pine Brush State Forest, before re-joining the existing highway south of Maclean. Involves the duplication of 19 km of the existing highway. The option involves consideration of an interchange to the north of Glenugie State Forest and connects to the Pacific Highway at Shark Creek. Offers opportunities for staged construction.
Green/C	The option deviates from the existing highway just north of Wells Crossing. It then follows a northerly alignment to the Clarence River at Harwood Bridge. The option passes through the Pine Brush State Forest and an ecologically significant coastal wetland. Does not provide any opportunities for staged construction.
Red/D	The most eastern option. Deviates from the existing highway just north of Wells Crossing before following a northern alignment to the Clarence River at Harwood Bridge. Passes to the east of Pillar Valley and the Pine Brush State Forest. Does not provide any opportunities for staged construction.

■ **Table 3-2 Potential impacts of Wells Crossing to Iluka Road route options, Glenugie upgrade area**

Route option	Potential impacts
Orange/A	<ul style="list-style-type: none"> ■ Crosses 38 km of flood plain north of Glenugie and presents the greatest risk in relation to flooding of the Swan Creek area and potential impacts on Grafton. ■ Would also result in the highest number of houses being impacted, primarily along the existing highway (about 175). ■ Impacts about 465 ha of prime agricultural land north of Glenugie. ■ Presents the least risk from an ecological perspective when compared with other options. ■ Impacts on items of non-Aboriginal heritage (one in the Glenugie area). ■ Upgrading in the vicinity of the existing road corridor would provide the most advantages in terms of the safety and transport efficiency objectives of the Pacific Highway Upgrade Program. ■ This option would achieve the most significant decrease in the overall number of accidents on the road network, as a result of the higher volume of traffic that would be attracted and highest overall travel time saving for all vehicles.
Purple/B	<ul style="list-style-type: none"> ■ Crosses 13 km of floodplain north-east of Glenugie. ■ Would impact about 90 houses, north-east of Glenugie. ■ Flooding issues associated with Shark Creek and north, although presents less risk than the Orange/A option. ■ Impacts about 265 ha of prime agricultural land north east of Glenugie. ■ Impacts areas of high habitat quality, endangered ecological communities and wetlands primarily to the north and north-east of Glenugie. ■ Some impact on items of Aboriginal heritage to the north-east of Glenugie. ■ Would provide some advantages in terms of achieving the safety and transport efficiency objectives of the Pacific Highway Upgrade Program.
Green/C	<ul style="list-style-type: none"> ■ Travels through Pine Brush State Forest and Shark Creek SEPP 14 wetland. ■ Would result in a small number of houses being affected (about five). ■ Would have high impacts on residential amenity. ■ Would have high impacts on rural residential amenity. ■ Would impact about 115 ha of prime agricultural land. ■ Would result in very high ecological impacts. ■ Impacts an item of non-Aboriginal heritage. ■ Impacts items of Aboriginal heritage. ■ Would achieve significant travel time and transport cost savings for through traffic.

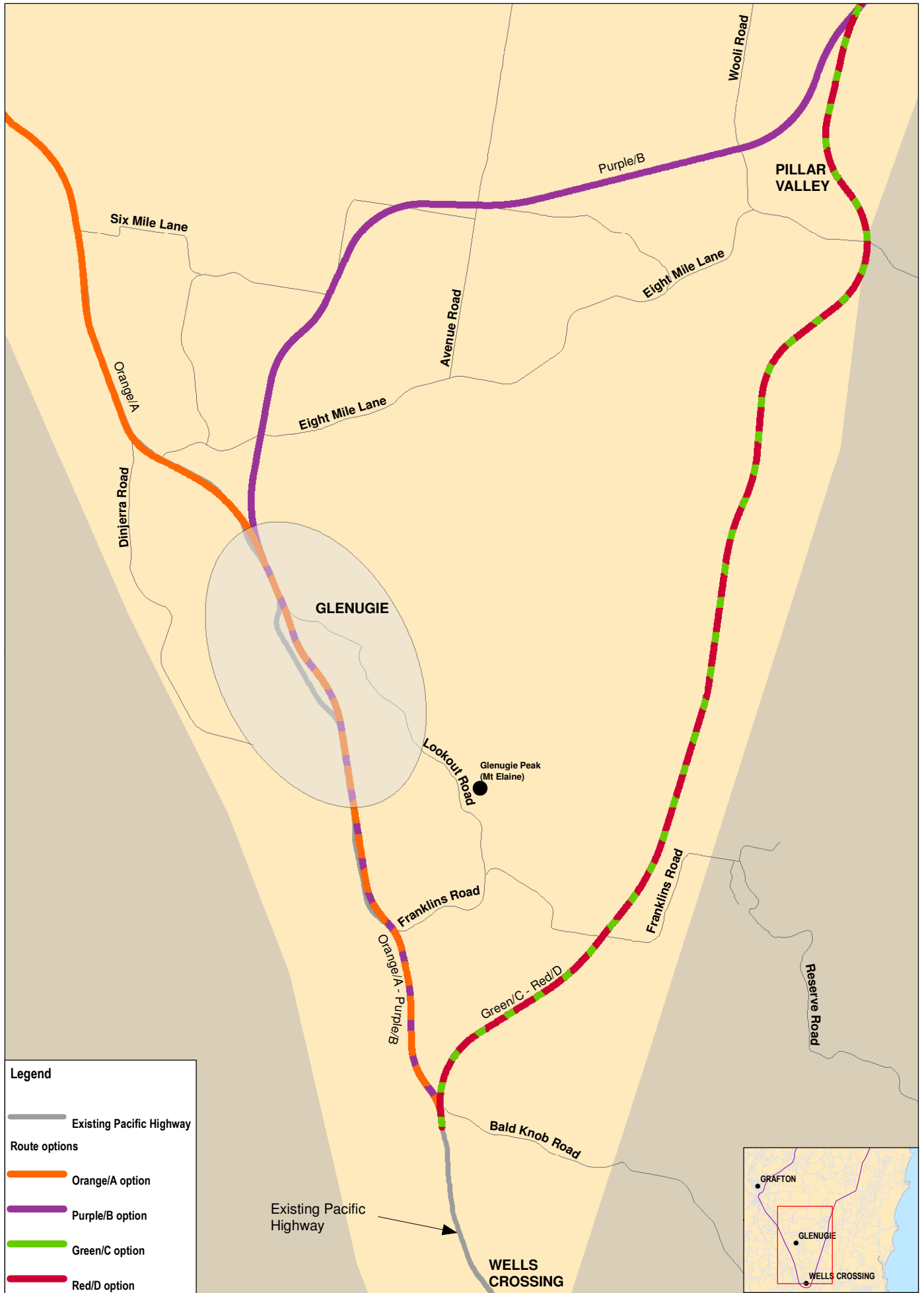
Route option	Potential impacts
Red/D	<ul style="list-style-type: none"> ■ Crosses nine kilometres of floodplain. ■ Interchanges at Bald Knob Road and Yamba Road, ■ Would result in a small number of houses being affected (about 10). ■ Would have high impacts on rural residential amenity. ■ Would impact about 220 ha of prime agricultural land. ■ Does not affect Coldstream flood basin. Issues associated with high velocity local catchment flooding and the floodplain associated with Wooloweyah Lagoon. ■ Would result in very high ecological impacts. ■ Impacts an item of non-Aboriginal heritage. ■ Impacts items of Aboriginal heritage. ■ Would achieve significant travel time and transport cost savings for through traffic.

The route options were subsequently examined in the value management workshop and route selection workshop. The criteria used to assess the route options covered three categories of option performance:

- Functional performance in terms of transport efficiency, engineering risk and improved road safety and reduced travel times.
- Potential social and local economic impacts, including heritage, dwellings, businesses, productive lands, flooding and amenity.
- Potential biophysical impacts, including native vegetation, high quality habitat, endangered ecological communities, threatened fauna and flora, wildlife corridors and water quality.

No option emerged from the route options assessment process as clearly performing better in terms of all three groups of assessment criteria. Rather, the selection of the preferred route involved identifying the option that would provide the best outcomes, on balance, across all criteria categories in a cost effective manner.

A refined version of the Purple/B Option (refer to **Figure 3-1**), with minor adjustments in some locations to mitigate impacts or address design issues, combined with a package of measures to improve the safety of the existing highway, was identified as the option that, on balance, best met the objectives of the Pacific Highway Upgrade Program. In summary, this option avoids key risk areas in terms of both ecology and flooding and balances outcomes in relation to the functional, social and local economic and environmental criteria. Further details of the refined Purple/B Option are provided in RTA (2005) and RTA (2006).



Data Sources
Streetworks, LPI 2008

Figure 3-1: Wells crossing to Iluka Road route options, Glenugie upgrade area



0 1
A4 1:75,000 Kilometres

The preferred route for the project

This section describes the benefits of the preferred route in comparison to the alternative, being a route that would veer further to the north east (the route coinciding with the Green/C and Red/D options). The preferred route for the project locates the upgrade closer to and parallel to the eastern side of the existing highway.

Functional considerations

- The preferred route would be used by the majority of corridor traffic, including local, regional and through traffic. A higher proportion of road users would therefore benefit from the preferred route. Higher proportions of traffic using a route located close to the existing highway route would mean safety benefits for a greater number of road users.
- By locating the upgraded highway closer to Grafton, the preferred route would facilitate the future construction of the Glenugie Interchange. The location of the interchange has been identified by community, businesses and Council representatives as very important to the local economy. Specifically, locating the interchange close to Grafton would provide opportunities for existing and potential new businesses to benefit from the upgraded highway and improve regional access to markets. It would also provide the best opportunity for access to Grafton Airport. The Glenugie Interchange would not be constructed as part of the project.
- The preferred route would allow for staged construction and operation of the Wells Crossing to Iluka Road upgrade, providing earlier road safety and economic benefits.

Social and local economic performance

- Following the existing highway corridor through Glenugie State Forest would reduce and avoid severance and other impacts on private properties. The preferred route would mainly impact State Forest. By contrast, a route option further to the east would create a new corridor through mostly privately owned properties. This would result in high property severance impacts with relatively remote areas, with a greater resultant impact on the amenity of rural residents.
- The preferred route would result in minimal changes in the potential for noise impacts and minimal changes in the amenity of rural areas outside the area of influence of the existing highway. In comparison to the preferred route, the amenity impacts of a route further to the east would be high because of the isolation of areas that it would pass through. These additional impacts are avoided by following the existing highway.
- The preferred route would avoid the Pillar Valley locality, the amenity and character of which would be significantly impacted by a route that was further east.
- Pillar Valley and its proximal area are highly sensitive in relation to Aboriginal cultural sites. A route further to the east would pass very close to sensitive sites and would potentially increase the risk of indirect impacts and impacts on the context of these areas.

Natural environment performance

- The preferred route would generally widen the existing highway corridor rather than creating a new corridor through areas that currently have large areas of continuous native vegetation.
- In comparison to the preferred route, a route further to the east would result in greater severance of areas of remnant native vegetation and areas with high habitat values.
- In comparison to the preferred route, a route further east would have substantially greater potential to impact fauna corridors in an east-west direction between the forest habitats of the coastal range and the wetland habitats of the floodplain.

Refinement of the preferred route

The results of specialist studies undertaken during project planning found that the preferred route would impact a population of *Eucalyptus tetrapleura* in Glenugie State Forest. This species is listed as a vulnerable species under both the NSW *Threatened Species Conservation Act* 1995 and the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. Given the potential for impacts on this species, route refinements were investigated to determine if there was an alternative alignment available that would reduce impacts on this species while still providing the above-listed benefits that influenced the preferred route selection (see description of the preferred route for the project, above).

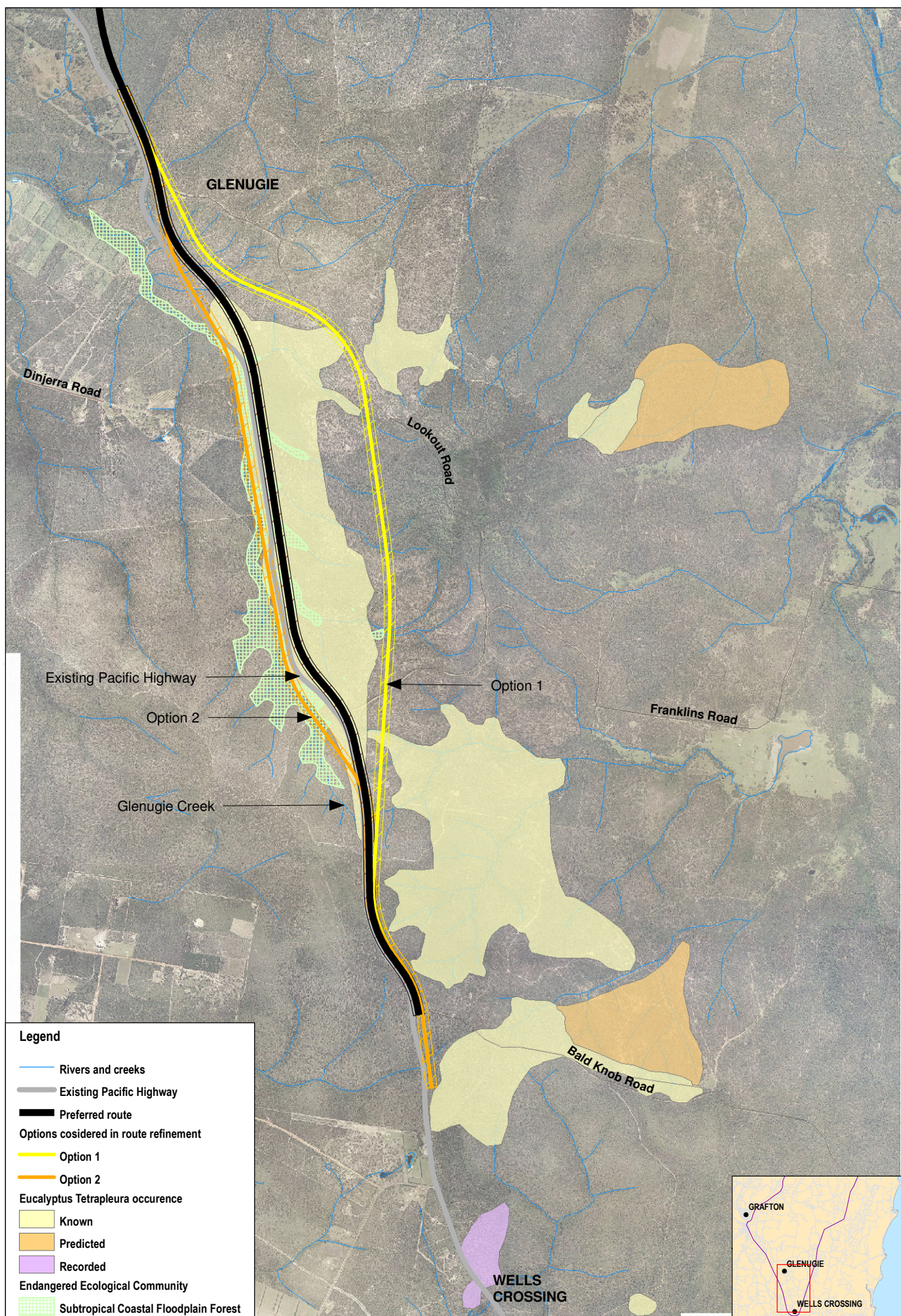
Two alternative alignments were investigated (**Figure 3-2**):

- Option 1, located about 900 m east of the preferred route.
- Option 2, located about 250 m to the west of the preferred route.

The route refinement investigations concluded that:

- Option 1 would have less of a direct impact on *E. tetrapleura* but would result in further fragmentation of remnant vegetation. This would result in fragmentation of the *E. tetrapleura* population and greater edge effects, affecting habitat quality, connectivity and fauna movement.
- Option 2 would impact a substantial population of *E. tetrapleura* and would also have a greater impact on an area of Glenugie Creek that supports Subtropical Coastal Floodplain Forest, an endangered ecological community under the TSC Act. This area is also likely to provide habitat for several threatened fauna species. Option 2 also impacts on private property located west of the existing highway and has lower amenity benefits as compared to the project.

It was concluded that the route refinement options had no clear advantages over the project. Given that the options for route refinement had no advantage over the project and that ecological impacts would be offset, it was concluded, on balance, not to progress further with Option 1 or Option 2.



Data Sources
Streetworks, LPI 2008
Aerial, 2007

0 1
A4 1:45,000 Kilometres

3.2 Confirmation of the project as the preferred option

The project is consistent with relevant State Government plans, strategies and policies and with the strategic outcomes of the Pacific Highway Upgrade Program. The project addresses safety, traffic and transport issues. It meets requirements for the projected growth in traffic and transport on the highway by providing for a dual carriageway that meets appropriate RTA design standards. When compared to other options and assessed against the project objectives, the project is preferred in relation to social, environmental, design and economic considerations.

The project is the result of extensive analysis of potential options within the wider Wells Crossing to Iluka Road study area, including the Glenugie area. This led to the RTA decision on the preferred route. There was extensive community consultation throughout that process and agency, community and stakeholder representatives participated in a number of meetings and workshops that contributed to the decision process. The proposal to locate the upgrade close to the existing highway as described in this report is the option that performs best in relation to social, environmental and design factors.

A detailed description of the project is provided in Chapter 4. A justification of the project in consideration of the objects of the *Environmental Planning and Assessment Act 1979* is provided in Chapter 11.