4. Project need, objectives and design principles

4.1 Need for the project

The need to upgrade the Pacific Highway between Iluka Road and Woodburn has been evaluated in the context of the overall Pacific Highway. The highway is a major inter-state transport infrastructure facility that not only forms the primary Sydney - Brisbane surface transport link, but also serves as the backbone for a significant and growing coastal residential and recreational population.

The project is required to meet the NSW and Commonwealth governments' overall objective of fully upgrading the Pacific Highway to a four-lane divided highway standard. It will provide additional capacity in an area with continued traffic growth, and will join other completed and planned projects to form a continuous high-standard road, better able to meet the demands placed on it.

The project is also an essential component of the wider regional network, and the need for it is based on a number of issues, including:

- Road safety – including the need to reduce the number of road traffic accidents through safer design;
- Population growth, urban expansion, commercial development, tourism and employment growth on the NSW north coast and in southern Queensland; and
- Freight transport demand and service patterns.

It is expected that traffic volumes on the Pacific Highway will continue to increase due to:

- Population increases in the North Coast region;
- Traffic diverted from other routes as the Pacific Highway is improved; and
- Traffic generated by improved travel times and reduced travel costs.

4.1.1 Pacific Highway Upgrade Program objectives

The RTA's overall objectives for the PHUP are to:

- significantly reduce road accidents and injuries;
- reduce travel times;
- reduce freight transport costs;
- develop a route that involves the community and considers their interests;
- provide a route that supports economic development;
- manage the upgrading of the route in accordance with ESD principles; and
- provide the best value for money.

4.1.2 The 'base case' – 'do minimum'

Within the context and overall scope of the PHUP, it is useful to compare the proposed highway upgrade with the 'base case' or 'do minimum' scenario. The 'do minimum' option infers no substantial change. Minor improvements could be undertaken along the Pacific Highway under a 'do minimum' scenario to eliminate black spots, improve line marking, construct safety features such as median safety barriers (currently being installed along the route), and provide better overtaking opportunities.

The consequences of the 'do minimum' option for Iluka Road to Woodburn would not mean substantial improvements in terms of traffic congestion, travel times or general LOS. However, as discussed in section 2.2, this section of the Pacific Highway has a poor accident record, including fatalities. Any increase in traffic volumes, regardless of the effect on overall highway capacity, is likely to result in an increased frequency of accidents, particularly as driving conditions are improved elsewhere. Many of the accidents including head on collisions are attributed to fatigue, and only a change in the type and function of the highway can address this issue.

Highway safety is a major concern of residents in the study area and to the wider community. Local residents must rely on the Pacific Highway for local trips, which can conflict with through traffic. In particular, residents perceive the high volumes of truck traffic, especially at night, as being a considerable risk to safety. Access on and off the Pacific Highway into minor roads or to private properties often requires turn movements in unsafe situations such as on curves or crests, where sight distances can be inadequate, or where shoulder width or conditions are sub-standard (eg potholed, gravelled, etc). It is anticipated that these conditions would improve with the highway upgrade as conflicts associated with slower moving heavy traffic on single carriageway highways are reduced ie fatigue and high risk overtaking manoeuvres.

In addition, the overall traffic noise level and the frequency of night-time noise 'events' such as use of engine compression brakes, which are already major sources of concern to many residents along the route, would increase under a 'do minimum' option.

These conditions are a result of the function and geometric design of the existing highway and would be substantially improved with the proposed concept design as the following would be eliminated:

– Overtaking manoeuvres in opposing flow traffic lanes – linked to head on collisions.
– Tight curves in road – linked to loss of control or head on collisions.
– Crests in roads – linked to nose to tail and head on collisions.
– Reduced visibility from side roads – linked to side impact collisions.
– Steep grades – linked to increased noise or compression breaking.
– Single lane flow – platooning of traffic caused by differential speed and low opportunities to overtake.

4.1.3 Project objectives

Objectives for the Iluka Road to Woodburn project have been derived to guide its development and to address the needs and issues identified at this stage of the project. These objectives have been developed from the PHUP objectives.

The project objectives form the basis of a range of performance measures. The performance measures will be elaborated upon as more detailed investigations and assessments occur through each stage of project development.

The project objectives were discussed with members of the community (at the CISs (Community Information Sessions) held on 14 December 2004 and 8 March 2005) and key government agencies (at the PFM held on 14 December 2004).

The project objectives arising from the community and agency consultation process, as derived from the PHUP objectives, are:

Significantly reduce road accidents and injuries:
– Develop a dual carriageway road with a route target crash rate of a maximum 15 crashes per 100 MVK over the project length.
– Minimise the number of access points onto the highway for 'Class A' Freeway sections.
– Retain or replace existing rest areas within the study area.

Reduce travel times:

- A concept design for a 110 km/h design speed for the vertical alignment and 110 km/h design speed for the horizontal alignment.
- A route that can be upgraded to Class M or Motorway standard in the future (as applicable), with controlled access only via grade-separated interchanges, and a parallel service road network for local traffic.
- Provide a route that maximises the reduction in travel time for Pacific Highway traffic.
- Provide intersections designed to at least a LOS C, 20 years after opening for the 100th Highest Hourly Volume.
- Minimise user delay from incidence and road closure on the highway including from flooding.
- Reduce delays from holiday congestion.
- Minimise disruption and delay during construction

Reduce freight transport costs:

- Provide a route which reduces the overall freight transport cost for trucks using the highway.
- A route that meets or exceeds B-double requirements.

Develop a route that involves the community and considers their interests:

- Develop a project that meets the objectives of the Community Involvement Plan.
- Minimise the physical and traffic impacts of the route such as traffic noise levels, intrusion, community severance and access patterns.
- Minimises the physical impacts on heritage (Indigenous and European) sites.
- Provide transport developments which are complementary with land use.
- Maintain access to affected properties and land during construction.
- Upgrade and improve the existing highway where it is retained as part of the Project.

Provide a route that supports economic development:

- Maintain accessibility for local industries to regional and interstate markets.
- Maintain access to local and regional centres of economic importance.
- Minimise the impacts on business/service facilities dependent on Pacific Highway traffic.

Manage the upgrading of the route in accordance with principles of ecologically sustainable development (ESD):

- Provide a flood immunity on at least one carriageway between 1% AEP (annual exceedance probability) (target) and 20% AEP (absolute minimum).
- Minimises the effects on sensitive habitats.
- Minimise the effects on native vegetation.
- A route that minimises impacts on National Parks.
- A route which satisfies the principles of ESD.

Provide the best value for money:

- Minimise the Whole of Life Costs of the project.
- Maximise the use of the existing road reserve for duplicated sections of the project where possible.
- Benefit cost ratio (BCR) of greater of 2.
- Expenditure supports NSW State government and Clarence Valley/Richmond Valley Council development policies.

4.2 Design principles and standards

4.2.1 Urban design principles

The urban design principles for the proposed upgrade are derived from:

- PHUP goals;
- Iluka Road to Woodburn project objectives; and
- The RTA's Pacific Highway urban design framework (March 2005); Pacific Highway Development Framework (2004), Beyond the Pavement 2004 Update (Urban and Regional Design Practice Notes); and Bridge Aesthetics – Design Guidelines to improve the appearance of bridges in NSW (2003).

4.2.2 Highway design standards

The design of the Iluka Road to Woodburn upgrade of the Pacific Highway is being carried out according to Upgrading the Pacific Highway – Upgrading Program Beyond 2006: Design Guidelines (2005), prepared by the RTA's Pacific Highway Office. The project will also comply with Austroads standards (various dates) and the RTA's Road Design Guide (1989). Key standards applying to this project are summarised below in **Table 4.1**. The typical cross section for the proposed highway upgrade is shown in **Figure B**.

Table 4.1 Road design standards

Feature	Class A dual carriageway	Intersecting and other roads
Design speed	Generally 110 km/h except vertical alignment may be reduced to 100 km/h at certain locations based on cost effective advantages and approved by the Pacific Highway Office.	80 and 60 km/h dependent on function.
Cross section	Dual carriageway with two 3.5 m wide lanes, 2.5 m nearside shoulder and 0.5 m offside shoulder, median width 12 m where appropriate given geotechnical and land use constraints. Minimum 10 m clearzone from edge of running lane plus additional reserve on one or both sides to enable service road to be provided under a Class M scenario.	Two lane single carriageway with typically 3.5 m lanes and 2 m shoulders dependent on road function.
Flood immunity	One carriageway positioned above the 1 in 100 year flood level (desirable) or the 1 in 20 year flood level (minimum) across the flood plain.	No change to existing conditions.
Intersections	No grade-separated interchanges for this project (Class A). At-grade 'Seagull' type T-intersections at key local roads.	At grade T-intersections with some turning lanes.
Access	Left-in, left out for all existing access roads and private properties not serviced by 'Seagull' type T-intersection (Class A).	Unrestricted.
Overhead clearances	5.3 m.	Varies dependent on function.
Fill/batter	1 vertical : 3 horizontal – 1 vertical : 2 horizontal	1 vertical : 3 horizontal – 1 vertical : 2 horizontal
Cuttings	1 vertical : 2 horizontal	1 vertical : 2 horizontal

Source: RTA, various publications.