

## 7. Traffic, cyclists, pedestrians and buses

This chapter provides a description of the projected traffic, cyclist, pedestrian and bus movements on the proposed highway. It takes into account the findings of the preliminary and detailed traffic assessments as well as information obtained from RTA and local councils.

### 7.1 Traffic assignment

A comparison of the projected traffic for the proposed upgraded highway with the projected flows for the existing highway, as shown in Table 7-1, shows that traffic on the upgraded highway section between Arrawarra and Dirty Creek Range (Range Road) will reduce mainly due to the removal of local traffic from the upgraded highway between Arrawarra and Dirty Creek Range (Range Road). Local traffic within this area will utilise the existing highway service road to access the upgraded highway north of Range Road and south of Arrawarra Beach Road.

**Table 7-1 Upgraded Pacific Highway - projected average annual daily traffic**

| Highway section                        | 2006<br>(Existing) | 2016   | 2026   | 2036   |
|--|--------------------|--------|--------|--------|
| Arrawarra Road to Range Road           | 11,870             | 9665   | 11,950 | 14,230 |
| Range Road to Bald Knob Tick Gate Road | 9746               | 12,380 | 15,300 | 18,225 |

Note: The figures shown above, for the existing scenario (2006) are based on the 2004 traffic data and adjusted for 3% linear traffic growth.

### 7.2 Operational performance

#### 7.2.1 Highway operation

The traffic conditions of major roads and intersections can be quantified in terms of their operating level of service. Level of service is defined by Austroads (1988) as a qualitative measure of features that include speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort, convenience and operating costs. Level of service (LOS) ranges from A to F as described below:

- LOS A Generally free flow conditions with vehicles unimpeded in manoeuvring in the traffic stream.
- LOS B Stable flow with manoeuvring traffic stream only slightly restricted with the possibility of slight delays.
- LOS C Stable flow with manoeuvring becoming more restricted however any delays are acceptable.
- LOS D Approaching unstable flow with delays common but tolerable.
- LOS E Unstable flow with traffic stream congested and with intolerable delays.
- LOS F Forced flow with movement of traffic stream at very slow speed.

An assessment of the service levels for the various sections of the upgraded highway is shown in Table 7-2. The level of service was determined using the Highway Capacity Software HCS 2000.

**Table 7-2 Upgraded Pacific Highway - level of service (HCS 2000)**

| Highway section                        | 2016 | 2026 | 2036 |
|--|------|------|------|
| Arrawarra - Range Road                 | A    | A    | A    |
| Range Road to Bald Knob Tick Gate Road | A    | A    | B    |

The results in Table 7-2 highlights that all sections of the upgraded highway would operate at level of service B or better within a 20 year operations horizon (assuming the upgraded highway will open to traffic in 2016).

The likely speed limits for the arterial (100 km/h) and motorway (110 km/h) standard highway upgrade showed no changes in the operational level of service over a 20 year period.

### 7.3 Intersection performance

#### 7.3.1 At-grade intersections with cross highway movements

Seven local at-grade intersections/roundabouts were assessed using SIDRA to determine their operational efficiency in both the opening year (2016) and during operation (2026 and 2036). Each of the proposed intersections is discussed below.

##### **McPhillips Road (“left in, left out with right in”)**

The operation of this intersection is a level of service C from 2016 due to the through highway volumes, however it maintains this level of service through to 2036.

The intersection of the Pacific Highway and McPhillips Road is likely to operate at an acceptable level of service to 2036.

##### **Service road connection to Lemon Tree Road**

The operation of the intersection of the service road and Lemon Tree Road is a level of service B until 2036 where it is likely to operate at an acceptable level of service C due to through highways volumes.

##### **Kungala Road**

This intersection operates at a level of service B in 2016 and maintains this level of service through to 2036. The intersection of the Pacific Highway and Kungala Road is likely to operate at an acceptable level of service to 2036.

##### **Luthers Road**

This intersection operates at level of service B to 2026 and drops to level of service C in 2036. The intersection of the Pacific Highway and Luthers Road is likely to operate at an acceptable level of service to 2036.

## **Parker Road**

This intersection operates at level of service B to 2026 and maintains this level of service to 2036. The intersection of the Pacific Highway and Parker Road is likely to operate at an acceptable level of service to 2036.

## **Bald Knob Tick Gate Road**

This intersection operates at level of service B to 2026 and drops to level of service C in 2036. The intersection of the Pacific Highway and Bald Knob Tick Gate Road is likely to operate at an acceptable level of service to 2036.

### **7.3.2 On and off slip lanes**

The project objectives, as set by the RTA, include: “provide intersections designed to provide at least level of service C twenty years after opening for the 100th highest hourly volume”. The 100th highest hourly volume is defined as 13 per cent of annual average daily traffic.

The capacity of single lane on and off slip lanes (with reference to *Section 5.3 of Roadway Capacity, Austroads 1988*) for the following seven accesses were analysed:

- New Link to Highway South of Range Road.
- Range Road.
- Lemon Tree Road.
- Grays Road.
- Rediger Close.
- Kungala Road.
- Luthers Road.
- Parker Road.
- Bald Knob Tick Gate Road.

The single lane on and off slip lanes would provide adequate capacity with an operation level of service of level of service A for 2016, 2026 and 2036 determined using the Highway Capacity Software package HCS2000. These years represent the forecast planned year of opening (2016) and the 10th and 20th year of operation (2026 and 2036) for the new highway.

## **7.4 Distance and travel time savings**

### **7.4.1 Distance**

The project length of the upgraded highway is approximately 26.29 km (from south of Arrawarra Beach Road to Bald Knob Tick Gate Road) while the corresponding section of the existing highway is approximately 27.83 km, giving a distance saving of about 1.09 km. The estimated distance (veh-km) saving for highway traffic, comparing unimproved highway travel with dual carriageway travel for 2016, 2026 and 2036, is shown in Table 7-3.

**Table 7-3 Upgraded Pacific Highway - distance savings**

| Year | Distance travelled per year - existing highway (million vehicle-km) | Distance travelled per year - upgraded highway (million vehicle-km) | Distance saving per year (million vehicle-km) |
|------|---|---|---|
| 2016 | 100.22  | 80.21   | 20.01   |
| 2026 | 123.89  | 99.16   | 24.73   |
| 2036 | 147.57  | 118.11  | 29.46   |

#### 7.4.2 Travel time analysis

The Pacific Highway Upgrade Program aims to reduce travel times. Table 7-4 shows the design speeds and travel times (at design speeds) over the project length.

**Table 7-4 Existing and upgraded Pacific Highway - travel times**

| Scenario                  | Distance (km) | Speed limited (km/h) | Travel time (min) |
|---------------------------|---------------|----------------------|-------------------|
| Existing highway          | 27.83         | 100                  | 16 min 42 sec     |
| Arterial standard upgrade | 26.29         | 100                  | 15 min 46 sec     |
| Motorway standard upgrade | 26.29         | 110                  | 14 min 20 sec     |

Section 4.5.1 of the Austroads “Guide to Traffic Engineering Part 2 – Roadway Capacity” has been applied to determine the average speed for uninterrupted traffic flow. Further information regarding the travel time analysis is provided in the Detailed Traffic Assessment working paper.

#### 7.5 Crash analysis

It is expected that the upgraded highway will reduce crashes, in particular those resulting from head-on collisions, vehicles hitting objects adjacent to the road and hitting animals. The proposed wide vegetated median on the upgraded highway is expected to significantly reduce head-on accidents following project opening. The provision of sealed shoulders and removal of roadside objects is expected to greatly reduce accidents resulting from hitting off-road objects and animals. It is anticipated that crashes may be reduced by up to 43 per cent for the arterial upgrade standard. With the motorway upgrade standard it is considered that a further reduction in accidents rates may occur as a result of removing all at-grade intersections along the indicative alignment.

Table 7-5 provides a summary of the anticipated crash reductions based on the Woolgoolga to Wells Crossing accident data for the period of January 2002 to December 2006.

**Table 7-5 Expected crash reduction - Pacific Highway – Woolgoolga to Wells Crossing**

| <b>Accident type / description</b> | <b>Proportion of total crashes</b> | <b>Expected reduction</b> | <b>Reduction in total accidents</b> |
|------------------------------------|------------------------------------|---------------------------|-------------------------------------|
| Head-on                            | 10.5%                              | 100%                      | 10%                                 |
| Hitting objects                    | 32.0%                              | 75%                       | 24.3%                               |
| Hitting animals                    | 10.5%                              | 75%                       | 7.9%                                |
| <b>TOTAL</b>                       | <b>53.0%</b>                       |                           | <b>42.7%</b>                        |

## **7.6 Provision for heavy vehicles**

The existing truck stop lay-bys located northbound and southbound at Lemon Tree Road service station shall be retained and a pedestrian underpass or overpass provided for pedestrian access to the service station.

Truck lay-bys are to be provided primarily for short-term use in the event of a blown tyre or similar. Seven lay-bys have been allowed for in the concept design at the following locations:

- 500 m north of Kangaroo Trail Road.
- 300 m south of Redbank Creek.
- 1.3 km north of Redbank Creek.
- 900 m north of Range Road.
- 900 m south of Kungala Road.
- 630 m north of Parker Road.
- Service Station at Lemon Tree Road.

## **7.7 Provision for pedestrians**

A pedestrian footpath will be provided on the Dirty Creek / Range Road underpass, Lemon Tree Road service station pedestrian underpass and proposed access road underpasses.

## **7.8 Provisions for cyclists**

The “Upgrading the Pacific Highway - Upgrading Program beyond 2006 - Design Guidelines, July 2005, Issue 2.1” require a minimum nearside shoulder width of 2.5 m with a maximum of 3.0 m adjacent to safety barrier. The NSW RTA Bicycle Guidelines and Austroads Guide to Traffic Engineering Practice – Part 14 Bicycles (Section 4.4.2) recommend a 3.0 metre shoulder on motorways and state highways, where the speed limits are greater than 100 km/h.

The Department of Planning is currently co-funding (with local government) a NSW Coastline Cycleway. The Coastline Cycleway is based upon a 30-year vision of former planning academic Elias Duek-Cohen, for a 1500 km coastal route from the Victorian border to the Queensland border. The Department of Planning has identified a route for the Coastline Cycleway in conjunction with the Coffs Harbour City and Clarence Valley Councils (see Figure 6). Within the project, the Coastline Cycleway uses the Pacific Highway between Range Road and the project’s northern limit (Bald Knob Tick Gate Road), with the Coastline Cycleway having no other route option.

The provision of a 2.5 m shoulder is considered appropriate for use by cyclists. Bike lanes will be provided through at-grade intersections and crossing points on interchange ramps.

## **7.9 Provision for public transport**

The proposed highway upgrade will provide for improved travel times for regional and long-distance bus services. A bus workshop was held in June 2007 with key stakeholders for the Oxley Highway to Kempsey project with the objective of setting a direction for the consideration of bus use generally along the highway, primarily focusing on school buses. Some of the key design principles that were highlighted at the workshop include:

- No pedestrian should be compelled to cross the highway at grade.
- Bus stops should be considered in catchments with nodes for bus stop locations.
- Bus stops shall be located on side roads, not on the highway.

The design of the project has broadly incorporated the key principles identified in the Oxley Highway to Kempsey project workshop. In this regard it is anticipated generally that no bus will pick up or set down along the highway with the preference for service roads to be used instead.

**Figure 6 NSW Coastline Cycleway (Coffs Harbour City Council and Clarence Valley Council)**

