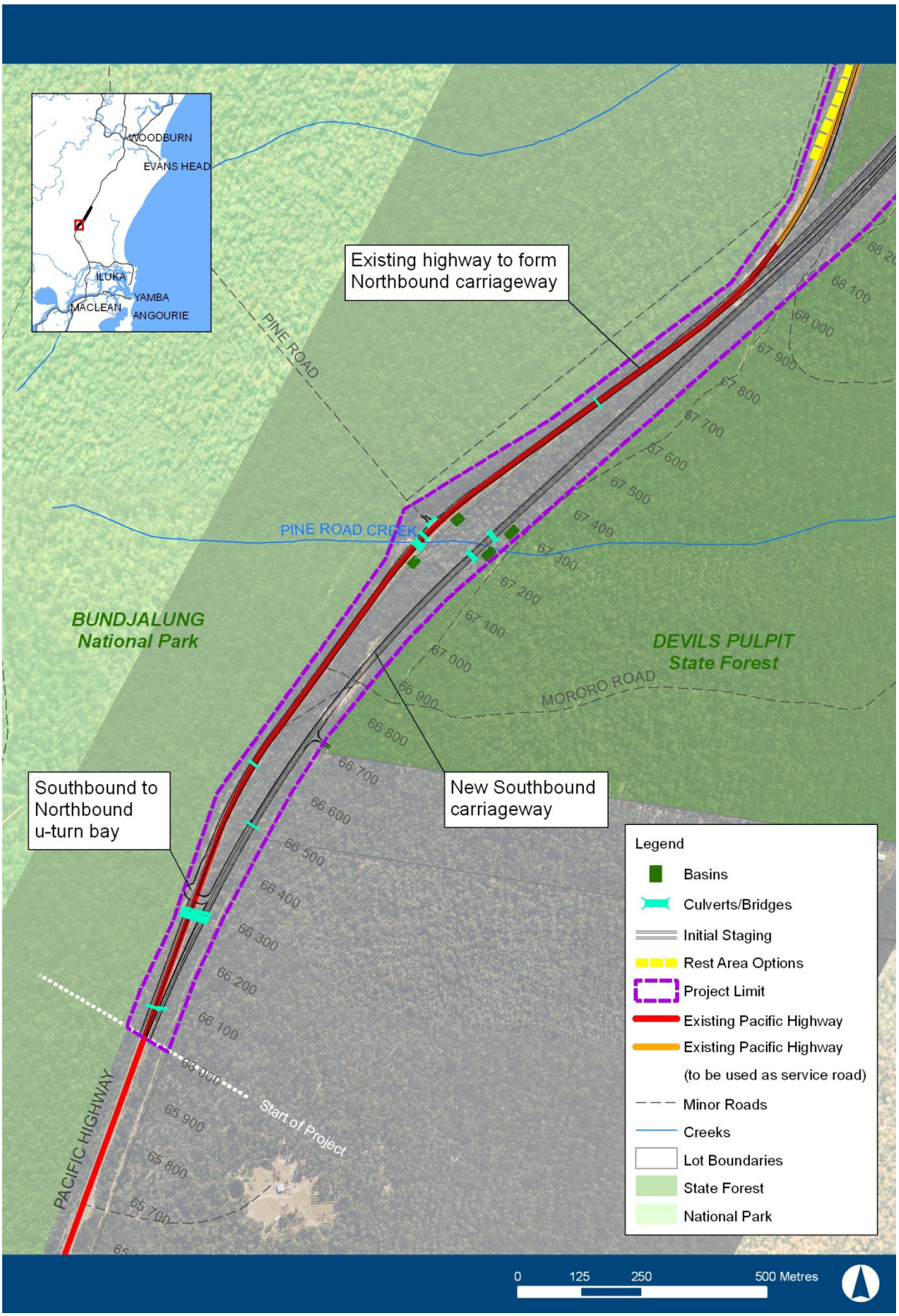

Figure 4-5a Key features of the initial staging (Ch 66000-Ch 68000)

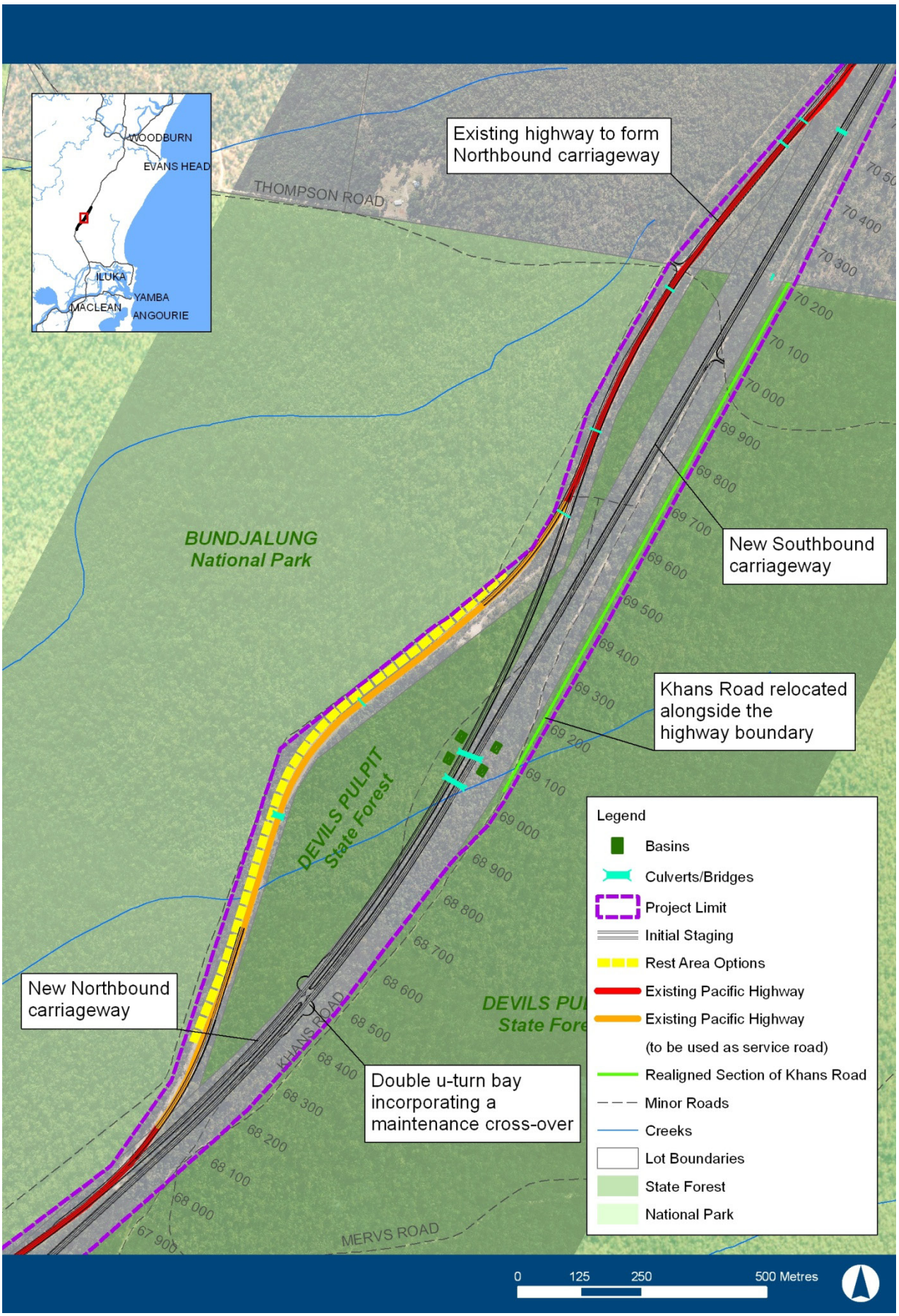

Figure 4-5b Key features of the initial staging (Ch 68000-Ch 70500)

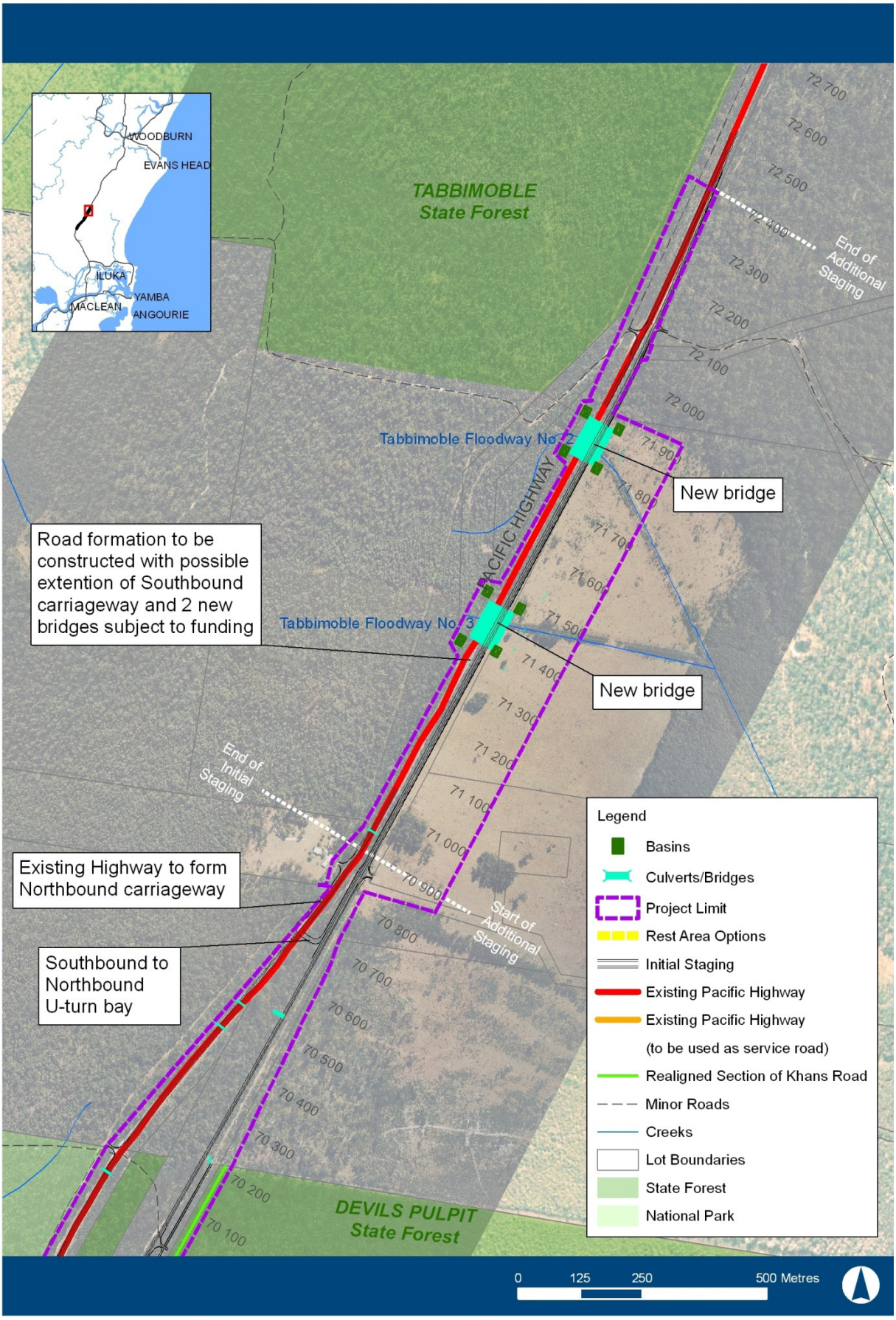

Figure 4-5c Key features of the initial staging (Ch 70500-Ch 72500)

Initial staging

As depicted in Figure 4-5(a–c), the initial staging would comprise:

- Two kilometres of dual carriageway upgrade at the southern end of the project (from about Ch 66000–68000). The existing highway would be retained as the northbound carriageway and may require some pavement improvements. Pavement improvements may be undertaken progressively across the life of the project. A new carriageway would be built for southbound traffic along the Class M motorway standard upgrade alignment.
- 1.8 kilometres of new dual carriageway highway, deviating to the east of the existing highway alignment (about Ch 68000–69800). Both the northbound and southbound carriageways would be built to the full Class M motorway standard in this section.
- 1.2 kilometres of dual carriageway between Ch 69800–71000. The existing highway would be retained as the northbound carriageway and require some pavement improvements. A new carriageway would be built for southbound traffic along the Class M upgrade alignment. The two carriageways would merge to form a single-carriageway highway at Ch 71000.
- 1.4 kilometres of earthworks (about Ch 71000–72400). Under the initial staging, construction of this section would include earthworks to pavement base only, and would exclude construction of the two new bridges over Tabbimoble Floodways No. 2 and No. 3 as well as the pavement from Ch 71000–72400. At the Tabbimoble Floodways No. 2 and No. 3, gaps would be provided to accommodate drainage channels and mimic bridge embankments. The surface and fill batters of the pavement base would be stabilised to prevent erosion.
- The combined emergency crossover and U-turn facilities described previously would be constructed under the initial staging option. Under the initial staging upgrade, existing direct local access to and from the northbound and southbound travel lanes would be retained at all locations. Right turn movements into and out of some access would be restricted; however, U-turn facilities would be provided upstream and downstream of the accesses to cater for all movements. The only exception to this is where vehicles performing a northbound to southbound U-turn near the north of the project would continue north and use Serendipity Road to perform a U-turn.
- Realignment of Khans Road (as described above for the Class M upgrade).
- A probable posted speed of 100 kilometres per hour.

Additional detail regarding the treatment of intersections for existing accesses and side roads is given in Section 4.2.

Potential additional staging

An additional stage includes building on the earthworks between Ch 71000–72400 to provide a 1.4-kilometre section of new southbound carriageway. This would include two new bridges, adjacent to existing structures, over Tabbimoble Floodways No. 2 and No. 3. The existing highway would be retained for use as the northbound carriageway.

Construction of this additional stage would be dependent upon the availability of funding.

Final stage

The final stage of the project is the completion of the Class M motorway upgrade as described above.

4.1.3 Environmental assessment of the stages

This Environmental Assessment addresses the potential impacts of the motorway upgrade and both the initial and the potential additional staging. As the construction footprint and associated environmental impacts of the full motorway upgrade would be greater than those of the initial and the potential additional staging, the Environmental Assessment focuses on the motorway upgrade proposal.

Consideration is given to the potential impacts of the initial and potential additional staging where the impacts of these stages are substantially different from those of the motorway upgrade. Where the impacts of the initial and potential additional stages differ, these have been described and considered separately.

Where environmental protection and impact mitigation measures are proposed, they would be applied to both the staging options and the motorway upgrade. Where necessary, mitigations specific to the initial stage and potential additional stages have also been developed.

4.2 Details of project design elements

4.2.1 Road grade and lane widths

The project would be constructed in accordance with the RTA's Pacific Highway Design Guidelines (RTA 2006) and Road Design Guidelines (RTA 2000). A typical cross-section for a Class M upgrade is shown in Figure 4-6. The typical lane width would be 3.5 metres. The left-hand side shoulder of each carriageway (in the direction of travel) would be 2.5 metres wide, and the right-hand side shoulder 0.5 metres wide. This applies to both the full motorway upgrade and the initial staging.

The median would generally be 12 metres wide. The cross-section, including cross-fall, batter slopes, and drainage channels, would be in accordance with the RTA's Pacific Highway Design Guidelines (RTA 2006). Longitudinal grades of the alignment would be generally less than the desirable maximum of 4.5 per cent.

The motorway upgrade would be designed to operate at a posted speed limit of 110 kilometres per hour. The posted speed limit for the initial staging is likely to be 100 kilometres per hour.

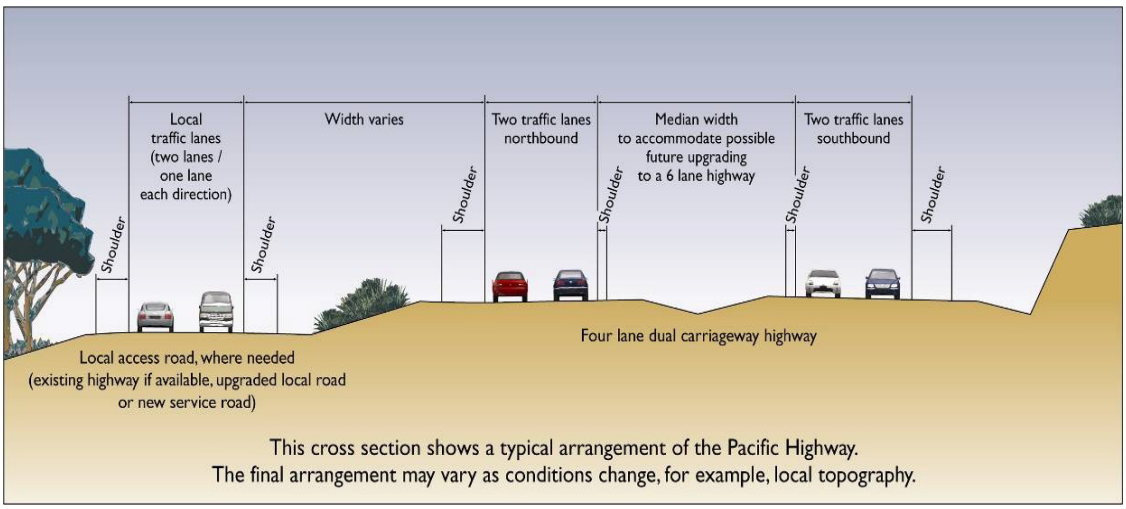

Figure 4-6 Typical cross-section for a motorway upgrade

4.2.2 Corridor width and project footprint

The definition of the project corridor (or boundary) encompasses the existing highway, the motorway upgrade, the initial staging and the potential additional staging configurations. This represents the maximum land acquisition requirements for the project. The corridor width varies along its length and includes:

- The carriageways and road reserves of both the existing highway and the upgrade.
- Boundary fencing and associated maintenance access tracks.
- The area between the existing highway and the upgrade.
- Areas for construction facilities, drainage infrastructure and erosion and sedimentation controls.

While the total project corridor (road reserve) is up to 250 metres wide in some places, the project footprint (area of direct impact or disturbance) is much less than this. The project corridor width varies between about 40 metres and 250 metres (inclusive of both the northbound and southbound carriageways), depending on the location of sedimentation basins and the cut and fill heights.

The maximum width reflects the motorway upgrade, with adjacent carriageways separated by a 12-metre median, where sedimentation basins are located on either side of the alignment. The total clearing to be carried out for the motorway upgrade is about 54 hectares, 46 hectares of which would be completed as part of the initial staging.

For the motorway upgrade and both of the staging options, part of the area between the existing highway and the proposed new roadway section would be used for temporary construction facilities and sediment basins as required. Additional sites may be required for efficiency of construction and materials management.

For the initial staging, an alternative location for these facilities would be within the future motorway footprint for the southbound carriageway or the adjacent alignment for the

northbound carriageway, where this is not yet required for construction. This would minimise the need for any additional vegetation clearing.

Where these areas are used for ancillary purposes, endangered ecological community (EEC) areas would be avoided. The proposed indicative locations of temporary construction facilities are shown in Figure 4-9(a–c) and Figure 4-10(a–c). Sedimentation basins are shown in Figure 4-4(a–c) and Figure 4-5(a–c). Further details of these facilities are provided in Section 4.4.

4.2.3 Local access

The existing highway currently intersects with six low-traffic roads over the length of the study area providing access to Bundjalung National Park and Devils Pulpit State Forest. There are also three private driveways with direct access to the highway within the study area. Each of the roads and private accesses in the study area are unsealed. Each meets the highway at a T-intersection allowing unrestricted traffic movements.

The motorway upgrade has no provision for direct access onto either the northbound or southbound carriageway. Access to the motorway would be provided via a constructed service road or by the existing Pacific Highway, which would be retained as a service road.

Access to the motorway upgrade from service roads would be via a grade-separated interchange. Locations of interchanges would be subject to the requirements of the Iluka Road to Woodburn upgrade program. The final location of grade-separated interchanges would be outside the current project area and therefore these not within the scope of the current assessment.

For the initial staging of the project, all upgraded accesses would be designed with a short deceleration lane and a departure taper for acceleration lanes, which are both supplemented by a continuous 2.5-metre shoulder.

Table 4-3 describes intersection arrangements for all existing roads and accesses under the initial and potential additional staging, as well as the final motorway upgrade. Arrangements are also illustrated in Figure 4-7(a–c) and Figure 4-8.

Table 4-3 Project arrangements for existing accesses and intersections

Existing access	Side of road	Existing access name/type	Layout under initial staging	Layout under full motorway upgrade
Ch 66850	East	Mororo Road (access to Khans Road via Mororo Road)	Relocate intersection to Ch 66700. Modify to provide access to property owner and Devils Pulpit State Forest. Left in/out movements onto southbound carriageway only. Southbound to northbound U-turn possible at Ch 66300. Northbound to southbound U-turn possible at Ch 68500.	Retain new location at Ch 66700. Remove connection to highway and connect to new service road. Connection from service road back to highway possible immediately south of the project limit at Ch 66000.
Ch 67200	West	Pine Road	Retain current location. Left in/out movements onto northbound carriageway only. Southbound to northbound U-turn possible at Ch 66300. Northbound to southbound U-turn possible at Ch 68500.	Retain current location. Modify connection to existing highway (which becomes service road) to allow all movements. Connection from service road back to highway possible immediately beyond project limits at Ch 66000 and Ch 71000.
Ch 69350	East	Mervs Road	Retain current location to service land between existing highway and new highway. No through connection to main section of Mervs Road. Right in/right out movements onto one-way service road (existing highway). Southbound to northbound U-turn possible at Ch 66300. Northbound to southbound U-turn possible at Serendipity Road.	Retain current location. Modify connection to service road (which becomes two-way service road) to allow all movements. Connection from service road back to highway possible immediately beyond project limits at Ch 66000.
Ch 70150	East	Big Marsh Road	Relocate intersection to Ch 70000 (to point where Big Marsh Road alignment intersects with new southbound carriageway). Left in/out movements onto southbound carriageway only. Southbound to northbound U-turn possible at Ch 68500. Northbound to southbound U-turn possible at Serendipity Road.	Retain new location at Ch 70000. Remove connection to existing highway and connect to new two-way service road. Connection to highway possible immediately beyond project limits at Ch 66000 and Ch 72400.
Ch 70150	West	Thompsons Road	Retain current location. Left in/out movements onto southbound carriageway only. Southbound to northbound U-turn possible at Ch 68500. Northbound to southbound U-turn possible at Serendipity Road.	Retain current location. Modify connection to existing highway (which becomes a two-way service road) to allow all movements. Connection from service road back to highway possible immediately beyond project limits at Ch 66000 and Ch 71000.