



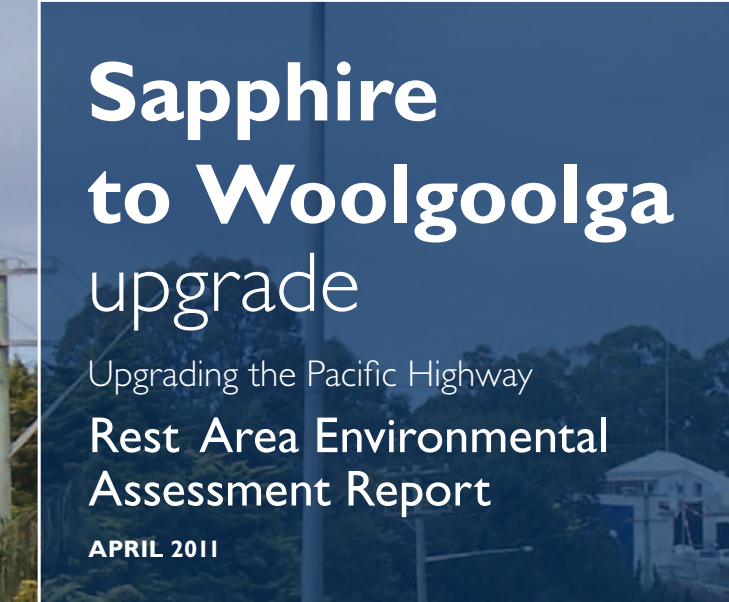
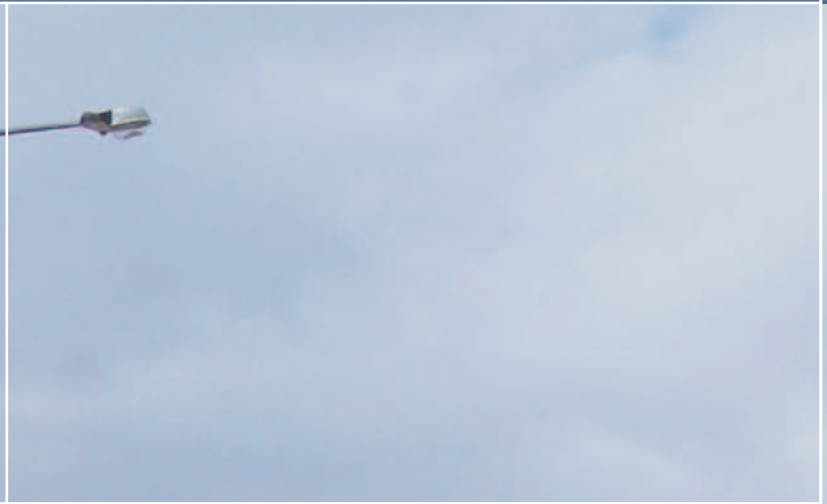
Transport
Roads & Traffic
Authority

Sapphire to Woolgoolga upgrade

Upgrading the Pacific Highway

Rest Area Environmental Assessment Report

APRIL 2011



Modification environmental assessment: Arrawarra rest area

Sapphire to Woolgoolga Pacific Highway Upgrade

NSW Roads and Traffic Authority

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Appendix A

Aboriginal cultural heritage assessment

1. Introduction

1.1 Background

Currently 332 kilometres of a total of 664 kilometres of the Pacific Highway between Hexham and the Queensland border are now double lane divided road. A further 72.5 kilometres is under construction. About another 130 kilometres are being prepared for construction with environmental assessments.

The Pacific Highway is part of the National Land Transport Network. Up until June 2009, the New South Wales (NSW) Government has spent \$2.45 billion and the Australian Government \$1.45 billion towards the upgrade of the Pacific Highway.

A further \$3.6 billion is being provided by both governments to continue the upgrade of the Pacific Highway over the next five years to mid 2014.

The Roads and Traffic Authority of NSW (RTA) is upgrading the Pacific Highway from approximately eight kilometres north of Coffs Harbour at Sapphire, extending for approximately 25 kilometres to the vicinity of Arrawarra Beach Road, north of Woolgoolga (the proposal). The proposal has a southern "upgrade" section from Sapphire to south Woolgoolga and a northern "bypass" section around Woolgoolga.

The RTA has prepared several documents as part of the process for seeking planning approval of the proposal under Part 3A of the *Environmental Planning and Assessment (EP&A) Act 1979*. Key recent documents prepared as part of this process include:

- Coffs Harbour Highway Planning Sapphire to Woolgoolga section Project Application Report, October 2006 (the project application report).
- Coffs Harbour Highway Planning Sapphire to Woolgoolga section Environmental Assessment, Volumes 1- 3, November 2007 (the environmental assessment).
- Coffs Harbour Highway Planning Sapphire to Woolgoolga section Environmental Assessment submissions report, July 2008 (the submissions report).

The proposal is described in detail in Chapter 7 of the environmental assessment which was displayed for community comment between 29 November 2007 and 15 February 2008. The proposal included a rest area at the Arrawarra interchange (refer to section 7.5.11 of the environmental assessment). As a result of issues raised in submissions, some minor refinements were made to the proposed rest area design (refer to Chapter 4 of the submissions report).

Issues raised in submissions to the environmental assessment relating to the proposed Arrawarra rest area by the community and government agencies are identified in section 2.2.12 of the submissions report. Predominantly, the issues raised relate to ecological impacts (fauna movement, removal of hollow bearing trees, impacts to vegetation communities etc) and suggested alternative locations for the rest area.

Based on the number of submissions received and issues raised, the RTA recognised the need for further consideration into the location of a rest area. The RTA therefore decided to remove the proposed rest area at Arrawarra interchange from the project approval process. The RTA advised the Department of Planning of this decision on 29 October 2008.

The Minister for Planning approved the project (excluding the provision of a rest area at Arrawarra) subject to 56 conditions on 13 January 2009.

In October 2009, the RTA published a Rest Area Assessment Report which comparatively assessed two short-listed locations for the rest area, Arrawarra and south Woolgoolga. This report was placed on public display for community comment. All submissions received were considered and addressed in the Rest Area submissions report (May 2010).

Based on consideration of the Rest Area Assessment Report, the submissions received from display of the report and consultation with government agencies, the Arrawarra site was selected as the preferred location for the rest area within the Sapphire to Woolgoolga Pacific Highway upgrade project.

The Arrawarra interchange was selected as the preferred location for the rest area as, compared to the south Woolgoolga option, it would:

- Have less noise and other amenity impacts.
- Have less impact on existing agricultural properties.
- Have less impact on properties proposed to be re-zoned for industrial purposes.
- Be less expensive to build.

While Arrawarra has been selected as the preferred location for the rest area, the RTA acknowledges that the site would result in greater ecological impacts than the south Woolgoolga site.

The concept design for the Arrawarra rest area has been further refined to reduce these potential ecological impacts. To avoid potential impacts on native vegetation in the state forest north of Arrawarra Beach Road, the possible future highway service centre has been relocated to within the rest area site south of the road (refer Figure 1.1).

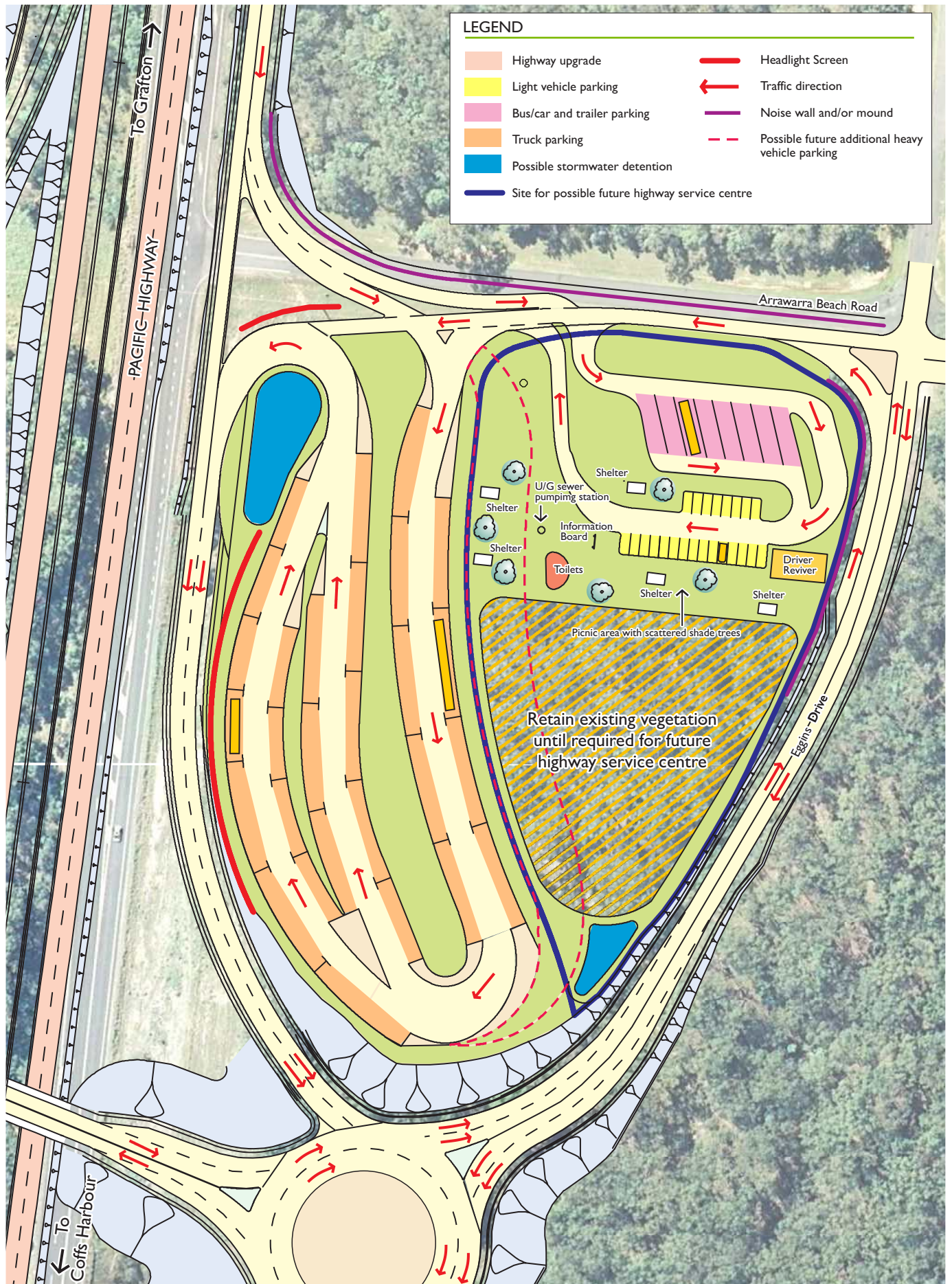
By moving the future highway service centre south of Arrawarra Beach Road, it also moves it away from the nearest residences. The proposed relocation would reduce the potential noise, visual impacts and other amenity impacts of the facility on these residences.

1.2 Purpose of this report

This modification environmental assessment provides an overview of the process leading to the selection of the Arrawarra location and the preferred layout for the proposed rest area, an assessment of the potential impacts of the rest area and the measures proposed to mitigate these potential impacts.

The report builds upon work already undertaken in the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment, the environmental assessment submissions report, the rest area assessment report and the rest area submissions report.

This environmental assessment seeks planning approval for the proposed Arrawarra rest area as a modification to the Sapphire to Woolgoolga Pacific Highway upgrade project approved by the Minister for Planning on 13 January 2009.



SCALE
0 20 50m

Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 1.1: Proposed layout of Arrawarra service centre

2. Project need

2.1 Need for a rest area

Rest areas form part of the RTA's fatigue management regime, enabling long distance drivers to increase the frequency, duration and quality of rest breaks. They improve the driving experience on NSW roads and may support local tourism.

Heavy vehicle rest areas also provide places for heavy vehicle drivers to stop so that they may observe statutory regulations for driving and rest breaks to counter the effects of fatigue, as well as to check their loads and fill in log books. There has been a consistent growth in use of the Pacific Highway by heavy vehicles, especially since the opening in August 2002 of the Yelgun to Chinderah Freeway and the declaration of the full length of the Pacific Highway as a route for B-Double vehicles in excess of 19 metres long. The role of the Pacific Highway as an interstate freight route will continue and freight movements are predicted to continue to increase.

2.1.1 Existing rest areas

Between Clybucca Service Station and Halfway Creek rest area, there is a gap of approximately 140 kilometres (refer Figure 2.1). This is one of two locations along the Pacific Highway where there is a gap of more than 100 kilometres between formal rest facilities for heavy vehicles. There are currently no formal truck rest areas along the existing highway between Sapphire and Woolgoolga. A rest area in the vicinity of Woolgoolga would assist in reducing the gap between rest facilities. In conjunction with the Halfway Creek rest area, there are safety concerns for the northbound traffic accessing the existing commercial operation (which requires vehicles to cross the highway).

In Woolgoolga there is a light vehicle rest area and driver reviver facility. The next closest light vehicle rest area to the Sapphire to Woolgoolga project area is at Glenugie (70 kilometres north of Coffs Harbour).

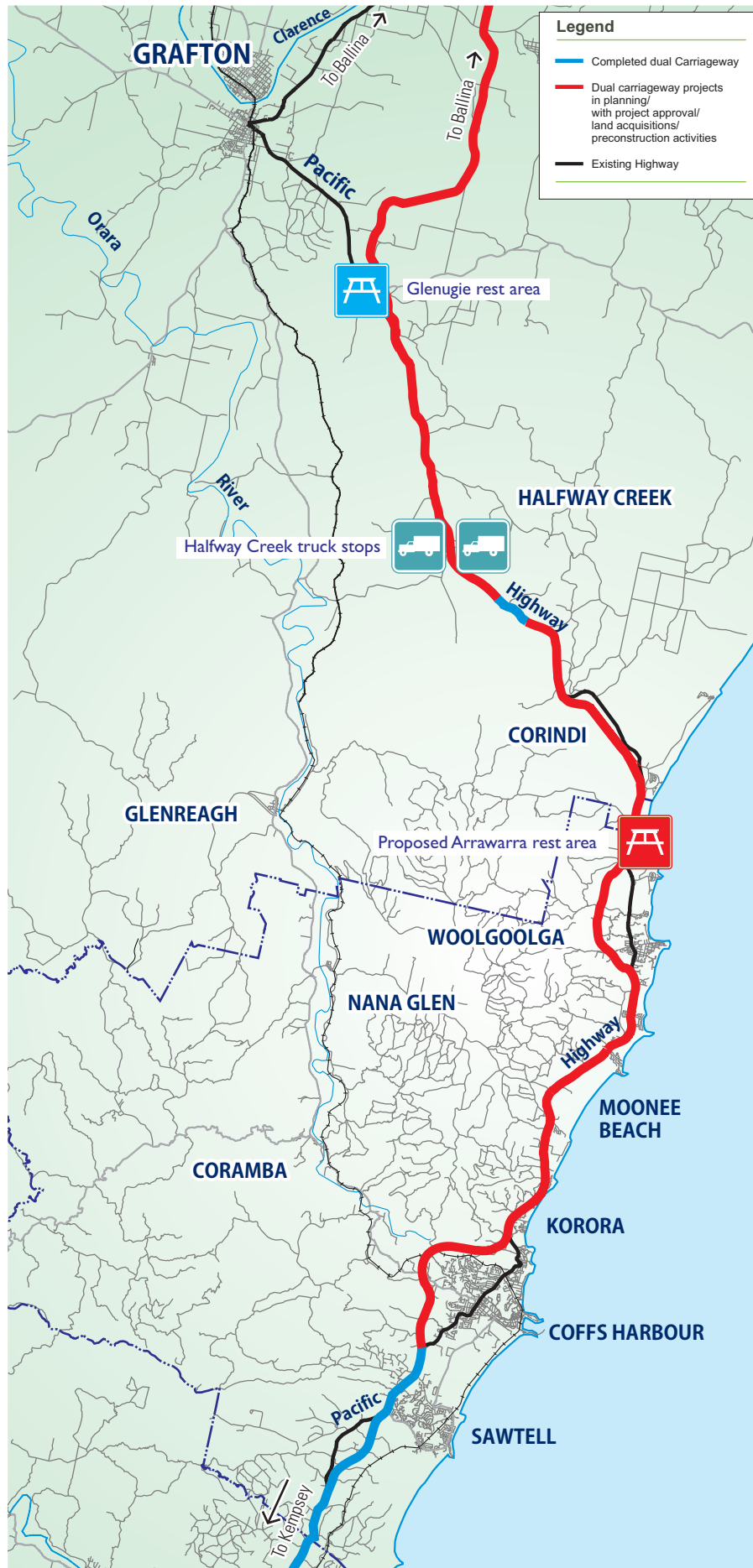
Due to the distance between existing rest areas on the highway, the *Pacific Highway Safety Review* (RTA, May 2004), confirmed the need for rest areas on the Pacific Highway and identified that additional rest areas need to be developed in the Coffs Harbour/Woolgoolga area.

2.1.2 Pacific Highway Upgrade Program

As part of the Pacific Highway Upgrade Program, the RTA is implementing a strategy to establish major rest areas at approximately 50 kilometre intervals along the upgraded highway. A rest area is proposed to be located at the future Nambucca Heads interchange as part of the upgrade of the Warrell Creek to Urunga section of the highway. As the proposed rest area at the Nambucca Heads interchange and the existing rest area at Halfway Creek are located approximately 96 kilometres apart, an additional rest area site is required in the Coffs Harbour/Woolgoolga area. The proposed rest area at Arrawarra would be constructed to specifically address the gap of rest areas on the Pacific Highway between Nambucca Heads and Halfway Creek.

In addition, the concept design for the upgrade of the highway between Woolgoolga and Wells Crossing south of Grafton significantly impacts on the existing northbound rest area at Halfway Creek. Consequently, there is uncertainty in regard to the future usage of the Halfway Creek rest area and the ongoing viability of the associated commercial operation.

While the upgraded Pacific Highway will bypass the township of Woolgoolga and the light vehicle rest area at Apex Park, the interchanges at south Woolgoolga and Arrawarra will provide safe and efficient access to the township and available rest facilities for light vehicles. With the upgrade in place, the closest existing light vehicle rest area on the highway is situated 70 kilometres north of Coffs Harbour at Glenugie.



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SCALE
0 7.5 15km

Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 2.1: Closest Pacific Highway rest areas

Within the Sapphire to Woolgoolga Pacific Highway upgrade area, suitable sites for a rest area south of Woolgoolga are not available due to topographical and ecological constraints and potential amenity impacts on existing and proposed land uses (including those identified in Coffs Harbour City Council's *"Our Living City" Settlement Strategy*, 2006). Consequently, consideration of potential sites for a rest area within the project corridor have concentrated on the northern (or Woolgoolga to Arrawarra) section of the upgrade project.

3. Legislative and planning framework

3.1 Environmental Planning and Assessment Act 1979

3.1.1 Approved project context

On 5 December 2006, the Minister for Planning under 75B(1) of the *Environmental Planning and Assessment Act 1979* ordered 13 components of the Pacific Highway upgrade, including the Sapphire to Woolgoolga upgrade, to be a project to which Part 3A of the Act applies.

The *Environmental Planning and Assessment Act 1979* also provides that any project to which Part 3A applies can be declared to be a Critical Infrastructure project if it is of a category that, in the opinion of the Minister for Planning, is essential for the State for economic, social or environmental reasons.

On 5 December 2006, the Minister for Planning also declared the same 13 components of the Pacific Highway upgrade to be essential for the State for economic and social reasons. The Sapphire to Woolgoolga upgrade was therefore deemed to be a Critical Infrastructure project under Section 75C of the Act.

The order and declaration were gazetted in the NSW Government Gazette No.175 on 8 December 2006.

The project (excluding the Arrawarra rest area) was approved by the Minister for Planning under Part 3A of the EP&A Act on 13 January 2009. Any refinements to the project which are not consistent with the approved project must be approved by the Minister for Planning under Section 75W(2) of the Act.

3.1.2 Proposed modification

The RTA considers that the rest area proposal outlined in this modification environmental assessment is not consistent with the approval for the Sapphire to Woolgoolga upgrade project. Accordingly, the RTA proposes to seek a modification of the Minister's approval under Section 75W(2) of the EP&A Act.

This modification environmental assessment to the approved project has been prepared for the purposes of seeking approval for the proposed Arrawarra rest area as a modification to the Sapphire to Woolgoolga Pacific Highway upgrade project.

3.1.3 Director General's requirements

As part of the Part 3A approvals process, the Minister for Planning issues Director General's requirements (DGRs) also known as environmental assessment requirements. The DGRs identify the key issues for the project which are to be addressed within the environmental assessment.

Additional DGRs were not issued for this modification environmental assessment, and as such, the RTA has adopted the DGRs from the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment (refer to Appendix A) as the key issues for this modification environmental assessment. Table 3.1 below identifies where the relevant DGRs have been addressed in this modification environmental assessment.

Table 3.1 Relevant Director General's Requirements and where they are addressed in the modification environmental assessment

Key Issues	Section of the modification EA
Traffic and access Identification of traffic impacts (construction), changes to regional and local road network and access management, changes in usage characteristics, safety and performance. Identification of provisions relating to truck movements, freight efficiency, pedestrians, cyclists and public transport services.	Section 6.2 Section 7.2
Noise and vibration Assessment of construction and operational noise and vibration impacts including a description of the existing environment, identification of noise objectives and methodologies, and a description of project impacts and affected receivers including all sensitive receptors based on appropriate assessment methodologies. Details of the mitigation measures to minimise and manage any noise impacts.	Section 7.3
Planning and land use Identification of the potential impacts on existing and future planning, land use and development strategies, including: - Property acquisition, changes to access and land configuration, including forestry and agricultural land uses. - Existing and known future residential development and access to surrounding communities.	Section 7.5
Heritage Identify and assess the significance of indigenous and non-indigenous heritage and natural areas impacted directly or indirectly, including potential archaeological deposits. Affected items are to be identified by field survey. Assess potential impacts on identified items and natural areas of heritage significance, and where necessary include a Statement of Heritage Impact Assessment. Particular attention should be given to the Aboriginal heritage sites at the Coffs Harbour Gun Club and the Arrawarra Creek/Embankment Road site. Demonstrate that effective Aboriginal community consultation has been undertaken in determining and assessing impacts, developing options and making final recommendations.	Section 7.4

Economic and social impacts Assess the economic and social impacts on local and regional communities. In particular, consideration is to be given to the: - Potential social and economic impacts on the Woolgoolga community, including the local Sikh community; and - Potential impacts on the viability, production and management of agribusinesses due to fragmentation, loss of agricultural land and any potential edge effects of the highway.	Section 7.6
Biodiversity Identification of biodiversity impacts and ecological performance, including direct and indirect impacts on habitat and flora and fauna (including threatened and protected species, populations and Endangered Ecological Communities, and aquatic/riparian habitats); cumulative impacts on regional communities, identification and protection of key habitats and corridors, and riparian zone impacts.	Section 7.7
Soil and water Identification of impacts on surface water, flows and quantity, with particular reference to any likely direct or indirect impacts on surrounding water bodies, wetlands and their habitats including the potential indirect impacts on the Solitary Islands Marine Park by works in proximity to Cunningham and Double Crossing Creeks. Identification of flood prone areas along the project corridor, with an assessment of the potential changes to flooding behaviour, such as flood duration, inundation periods and afflux.	Section 7.8
Urban design and landscaping Describe the visual significance of the affected landscape. Identification of sources of visual impacts (including bridges, embankments, interchanges and alterations to natural landscape features and their visual impact on affected landscapes. Provide a clear description on how the potential visual impacts would be addressed and/or minimised, such as through road design, particularly in areas along the Woolgoolga bypass route.	Section 7.9

3.2 Other environmental legislation

Other environmental legislation which would be relevant to this project has been reviewed. The review confirmed that there are no additional requirements over and above those already identified in the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment.

4. Consultation

4.1 Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment consultation

The environmental assessment for the Sapphire to Woolgoolga upgrade was placed on public exhibition between Thursday 29 November 2007 and Friday 15 February 2008. Submissions were invited from anyone with an interest in the upgrade and submissions were received until 15 February 2008.

Ninety three submissions were received in response to the exhibition of the environmental assessment and these were provided to the RTA by the Department of Planning. A submissions report was prepared by the RTA that provided responses to the issues raised in the submissions. The submissions report was made publicly available via the RTA website from July 2008. Section 2.2.12 of the submissions report discusses issues raised that relate to the rest area proposed at Arrawarra and a possible future highway service centre.

As identified in Section 1.1 above, a number of submissions to the environmental assessment related to the proposed rest area at Arrawarra. Based on the number of submissions received and issues raised, the RTA recognised the need for further consideration into the location of a rest area. The RTA therefore decided to remove the proposed rest area at Arrawarra interchange from the project approval process and advised the Department of Planning of this decision on 29 October 2008.

The removal of the rest area proposal has enabled the RTA to conduct further investigations to identify the preferred location for a rest area (including the potential for expansion to a future service centre) along the length of the project.

4.2 Rest area assessment report consultation

The rest area assessment report was placed on public exhibition from the 28 September to 30 October 2009. Approximately 4,000 community updates were issued to the public during this time. By the end of the submissions period, 62 submissions were received from the public.

Meetings were held with regional representatives of the Department of Planning (DoP), Department of Environment, Climate Change and Water (DECCW) and Coffs Harbour City Council (CHCC) on 30 April 2008 and with DoP and DECCW representatives on 23 July 2008 to specifically discuss issues regarding the rest area at the Arrawarra interchange proposed in the environmental assessment and the potential impacts of locating the rest area at the south Woolgoolga interchange. At the meeting on 23 July 2008, it was agreed that the RTA would prepare a comparative assessment of the benefits and disadvantages of both rest areas and possible future highway service centres at the Arrawarra and south Woolgoolga interchanges.

On 5 February 2010 (following the public display of the rest area assessment report) a rest area workshop was held with senior regional representatives of DoP, DECCW and CHCC. Workshop attendees discussed the results of the assessment of the rest area options in the rest area assessment report and the submissions received from the public display of the report. The consensus conclusion of the agency and council representatives at the workshop was that;

- There was no significant impediment to the development of a rest area/future highway service centre facility as proposed at either the south Woolgoolga or Arrawarra interchange.
- On balance, based on non-cost considerations, south Woolgoolga was the preferred location for a rest area/highway service centre facility.
- The additional cost of the south Woolgoolga option was a factor to be considered in the selection of the location for the rest area.

Community submissions and government agency comments were reviewed and a rest area assessment submissions report was produced, outlining the issues raised and RTA's responses. The rest area assessment submissions report was released on 5 May 2010.

5. Rest area option development

5.1 Initial rest area selection process

Following a meeting with DoP and DECCW representatives on 23 July 2008, potential locations for a rest area (and potential expansion of that rest area to include a future highway service centre) were identified and a comparative assessment of those locations undertaken. Key factors considered when initially identifying an appropriate location for the rest area included:

- Proximity to a grade-separated interchange to provide efficient access to the rest area for northbound and southbound vehicles on the highway via the proposed interchange infrastructure.
- Land use considerations (especially proximity to residential areas).
- Level of ecological impact.
- Criteria and objectives outlined in Section 117 Ministerial Direction No. 5.4 (Commercial and Retail Development along the Pacific Highway, North Coast).
- A minimum land area of approximately 3 hectares.
- Capacity for 15 B-Doubles, 9 Stock Truck type vehicles, 6 car + trailer and 20 cars.
- Opportunities for potential expansion of the rest area to include a future highway service centre.

Suitable sites for a rest area within the highway corridor south of Woolgoolga in the Coffs Harbour/Woolgoolga area are not available due to topographical and ecological constraints and due to potential amenity impacts on existing and proposed land uses, (including those identified in Coffs Harbour City Council's *Our Living City Settlement Strategy*). Consequently, consideration of potential sites for a rest area within the project corridor have concentrated on the northern (or Woolgoolga to Arrawarra) section of the Sapphire to Woolgoolga upgrade project.

The review of the proposal design identified three potentially suitable locations for positioning the rest area and potential future service centre. These locations are at:

- Arrawarra Interchange.
- An area on the Woolgoolga bypass section, north of Bark Hut Road.
- South Woolgoolga Interchange.

The initial rest area selection process saw the development of three potential options at the Arrawarra interchange location (A1, A2 and A3), one option to the north of Bark Hut Road (B1) and three options at the south Woolgoolga interchange location (C1, C2 and C3). These options are described in the Rest Area Assessment Report (October 2009).

A rest area at either the south Woolgoolga or Arrawarra interchange was preferred to one on the Woolgoolga bypass as the rest area would be able to be accessed from the highway via the proposed interchange and from the local access road network. In addition, a rest area on the bypass would require separate facilities for northbound and southbound traffic, which due to the relatively low traffic volumes on this section of the highway would be unlikely to provide viable opportunities for a possible future co-located highway service centre.

5.2 Comparative assessment of long list options

In order to assess the advantages and disadvantages of the "long list" of rest area options, a qualitative triple bottom line approach was implemented. The analysis included consideration of:

- Functional performance (including cost).
- Biophysical performance.
- Socio-economic performance.

The comparative assessment process was undertaken to qualitatively identify the advantages and disadvantages relating to the triple bottom line factors identified above for each of the rest area options. The comparative assessment found that:

- Overall, Option A3 was identified as the best performing of the Arrawarra rest area options.
- Option B1 north of Bark Hut Road should not be included in the short listed rest area options.
- Overall, Option C3 was identified as the best performing of the south Woolgoolga rest area options.

Further details regarding the comparative assessment is detailed in the rest area assessment report (Chapter 4).

5.3 Short listed rest area options

Option A3 (Arrawarra option) and Option C3 (south Woolgoolga option) were the two rest area configurations identified as providing the best comparative performance based on the criteria considered.

Option A3 and Option C3 were short listed for further comparative assessment and as such, a rest area assessment report was produced. This report outlined the potential impacts that could occur as a result of development at these two sites and identified proposed measures to mitigate these potential impacts. It also assessed the potential impacts of a potential future highway service centre being erected at the site.

5.4 Selection of the preferred location for the rest area

Based on consideration of the rest area assessment report, the submissions received from display of the report and consultation with government agencies, the Arrawarra site has been selected as the preferred location for the rest area within the Sapphire to Woolgoolga upgrade of the Pacific Highway.

The Arrawarra interchange was selected as the preferred location for the rest area as, compared to the south Woolgoolga option, it would:

- Have less noise and other amenity impacts.
- Have less impact on existing agricultural properties.
- Have less impact on properties proposed to be re-zoned for industrial purposes.
- Be less expensive to build.

While Arrawarra has been selected as the preferred location for the rest area, the RTA acknowledged that a rest area at Arrawarra would have a greater impact on non Endangered Ecological Community (EEC) vegetation than a rest area at south Woolgoolga.

5.5 Refinement of the concept design for the Arrawarra rest area and future highway service centre

Opportunities to further refine the concept design for a rest area and potential highway service centre at Arrawarra have been investigated. These investigations have concentrated on opportunities to:

- Minimise potential impacts of a future highway service centre on the EEC vegetation north of Arrawarra Beach Road.
- Provide enhanced outcomes for stormwater flows and quality from the rest area site.
- Rationalise arrangements for access into the rest area.

The site for the rest area south of Arrawarra Beach Road has a total area of approximately 3.0 hectares which is similar to the site areas for a number of existing highway service centres.

Based on these comparisons, investigations were undertaken into the opportunity to accommodate a future highway service centre within the rest area site south of Arrawarra Beach Road. These

investigations demonstrated that a rest area and future highway service centre could be accommodated within the rest area site. However, the site was assessed as only a rest area in both the environmental assessment for the Sapphire to Woolgoolga upgrade project and the rest area assessment report. Any future initiative to develop a portion of the site as a highway service centre would require a separate approval at that time.

Relocation of the highway service centre to within the rest area site south of Arrawarra Beach Road would significantly reduce the ecological impact of a future highway service centre at Arrawarra by eliminating the potential impact on 1.41 hectares of EECs north of Arrawarra Beach Road identified in the rest area assessment report.

The modified layout includes approximately 710m² for stormwater detention basins and stormwater quality control ponds.

The modified layout also has the potential to retain more of the existing vegetation within the rest area site than the layout assessed in both the environmental assessment for the upgrade project and the rest area assessment report.

By moving the future highway service centre away from the nearest residences, the proposed relocation would potentially reduce the concerns of residents in regard to the noise and visual impacts of the facility.

While the rest area site has been designed to spatially cater for a future highway service centre, no highway service centre is currently proposed for the site. This modification environmental assessment is seeking approval for a rest area only.

6. Description of the proposed modification

6.1 The approved project

The Sapphire to Woolgoolga Pacific Highway upgrade project consists of upgrading around 25 kilometres of Pacific Highway, beginning eight kilometres north of Coffs Harbour at Sapphire and extending to Arrawarra Beach Road. The project has a southern “upgrade” section from Sapphire to south Woolgoolga and a northern “bypass” section around Woolgoolga and is described in detail in Chapter 7 of the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment.

Based on the number of submissions received and the issues raised following the display of the environmental assessment for the upgrade, the RTA recognised the need for further consideration into the location of a rest area. The RTA therefore decided to remove the proposed rest area at Arrawarra interchange from the project approval process. The RTA advised the Department of Planning of this decision on 29 October, 2008. The project (excluding the provision of a rest area at Arrawarra) was approved by the Minister for Planning under Part 3A of the EP&A Act on 13 January 2009.

6.2 The proposed modification

6.2.1 Refined concept design for Arrawarra rest area

The refined concept design for a rest area at Arrawarra is shown in Figure 1.1. The rest area design facilitates the possible future development of the site as a highway service centre.

The concept design provides separate parking areas for trucks, stock and refrigerated trucks, light vehicles and buses/cars with trailers, including:

- Front to rear parking in the truck parking area capable of providing 20 x 30 metres long B-double or 30 x 20 metres long semi-trailer parking bays or a combination of both.
- Front to rear parking in the stock and refrigerated truck parking area capable of providing 8 x 20 metres long semi-trailer parking bays.
- 8 x bus/car and trailer parking bays.
- 23 x light vehicle parking bays.
- Provision for additional front to rear parking in the truck parking area capable of providing 8 x 30 metres long B-double or 12 x 20 metres long semi-trailer parking bays or a combination of both.
- 1 four cubicle unisex toilet block connected to Coffs Harbour City Council's reticulated sewerage system via an underground pumping station and sewer rising main.
- Information sign suitable for the display of a map of Woolgoolga and the northern beaches area and available facilities.
- Provision for a 24 hour driver reviver facility, including a rectangular trafficable concrete slab hard stand area with minimum dimensions of 15 metres by 8 metres.
- Picnic area with picnic shelters and scattered shade trees.
- Areas for stormwater detention/quality control basins.
- Approximately 0.5 hectares of retained vegetation. However, both the possible future additional truck parking and the possible future development of a highway service centre would require the clearing of some or all of this retained vegetation.

The rest area facilities would be available for use by motorists, users of public transport, cyclists, pedestrians and the local community.

6.2.2 Rest area layout

As identified in section 6.1 above, the layout of the proposed rest area at Arrawarra caters for both light and heavy vehicles. There are two entry points for the rest area, one from the southbound off ramp for the Arrawarra interchange and the other from the local access road which provides access

for northbound highway traffic and traffic using the local access road network. Within the rest area, light and heavy vehicles are separated into different areas with separate internal loop roads and parking facilities. All traffic would leave the rest area via the southbound off ramp and the large five legged roundabout on the eastern side of the highway overbridge.

The different internal loops for heavy and light vehicles are separated by landscaped areas or grassed picnic and amenities areas. The proposed layout of the Arrawarra rest area is illustrated in Figure 1.1.

6.2.3 Key features of the design

Key features of the proposed rest area at Arrawarra are discussed in the sections below.

Constructability

The rest area would be constructed in conjunction with the Sapphire to Woolgoolga Pacific Highway upgrade.

Earthworks

Table 6.1 below identifies the estimated earthworks volumes required for the rest area. Most of the fill required is for the proposed noise mounds on the eastern side of the site. The earthworks volumes shown have been derived from the concept design for the highway upgrade. As the design of the rest area would be subject to refinement during detailed design, the actual earthworks may differ to those shown below.

Table 6.1 Option A3 earthworks volumes

Earthworks element	Cut Volume	Fill Volume
Rest area earthworks platform	Approx. 4,000 m ³	33,000 m ³

Cost estimate

At \$4.48 million (in 2008/09 dollars) the estimated cost of the refined rest area is very similar to the estimated cost of the Arrawarra option assessed in the rest area assessment report (Option A3). The estimate was developed from the concept estimate for the Sapphire to Woolgoolga upgrade project and assumes that the rest area would be constructed in conjunction with the Sapphire to Woolgoolga upgrade project.

Table 6.2 Option A3 concept design cost estimate

Description	Amount (\$M) (\$2008/09)
Investigation and design	\$0.14
Property acquisition for rest area and possible future service centre (state forest)	\$0.06
Construction of rest area	\$4.00
Project management and site supervision	\$0.28
Total	\$4.48 M

6.2.4 Proposed noise management measures

To reduce the potential for noise impacts (particularly from heavy vehicle truck movements at night) on surrounding residents, noise walls/mounds are proposed along the northern and eastern sides of the rest area (refer Figure 1.1).

6.2.5 Proposed urban design and landscape measures

The landscaping strategy for the Arrawarra rest area is depicted in Figures 6.1 and 6.2. An artist's impression of the Arrawarra rest area and the upgraded highway is depicted in Figure 6.3. While the refined layout is slightly different from that depicted in the figures, the landscape strategy would still be applicable to the rest area.

As the rest area would be visibly different to the timbered areas which comprise most of the surrounding land, vegetation screening would be used to reduce the visual impacts of the rest area. Strategic planting of the rest area perimeter and locations within the rest area would be undertaken with suitable woodland plant species where possible to screen the rest area from the highway, local access roads and nearby residents. Where possible, the existing mature plantings within the state forest would be protected and retained.



- ① Proposed Rest Area, to include landscaping between all parking and hardstand areas. Facilities to be sympathetic to natural surroundings.
- ② Mature forest to be protected and retained.
- ③ Noise wall/mound with screen seeding and planting on both sides
- ④ Headlight screen with screen planting on both sides.
- ⑤ Possible stormwater detention basin - basins designed to allow for natural wetland plant revegetation.
- ⑥ Raised roundabout, surrounds to be planted with forest shrub species, with native sedges to the centre of roundabout. All planting to allow for sight lines.
- ⑦ Proposed overbridge to Pacific Highway. Design to be consistent with all urban design elements along route. Clean lines and transparency reduce impact in the landscape context.
- ⑧ Forest tree and shrub planting to mitigate views to the proposed roundabout.

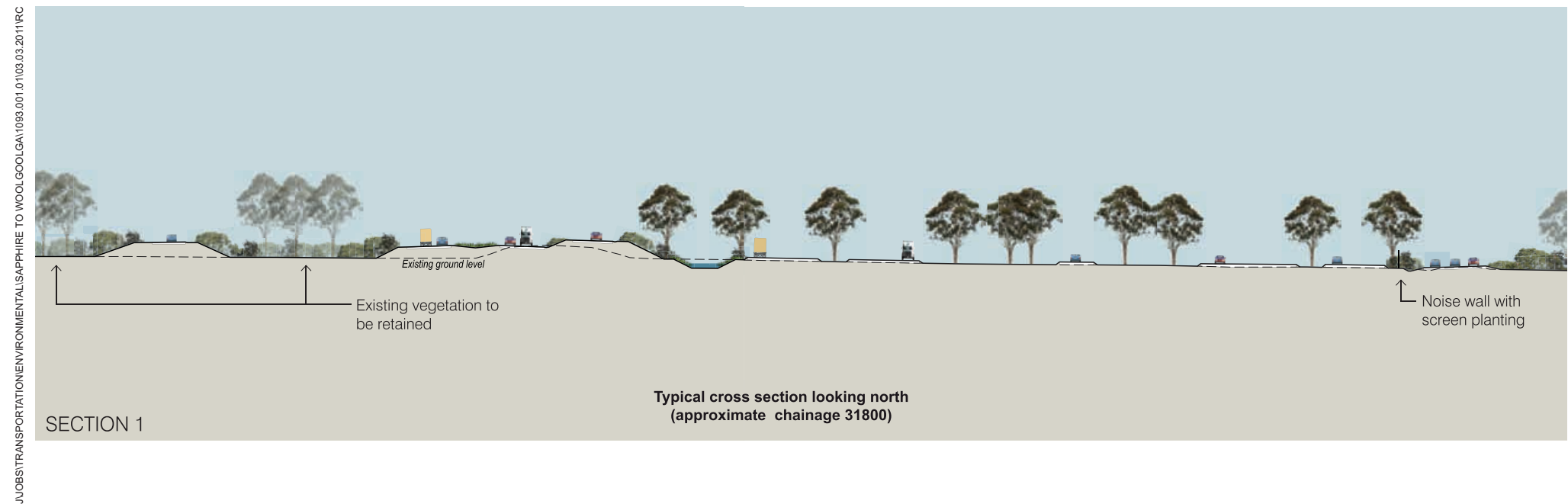
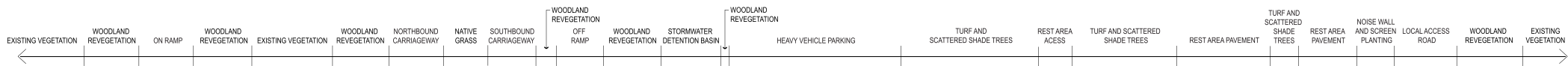
LEGEND	
	Woodland Understorey shrub and grass planting
	Woodland Tree Planting
	Native Grass Planting
	Turf with Scattered Trees



APPROX. SCALE
0 50 100m

Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 6.1: Arrawarra rest area landscape strategy





Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 6.3: Artist impression of Arrawarra rest area - looking south

7. Environmental assessment

7.1 Context and scope of modification environmental assessment

The Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment details the potential environmental impacts of the project and provides proposed mitigation and management measures. The submissions report includes a revised statement of commitments to address issues raised in submissions to manage the potential environmental impacts of the project.

Mitigation and management measures for the approved project are also outlined in the Conditions of Approval. Should any further mitigation and management measures be identified in this modification environmental assessment, the Conditions of Approval would be amended and would apply to both the previously approved project (if applicable) and the proposed Arrawarra rest area.

As this modification environmental assessment focuses specifically on the Arrawarra rest area, only the potential environmental impacts associated with the rest area are assessed. Additional mitigation and management measures (to those identified for the approved project) are identified where required and feasible.

The scope of the modification environmental assessment is to assess the potential environmental impacts that would result from the construction and operation of the Arrawarra rest area and to identify proposed measures to mitigate these potential impacts. In assessing the potential impacts, the issues identified in the Director General's Requirements (as mentioned in section 3.1.2 of this report) are the key issues in this environmental assessment. The modification environmental assessment builds on the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment and submissions report and the rest area assessment report and submissions report.

The following sections of this modification address the key issues for the rest area, assessing both construction and operational impacts.

7.2 Traffic and transport

This section addresses the traffic and transport impacts for the introduction of a rest area. Traffic and transport impacts for the whole of the approved project were addressed in Chapter 10 of the environmental assessment and a traffic and transport assessment report was included in Appendix F (Working Paper 1). A specialist traffic assessment report for the rest area site was undertaken as part of the rest area assessment report (Appendix A).

7.2.1 Existing situation

Existing road network

The Pacific Highway section between Sapphire and Arrawarra Beach Road is currently a two-lane, two-way rural road with a number of overtaking lanes. The highway caters for local traffic from the developments situated along the coastal area as well as through traffic travelling between Coffs Harbour and Grafton and vice versa and more generally between Sydney and Brisbane. Except for sections at Moonee Beach and Woolgoolga, the highway has a posted speed limit of 100 km/hr. At Moonee Beach and north and south of the Woolgoolga township the highway is signposted at 80 km/hr. A 60 km/hr speed limit applies through Woolgoolga with a 40 km/hr speed limit in the Woolgoolga town area during school opening and closing periods.

Sapphire to Woolgoolga Pacific Highway upgrade

The Sapphire to Woolgoolga Pacific Highway upgrade project would result in the highway being upgraded to a four lane dual carriageway highway with a separate local access road. Predicted traffic volumes for the highway in the vicinity of the rest area have been identified in the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment for both 2011 and 2031 and were

based on 2006 traffic counts combined with the growth in through traffic and trip generation associated with proposed future land use developments.

Existing rest area facilities

There are four rest areas currently on the Pacific Highway between Coffs Harbour and Grafton:

- Fifty kilometres north of Coffs Harbour at Halfway Creek for both northbound and southbound traffic (heavy vehicle and light vehicle rest area).
- Apex Park Woolgoolga (light vehicle rest area and driver reviver facility during peak holiday periods).
- Seventy kilometres north of Coffs Harbour at Glenugie (northbound and southbound rest areas).

Existing town facilities (such as toilets, service stations etc) are also available adjacent to the Pacific Highway at Coffs Harbour and Woolgoolga.

Midblock traffic volumes

The closest midblock traffic volumes to the rest area location (measured along the Pacific Highway in 2006) were north of Mullaway Drive. The annual average daily traffic (AADT) volumes were measured at 10,773 vehicles/day.

Intersection performance

The existing intersection of the Pacific Highway and Arrawarra Beach Road was assessed as being acceptable, with Level of Service (LoS) of B for both AM and PM peak periods in 2006.

7.2.2 Traffic methodology

Potential traffic impacts from the Arrawarra rest area are assessed at 2011 and 2031 traffic volumes. These timeframes were selected for consistency with the environmental assessment.

The generation of traffic volumes for the rest area were based on traffic volume studies undertaken at the Sleepy Hollow heavy vehicle rest area and Halfway Creek heavy vehicle rest area in 2002 and 2003 respectively. These surveys estimated that approximately 9 per cent of passing heavy vehicle traffic used these rest areas.

As such, for both the 2011 and the 2031 traffic assessments, it has been assumed that 9 per cent of the passing traffic on the Woolgoolga bypass would use the rest area. These traffic volumes are considered to be conservative and are likely to be the maximum traffic volumes using the rest area.

Any additional traffic along the upgraded highway due to the rest area would be minimal as the facility would be primarily used by passing traffic (ie traffic that would use the highway regardless of whether or not a rest area was established).

7.2.3 Operational traffic impacts

General

By providing additional rest area facilities for traffic on the Pacific Highway, including heavy vehicles, the proposed rest area has the potential to improve road safety and freight efficiency.

Midblock traffic volumes

The predicted midblock traffic volumes for Arrawarra, north of Mullaway Drive, in 2011 and 2031 are provided in Table 7.1. As the rest area would not generate any additional traffic, but rather would be used by traffic already on the highway, the annual average daily traffic volumes identified below would not increase from traffic volumes for the base case (the approved project).

Table 7.1 – Future midblock traffic volumes for Arrawarra, north of Mullaway Drive

Location	Annual Average Daily Traffic Volumes (veh/day)	
	2011	2031
Woolgoolga bypass	8,329	13,784
Local access road (existing highway) south of Arrawarra interchange	5,073	9,585
Total passing traffic	13,402	23,369

Except for the section between the roundabout and Arrawarra Beach Road, it is not anticipated that there would be any change to the local traffic on the local access road network.

Ramp traffic volumes

The predicted 2011 and 2031 daily traffic volumes with and without the proposed rest area on the ramps of the proposed Arrawarra interchange are presented in Table 7.2.

Table 7.2- Predicted daily traffic volumes (veh/day) along the highway off/on ramps

Location	2011 (veh/day)		2031 (veh/day)	
	Approved project	Rest area	Approved project	Rest area
Arrawarra interchange				
On ramp – northbound	1,827	2,202	3,853	4,473
Off ramp – northbound	439	814	548	1,168
On ramp – southbound	391	766	479	1,099
Off ramp – southbound	2,086	2,461	3,878	4,498

The introduction of a rest area at 2011 would result in an increase in the traffic volumes on the on/off ramps at the Arrawarra interchange. The rest area would result in approximately 750 vehicles per day leaving the highway to access the rest area.

In 2031, the rest area would result in an increase in the traffic volumes on the on/off ramps at the Arrawarra interchange, with 1,240 vehicles per day leaving the highway to access the rest area.

Intersection performance

An analysis of the future intersection performance during the morning and afternoon peak hour periods has been undertaken for the approved project and the approved project with a rest area for the years 2011 and 2031.

The Level of Service (LoS) rating for the local access roads and southbound ramps at the Arrawarra interchange are shown in Table 7.3.

Table 7.3- Arrawarra interchange performance (Level of Service)

Intersection	Peak hour	2011		2031	
		Approved project	Approved project with Rest area	Approved project	Approved project with rest area
Local access road /southbound ramps/local access road	AM	LOS A	LOS A	LOS A	LOS A
	PM	LOS A	LOS A	LOS A	LOS B

From Table 7.3, the performance of the intersection is predicted to be good (LOS A or B) for both 2011 and 2031, regardless of the operation of a rest area.

7.2.4 Construction traffic impacts

The Arrawarra rest area is included in the Proposal considered in the environmental assessment for the Sapphire to Woolgoolga Pacific Highway upgrade project. Construction traffic impacts for the project (including the Arrawarra rest area) were considered in Section 8 of the environmental assessment.

7.3 Noise and vibration

This section assesses the potential noise and vibration impacts of the Arrawarra rest area. Noise and vibration has been previously considered in Chapter 11 of the environmental assessment and a noise and vibration assessment report was undertaken and attached as Appendix F (Working Paper 2).

The Arrawarra rest area is included in the proposal considered in the environmental assessment for the Sapphire to Woolgoolga Pacific Highway upgrade project. Construction traffic impacts for the project (including the Arrawarra rest area) were considered in Section 8 of the environmental assessment.

As part of the rest area assessment report, a specialist operational noise report was also prepared. The following sections provide a summary of that report.

7.3.1 Methodology

Consideration of noise as part of this proposal requires assessment of potential impacts using two separate sets of criteria/guidelines. The assessment of noise from moving traffic is assessed in accordance with the *Environmental Criteria for Road Traffic Noise* (ECRTN) developed by the NSW Department of Environment, Climate Change and Water (DECCW) 2001. The ECRTN guideline has been used to assess the potential traffic noise impacts from “offsite” traffic (ie. traffic on public roads accessing the rest area and potential future service centre). The ECRTN criteria do not specifically address noise impacts associated with the operation of the rest area.

Rest area operational (onsite) noise (ie. internal traffic movements and noise associated with the operation of facilities) must also be considered. As there are no specific criteria for addressing noise from rest areas, the most relevant assessment methodologies have been reviewed and a conservative approach adopted, resulting in the assessment of the rest area’s operational noise using the NSW *Industrial Noise Policy* (INP), also developed by the DECCW (2000).

ECRTN assessment

Noise criteria for residences

Under the ECRTN, road developments are classified as either “new road” or “redevelopment of an existing road”. In general terms the Woolgoolga bypass section would be classified as a “new freeway

or arterial road corridor” and the sections to the south and north of the bypass would be classified as a “redevelopment of existing freeway/arterial road”. The relevant criteria set out in Table 7.4 will apply.

Table 7.4 ECRTN Criteria for operational traffic noise – residences

Type of development	Noise level criteria		Where criteria are already exceeded
	Day (7.00am-10.00pm)	Night (10.00pm-7.00am)	
New freeway or arterial road corridor	LA _{eq} ,15hr 55dBA	LA _{eq} ,9hr 50dBA	The new road should be designed so as not to increase existing noise levels by more than 0.5dB.
Redevelopment of existing freeway/arterial road	LA _{eq} ,15hr 60dBA	LA _{eq} ,9hr 55dBA	In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2dB.

Where feasible and reasonable, noise levels from existing roads should be reduced to meet the noise criteria. In many instances this may be achievable only through long-term strategies.

In applying Table 7.4, the noise level criteria apply to the predicted noise level at a time 10 years after opening of the project, which in this case has been adopted as year 2021 for consistency with the environmental assessment for the approved project. The RTA has also published the *Environmental Noise Management Manual* (ENMM) to assist in implementing the ECRTN. Noise levels due to traffic on existing roads as predicted at a time immediately before opening of the project are described in the ENMM as “future existing” levels. Criteria derived at each of the residential locations in the original noise assessment (Appendix F, Working Paper 2 to the environmental assessment) have been adopted for this assessment.

Where the “base” criteria in Table 7.4 are already exceeded, Practice Note (iv) of the ENMM provides further discussion of situations where provision of additional controls would be considered “feasible and reasonable”. In particular, for “new freeways or arterial roads” it is generally not considered reasonable to take action to reduce noise levels to the target noise levels if the noise levels with the proposal, ten years after project opening, are predicted to be:

- Within 2dBA of “future existing” noise levels.
- No more than 2dBA above the target noise levels set out in the Table 7.4.

Modelling scenarios

For the purposes of this modification environmental assessment, two scenarios were assessed:

- Base case: This corresponds to the predicted noise levels for the approved Sapphire to Woolgoolga upgrade project.
- Rest area: Predicted traffic flows on the highway, ramps and local roads are modelled with the rest area.

Assessment under the Industrial Noise Policy (INP)

Noise criteria

Assessment using the INP considered the rest area as if it were an “industrial” operation. The INP requires that the L_{Aeq} noise level associated with the proposed operation over a typical 15 minute period at any time should not exceed the background L_{A90} noise level by more than 5dBA. The specific approach taken for the Arrawarra rest area is therefore to assess vehicle noise on ramps that are public roads under the ECRTN, and noise emanating from vehicles within the rest area that are not considered public roads under the INP.

For night time use of the rest area, an assessment was undertaken against the DECCW sleep arousal guidelines contained in the *Environmental Noise Control Manual* (ENCM) (EPA, 1994). This requires that the typical maximum noise level (denoted as L_{A1} , 1 minute in the ENCM) associated with noise from heavy vehicles at the rest area (engines starting/doors closing etc.) should not exceed the background L_{A90} noise level by more than 15dBA.

Table 7.5 outlines the derived rating background level (RBL) for the residences closest to the proposed Arrawarra rest area. This is based on measured ambient noise levels at other locations taken during noise surveys for the Sapphire to Woolgoolga Pacific Highway environmental assessment, after allowing for potential traffic growth.

Table 7.5 Derived rating background levels at residences (Arrawarra)

Location ¹	Approximate distance from highway (m)	Rating background levels (dBA)		
		Daytime (7.00am-6.00pm)	Evening (6.00pm-10.00pm)	Night (10.00pm-7.00am)
Eastern residences (property No. 771)	250	43	43	33
Northern residences (property No. 450)	550	45	45	35

¹ Property numbers are the same as those identified in Appendix C of Working Paper 2 to the environmental assessment.

Closest residences

The closest residential receivers to the Arrawarra rest area are located in two clusters: one to the north of the site and the other to the east of the site. The closest residence in the northern group (residence 450) is approximately 550 metres away from the rest area. The closest residence in the eastern group (residence 771) is at a distance of approximately 250 metres away from the proposed rest area. These residences are shown in Figure 7.1.

7.3.2 Noise impacts

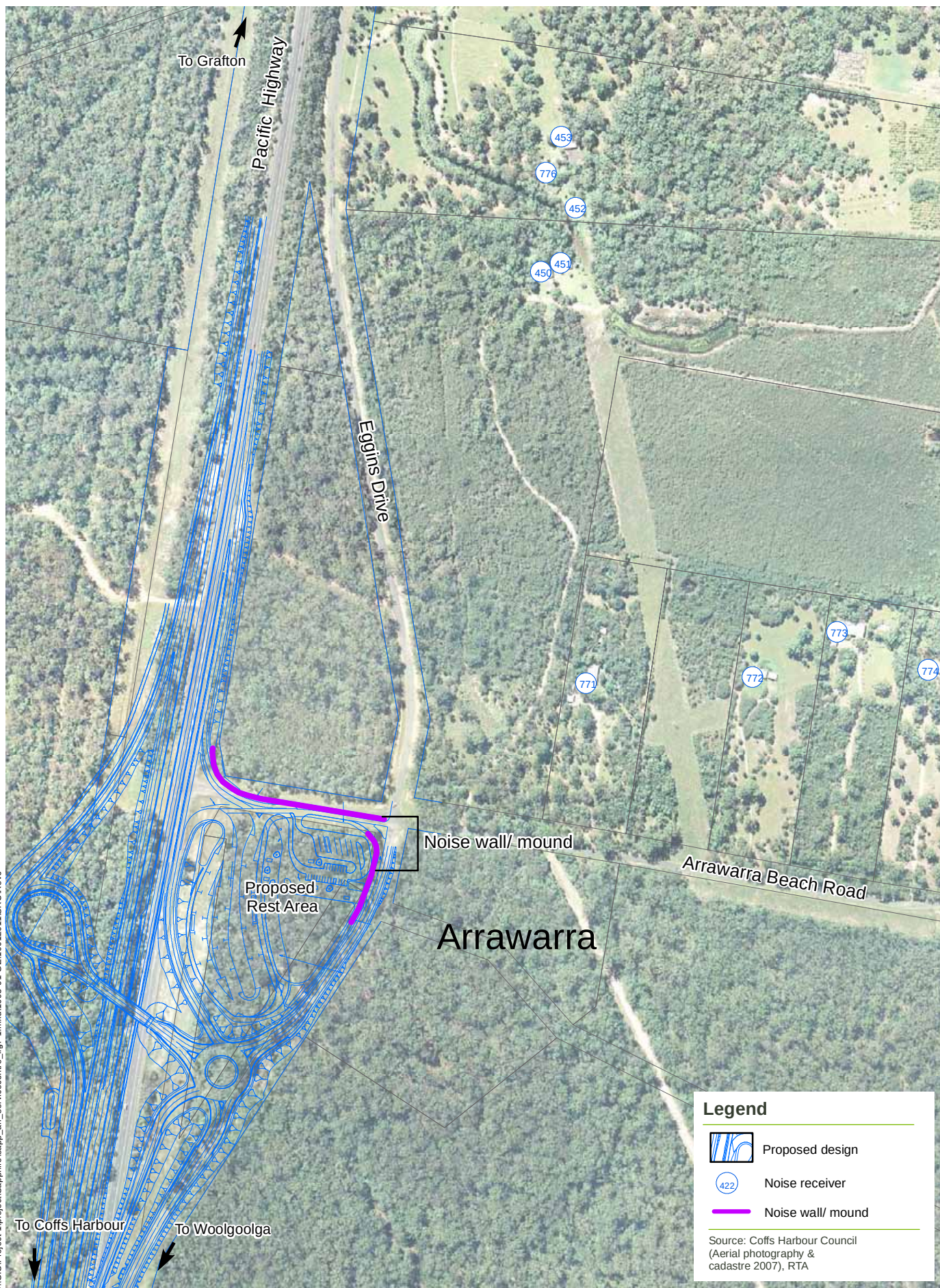
ECRTN assessment

Predicted ECRTN noise levels

The introduction of a rest area at Arrawarra would potentially impact both of the identified groups of residences (to the north and east of the rest area location). Consideration of noise levels as a result of the introduction of a rest area at Arrawarra was undertaken as part of the environmental assessment (November 2007).

Future existing (2011) noise levels and associated ECRTN criteria are outlined in Table 7.6. As the predicted noise level is close to the ECRTN criteria for the Northern residences, this location has been assessed as the “future existing” noise levels exceeding the criteria. Therefore, a 2dB allowance on the “future existing” noise levels is permitted.

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SCALE 1:5,000 @ A4

0 100 200 Metres

Projection: MGA

Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 7.1: Arrawarra closest receivers

Table 7.6 2011 Environmental criteria for road traffic noise (night)

Residence	2011 $L_{Aeq, 9hr}$ future existing noise level (dBA)	ECRTN criteria	
		Base	Allowance if base already exceeded
Eastern residences (property No. 771)	52	55	N/A
Northern residences (property No. 450)	54	55	56

Base case 2021 noise levels (ie. no rest area at Arrawarra) are shown in Table 7.7. Noise levels calculated as a result of the introduction of a rest area at Arrawarra are provided in Table 7.8. The predicted noise levels are assessed against the ECRTN criteria. As there is an exceedance of the ECRTN base criteria, a 2dB allowance on the “future existing” noise levels (2011- shown in Table 7.6) is permitted. Noise levels calculated as a result of the introduction of a rest area at Arrawarra are provided in Table 7.8 and are assessed against the ECRTN criteria.

Table 7.7 2021 Calculated L_{Aeq} noise level with no rest area

Residence	$L_{Aeq, 9hr}$ level (dBA)			ECRTN criteria	
	Highway	Ramps	Total	Base	Allowance
Eastern residences (property No. 771)	54	37.5	54	55	N/A
Northern residences (property No. 450)	55.5	36	55.5	55	56

In the base case, noise from traffic on the highway is dominant at both the northern and eastern residential locations, to the extent that noise from traffic using the ramps would have a negligible impact on residents.

Table 7.8 2021 Calculated L_{Aeq} noise level with rest area only

Residence	$L_{Aeq, 9hr}$ level (dBA)			ECRTN criteria	
	Highway	Ramps	Total	Base	Allowance
Eastern residences (property No. 771)	54	40	54	55	N/A
Northern residences (property No. 450)	55.5	39	55.5	55	56

When rest area traffic is added to non-rest area traffic on the ramps, the noise level at residences from traffic on the ramps only is predicted to increase by approximately 3dBA. This level is at least 14dBA below noise levels from traffic on the proposed upgraded highway and as such would have a negligible impact on residents. The overall noise level with the introduction of a rest area would remain the same as the base case (no rest area) scenario, and is within the ECRTN criteria.

Assessment under the Industrial Noise Policy

Predicted traffic volumes within rest area

Peak traffic movements within the rest area have been estimated based on counts obtained at the Halfway Creek truck rest area and the Port Macquarie service centre. Noise impacts at residences during typical peak 15 minute periods have been assessed. Traffic flows for the introduction of the Arrawarra rest area are outlined in Table 7.9.

Table 7.9 Predicted 15 minute traffic flows in 2021– Arrawarra rest area only

	Light vehicles			Heavy vehicles		
	Arrive	Leave	At Rest	Arrive	Leave	At Rest
Day	10	10	10	6	8	10
Evening	8	8	8	7	8	13
Night	2	2	2	7	9	17

Predicted noise levels at residences

Noise levels are calculated at residences with the following assumptions:

- Traffic would travel at no more than 20 km/hr whilst within the rest area car park and no more than 40 km/hr whilst on ramps inside the rest area;
- The majority of trucks would turn off engines whilst at rest however it is estimated that 25 per cent of trucks would include refrigerated trailers and those units would remain switched on whilst stationary; and
- It is proposed to construct noise mounds approximately 3.5 metres in height along the northern and eastern boundaries of the proposed rest area. The layout of the rest area and proposed noise mounds is shown in Figure 1.1.

Noise levels from refrigeration units, engines starting and door closing are calculated as point sources taking into account noise attenuation due to geometric spreading of sound over distance shielding provided by proposed barriers. Table 7.10 details noise levels used in those calculations.

Table 7.10 Calculated rest area LA_{eq}, 15min noise levels

Item	Sound Pressure Level at 7m (dBA)
Truck L _{Amax} (high revs)	87
Truck start	85
Truck idle	66
Truck door close	75
Truck refrigeration unit	73

The *Industrial Noise Policy* (INP) criteria for residences requires that the LA_{eq} noise level associated with the proposed operation over a typical 15 minute period at any time should not exceed the background LA₉₀ noise level by more than 5dBA. Calculated noise levels at residences with an operational rest area at Arrawarra are shown in Table 7.11 for day, evening and night periods, comparing it to the INP Intrusiveness criteria.

Table 7.11 Calculated rest area LA_{eq}, 15min noise levels

Location	Day (7am- 6pm)		Evening (6pm- 10pm)		Night (10pm- 7am)	
	LAeq, 15min noise level (dBA)	INP Criterion (dBA)	LAeq, 15min noise level (dBA)	INP Criterion (dBA)	LAeq, 15min noise level (dBA)	INP Criterion (dBA)
Eastern residences (property No. 771)	36	48	37	48	37	38
Northern residences (property No. 450)	32	50	33	50	33	40

These calculations have been predicted at the closest sensitive receivers including the proposed noise walls/mounds. Table 7.11 shows that noise levels are predicted to comply with INP criteria at both groups of residences surrounding the Arrawarra rest area, during day, evening and night assessment periods.

For sleep disturbance, assessment of maximum noise levels was undertaken against the sleep arousal guidelines outlined in the *Environmental Noise Control Manual*. The calculated L_{Amax} noise levels from both movement and vehicles at rest were compared with the ENCM sleep disturbance guideline and found to be within the guidelines for both groups of residences (refer Appendix B of the rest area assessment report).

7.3.3 Mitigation and management measures

The mitigation/management measures detailed below are separated out into those that were identified for the approved project (and are relevant for any additional impacts which may result from the introduction of a rest area) and any new mitigation/management measures which would be implemented as a result of any potential environmental impacts from the rest area.

Mitigation/management measures for the approved project

Mitigation measures to be implemented to mitigate and manage noise and vibration issues during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures which appeared in the environmental assessment include:

- Pre-construction noise monitoring will be undertaken in locations used to identify the background noise levels for the environmental assessment and/or at representative noise sensitive locations.
- Construction activities will be restricted to construction hours for the Proposal. The hours will be 7.00am to 7.00pm Monday to Friday; 7.00am to 4.00pm Saturdays and no work on Sunday or public holidays except in accordance with the commitment below.
- Works outside standard construction hours will be limited to:
 - (i) Any works that do not cause construction noise to be audible at any sensitive receivers; or
 - (ii) The delivery of materials required outside these hours by the Police or other authorities for safety reasons; or
 - (iii) Emergency work to avoid the loss of lives, property and/or to prevent environmental harm; or
 - (iv) Any other work as agreed after appropriate consultation with affected residences, the Department of Environment Climate Change and Water and the local council.
- All plant and equipment will be well maintained and fitted with adequately maintained silencers which meet the vehicle design specifications.
- Prior consultation and notification will be undertaken with nearby residences that may be affected by noise or vibration generating activities.
- Public address systems used at any construction site will not be used outside normal construction hours. Public address systems will be designed to limit noise spillage off-site.

- Noise and vibration monitoring will be undertaken during construction to determine the effectiveness of mitigation strategies.
- Monitoring of operational noise will be undertaken between six months and one year after opening along the proposed highway upgrade and within Woolgoolga. Should the monitoring indicate traffic noise levels exceeding the relevant noise level criteria in NSW Government's *Environmental Criteria for Road Traffic Noise*; the RTA will investigate and implement further "reasonable and feasible" mitigation measures. The selection of these measures will be undertaken in consultation with affected property owners.

Additional mitigation/management measures

- Construction of noise walls/mounds (to a height of around 3.5 metres) to the north and east of the rest area site.

7.4 Aboriginal and non-Aboriginal heritage

Chapter 12 of the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment discusses the presence and likely significance of Aboriginal cultural areas and archaeological items or sites of Aboriginal significance within the study area of the approved project. Chapter 13 of the environmental assessment discusses the presence and likely significance of non-Aboriginal cultural sites and items within the study area and provides an assessment of their likely heritage significance.

A specific Aboriginal cultural heritage assessment (Jacqui Collins, 2010) was undertaken in the Arrawarra area in October 2010. This assessment surveyed the area of the proposed Arrawarra interchange and the Arrawarra rest area. The report is attached as Appendix A. Consultation for this assessment was undertaken as part of the wider Sapphire to Woolgoolga upgrade project.

7.4.1 Aboriginal heritage

A walkover of the site was undertaken in October 2009 with the assistance of five Aboriginal stakeholders of different local Aboriginal groups. One scatter artefact was discovered during the field survey (S2W-14); however this was located to the west of the existing highway and would not be affected by the construction of the rest area. At the time of preparing this report, S2W-14 had been subject to surface salvage as part of the Sapphire to Woolgoolga upgrade project.

The rest area would be located adjacent to an area of land that is under the ownership of an Aboriginal Corporation; however there would be no impact on this land as a result of the introduction of the rest area.

The rest area at Arrawarra would not impact on the Arrawarra Creek/Embankment Road Aboriginal heritage site or other heritage sites identified in the environmental assessment for the Sapphire to Woolgoolga Pacific Highway upgrade project.

The Arrawarra area in general is an important aboriginal heritage area, appearing to have been used for traditional occupation purposes over a period of at least 1000 years.

The rest area at Arrawarra would be located on state forest land (part of the Wedding Bells State Forest). The specialist Aboriginal heritage report (p.53) for the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment indicated that:

"Forested lands, including Wedding Bells State Forest, are of enduring value to the Gumbaingirr people, who have detailed knowledge of the wide variety of bush foods, medicines and other raw material products they contain... the natural appearance of forested lands provides a tangible link with the traditional landscape, and remains a visually significant part of Gumbaingirr identity and culture."

The introduction of a rest area at Arrawarra would impact upon approximately 2.2 hectares of Wedding Bells State Forest vegetation, and represents less than 0.05% of the total Wedding Bells State Forest area. Given the minor overall increase in state forest land affected as a result of

introduction of the rest area, the conclusion reached within the Sapphire to Woolgoolga Pacific Highway upgrade project environmental assessment Aboriginal heritage report that:

“the development would have no appreciable detrimental effect on existing Aboriginal plant collection practices, given that plant resources are not currently sourced from Wedding Bells State Forest”.

is still considered valid with regard to potential Aboriginal heritage impacts relating to state forest land.

However, it is acknowledged that at the rest area site, there is the potential that undetected low-density artefacts may be present on site. As the site has been affected by past logging activities, any undetected sites/materials are unlikely to be in an undisturbed state, but they may still be of Aboriginal socio-cultural value.

7.4.2 Non-Aboriginal heritage

The introduction of a rest area at Arrawarra would not impact on any listed non-Aboriginal heritage sites or relics. The land is heavily forested and it is not anticipated that any sites/relics would be found.

7.4.3 Mitigation/management measures

Mitigation/management measures for the approved project

Mitigation measures to be implemented to mitigate and manage heritage issues during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures which appeared in the environmental assessment include:

- All construction personnel will receive training on their obligations for protection of Aboriginal cultural materials, including information on site locations, conservation management requirements and legal obligations in regard to Aboriginal cultural materials.
- If any presently unknown Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find will cease until Aboriginal heritage specialist advice is obtained.
- The RTA will comply with the NSW Government's *Aboriginal Participation in Construction Guidelines*.
- All personnel working on site will receive training in their responsibilities under the *Heritage Act, 1977*. Site specific training will be given to workers when working in the vicinity of identified heritage items.
- Should any additional heritage items be uncovered during works, all works in the vicinity of the find would cease until specialist heritage advice is obtained.

7.5 Planning and land use

This section considers the potential impacts associated with the introduction of a rest area on planning, surrounding land use, agriculture and forestry. These issues were previously addressed in Chapters 14 (Planning and land use) and 15 (Agriculture) of the approved project environmental assessment. A land use, planning and socio economic assessment was also prepared and attached in Appendix F (Working Paper 4).

7.5.1 Strategic planning

The Arrawarra rest area would affect a parcel of State Forest land to the east of the existing highway. The site is currently zoned as 'Rural 1F State Forest'. However, the introduction of the rest area at this location would not impact on any known future strategic (or otherwise) planning strategies and is not within any Coffs Harbour City Council Development Control Plan area.

The *Pacific Highway Safety Review*, May 2004 (RTA, 2004), recognised that additional rest areas need to be developed in the Coffs Harbour/Woolgoolga area. Constructing a rest area at Arrawarra would be consistent with this strategy.

7.5.2 Land use and zoning impacts

The Arrawarra rest area would predominantly affect land zoned “Rural 1F State Forest” and to a lesser extent ‘7b Environmental Protection Scenic Buffer’ (refer Figure 7.2). Part 2 Clause 9 of the *Coffs Harbour Local Environmental Plan 2000* (CHLEP 2000) indicates that all activities are prohibited in the Rural 1F State Forest zone excluding:

- Those authorised by or under the *Forestry Act 1916*.
- Extractive industries.
- Mines.
- Recreation areas.

Notwithstanding, Clause 7(b) of the CHLEP 2000 indicates that “nothing in this Plan prohibits or requires development consent for any activity listed in Schedule 1”.

Schedule 1, Clause 6 of the CHLEP 2000 states:

‘The carrying out by persons carrying on public utility undertakings, being road transport undertakings, on land comprised in their undertakings, of any development required in connection with the movement of traffic by road, including the construction, reconstruction, alteration, maintenance and repair of buildings, works and plant required for that purpose, except:

(a) the erection of buildings and the reconstruction or alteration of buildings so as materially to affect their design or external appearance, or

(b) the formation or alteration of any means of access to a road.’

On this basis, the introduction of a rest area is permissible without consent in the “Rural 1F State Forest” zone.

Clause 93 of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) identifies rest areas as being a “road infrastructure facility”. Clause 94 of the Infrastructure SEPP states that “development for the purposes of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land”.

This modification environmental assessment is to be assessed as a modification to the approved project which as approved under Part 3A of the EP&A 1979. As such, the provisions under the existing environmental planning instruments (including the CHLEP 2000) would not be applicable.

7.5.3 Property impacts

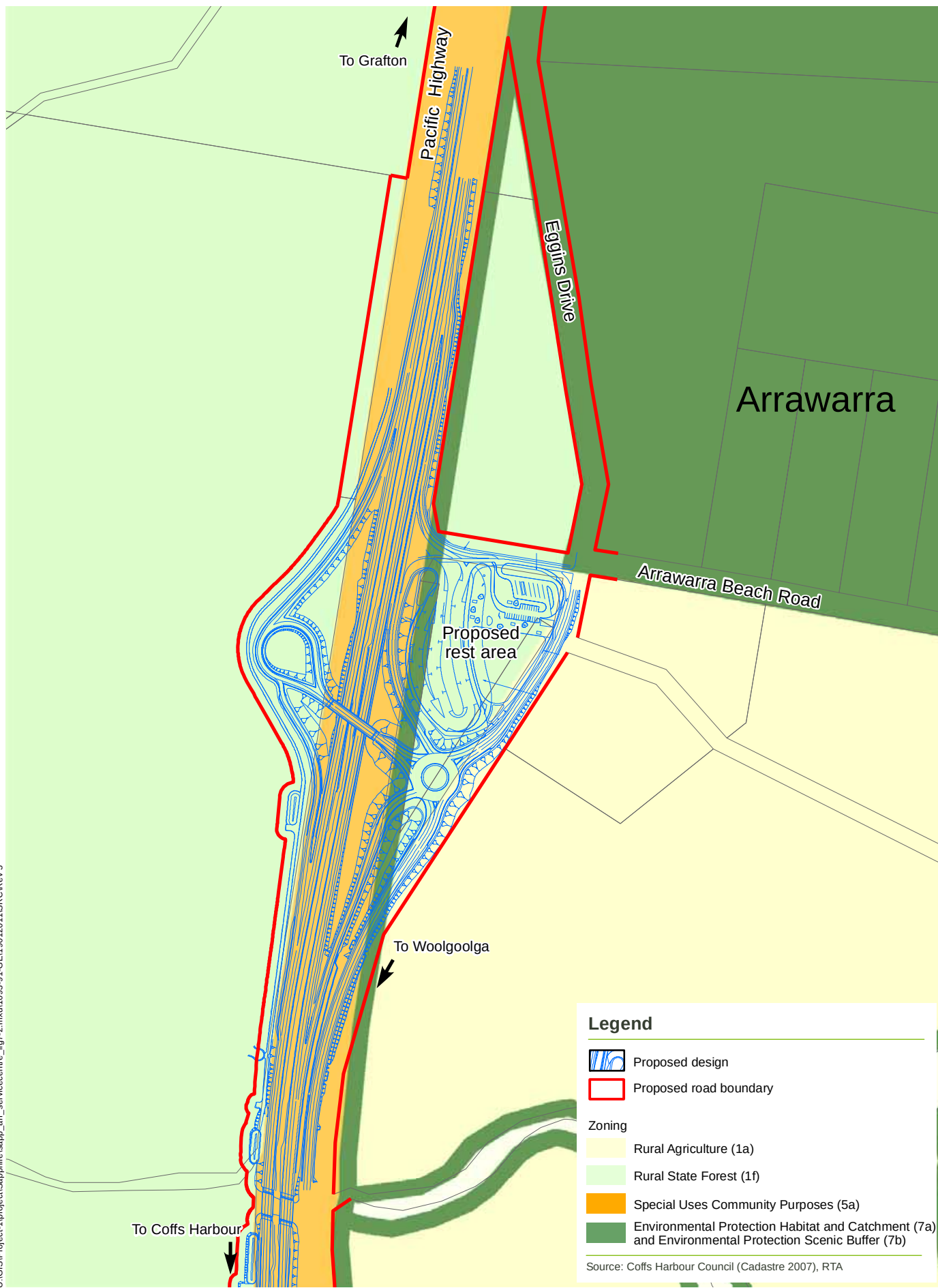
The Arrawarra rest area would require the acquisition of an additional 2.2 hectares of state forest land compared to the base case. The impact on properties 106 and 126 identified in Figure 14.2h and Table 14.5 of the environmental assessment includes the impact of a rest area at Arrawarra.

The rest area would not require the realignment of any roads or the need for any property access changes. Further, the introduction of a rest area at this location would not cause severance of any existing property.

7.5.4 Residential land use

The proposed rest area of Arrawarra would not be located on land used or proposed to be used for residential development and would therefore not affect these land uses.

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Sapphire to Woolgoolga Pacific Highway upgrade **rest area modification EA**

FIGURE 7.2: Existing zoning of Arrawarra rest area

7.5.5 Agriculture

The proposed rest area at Arrawarra would not be located on an agricultural property and would therefore not affect any agricultural activity.

7.5.6 Forestry

The proposed rest area would be situated on state forest land. The introduction of the rest area would result in the removal of an additional 2.47 hectares of vegetation compared to the base case scenario. The affected area of State Forest has the following Forestry Management Zone (FMZ) classifications:

- FMZ 4 - General Management (approximately 1.04 hectares affected).
- FMZ 7 - Non- Forestry Use (approximately 0.6 hectares affected).
- FMZ 8B - Areas for further assessment (approximately 0.4 hectares affected.).

FMZ 4 is considered to be a forest harvesting zone (and FMZ 8B could also be a forest harvesting zone). As such, up to 1.44 hectares of the land affected by the proposed rest area could be classed as forest harvesting area. Due to the small proportion of the forest harvesting zone impacted by the proposed rest area (compared to that area of land zoned for forest harvesting retained within the Wedding Bells State Forest), it is not anticipated that there would be any substantial impact on timber production activities or the viability of the forestry business in the area as a result of the proposed rest area.

Flora and fauna issues associated with impacts to flora and fauna are discussed in section 7.7 of this report.

7.5.7 Mitigation/management measures

Mitigation/management measures for the approved project

Mitigation measures to be implemented to mitigate and manage land use issues during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures which appeared in the environmental assessment include:

- The Department of Primary Industries (Forests) will have access to areas of state forest land identified for acquisition by the RTA to remove any harvestable timber within the footprint of the Proposal.

7.6 Socio-economic analysis

This section considers potential socio-economic impacts, including potential Sikh cultural impacts which could occur from the Arrawarra rest area. These issues were addressed in chapter 16 (Socio-economic analysis) of the environmental assessment. A land use, planning and socio-economic assessment was also prepared and attached in Appendix F (Working Paper 4). The Sikh cultural assessment was included in Appendix F, (Working Paper 6) of the environmental assessment.

7.6.1 Community cohesion

The proposed rest area would generate some additional traffic on the local roads in the immediate vicinity of the Arrawarra interchange (refer section 7.2 of this report); however the approved project would have the capacity to accommodate this increase. There would be some minor mixing of local and through traffic on the local access road between the roundabout on the eastern side of the interchange overbridge and Arrawarra Beach Road, due to northbound vehicles accessing the rest area.

The increase in traffic volume would not interrupt any normal community/local movements. There would be minimal additional community cohesion issues as a result of the introduction of the rest area.

7.6.2 Sikh cultural effects

No specific impacts to the Sikh community have been identified as a result of introduction of a rest area at Arrawarra.

7.6.3 Amenity effects

As a result of the introduction of the rest area, there would likely be minor impacts to the general amenity of the area. The proposed location for the Arrawarra rest area is heavily vegetated, as is the surrounding immediate environment. The introduction of the proposed rest area would require removal of existing vegetation.

The distance between the closest residence and the nearest corner of the proposed rest area is approximately 250 metres (residence located to the east of the rest area site). Amenity issues that could occur as a direct result of the introduction of the proposed rest area include noise and visual impacts.

Due to access to and from the rest area and movements within the rest area, there would be a slight increase (0.5dBA) in noise impacts to eastern residences compared with the base case scenario, during the night, when background noise levels are lower. Noise mounding would be located to the north of Arrawarra Beach Road and to the east of the rest area (west of the proposed local access road) to reduce noise at adjacent residences.

The introduction of the rest area would require the removal of approximately 2.47 hectares of existing native vegetation, which would alter the visual amenity of the site (refer section 7.9). The access to the rest area would be visible for one resident in Arrawarra Beach Road, but as the resident is approximately 500 metres away, the view is a long distance view and would not comprise a large proportion of the view from that property. In order to manage identified visual impacts, the design incorporates a number of features including retaining, where possible the original vegetation on the site. The proposed noise mounding and landscaping would provide some visual screening between the rest area and the local access road and residences.

Operation phase activities at the site that could influence air quality include exhaust emissions from idling vehicles, refrigerated vehicles and general patronage of the rest area. As the rest area would be alongside the highway, it is not anticipated that there would be substantial additional impacts to the air quality of the area as a result of its introduction.

7.6.4 Property and land use impacts

Property and land use impacts are addressed in section 7.5 of this report. The rest area is situated within the Wedding Bells State Forest. It would not impact directly on surrounding land uses.

7.6.5 Effects on business activity

As there are no commercial facilities associated with the rest area, the rest area would not be “competing” with any business in Woolgoolga. Consequently, the introduction of a rest area at Arrawarra is not considered to be the type of development that would take business away from existing businesses in Woolgoolga. However, it is possible that highway users who require a stop, may stop at the rest area instead of stopping within Woolgoolga itself. This may result in some minor loss of incidental trade for businesses within Woolgoolga.

7.6.6 Effects on tourism

It is not anticipated that tourism would be adversely affected in the area as a result of the rest area. With over 90 per cent of tourists to the North Coast using car travel, the installation of better facilities including a rest area along this section of the Pacific Highway would result in better driving and stopping facilities for all travellers along the North Coast.

Due to the location of the rest area, travellers stopping at the rest area may decide to travel on the local access road through Woolgoolga and onto the Coffs Coast rather than along the upgraded highway, which they may not have done if travelling straight through on the bypass route. The rest area would also present an opportunity to provide tourist information for visitors to Woolgoolga and the Coffs Coast.

7.6.7 Mitigation/management measures

Mitigation/management measures for the approved project

The RTA identified a range of measures which were not part of the statement of commitments for the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment. However, they are measures which the RTA has confirmed their commitment to, and which are also relevant to the rest area development. Measures which appeared in the environmental assessment include:

- Increase local business promotional activities for Woolgoolga (promote the town to attract local residents).
- Strategies for the development and promotion of tourism on the Mid North Coast region (such as those included in the *North Coast NSW Regional Tourism Plan 2004-2007* (North Coast NSW) and *Coffs Coast-North Coast Region-Tourism Development Plan* (Coffs Harbour City Council)) should be implemented (to promote the town as a tourist location to increase tourism and provide jobs).

Measures relating to noise impacts and urban design and landscape are addressed in section 7.3.3 and section 7.9.3 of this report.

7.7 Flora and fauna

This section addresses the flora and fauna impacts of the proposed rest area. These areas were addressed for the whole of the Sapphire to Woolgoolga project in the environmental assessment, chapter 17 (Flora and fauna). A range of flora and fauna reports prepared for the environmental assessment were included in Appendix F (Working Papers 7a to 7d) of the EA. Another specialist ecology assessment report was undertaken specifically as part of the rest area assessment report (Appendix C).

7.7.1 Existing environment

The Arrawarra rest area site consists of the vegetation community: Black Butt/Grey Iron Bark very tall open forest with associated fauna habitat (refer to Figure 7.3).

Black Butt/Grey Iron Bark very tall open forest

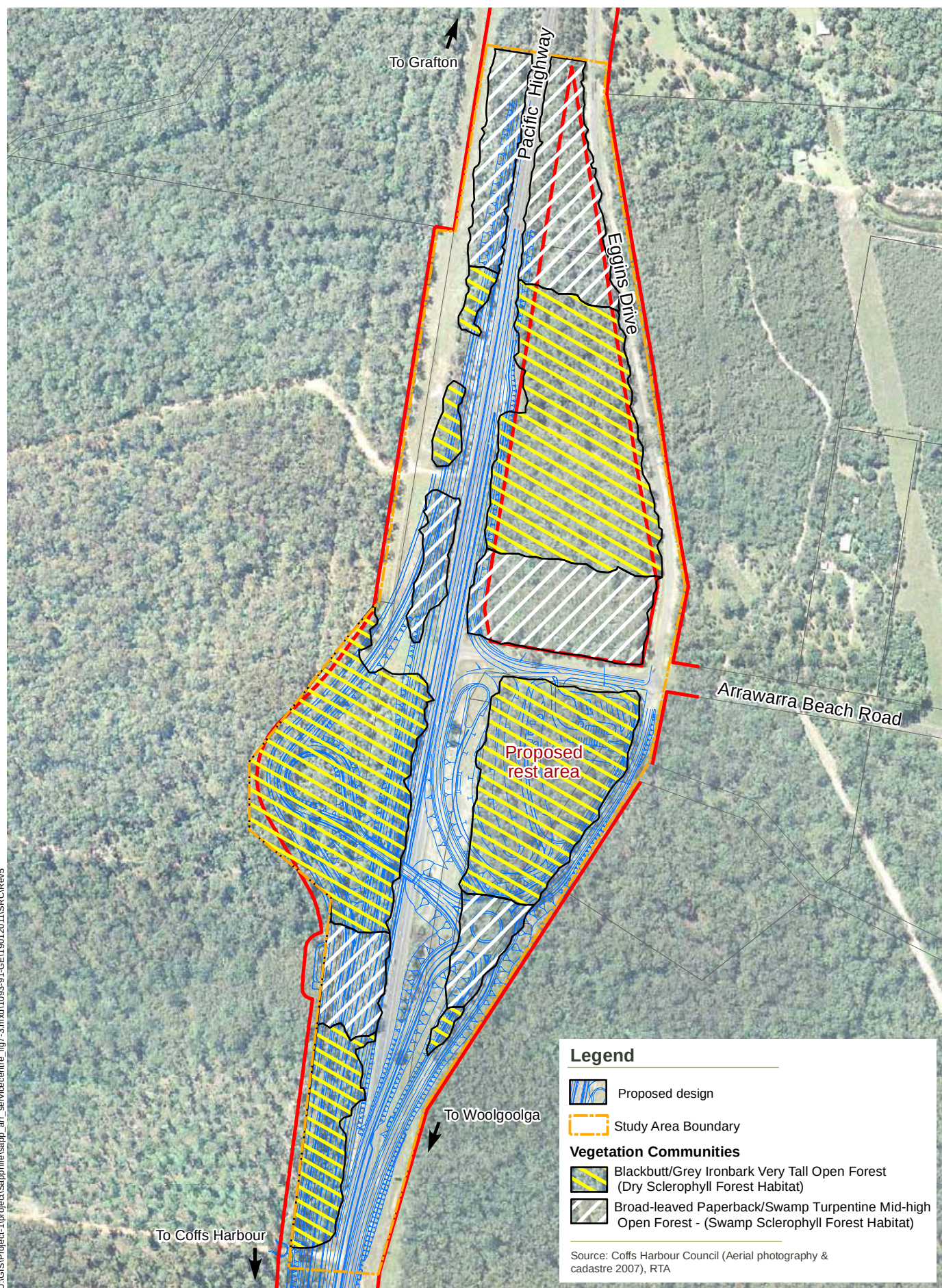
This vegetation community extends over the slightly elevated undulating portions of the site with better drainage.

The dominant over storey species is Black Butt (*Eucalyptus pilularis*), with Grey Iron Bark (*E. siderophloia*) occurring as a sub-dominant species. Other occasional canopy species include Pink Bloodwood (*Corymbia intermedia*) and Red Mahogany (*E. resinifera*). The over storey stratum is approximately 26 metres high, with a vegetative cover of 40 per cent.

The mid storey stratum consists of a mixture of Black Butt, Red Mahogany and Grey Iron Bark saplings. Tallowwood also occurs occasionally as a mid storey species. The mid storey stratum extends up to 16 metres high, with a vegetative cover of 15 per cent.

The understorey stratum is dominated by Breynia (*Breynia oblongifolia*) and Forest Oak (*Allocasuarina torulosa*). Other occasional understorey species include red ash (*Alphitonia excelsa*) and Sydney Golden Wattle (*Acacia longifolia*). The understorey stratum extends up to three metres high, with a sparse vegetative cover of five to ten per cent.

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FIGURE 7.3: Distribution and extent of vegetation communities and habitat types at Arrawarra

The groundcover stratum consists of a mixture of Blady Grass (*Imperata cylindrica*), Bracken Fern (*Pteridium esculentum*) and Kangaroo Grass (*Themeda australis*). Other common groundcover species include Kidney Weed (*Dichondra repens*), Wiry Panic (*Entolasia stricta*), Native Violet (*Viola hederacea*) and Rough Guinea Flower (*Hibbertia aspera*). The groundcover stratum is generally less than 0.7 metres high, with a vegetative cover of 40 per cent.

Fauna habitat

The habitat type present on the Arrawarra rest area site is Dry Sclerophyll Forest.

Dry Sclerophyll Forest

The Dry Sclerophyll Forest has a low level of weed infestation and has been subjected to a moderate to high intensity of logging. The area has been fragmented by the current and former Pacific Highway corridors and numerous forestry trails. The remaining areas of habitat are in relatively close proximity to each other, which is likely to facilitate continued fauna movement, particularly by fauna species with a moderate to high level of mobility.

When flowering, the Black Butt in the tree layer would provide spring and summer foraging resources for a variety of nectivorous fauna species. Forest Oak and Black She-Oak occur frequently in the small tree layer of this habitat type. These tree species provide a known foraging resource for the glossy Black-Cockatoo (*Calyptrorhynchus lathami*), which is listed as vulnerable on the *Threatened Species Conservation (TSC) Act 1995*. Furthermore, this species has been previously recorded in this habitat type on site by Connell Wagner (2007), and evidence of recent feeding activity (ie chewed cones) was recorded on site during a 2008 current survey.

The Dry Sclerophyll Forest habitat contains relatively few tree hollows, particularly within living trees. This is most likely a result of past forestry management practices. This habitat type contains a relatively dense coverage of fallen logs and leaf litter, which would also provide suitable shelter for smaller ground-based fauna including frogs, reptiles and small terrestrial mammals.

Threatened species and Endangered Ecological Communities

The Arrawarra site contains known habitat resources for eight fauna species and potential habitat resources for an additional 20 fauna species currently listed as threatened on the TSC Act. Five of these threatened fauna species are also listed as threatened nationally on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

7.7.2 Impacts

The Arrawarra site has high quality habitat resources to a number of threatened species. Due to the surrounding vegetated land, the site is likely to provide an effective and important corridor function to a broad range of native wildlife.

The Arrawarra rest area has been refined to reduce the ecological impacts. The incorporation of space for a potential future service centre within the footprint of the rest area would avoid impacting on the EEC to the north of Arrawarra Beach Road.

The rest area site would directly impact on approximately 2.47 hectares of Black Butt/Grey Iron Bark Very Tall Open Forest vegetation community. However, not all of this vegetation would be removed for the rest area, with some existing vegetation being retained on site. The removal of vegetation could also impact on fauna that use the vegetation for nesting or feeding. However, this vegetation type is also found on surrounding land.

7.7.3 Mitigation/management measures

Mitigation/management measures for the approved project

Mitigation measures to be implemented to mitigate and manage flora and fauna issues during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures which appeared in the environmental assessment include:

- A suitably qualified ecologist will undertake specific searches for native fauna immediately prior to clearing activities. Searches will include nests and large hollow-bearing trees and target habitats of hollow-dwelling species, koalas and frogs.
- Fauna species found in areas to be cleared prior to clearing activities will be re-located into suitable habitat as close as possible to the area in which they were found.
- Strategies will be developed to deal with incidents involving individual animals during construction activities in consultation with local Department of Environment and Climate Change officers, WIRES and/or other relevant local wildlife carer groups.
- Where feasible and reasonable, nest boxes will be utilised to replace the removal of hollow-bearing trees. If used, nest boxes will be fixed to suitable retained vegetation and in a way that does not damage the tree.
- Water quality control measures will be installed as early as possible in the construction program and will be designed/selected to meet identified receiving water objectives.
- The limits of clearing and other native vegetation disturbance will be clearly marked on relevant work plans and on site with temporary fencing installed prior to clearing.
- Weeds in areas disturbed by construction activities will be managed for a minimum of two years after construction completion.
- Native and locally indigenous plants will be used in the landscaping and disturbed areas will be progressively revegetated.

Additional mitigation/management measures

Additional mitigation/management measures proposed for the rest area site are:

- Retain as much existing vegetation on the site as possible, particularly on the south eastern portion of the site.
- Vegetation to be retained on site is to be marked with temporary fencing prior to tree removal on the site. This is also to be included in the project CEMP.
- Update the Sapphire to Woolgoolga biodiversity offset strategy to offset impacts relating to clearing for the rest area.

7.8 Hydrology, water and soil management

This section addresses the hydrology, water and soil management aspects for the Arrawarra rest area. These issues were originally addressed for the project in Chapter 18 (Hydrology, water and soil management) of the environmental assessment. Additional consideration relating to the potential impacts of climate change on flooding regimes and its impact on (and from) the Proposal was undertaken in Section 3.1 of the submissions report.

7.8.1 Existing environment

Watercourses and drainage

The closest main watercourse to the Arrawarra rest area is Arrawarra Creek, located approximately 600 metres to the south. Arrawarra Creek has a catchment of approximately 464 hectares with a defined watercourse that discharges directly to the ocean and the Solitary Islands Marine Park. Arrawarra Creek has a generally well defined flow path within the creek channel.

Soils including acid sulphate soils

The Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment investigated the soil profile for the area around the Sapphire to Woolgoolga upgrade alignment. The soil landscapes for the rest area site include Megan/Ulong landscape units and Newports Creek landscape unit. Details of these soil landscape units are provided within Chapter 18 of the environmental assessment.

For most of the proposed site, there is a high probability of acid sulphate soils occurring at depths greater than 3 metres below ground surface.

7.8.2 Potential impacts of the rest area

Hydrology and hydraulics

The site hydrology would be modified in the vicinity of the Arrawarra interchange and rest area site as a result of the construction of a roundabout on the eastern side of the highway over an existing minor watercourse. This section of the watercourse is proposed to be replaced by culverts to maintain sufficient flow area and direction for stormwater runoff from upstream. The discharge point is located on the existing creek line. The introduction of culverts at this location forms part of the base case scenario assessed in the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment. As such, this potential impact has previously been assessed within the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment.

The car parks and hardstand areas of the proposed rest area would potentially increase the volume of stormwater runoff. Only one hectare of hardstand areas would be introduced to the site from the rest area. Any increase in stormwater run off from the site would be detained within the proposed stormwater detention ponds.

The configuration of the rest area provides opportunities to implement water sensitive urban design (WSUD) techniques to treat and control stormwater run off. Conventional road drainage would be provided to internal rest area roads.

A flood analysis, including climate change assessment, was previously undertaken on the major creek crossings along the proposed road upgrade. The climate change assessment included various combinations of increased rainfall, increased tides and storm surges. The assessed one per cent Annual Exceedance Probability (AEP) flood levels for Arrawarra Creek (without climate change impacts) was RL 6.05 metres AHD upstream of the highway crossing and RL 4.32 metres AHD downstream of the highway crossing. Based on a one percent AEP flood with a 10 per cent increase in storm intensity, the assessed impact of climate change on Arrawarra Creek was a potential maximum flood level of RL 7.06 metres AHD upstream of the highway crossing, an increase on 1.01 metres.

The rest area site would be elevated slightly to around the same level of the upgraded highway. This would provide an appropriate level of flood immunity from flooding of Arrawarra Creek.

Soils and surface water quality

The Megan soil landscape is highly susceptible to erosion and has the potential to create high suspended solids in the stormwater runoff. The topography of the site however is gently sloping to the east and would require only minimal cut/fill operations to obtain the desired construction levels (the bulk of the fill material required would be for the proposed noise mounds). This reduces the potential of erosion occurring.

Appropriate erosion and sedimentation controls, as outlined in the revised statement of commitments in Chapter 5 of the submissions report would be implemented during construction and operation of the proposed rest area.

For most of the proposed site, there is a high probability of acid sulphate soils occurring at depths greater than three metres below ground surface. These soils would not be extensively disturbed by the construction activities on the site.

Further refinement of the rest area design has incorporated stormwater treatment and control considerations such that potential operation phase hydrology and water quality impacts would be appropriately managed. These would also contain spills from vehicles using the site and minimise the risk of impacting on the local water quality of the Arrawarra Creek. The basins would be designed in accordance with the provisions of *Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction*.

Opportunities to include water management methods such as bio-retention swales between the internal roads would also be investigated to treat and control stormwater runoff.

7.8.3 Mitigation/management measures

Mitigation/management measures for the approved project

Mitigation measures to be implemented to mitigate and manage hydrology, water and soil issues during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- Water quality will be monitored upstream and downstream of the project site during construction to determine the effectiveness of mitigation strategies.
- Where feasible and reasonable, the area of soil exposure during construction will be minimised.
- Design requirements for construction and operation phase water quality control structures will be determined on the basis of a site-specific investigation that considers the sensitivity of the receiving environment and the proximity of the discharge point to receiving waters.
- Areas of potential acid sulfate soils and actual acid sulfate soils will be identified and oxidisation of acid sulfate soil material will be limited, any exposed acid sulfate soil will be neutralised and surface water drainage and buffer acid runoff will be controlled.
- Containment strategies will be identified and implemented to ensure that any acidic leachate associated with the oxidation of acid sulfate soil is contained for treatment or removal and is prevented from entering downstream watercourses.

Additional mitigation/management measures

Additional mitigation/management measures proposed for the rest area site are:

- Stormwater detention basins are to be constructed on the rest area site. The requirement for safety fencing would be considered during detailed design stage.
- Water treatment devices incorporating WSUD methods would be considered to treat and control all site runoff before discharging to any natural watercourse.

7.9 Landscape, visual and urban design

This section addresses the landscape and visual impacts of the Arrawarra rest area and includes a strategy for the urban design of the rest area. These impacts for the whole of the Sapphire to Woolgoolga project were addressed in the environmental assessment, Chapter 19 (landscape, visual and urban design). A specialist visual assessment report was been undertaken specifically as part of this rest area assessment and is provided at Appendix D of the rest area assessment report. While the internal layout for the rest area has been altered since the rest area assessment, the strategies for the landscape and urban design of the rest area are still relevant and have been incorporated into the design.

7.9.1 Visual analysis of existing conditions

The existing visual environment is a combination of natural and cultural attributes that make up the landscape setting. Three main components of the existing visual environment which will form the basis of the visual and landscape assessment are:

- Landform types.
- Vegetation types.
- Land use.

Landform type and vegetation

The rest area site is located in Coastal Flats, consisting of a low and gently undulating coastal strip, of 1:60 to 1: 20 gradients. The rest area is located on low lying state forest coastal woodland.

The rest area is in a forested area, being located within state forest coastal woodland.

Land use

The site is bounded by the existing Pacific Highway to the west and by the southern extension of Eggins Drive to the east. Arrawarra Beach Road which leads to the coastal community of Arrawarra, forms the northern boundary of the proposed rest area. A number of rural residential properties are located east of the site.

The rest area site is dominated by dense state forest, which consists predominantly of *Eucalyptus pilularis* (Black Butt).

Site view analysis

Based on the existing site conditions, Figure 7.4 and the dot points below summarise the available viewsheds towards the site, and those landscape elements that restrict these impacts:

- Views to the rest area site from areas to the north are restricted by substantial intermediate mature vegetation.
- Immediate views to the rest area site are available from the Pacific Highway. Views to the rest area from areas to the west beyond the highway are restricted by intermediate mature vegetation.
- Views to the rest area from areas to the south are restricted by substantial intermediate mature vegetation.
- Views from the rural residences to the east of the site are restricted by substantial intermediate mature vegetation. There are long distance views from the western most property of Arrawarra towards the subject site, and the interchange. The view is framed by substantial intermediate mature vegetation, and the rest area would not form a large part of the viewer's perspective.

7.9.2 Visual impacts

The change in land use through the introduction of the rest area would result in a change in character of the site within the immediate vicinity.

However, the rest area is situated within state forest, with surrounding land either being state forest or heavily forested privately owned land. The mature vegetation surrounding the site would mitigate all long and middle distance views from surrounding land uses. Retention of existing trees on the site where possible, particularly in the south eastern portion of the site and the construction of noise walls/mounds to the north of the site would also limit views into the site. One residence in Arrawarra that would have long distance views to the rest area entry. However, as it is a long distance view, incorporating only a small part of the available view, the impact would be minimal.



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FIGURE 7.4: Arrawarra site view analysis

The only immediate views to the rest area site will be from the highway and from the southern extension of Eggins Drive. Visibility from the road would encourage usage of the rest area, as well as providing a degree of safety for those using the rest area.

7.9.3 Urban design and visual mitigation measures

Mitigation/management measures for the approved project

Mitigation measures to be implemented with regards to reducing and managing the use of energy and waste during construction would be as detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- The schedule of species to be used in the landscaping treatments will include native and locally indigenous plants selected in consultation with a qualified landscape officer.
- Landscape and rehabilitation works will be subject to monitoring and any remedial measures where required for a minimum of two years.

Additional mitigation/management measures

Additional mitigation/management measures proposed for the rest area site are:

- Existing vegetation to be retained where possible particularly on the south eastern portion of the site. Where existing vegetation cannot be retained, woodland vegetation planting is proposed where possible to continue the tree canopy and tie the rest area into the existing surrounding landscape character.
- In order to reduce the visibility of the rest area at night from surrounding land uses, all lighting in the area is proposed to be of the cut off light type.

7.10 Other environmental issues

7.10.1 Air quality

Construction phase

The construction of the Arrawarra rest area would be undertaken in conjunction with the wider Sapphire to Woolgoolga Pacific Highway upgrade. Air emissions during the construction of the Woolgoolga rest area would generally comprise dust and vehicular emissions. Dust would be generated as a result of various construction phase activities including:

- Clearing of vegetation and moving topsoil.
- Earthworks including embankments and cuttings.
- Wind erosion of stockpiles and unsealed haul roads and access tracks.

The dust levels (total suspended particulates) experienced on any given construction day would relate to the nature of earthmoving activities being undertaken, the area of soil exposed, the antecedent rainfall and wind strength. Levels of particulate matter are not anticipated to be excessive with the introduction of construction management measures and are not expected to result in reduced local air quality at the nearest residences.

Operation phase

The rest area at Arrawarra would not introduce any additional traffic onto the highway. Rather, the rest area would cater for those vehicles. However, vehicles idling in the rest area could result in localised vehicle emissions.

The predicted increase in highway traffic volumes would be offset to a point by the continual improvement in average emission performance of vehicles, with newer more efficient vehicles replacing older less efficient vehicles (DOTARS, 2003). Emissions would also be reduced due to more efficient traffic movement (reduced travel times) and less traffic congestion at certain times.

Vehicle emission controls were introduced in the early 1970s and emission limits have been progressively tightened over the past 30 years. These controls have resulted, particularly over the last 10 years, in improvements in a number of air quality indicators and it is accepted that vehicles meeting tighter emission standards have played a major part in the improvement. The vehicle standard (Australian Design Rules) is the principal measure for reducing vehicle emission through the introduction of tighter emission standards of new vehicles.

The rest area would be used by vehicles that would use the highway even without the presence of the rest area. The rest area would not generate additional vehicle usage on its own. Most vehicles using the site would have their ignition switched off for the duration of their stay. Some vehicles, however, may need to keep their engines or ancillary motors on (for example: refrigerated vans and trucks). Overall, the rest area is not anticipated to result in a noticeable adverse impact to the local air quality.

Mitigation measures

Mitigation measures to be implemented with regards to minimising any adverse air quality impacts during construction are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- Potential dust sources and dust suppression measures will be identified in consultation with the Department of Environment, Climate Change and Water.
- Baseline dust deposition monitoring will be undertaken and dust deposition gauges installed at sensitive locations to determine the effectiveness of dust suppression measures.

7.10.2 Greenhouse gases

In the Sapphire to Woolgoolga Pacific Highway upgrade environmental assessment, the greenhouse gases identified included the effects of the construction and operation of a rest area at Arrawarra. During construction, the project is anticipated to emit 2.3 kilo-tonnes of carbon dioxide equivalents per kilometre of highway, which would result in approximately 60 kilo-tonnes being emitted over the construction period. An additional 44 kilo-tonnes is expected to be emitted from clearing vegetation along the route.

During the operation of the Sapphire to Woolgoolga Pacific Highway upgrade, it is anticipated that in 2011, 49 kilo-tonnes of greenhouse gases would be emitted. The rest area would not result in additional vehicles on the highway, but rather service those vehicles already using the highway. As such, there would be a minor increase in greenhouse gas emissions as a result of the operation of the rest area due to vehicles accessing and idling in the rest area.

Mitigation measures

Mitigation measures to be implemented with regards to minimising greenhouse gas emissions during construction and operation are detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- Energy efficient work practices will be adopted to limit energy use. Measures will include conducting awareness programs for all site personnel regarding energy conservation methods and conducting energy audits during the project to identify and address energy waste.
- Plant and office-based equipment (including lights and computers) will be operated in an efficient manner and regularly maintained. If economically available, electrical energy derived from a renewable energy source accredited by the National Green Power Accreditation Steering Group (or equivalent) will be used for the supply of at least 50 per cent of the on-site electrical energy required during construction.
- The energy saving measures implemented will be monitored to determine their effectiveness.

7.10.3 Contaminated land

A Phase 1 Contamination Assessment (Connell Wagner, 2005) undertaken for the Sapphire to Woolgoolga Pacific Highway upgrade did not show any sites near the rest area location to have potential contamination issues.

As the site is part of the Wedding Bells State Forest, no contamination is expected to be found on the site. However, should contamination be found on the site during construction, measures identified in the Sapphire to Woolgoolga Pacific Highway upgrade statement of commitments would be implemented to minimise any risks to the environment or people.

Mitigation measures

Mitigation measures to be implemented with regards to minimising contaminated land impact during construction would be as detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- Areas of potential soil contamination will be identified, investigated and appropriately managed.
- If contamination is found to pose unacceptable risk to either the environment or human health receptors a remedial action plan will be developed and remediation works will be undertaken.

7.10.4 Energy and waste

Energy consumption

Energy would be consumed during the construction of the rest area from a range of sources and activities including:

- Procurement and delivery of materials to the site.
- Site establishment.
- Relocation and protection of services.
- Earthworks and pavement construction.
- Other miscellaneous construction activities.

Construction plant and equipment would be selected by the appointed contractor. The duration of use of the plant and equipment would depend on the specific conditions encountered. It is anticipated that the rest area would be constructed during the construction of the Sapphire to Woolgoolga Pacific Highway upgrade project which is expected to be completed over a period of approximately 36 months.

While there would be no construction compound on the rest area site, as the rest area is planned to be constructed as part of the Sapphire to Woolgoolga project, the main electricity consumption would be power supply for construction compounds to provide electricity for air conditioning, operation of office equipment etc and external lighting during occasional night-time works.

When the rest area becomes operational, energy consumption requirements would include for lighting in the rest area, sewage pumping, maintenance works and road user energy use. It is not expected that there would be substantial energy consumption requirements during operation.

Waste

The main waste streams during construction are likely to include:

- Green waste from the removal of trees and shrubs.
- Excavation wastes from soil which cannot be used elsewhere on site.
- Packaging materials associated with items delivered to site.

- Wastes would be generated from maintenance of various heavy construction equipment including liquid hazardous wastes from cleaning, repairing and maintenance. Likewise leakage or spillage of fuels/oils during construction would need to be managed and disposed of appropriately.
- Non-hazardous liquid wastes would be generated through the use of workers' facilities such as toilets.
- General wastes including office wastes, scrap materials and biodegradable wastes.

During operation, the main sources of waste would include solid waste and sewage waste.

Mitigation/management measures for the approved project

Mitigation measures to be implemented with regards to reducing and managing the use of energy and waste during construction would be as detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project. Measures include:

- The waste minimisation hierarchy principles of avoid/reduce/re-use/recycle/dispose will be applied to all aspects of the Proposal.
- Waste will be handled, stored and disposed of in accordance with relevant guidelines.
- Secondary waste materials, such as fly ash and steel slags will be used in construction materials where reasonable and feasible.

Additional mitigation/management measures

Additional mitigation/management measures proposed for the rest area site are:

- Rest area to be designed to incorporate appropriate and sustainable lighting. Other sustainable measures (such as the use of rooftop water/rainwater tank water, dual flush or low water toilets (four star rating)) would also be considered during detailed design.
- Appropriate disposal/recycling facilities are to be provided onsite for public use.
- Toilets constructed in the rest area are to be connected to the Coffs Harbour City Council's reticulated sewerage system.

7.10.5 Hazards and risks

The rest area is located in a vegetated area that is identified as being located within a bush fire prone area, according to Coffs Harbour City Council mapping. The rest area would be constructed to RTA guidelines, and further investigation into the use of fire resistant materials and other fire control measures would be undertaken during the detailed design of the rest area.

Mitigation measures to be implemented to manage other hazards and risks during construction of the rest area would be as detailed in the statement of commitments and conditions of approval of the Sapphire to Woolgoolga Pacific Highway upgrade project.

Additional mitigation/management measures

Additional mitigation/management measures proposed for the rest area site are:

- Consideration of use of fire resistant material and other fire control measures.
- Consultation should be undertaken with the NSW Rural Fire Service to determine any additional firebreak requirements to the east of the site.

7.10.6 Environmental management

The RTA requires that the environmental impacts of all its activities be well managed and the RTA's corporate approach is underpinned by an environmental management system and an environmental policy. Other relevant influences include the RTA Corporate Plan, *Blueprint (2008-2012)*, requirements of the International Standard ISO 14001 and relevant legislation. The RTA has an ongoing commitment to improving its environmental management system.

The RTA would require that the appointed construction contractor have an environmental management system in accordance with NSW government requirements guidelines and the RTA *QA Specification G36 Environment Protection (Management System)*, or equivalent.

A construction environmental management plan would be prepared and implemented by the appointed contractor to guide project delivery, ensuring that proposed management measures (as identified in the statement of commitments and Conditions of Approval for the Sapphire to Woolgoolga upgrade project and the additional mitigation/management measures detailed in this report) are fully implemented. Requirements for minimum information to be included within the construction environmental management plan would be identified in contract documentation.

The construction environmental management plan would ensure specific environmental management measures are implemented during construction. The RTA would also coordinate ongoing monitoring and maintenance after commissioning of the project.

7.10.7 Cumulative impacts

The potential cumulative impacts with the existing and likely future activities have been taken into consideration in determining the overall impacts of the Sapphire to Woolgoolga Pacific Highway upgrade project (Sapphire to Woolgoolga Pacific Highway upgrade EA, 2007). This included the cumulative impacts associated with the rest area. The potential cumulative impacts have been examined at both a local and regional scale. In terms of the proposed rest area at Arrawarra, the cumulative impacts are considered to be minimal.

8. Conclusion and additional management measures

8.1 Conclusion

Based on the number of submissions received and issues raised from the display of the environmental assessment for the Sapphire to Woolgoolga Pacific Highway upgrade project, the RTA recognised the need for further consideration into the location of a rest area. The RTA therefore decided to remove the proposed rest area at Arrawarra interchange from the project approval process and advised the Department of Planning of this decision on 29 October, 2008.

The RTA has assessed two potential locations to address the need for a rest area within the project. Of the two locations assessed, the RTA selected Arrawarra as the preferred location for the rest area.

In response to issues raised in submissions received following the display of the rest area assessment report, the RTA refined the layout of the Arrawarra rest area to reduce potential impacts, primarily on Endangered Ecological Communities (EECs) in the state forest to the north of Arrawarra Beach Road. The option resulted in the rest area being altered to incorporate a potential future service centre on the eastern portion of the site south of Arrawarra Beach Road. Until a service centre is developed for this site, this area would retain the existing vegetation. This also resulted in moving heavy vehicle parking areas to the western side of the site – further away from residences in Arrawarra.

This modification environmental assessment has been prepared in order to seek planning approval for the proposed rest area. The report addresses the key issues identified in the Director General's requirements for the Sapphire to Woolgoolga Pacific Highway upgrade as well as issues raised in the Rest Area submissions report. It should also be noted that this modification should be read in conjunction with the Rest Area Assessment Report (Aurecon, 2009) and the Rest Area Submissions Report (Aurecon, 2010).

The Arrawarra rest area would address the identified need for a rest area in the Coffs Harbour/Woolgoolga section of the Pacific Highway to reduce the distance between rest areas on the highway between Nambucca Heads and Halfway Creek.

While the construction of the Arrawarra rest area would result in better resting opportunities for people travelling on this section of the Pacific Highway, it is acknowledged, that the rest area would have some adverse impacts during construction and operation, particularly to the local area. These impacts include:

- Removal of 2.47 hectares of state forest vegetation and potential fauna habitat.
- Minor noise impacts to surrounding residences from the construction and the use of the rest area (an increase of approximately 0.5-1dBA).
- Change in the visual environment, due to the removal of mature vegetation and to a lesser extent, the construction of noise walls/mounds to the north and east of the site. However, due to the forested nature of the surrounding land, there would be minimal visual impact from surrounding residences.

Mindful of the adverse impacts, the rest area proposal has focussed on the development of environmental mitigation and management measures. As the rest area is proposed to be constructed in conjunction with the Sapphire to Woolgoolga Pacific Highway upgrade, this modification adopts all the commitments made in the Sapphire to Woolgoolga Pacific Highway upgrade as well as the Department of Planning's Conditions of Approval.

8.2 Additional mitigation and management measures

Mitigation and management measures, additional to those in the Minister's Conditions of Approval and the revised statement of commitments, to address the potential impacts of the Arrawarra rest area proposal are listed below.

Noise and vibration

- Construction of noise walls/mounds (to a height of around 3.5 metres) to the north and east of the rest area site.

Flora and fauna

- Retain as much existing vegetation on the site as possible, particularly on the south eastern portion of the site.
- Vegetation to be retained on site is to be marked with temporary fencing prior to tree removal on the site. This is also to be included in the project CEMP.
- Update the Sapphire to Woolgoolga biodiversity offset strategy to offset impacts relating to clearing for the rest area.

Hydrology, water and soil management

- Stormwater detention basins are to be constructed on the rest area site. The requirement for safety fencing would be considered during detailed design stage.
- Water treatment devices incorporating WSUD methods would be considered to treat and control all site runoff before discharging to any natural watercourse.

Landscape, visual and urban design

- Existing vegetation to be retained where possible particularly on the south eastern portion of the site. Where existing vegetation cannot be retained, woodland vegetation planting is proposed where possible to continue the tree canopy and tie the rest area into the existing surrounding landscape character.
- In order to reduce the visibility of the rest area at night from surrounding land uses, all lighting in the area is proposed to be of the cut off light type.

Energy and waste

- Rest area to be designed to incorporate appropriate and sustainable lighting. Other sustainable measures (such as the use of rooftop water/rainwater tank water, dual flush or low water toilets (four star rating)) would also be considered during detailed design.
- Appropriate disposal/recycling facilities are to be provided onsite for public use.
- Toilets constructed in the rest area are to be connected to the Coffs Harbour City Council's reticulated sewerage system.

Hazards and risks

- Consideration of use of fire resistant material and other fire control measures.
- Consultation should be undertaken with the NSW Rural Fire Service to determine any additional firebreak requirements to the east of the site

9. References

Acts and policies

Environmental Protection and Biodiversity Act 1999

Environmental Planning and Assessment Act 1979

Threatened Species Conservation Act 1997

Coffs Harbour Local Environmental Plan 2000

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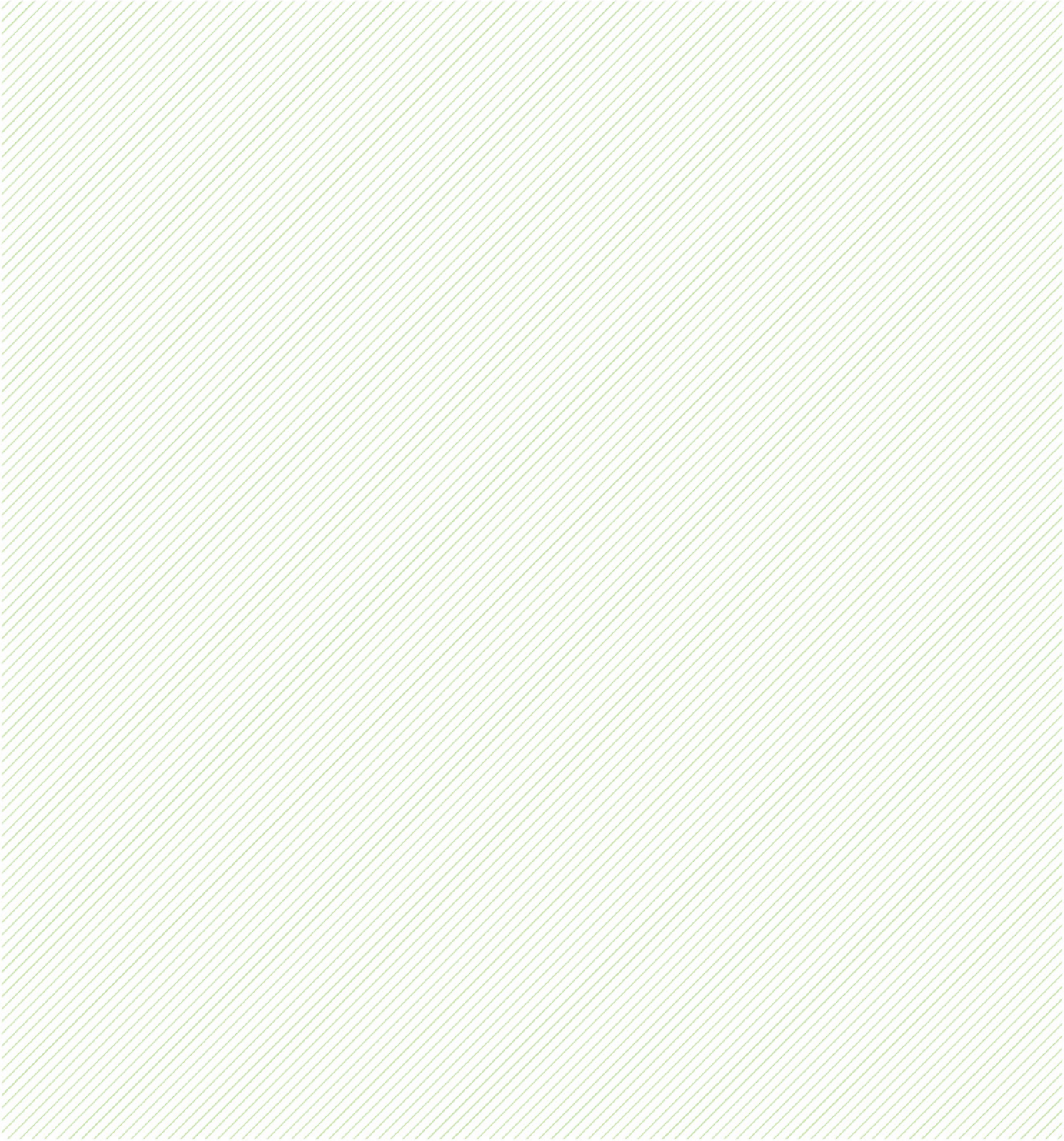
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Appendix A

Aboriginal cultural heritage assessment



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PACIFIC HIGHWAY SAPPHIRE TO WOOLGOOLGA UPGRADE

Aboriginal cultural heritage assessment of project area, Arrawarra

October 2010

(Updated to include additional DECCW AHIMS searches
conducted December 2010 and February 2011)

Prepared for:

Roads and Traffic Authority of NSW
Pacific Highway Office
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1 INTRODUCTION

1.1 Assessment purpose and background

The NSW State Government approved the upgrade of the Pacific Highway between Sapphire and Woolgoolga (S2W) in January 2010. The Chief Executive of the RTA subsequently determined that construction and operation of the S2W upgrade could proceed subject to the conditions listed in the approval from the NSW Minister for Planning. The RTA engaged the Leighton Fulton Hogan Joint Venture (JV) to design and construct the Project, and vegetation clearing and preliminary earthworks have commenced towards the southern end.

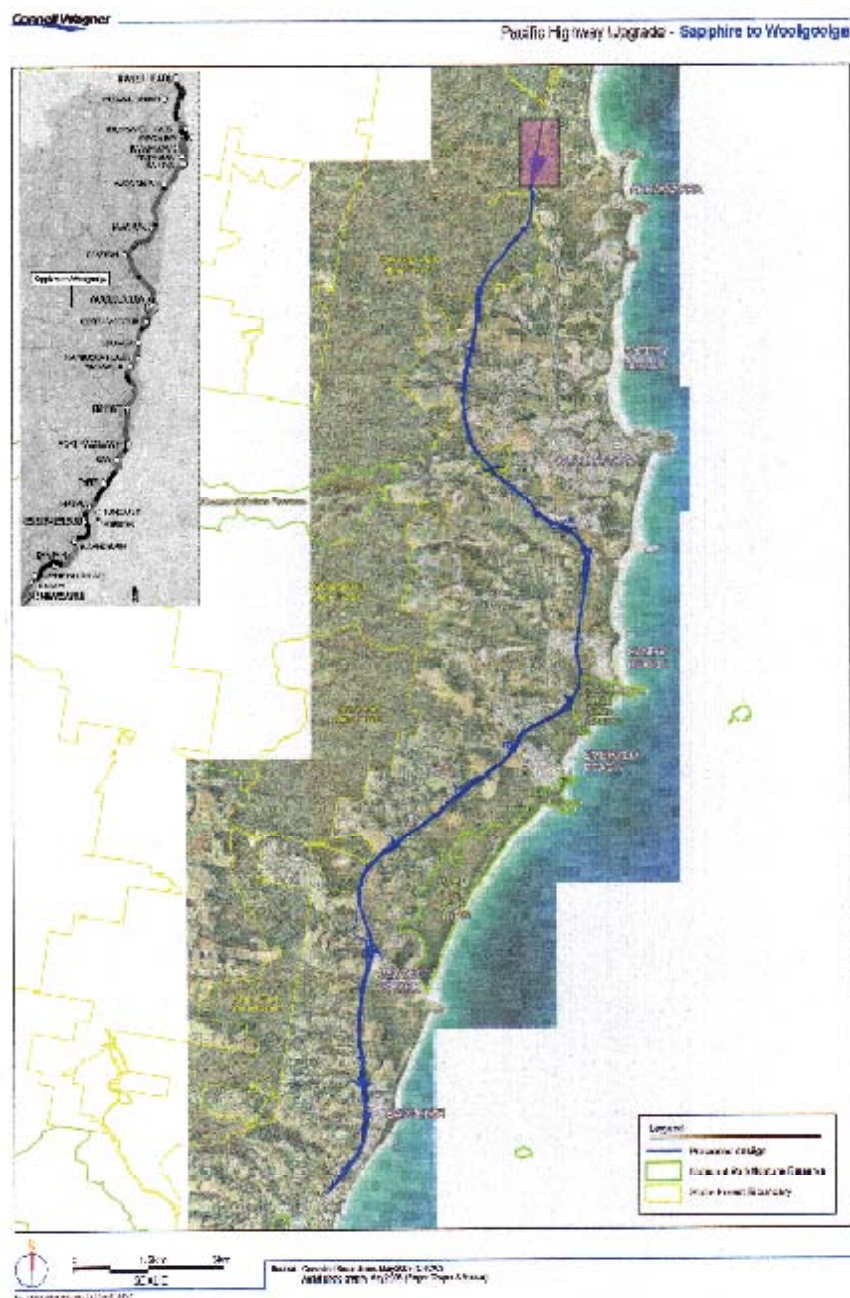


Figure 1. The approved Upgrade alignment, showing general location of the area addressed in this report (pink box) (base map source: Connell Wagner Pty Ltd 2007)



The Upgrade will extend for approximately 25 kilometres from 7.15 kilometres north of Coffs Harbour at Sapphire to 32.53 kilometres north of Coffs Harbour at Arrawarra, and involves duplication of the existing highway to dual carriageway between Sapphire and South Woolgoolga, and construction of a divided dual carriageway western bypass of Woolgoolga. The proposal includes an interchange with Arrawarra Beach Road north of Arrawarra Creek (Figures 1 and 2). While not part of the currently approved Project, the RTA proposes to seek approval to construct a rest area east of the new highway, south of Arrawarra Beach Road (Figure 2).

The Arrawarra Beach Road Interchange was not part of the original Project design when field surveys were undertaken in 2005 (Collins 2007). This report was thus commissioned by the RTA to identify, assess and manage Aboriginal cultural heritage impacts within the previously unassessed section of the Project between Arrawarra Creek and Arrawarra Beach Road (chainage 31100 to 31900), including the Arrawarra Beach Road Interchange and the proposed Arrawarra Rest Area. Aboriginal heritage values of alignments to be affected by the relocation of public utilities required as a result of the Upgrade are reported separately (Collins 2010a). The northern tie-in with the existing highway north of Arrawarra Beach Road has also been subject of a separate assessment (Kuskie 2007).

1.2 Approval context

The NSW Minister for Planning approved the S2W Project under Part 3A of the *Environmental Planning and Assessment Act 1979* (as amended), and declared it to constitute critical infrastructure (as per Section 75C of the Act) on the basis that the upgrade is essential to NSW for social and economic reasons. Under Section 75U of the *Environmental Planning and Assessment Act 1979* (as amended), Part 3A projects do not require certain permits/approvals required by other legislation. These include Aboriginal Heritage Impact Permits (AHIPs) required under Part 6 of the *National Parks and Wildlife Act 1974* (incorporating the *National Parks and Wildlife Amendment Act 2010*). The NSW Department of Planning nevertheless requires an equivalent level of information as would be called for by the Department of Environment, Climate Change and Water (DECCW) to satisfy the issue and reporting conditions of an AHIP.

The proposed Arrawarra Rest Area does not form part of the current Part 3A approval, but was assessed for planning purposes in the event that the RTA elects to lodge a development application in relation to construction of this facility.

2 ABORIGINAL INVOLVEMENT

Aboriginal involvement in the Pacific Highway S2W Project commenced with route selection studies in 2002, and has continued through the EA and present project implementation stages. While the *Interim Community Consultation Requirements for Applicants* (DECC 2005) were not implemented, a comprehensive program of Aboriginal consultation has been undertaken by both the consultant and the RTA, which accords with the general principles of the current DECCW (2010) consultation requirements.

Identified Aboriginal stakeholders comprise the Coffs Harbour and District Local Aboriginal Land Council (CHLALC), Yarrawarra Aboriginal Corporation, the Garby Elders, Bagawa Birra Murri Aboriginal Corporation, and the Garlambirla Guyuu-girwaa Elders Aboriginal Corporation (formerly the Gumbula Julipi Elders). These same Aboriginal stakeholder groups were the only respondents to written invitations and advertisements published in a range of newspapers in relation to archaeological test excavations on the approved Project corridor (Collins 2010b: 2-3).

A duly notified Aboriginal Focus Group meeting, held on the 10th of June 2009, was attended by Chris Spencer (CHLALC), Milton Duroux (Garby Elder), Tim Cowan and Dee Murphy (Yarrawarra Aboriginal Corporation), RTA and Coffs Harbour City Council representatives, and the consultant. An apology was received from Sue Hoskins (Bagawa Birra Murri Aboriginal Corporation). RTA Project Manager Chris Clark outlined the Part 3A approval and approval conditions, specifically those relating to Aboriginal heritage. Amongst other issues, Aboriginal stakeholder representation was discussed, along with the further assessments/investigations required ahead of construction, including field survey of the previously unassessed area north of Arrawarra Creek addressed in this report. It was resolved that representatives of the CHLALC, Yarrawarra Aboriginal Corporation, Garby Elders, Bagawa Birra Murri Aboriginal Corporation and the Garlambirla Guyuu-girwaa Elders Aboriginal Corporation would assist with the required further assessments/investigations.

A draft methodology for the present assessment was supplied to the Aboriginal stakeholder groups for comment/revision prior to its commencement. The draft methodology was verbally endorsed by all stakeholders. Field survey of the assessment area was conducted with the assistance of Mark Flanders (CHLALC senior sites officer), Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit,

Yarrowarra Aboriginal Corporation), Milton Duroux (Garby Elder), Sue Hoskins (Chairperson, Bagawa Birra Murri Aboriginal Corporation) and Trevor Wilson (Garlambirla Guyuu-girwaa Elder) on the 29th of October 2009. Cultural heritage significance issues and impact mitigation strategies were discussed during the course of the survey, and the Section 9 management recommendations were formulated as the most appropriate means of conserving cultural values in the development-related context.

The field survey was preceded by an on-site visit with Garby Elder and local knowledge-holder Cecil (Uncle Bing) Laurie on the 11th of August 2009. During this visit Uncle Bing Laurie confirmed that the Upgrade would not affect any known places of ceremonial, mythological or otherwise spiritual/sacred significance, or contemporary attachment, and that impact would be restricted to stone artefact sites reflecting traditional occupation and use of the S2W coastal hinterland.

Draft copies of this report were provided to the Aboriginal stakeholders for review and comment prior to its finalisation. No amendments to the draft report were called for. Correspondence from the Aboriginal stakeholders in support of the Section 9 management recommendations is reproduced in Appendix A.

3 ENVIRONMENT AND LANDUSE EFFECTS

The area to be affected by the approved Project (including the Arrawarra Beach Road Interchange) and the possible future Arrawarra Rest Area together comprise the approximately 20 hectares of land ('the study area') assessed in this report. The study area lies on the coastal plain 1.5 kilometres inland of the ocean, where it is traversed north-south by the existing Pacific Highway. It is bordered to the south by Arrawarra Creek, to the west by Wedding Bells State Forest, and to the north-east and east by Arrawarra Beach Road and a relict section of the highway (Eggin Drive) now used as a local property access.

Apart from the deeply dissected permanent channel of Arrawarra Creek, which is flanked by a narrow alluvial floodplain, the study area is set on low undulating erosional hills representative of the Ulong Soil Landscape, based on meta-sediments of the Coffs Harbour Association that have decomposed to produce strongly to very strongly acid silty clays up to a metre thick. The underlying meta-sediments are dominated by siliceous mudstone, greywacke and siltstone, within minor meta-basalt, volcanics, chert and jasper. These meta-sedimentary materials are all suited to the production of Aboriginal stone tools and whilst not naturally occurring on the study area surface, outcrop on the coastal headlands and in pebble beds along the beaches and some of the sub-coastal streams. Habitable rockshelters and overhangs are rare, and none have been recorded on or near the Upgrade.

Within the study area, the Ulong hills are of low relief, reaching a maximum elevation of 10 metres AHD on the eastern ends of two broad level to gently undulating spurs west of the existing highway. The southern-most of these spurs is reported to have supported a Blackbutt forestry plantation (cf Connell Wagner 2007b:Figure 3.1; Figure 3 of this report), which had been clear-felled and intensively disturbed just prior to the field survey. The balance of the elevated land supports Blackbutt/Grey Ironbark tall dry open forest with a mid-storey of shrubs and regrowth trees and a generally open grassy ground cover. In addition to that attributable to past highway construction, ecological (cf Benchmark Environmental Management 2009:16-17) and archaeological survey observations indicate disturbance caused by moderate to high intensity logging activities, construction, maintenance and on-going use of numerous forestry roads/trails, and frequent low intensity fires. A cleared electricity transmission line easement, which also houses a subsurface optical fibre cable, runs parallel with the eastern boundary of the existing highway reserve, within the study area.

The two spur ends are separated by a low-lying drainage/swampy depression that extends through the centre of the study area, across the existing highway and the eastern portion of the area to be affected by the Arrawarra Beach Road Interchange. A similar depression is situated on the north-western extremity of the study area, inland of Arrawarra Beach Road. The drainage depressions support Broad-leaved Paperbark swamp forest with a ground cover of sedges and mat-rush (Figure 3).



Recently logged forestry plantation on southern spur end (SU-1), north of Arrawarra Creek. Location of S2W-14 artefact scatter spanning Nashs Road.



Forestry trail on northern spur end west of existing highway (SU-2), within area to be impacted by the Arrawarra Beach Road Interchange.



Typical character and visibility on western margin of study area (SU-3), east of existing highway, to be potentially affected by the Arrawarra Rest Area.



Typical character and visibility adjacent to Eggins Drive (SU-3).



Typical character and visibility on drainage depression (SU-4), east of existing highway.

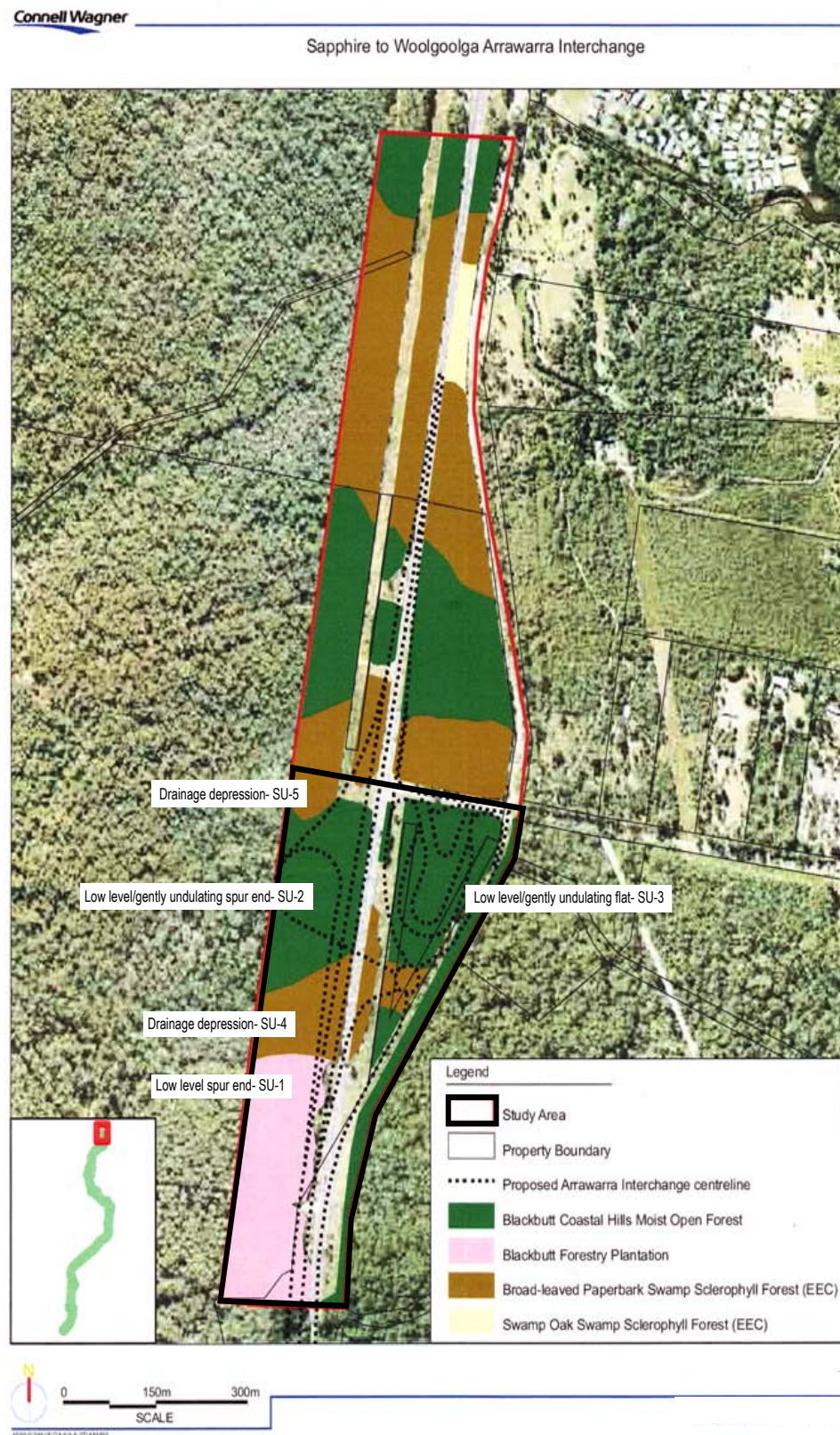


Figure 3. Study area landforms, vegetation communities and survey units (base map: Connell Wagner 2007, Figure 3.1)

4 EXISTING ABORIGINAL HERITAGE INFORMATION

4.1 Registered Aboriginal sites

DECCW Aboriginal Heritage Information Management System (AHIMS)

Aboriginal sites registered on the DECCW AHIMS database within the Arrawarra locality are plotted on Figure 4. These include low-density stone artefact occurrences on the southern side of Arrawarra Creek, west of the existing highway and south of the present study area (#22-1-370 and #22-1-371)(Collins 2010b), and an isolated artefact (#22-1-347) and two scatters containing ten (#22-1-348) and 21 (#22-1-346) surface artefacts, also west of the existing highway, north of the study area (Kuskie 2007). A complex of other sites, comprising shell middens, stone artefact occurrences, a scarred tree, a natural mythological/Bora ceremonial site and a stone fish trap, has been registered in and around Arrawarra Beach between 500 metres and 1.8 kilometres east of the study area (cf Figure 4).

To update previous AHIMS searches, a comprehensive search of land within at least 2.5 kilometres of the northern section of the approved S2W Project (including the study area) was conducted on the 17th of December 2010. Results of this search are reproduced in Appendix E. To protect archaeological sites and avoid the unauthorised disclosure of Aboriginal cultural heritage information, APPENDIX E SHOULD NOT BE INCLUDED IN ANY PUBLICLY AVAILABLE DOCUMENTS.

An updated basic AHIMS search of the study locality itself was conducted on the 10th of February 2011 (Appendix D). This search revealed two registered Aboriginal sites. These sites comprise S2W-14 (#22-1-373) recorded during the present assessment (cf Section 6.2), and the WWC 5 (#22-1-348) artefact scatter recorded by Kuskie (2007) on the proposed Pacific Highway Woolgoolga to Wells Crossing Upgrade alignment. Although the AHIMS register places WWC 5 (#22-1-348) 20 metres north of the study area addressed in this report, the site location/description and map supplied by Kuskie (2007:45 and 2007:Appendix E) indicate that WWC 5 is instead situated "north of Farm Trail ... around MGA grid reference 517728.6674907 (southern end)" (Kuskie 2007:45), approximately 275 metres north of the study area (as plotted on Figure 4).

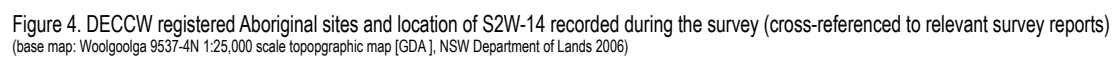
Other heritage registers

Searches of the Commonwealth and National Heritage Lists, Register of the National Estate, NSW State Heritage Register, Schedule 2 (Heritage Items) of the North Coast Regional Environmental Plan 1988 and Schedule 5 (Heritage Items) of the Coffs Harbour Local Environmental Plan 2000 revealed no listed Aboriginal sites or places within or near the study area. The closest listed place is the Arrawarra fish trap (1.3 kilometres east of the study area), which is included in both the Coffs Harbour Local Environmental Plan 2000 and the Register of the National Estate (Place ID #13667).

4.2 Past archaeological assessments/investigations

A number of archaeological surveys and investigations have been completed in the Arrawarra locality for both academic research and development-related purposes. The most relevant of these are reviewed in this section, and provide an insight to the types, density and environmental contexts of the identified sites to assist with the construction of a predictive model for the study area.

In 1980, Piper inspected an approximately 65 hectare land parcel bordered in the west by the then Pacific Highway (now Eggins Drive) and in the south by Arrawarra Beach Road, that stretched east to the northern branch of Arrawarra Creek. The area comprised dune sands, grading inland to low-lying Paperbark swamps. The survey resulted in the recording of two widespread surface scatters of estuarine midden shell (#22-1-032 and #22-1-033) on the sand-based ground. A redeposited scatter of stone artefacts (#22-1-034) was also recorded amongst natural pebbles in the creek bed just beyond the eastern property boundary.



In 1997, a salvage excavation was conducted by Yarrawarra Aboriginal Corporation and the Department of Archaeology and Palaeoanthropology, University of New England, on a foredune shell midden (#22-1-079) at Arrawarra Beach around a kilometre east of the study area. The salvage revealed a well-preserved archaeological deposit dating to 1,300-1,000 cal BP. The midden component was dominated by turban shell but also contained a range of other mollusc species from estuarine, rock platform and open beach environments. The large vertebrate assemblage included mammal, bird, reptile and fish bone (Smith 1998a, 1998b). Analysis of the fish bone indicated a predominance of small to medium-sized specimens, mainly of bream, which could have been captured in the nearby Arrawarra fish trap (#22-1-024) (Vale 1998, 2000). The midden also contained an unspecialised stone assemblage of cores, flakes, flaked pieces and debitage manufactured on sedimentary materials (mainly greywacke) available in pebble beds around Arrawarra Headland (Hill 2000).

More recently, Collins (2002, 2003, 2007a) assessed the area to be affected by the S2W Project between Sapphire and Arrawarra Creek immediately south of the present study area. Aboriginal stakeholders involved in the assessment identified two places of high cultural significance (a traditional ceremonial/sacred site and an historic campsite) within the Arrawarra Creek locality around 800 metres west of the approved corridor. Due to concerns that cultural materials associated with transit to and from these significant sites/places may have been intercepted by the Upgrade, archaeological test excavations were undertaken along the margin of Embankment Road (designated S2W-10 [#22-1-371]), and on the elevated southern bank of Arrawarra Creek (S2W-11 [#22-1-371]) (Collins 2010b). Two stone artefacts (unmodified flakes) were recovered from the nine square metre area test excavated on S2W-10, revealing the presence of a spatially unfocussed, low-density scatter of artefacts within the highly disturbed topsoil on this low spur crest. Two stone artefacts (unmodified flakes) were recovered from the four square metre area test excavated on S2W-11, both at the base of the disturbed topsoil. Six re-deposited artefacts (unmodified flakes, a retouched flake and a multi-platform core) were also collected from a deep artificial drain adjacent to S2W-11 ahead of the test excavations. The S2W-10 and S2W-11 stone assemblages were interpreted to represent 'background scatters' of artefacts itinerantly discarded during the course of Aboriginal transit along the Embankment Road spur and the southern high bank of Arrawarra Creek, and/or resource exploitation within and around Arrawarra Creek and wetlands sandwiched between these two sites.

Three past field surveys/Aboriginal heritage assessments have included parts of the study area itself.

In 1991, Davies surveyed a six metre wide corridor of land subsequently impacted by installation of the underground optic fibre cable that coincides with the cleared transmission line easement east of the existing Pacific Highway. No cultural materials or PADs were identified in the Arrawarra locality.

Macdonald and Collins (1999) produced a joint anthropological and archaeological report that assessed land to be affected by the Coffs Harbour sewerage strategy. This assessment included a 10 metre wide corridor targeted for installation of a reclaimed water main along the eastern edge of the existing highway reserve within the present study area. No archaeological or otherwise significant Aboriginal sites/places were identified in this locality.

Kuskie (2005a, 2005b, 2007) consulted with Aboriginal stakeholders and undertook field surveys of the area to be affected by an upgrade of the Pacific Highway between Arrawarra and Wells Crossing (approximately 26.5 kilometres north of Arrawarra Creek). The southern end of the Woolgoolga to Wells Crossing project area overlaps with the present study area north from Nashs Road. Three of the 15 Aboriginal sites recorded during Kuskie's survey of the preferred route are located west of the existing highway between approximately 200 and 800 metres north of the study area (none within the study area itself). These sites comprise an isolated stone artefact (#22-1-347) on a level-gently sloping flat, and scatters of ten (#22-1-348) and 21 (#22-1-346) artefacts on level-gently sloping spur crests. While Kuskie (2007:45) considered it possible that further undetected artefacts could occur at all three sites, the potential for *in situ* or scientifically significant subsurface deposits was assessed to be low. Overall, the survey results indicated a very low artefact density within the Woolgoolga to Wells Crossing area, consistent with background discard. There was nevertheless a trend for relatively higher artefact discard on level-very gentle flats and spur crests.

4.3 Ethno-history

At the time of first European settlement the study locality was occupied by Gumbaingirr-speaking people whose traditional country extended over a wide area from the Clarence River to at least as far south as the Nambucca (Enright 1934; Smythe 1948; Hoddinott 1978; Eades 1979; GL&CG 1992). The Gumbaingirr comprised several distinct but interrelated groupings of people, each associated with a

separate geographical area. Gumbaingirr groups shared economic resources, trading and ceremonial occasions, intermarried, and spoke a mutually intelligible language, even though differences of dialect or speech, of local territorial association, and some cultural practices varied from one group or locality to another (Macdonald and Collins 1999:37-38). As stated by McDougall (1900:116), "each tribe kept its own belt of country, and separated into small camps, and only collected together on special occasions".

From a review of ethnohistorical material, Coleman (1982) and Belshaw (1978) concluded that wide-ranging movement was usually undertaken in order to attend social gatherings and meet ceremonial obligations rather than to take up residence in another location. Early historical reports repeatedly mention the movement of Aboriginal people between the coast and interior, and between the river valleys (cf Secomb 1986:46). Oral evidence indicates that groups traveling between Moonee Beach and the inland Orara Valley used the low-gradient ridgelines now followed by Bucca Road (Collins 1994:14). This association between low-gradient ridgelines and traditional transit routes is likely to have been repeated throughout the Coffs Harbour-Woolgoolga region, where the exposed ridgelines support (or once supported) a drier and more open form of forest cover.

During the course of everyday life, resource exploitation appears to have been undertaken by family groups, and often several families would co-operate to form a highly flexible 'band' that would gather or disperse as conditions demanded (Godwin 1990:97). Away from the immediate coast, camps were shifted "about monthly as the game in the immediate vicinity became exhausted ... it took several months to give each ground in the locale its turn" (McFarlane 1934-5). Base camps were established in areas protected from the elements by dense vegetation (McFarlane 1934-5). According to Dawson (1935), "the middle of each day was spent around the fire where the venison or game was procured, and the remnant of the meal ... was carried back to camp for evening consumption". On the basis of this description it seems that base camps would have been situated in sheltered areas offering suitable conditions, with a large number of small task-specific sites scattered between. If group sizes in the order of 50 as claimed by England (1976:46) were the norm, then base camps are likely to have been reasonably large, even with a use-life as limited as a month.

As noted by Kuskie (2007:27; cf McBryde 1974:4-14), "material culture of the local people would have included a variety of items made from bark, other components of plants, stone, shell, bone or other animal components (eg fur), including shields, clubs, spears, digging sticks, boomerangs, water containers, canoes, rafts, message sticks, clapping sticks, spear throwers, bark and vine cords, huts, netted and woven dilly bags, bone tools, shell knives, shell pendants, stone tools, fur belts and cloaks."

During the early years of European settlement most of the Aboriginal population centred on the coastline, coastal alluvial plains and major river corridors, despite the rapid appropriation of these landsystems by timber-getters and farmers. The largest known historic camps were situated at Bagawa in the Orara Valley (England undated; Holder 1984:20), but substantial coastal camps remained east of the Pacific Highway at Moonee (England 1976:46) and Woolgoolga (Yeates 1982:23). Aboriginal landuse patterns were substantially modified in the decades following European settlement, as traditional lands were alienated and freedom to move through the country was progressively restricted. By the late 1890s the group of around 50 Aborigines that had frequented Moonee Beach during the autumn and winter months failed to return (Holder 1984:20), and no Aboriginal people remained at Woolgoolga (Yeates 1982:23). Even so, individuals and small family groups continued to occupy bush camps, often comprising clusters of earthen-floored bark huts, well into the 20th century, with many of the remembered camps dating from the 1940s, 50s and 60s (Perkins 1997). Both these camps and a range of other types of historic Aboriginal sites have been researched and mapped by Goulding (2001). A significant proportion of the historic camps were established at a place of work or in walking distance of work, but others were used seasonally for recreation purposes, or in response to the availability of certain resources (Goulding 2001:64).

Despite the massive changes brought about by European settlement, many local Gumbaingirr were able to maintain traditional knowledge of and contemporary associations with the Arrawarra area. In addition to important ceremonial and meeting places, information relating to such things as travel routes, resource use and relationships to land has been handed down through the generations (cf Goulding 2001). Forested lands have always played a prominent role in Aboriginal life and the local people still know of and use a variety of bush tucker, bush medicines and other forest products (Ahoy and Murphy 1996:35-39). A traditional ceremonial/sacred site/place and an historic campsite, both of on-going cultural significance, have been identified west of the present study area (Collins 2002:43, 2003, 2007:9-10). However, Aboriginal stakeholders involved in this assessment advised that neither of these sites/places would be adversely affected by the S2W Project, including the Arrawarra Beach Road Interchange and the possible Arrawarra Rest Area.

4.4 Synthesis of existing information and conclusions

In light of the available archaeological, ethno-historical and contemporary Aboriginal stakeholder information, the Arrawarra area appears to have been used for traditional occupation purposes over a period of at least 1,000 years (and probably for a considerably longer period, as suggested by evidence for initial artefact deposition in Tasmania and Victoria dating to between 18,000 and 44,000 years cal BP [cf Hewitt and Allen 2010:13-14], and general agreement that the first Aboriginal people most likely entered Australia via the northern coastline as long as 50,000 years ago [Lourandos 1997:84-88]).

Although a range of site types has been recorded in coastal, sub-coastal and hinterland contexts, low-density stone artefact occurrences are the most common type of Aboriginal site identified on and around the S2W corridor (Collins 2007; Kuskie 2007). Field surveys and test excavations conducted for the S2W Project have confirmed the presence of low-density surface and/or subsurface artefact distributions on the level/low gradient crests of bedrock-soil ridges/spurs and lowlands adjacent to creeks within the sub-coastal landscape between Sapphire and Arrawarra Creek. The known artefact assemblage is dominated by unspecialised simple flakes made on locally-available raw stone materials, which appear to have been collected from shoreline and/or streamline pebble beds (cf Collins 2010b:46).

Results of the S2W Project field surveys and test excavations are consistent with both the results achieved by Kuskie (2007:61-62) during assessment of the preferred Woolgoolga to Wells Crossing Pacific Highway upgrade corridor, and other surveys/investigations elsewhere in the sub-coastal and hinterland zones, which reveal an overall very low density background distribution of stone artefacts, with a trend towards relatively higher (but still usually low density) discard on level/low gradient ridge/spur crests and well-drained flats (Collins 2001). Where not exposed at the surface, these artefacts characteristically occur in an unstratified context, either within the disturbed topsoil or at the topsoil/B horizon interface (Collins 2010b; see also Hill and Murphy 2000b; Davies 2004, 2007; Collins 2006a, 2006b, 2007a, 2007b).

Owing to the strongly acid soil conditions (cf Section 3) in conjunction with the disturbance caused by construction of Arrawarra Beach Road, the existing and old (Eggins Drive) sections of Pacific Highway, Nashs Road and other forestry track/trails, installation of an above-ground electricity transmission line and underground optic fibre cable along the eastern highway margin, and past vegetation clearance and/or logging off the road corridors, organic Aboriginal occupation materials (shell, bone, wood, bark, charcoal etc), pre-contact burials and scarred trees are not expected to have survived within the study area.

In the absence of any reported sites/places of traditional ceremonial, spiritual or otherwise high Aboriginal cultural value, or any sites/places or resources of contemporary attachment or concern, it was concluded that evidence of Aboriginal use of the study area would be primarily (if not exclusively) restricted to low-density occurrences of stone artefacts.

4.5 Predictive model of site location

On the basis of the existing background environmental, archaeological and Aboriginal stakeholder information synthesised in Section 4.4 above, it was predicted that:

- Low-density stone artefact scatters (including background artefacts) and/or low-density scatters of midden shell may occur on the low spur ends represented in SU-1 and SU-2, and on the undulating flat represented in SU-3 (as mapped on Figure 3). In view of the eroding landscape conditions and extent of past disturbance and related surface exposure, at least some evidence of any significant artefact site/cluster or midden deposit should be evident at the surface.
- Drainage depressions represented in SU-4 and SU-5 (as mapped on Figure 3) are of low to negligible archaeological sensitivity, although the possibility of isolated stone artefacts itinerantly discarded during the course of resource exploitation cannot be ruled out.
- Evidence of Aboriginal bark and/or wood removal may occur on any of the extant mature trees.
- In view of Aboriginal stakeholder advice, the extent of landscape modification/disturbance, prevailing acid soil conditions and the proximity of sand-based grounds to the east, Aboriginal burials are unlikely to occur or survive within the study area.

- In the absence of suitable natural rock outcrops, Aboriginal stone quarries, grinding grooves or inhabited rockshelters/ caves will not occur within or near the study area.
- In the absence of Aboriginal stakeholder knowledge, there is low to negligible potential for unmodified sites/places of traditional ceremonial/spiritual significance, or for sites/places or resources of known contemporary value or attachment to occur within or near the study area.

5 FIELD SURVEY

5.1 Survey conduct, strategy and coverage

Full field survey of the study area was undertaken by the consultant with the assistance of Mark Flanders (CHLALC senior sites officer), Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit, Yarrawarra Aboriginal Corporation), Milton Duroux (Garby Elder), Sue Hoskins (Chairperson, Bagawa Birra Murri Aboriginal Corporation) and Trevor Wilson (Garlambirla Guyuu-girwaa Elder) on the 29th of October 2009. The fine sunny weather conditions were conducive to the detection of surface archaeological materials. Survey within Wedding Bells State Forest on the western edge of the study area was authorised by NSW State Forests under *Special Purposes Permit for Research* No XX47477, issued to the consultant on the 22nd of July 2009.

For reporting purposes, the study area was divided into five separate survey units (SUs) delineated on the basis of topography (after Speight 1990), disturbance, exposure and visibility. The survey units are mapped on Figure 3, and their landform and disturbance context summarised in Table 1. The survey targeted all available surface exposures, including vehicle tracks, erosion scours, log dumps, the rootballs of fallen trees, areas of light and patchy ground cover, and the recently logged land in SU-1 (cf Figure 3). The trunks of all mature trees sighted within the area were inspected for evidence of Aboriginal marking.

To provide data sufficient for evaluating survey effectiveness, variables constraining archaeological visibility were recorded for each of the survey units. These included an estimation of the mean frequency with which surface exposures were encountered, as well as an estimation of the quality of visibility on those exposures (mean frequency of bare ground suitable for artefact detection). Once exposure and visibility constraints are taken into account, it is estimated that approximately 20.4 percent of the study area (off the existing road formations) was subject to effective survey coverage (Table 2), including 36.9 percent of the spur ends, eight percent of the undulating flat, and one percent of the drainage depressions (Table 3). Given the degrading landscape context of the spur ends and the undulating flat, the widespread incidence of survey exposures on these landforms, and the low predicted sensitivity of the drainage depressions, the effective survey sample is considered to have been adequate for determining the archaeological potential of the study area.

Table 1. Environmental and disturbance context of survey units

Survey unit	Landform element	Disturbance context	Sources of survey exposure
SU-1	Low level spur end	Vegetation cleared. Forestry plantation recently fully logged. Traversed by Nashs Road and north-south track along west highway boundary.	Vehicle tracks, recent logging.
SU-2	Low level/gently undulating spur end	Mostly regrowth forest traversed by vehicle tracks with some log dumps.	Mechanical disturbances, vehicle tracks, erosion scours, sparse ground cover.
SU-3	Low level/undulating flat	Mostly regrowth forest traversed by vehicle tracks with some log dumps. Cleared electricity easement on western boundary.	Mechanical disturbances, vehicle tracks, erosion scours, fallen tree rootballs, sparse ground cover.
SU-4	Drainage depression	Mostly regrowth forest traversed by vehicle tracks.	Vehicle tracks.
SU-5	Drainage depression	Mostly regrowth forest traversed by vehicle tracks.	Vehicle tracks.

Table 2. Effective coverage data

Survey unit	Survey unit area (m2)	Horizontal exposure (%)	Area of exposure (m2)	Visibility (%)	Area available for site detection (m2)	Effective surface coverage (%)
SU-1	44,300	80	35,440	80	28,352	64
SU-2	43,000	10	4,300	90	3,870	9
SU-3	63,700	10	6,370	80	5,096	8
SU-4	27,900	5	1,395	20	279	1
SU-5	6,000	5	300	20	60	1
Total	184,900		47,805		37,657	20.4

* Road formations totalling approximately 15,100 square metres not included

Table 3. Summary of landforms effectively surveyed

Landform	Landform area (m2)	Area surveyed (m2)	Effective coverage (m2)	% of landform effectively surveyed	# sites detected	# artefacts detected
Low level spur end	87,300	87,300	32,222	36.9	1	8
Undulating flat	63,700	63,700	5,096	8.0	0	0
Drainage depression	33,900	33,900	339	1.0	0	0
Total	184,900	184,900	37,657	20.4	1	8

* Road formations totalling approximately 15,100 square metres not included

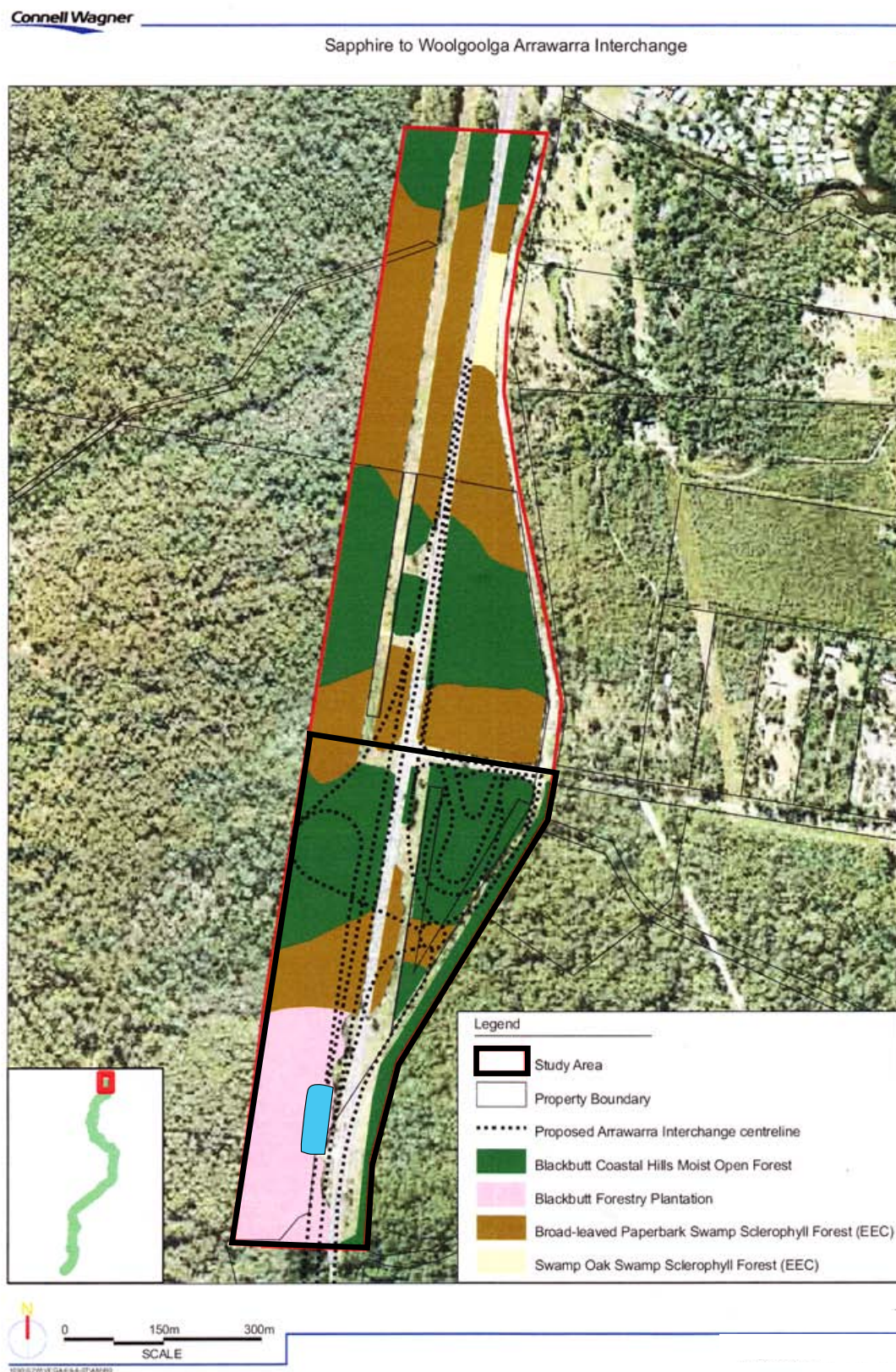


Figure 5. Location of the S2W-14 artefact scatter (blue) (base map: Connell Wagner 2007, Figure 3.1)

6 ASSESSMENT RESULTS

6.1 Unmodified sites and places of Aboriginal cultural significance

A number of unmodified sites/places of ceremonial, mythological and otherwise spiritual/sacred significance and contemporary attachment occur within the Arrawarra locality. However, the Aboriginal stakeholders advised that none of these sites/places would be adversely affected by the S2W Project, including construction of the Arrawarra Beach Road Interchange and any future construction of a rest area south of Arrawarra Beach Road.

6.2 Field survey

One scatter of eight surface artefacts (designated S2W-14, subsequently registered on the DECCW AHIMS database as site #22-1-373) was recorded during the survey. The artefacts were identified on the churned, fully cleared surface of the recently logged spur end in SU-1 (see plate on page 7), and had clearly been substantially disturbed. The artefacts occurred at a low density along a 110 metre stretch of the approved Project corridor spanning Nashs Road (Figure 5), within the area to be impacted by duplication of the existing highway between Arrawarra Creek and the Arrawarra Beach Road Interchange.

Further undetected artefacts are anticipated within the churned topsoil, but there is no expectation that any of these will be in a primary depositional context, or that intact subsurface archaeological deposits will survive if ever present.

S2W-14: Artefact scatter #22-1-373

GDA grid reference: 517610 E 6674126 N (determined by non-differential GPS)

Woolgoolga 9537-4N, Edition 3, 1:25,000 topographic mapsheet

Artefact description:

- 1) Fine-grained sandstone bipolar core, 75 x 57 x 20 mm.
6 negative flake scars, 40% pebble cortex.
- 2) Fine-grained sandstone multi-platform core, 80 x 65 x 53 mm.
9 negative flake scars, 40% pebble cortex.
- 3) Fine-grained sandstone flake, 25 x 35 x 20 mm.
Broad flaked platform, overpass termination.
1 dorsal negative flake scar. No cortex.
- 4) Greywacke bipolar core, 55 x 52 x 10 mm.
6 negative flake scars, 40% pebble cortex.
- 5) Siltstone retouched flake, 45 x 39 x 10 mm.
No platform, retouched feather termination.
3 dorsal negative scars. No cortex.
- 6) Siltstone flake, 40 x 27 x 4 mm.
Focal flaked platform, feather termination.
2 dorsal negative flake scars. No cortex.
- 7) Siltstone flake, 34 x 43 x 13 mm.
Broad flaked platform, feather termination.
100% dorsal pebble cortex.
- 8) Siltstone nuclear tool (discoïdal scraper), 43 x 45 x 21 mm.
12 negative flake scars, bifacial lateral and distal retouch.

6.3 Conclusions

The survey results are consistent with the predictive model of site location presented in Section 4.5, which was developed on the basis of past survey/investigation results, Aboriginal stakeholder advice, and the landscape and disturbance context of the study area.

It is acknowledged that there is a very high probability that additional undetected artefacts will occur in association with the identified S2W-14 artefact scatter. However, on the basis of the results of both the field survey and salvage excavations conducted on local bedrock-soil lands (Collins 2006a, 2006b, 2007b, 2007c, 2008, 2009, 2010b; Davies 2004, 2007; Hill and Murphy 2000b), which have revealed subsurface artefacts to be primarily if not entirely confined to the topsoil/B horizon interface, in conjunction with the widespread and intensive level of topsoil disturbance observed as an outcome of recent logging in SU-1, it is concluded that *in situ* S2W-14 artefacts (or any other cultural heritage materials) are highly unlikely to survive. Given the low identified surface artefact density and high level of topsoil disturbance it is further concluded that controlled archaeological test excavations/salvage, or Aboriginal stakeholder monitoring of construction-related disturbance within the S2W-14 area would be unlikely to provide information of supplementary scientific or any substantial Aboriginal socio-cultural value.

The only other landforms represented within the study area with any real potential to contain Aboriginal sites/cultural materials (other than scarred trees, which were not identified) are the spur end and flat within SU-2 and SU-3 respectively. While the presence of undetected low-density artefact occurrences cannot be discounted, both of these landforms have been similarly affected by past logging activities. As such, any undetected sites/materials are unlikely to be in an undisturbed state, but may be of Aboriginal socio-cultural value.

7 SIGNIFICANCE ASSESSMENT

7.1 Management principles and the concept of significance

Unlike aspects of the natural environment, "cultural heritage places are not alive in themselves, people give them 'life' and meaning by the way they treat them and by the way they think and feel about them. ... their value lies entirely within human culture" (Byrne et al 2001:22-23). The degree and type of value of a site/place will be different for various groups and individuals. All sites/places are not equally significant or important, and consequently are not equally worthy of conservation and management (Pearson and Sullivan 1999:17). Assessments of significance thus form the basis for management decisions and guide the development of impact mitigation strategies where these are warranted.

Aboriginal sites and places may have educational, tourism and other public values, but their primary values are generally those relating to their cultural/social significance to Aboriginal people, and scientific significance from an archaeological perspective (NPWS 1997:25). While sites/places considered to be scientifically significant are usually also significant to the Aboriginal community, others may be of outstanding Aboriginal cultural/social significance but have little or no scientific value.

Aboriginal cultural/social significance

Aboriginal cultural heritage is by no means confined to physical (archaeological) evidence. The cultural environment contains an invisible overlay of attachments and meanings, and Aboriginal people can and do hold equally strong and equally legitimate attachments to natural, unmodified, features of the landscape, and to entire landscapes themselves. The preservation of sites and places of cultural/social significance can be fundamental to maintaining an Aboriginal community's integrity, sense of place and unique cultural identity.

The level of significance that an individual site or place may hold for the present-day Aboriginal community is often dependent upon a variety of factors, including the nature, type and integrity of the site/place, the spiritual, emotional, historical and/or contemporary attachments attributed to it, its setting and importance within the traditional and/or contemporary cultural landscape, and the perceived value of the site/place in connecting past, present and future generations.

Scientific/archaeological significance

This type of significance is essentially an assessment of a site's potential to add to our understanding of past human behaviour. Such assessment is made not only with regard to currently available knowledge, theories and data retrieval methods, but with consideration of likely future scientific developments. Archaeological sites have special potential, and thus greater scientific significance, if there are few other sites that can contribute similar types of information, if they are in a good state of preservation, if they can provide a chronology extending back into the past, and/or if they form part of a larger site complex (NPWS 1997:26-28).

From a management and research perspective it is desirable that a representative sample of Aboriginal sites be maintained for the future. This means that not only are rare and unusual site types scientifically significant, but that a well-preserved site that provides a characteristic example of other sites common to its specific type, content and setting may also be of scientific significance. Any determination of representativeness must be based on the known sites in a region. Clearly, this will depend on the extent to which a region has been surveyed and as more work is completed and additional sites recorded, site representation (and significance) can change.

7.2 Site S2W-14 (#22-1-373)

Owing to its apparent low artefact density and disturbed landscape context, Aboriginal stakeholder representatives assessed S2W-14 to be of low-moderate *in situ* socio-cultural significance. Even though this significance was not considered sufficient to warrant controlled subsurface archaeological testing/salvage or an amendment to the S2W Project, the stakeholders advised that any intercepted artefacts would be of high cultural significance in their own right, and for this reason should be collected, recorded, and relocated to a nearby protected place within the RTA title corridor.

While probably associated with use of other nearby coastal and sub-coastal sites, the S2W-14 artefact scatter is not considered to be of any special archaeological/scientific representative value. Existing local DECCW reserves encompassing sub-coastal terrain similar to that containing S2W-14 include the Moonee Beach Nature Reserve and Yuraygir National Park. In the absence of any comprehensive archaeological survey or assessment, the conservation status of Aboriginal sites within these reserves is yet to be fully determined. However, Yuraygir National Park alone covers an area of more than 38,000 hectares, and it is envisaged that a representative sample of open stone artefact scatters on (potentially less disturbed) sub-coastal spurs will already be adequately conserved to provide future scientific research and Aboriginal community educational information. Considering its disturbance, apparent low artefact density, low potential for future academic research, and the likely preservation of a representative sample of similar sites in local reserves, S2W-14 is assessed to have a low level of scientific/archaeological significance.

8 IMPACT MITIGATION AND MANAGEMENT STRATEGIES

S2W-14 lies within the approved S2W Project corridor and would be entirely destroyed by carriageway construction. The site area has been extensively disturbed by logging activities (including the passage of heavy machinery). Surface evidence suggests that the site comprises a low-density artefact scatter only, and although additional undetected artefacts are expected within the churned topsoil, there is low to negligible potential for the survival of subsurface cultural deposits of scientific research value.

Unless the Project is re-designed to avoid S2W-14, the only feasible impact mitigation options are surface artefact collection, or surface artefact collection combined with controlled subsurface archaeological investigation/salvage and/or Aboriginal stakeholder monitoring of initial earthworks for the purposes of salvaging any artefacts able to be detected during the course of these works. Due to the apparent low artefact density and high level of existing disturbance, it is considered highly unlikely that controlled archaeological investigation/salvage and/or Aboriginal stakeholder earthworks monitoring would result in the provision of any information of scientific research or socio-cultural value above that offered by the existing surface artefact sample (which is probably representative of the site as a whole). As supported by the Aboriginal stakeholders, surface artefact collection is the preferred management strategy with respect to S2W-14. This strategy would partially mitigate impacts of the Project on socio-cultural values, and (as per RTA advice and given commitments) would enable permanent preservation of the collected artefacts in a nearby, undeveloped section of the RTA title corridor to be conserved in perpetuity.

No archaeological evidence or Potential Archaeological Deposits (PADs) were identified in SU-2 or SU-3 (Figure 3). Although it remains possible that undetected low-density artefact occurrences may occur, both of these survey units have been affected by past logging and are not expected to contain *in situ* surface materials or intact subsurface cultural deposits. SU-2 would be almost fully impacted by construction of the approved Arrawarra Beach Road Interchange, and SU-3 by any future construction of the Arrawarra Rest Area (Figure 3). In the absence of any specific landform elements with particular archaeological potential or areas of socio-cultural attachment or concern, subsurface investigations and/or Aboriginal stakeholder monitoring of initial earthworks are not considered warranted in SU-2, SU-3, or elsewhere within the study area. As agreed and supported by the Aboriginal stakeholders, the stop work provisions applicable to all Aboriginal cultural heritage materials off the recorded/individually managed sites intercepted by the approved Project (including S2W-14) (as per the JV Construction Heritage Management Plan, Appendix D Heritage Management Tool- reproduced in Appendix B of this report), in conjunction with the recording, assessment and re-deposition of salvaged artefacts, offer the only reasonable strategy for impact mitigation.

9 MANAGEMENT RECOMMENDATIONS

The Aboriginal stakeholder consultation, heritage register searches and field survey undertaken for this assessment revealed no constraints to the S2W Project within the study area, including construction of the Arrawarra Beach Interchange and any future rest area south of Arrawarra Beach Road, providing the management recommendations presented in this section are implemented. The management recommendations were formulated in liaison with, and are supported by the Aboriginal stakeholders as the most appropriate means of conserving socio-cultural values in the development-related context.

Recommendation 1

Prior to commencement of construction-related disturbance works within the approved Project corridor north of Arrawarra Creek, surface artefacts at site S2W-14 (#22-1-373; as per location shown on Figure 5) should be collected and fully recorded.

The JV has confirmed that the identified S2W-14 site area has been temporarily fenced and signposted to exclude machinery and unauthorised human access until such time as approval is given for the artefact collection and the collection has been satisfactorily completed with the assistance of Aboriginal stakeholder representatives. Once the artefacts are collected and recorded, an Aboriginal Site Impact Recording Form (ASIR) for S2W-14 will be forwarded to the DECCW for its records.

Recommendation 2

Prior to commencement of construction-related disturbance works north of Arrawarra Creek, all S2W Project personnel and subcontractors engaged for works within this area should undergo a general site induction. Consistent with the JV Construction Heritage Management Plan (2010:20-21), this induction is to include a cultural heritage component that highlights legal responsibilities under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*, reinforces the requirement for all on-site workers to comply with the legal conditions of these Acts, and outlines procedures to be implemented in the case of unexpected (including possible) cultural heritage finds (as per JV 2010:Appendix D Heritage Management Tool; Appendix B of this report).

Recommendation 3

In the event that any identified or potential heritage item is detected off the site S2W-14 location mapped on Figure 5 (following implementation of Recommendation 1) the stop-work conditions of the JV Heritage Management Tool (JV 2010: Appendix D; Appendix B of this report) should be observed.

Consistent with the Heritage Management Tool, disturbance works should not recommence within 50 metres of the find until such time as any required archaeological investigation, artefact salvage and/or field recording is completed (as per JV 2010:Appendix C; Appendix C of this report), and clearance has been given by the appropriate government agencies (Heritage Branch, NSW Department of Planning and/or the DECCW).

Recommendation 4

As decided and agreed by the Aboriginal stakeholder groups, the Aboriginal objects storage and management strategy to be implemented for artefacts collected/salvaged from other parts of the approved S2W Project footprint (cf RTA 2010:8; Collins 2010a, 2010b) should be extended to include the S2W-14 artefacts as well as any unexpected finds requiring collection/salvage from the study area (as per Recommendation 3).

In line with the agreed storage and management strategy, the Project archaeologist would fully record and appropriately bag and label the collected/salvaged artefacts with their respective site number and location. The artefacts would then be temporarily cared for by the Coffs Harbour and District Local Aboriginal Land Council in a locked cabinet to be furnished by the RTA. On completion of the Project (including landscaping), the artefacts would be re-deposited by the Aboriginal stakeholder representatives (each site together) within undeveloped sections of the RTA title corridor as close as feasible to their place of origin.

To allow the unhindered progression of any necessary on-going management of invasive weeds (pulling and spraying), it is recommended that the collected/salvaged Aboriginal artefacts be re-deposited at a depth of at least 50 centimetres, within purpose-dug holes placed in locations of assessed low to negligible existing archaeological potential. Given the need to take factors such as on-going highway and landscape maintenance into account, suitable alternative re-deposition locations for the S2W artefacts would be identified by the RTA in the first instance, and the Aboriginal stakeholders then consulted to decide the best options.

As committed by the RTA, all efforts will be made to ensure that the artefact re-deposition locations are conserved in perpetuity. Once selected in consultation with the Aboriginal stakeholders, the artefact re-deposition locations will be accurately pinpointed by Project surveyors and mapped and cross-referenced on all RTA maps and plans to avoid any future disturbance arising from highway/landscape maintenance or further highway upgrades. To this end, it is additionally recommended that a clearly labelled location peg, able to be readily cross-referenced to the RTA maps and plans, be installed and permanently maintained (checked at annual intervals and replaced as necessary) directly above each of the artefact re-deposition locations. To minimise public knowledge of Aboriginal site locations, no post-construction site fencing or specific signage with respect to the artefact re-deposition locations is considered warranted or in order.

Following re-deposition of the collected/salvaged S2W artefacts (including those from S2W-14) in suitably protected places agreed by the Aboriginal stakeholders and accurately mapped by the RTA, the artefact re-deposition locations will be duly registered with the DECCW for inclusion on the AHIMS database in accordance with Section 91 of the *National Parks and Wildlife Act 1974*.

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GLOSSARY

ALLUVIAL FLOODPLAIN

A level landscape unit with extremely low relief. There may be frequently active erosion and aggradation by channelled and overbank stream flow, or the landforms may be relict to these processes (Speight 1990:48).

ARCHAEOLOGICAL SITE

A place containing cultural materials of sufficient quality and quantity to allow inferences about human behaviour at that location (Plog *et al* 1978:383).

ARTEFACT

Any object having attributes as a consequence of human activity (Dunnell 1971).

BIFACIAL FLAKING/GRINDING

Flaking or grinding which has been undertaken on two opposing faces of an artefact (McCarthy 1976).

BIPOLAR CORE

An artefact with either negative flake scars present on opposite ends, or with negative flake scars and crushing (point initiations) present on opposite ends (McCarthy 1976:102).

BROAD PLATFORM

A platform which, when viewed from above, obscures the body of the flake. Usually produced by detaching the flake by striking well behind the platform margin (Witter 1992:110).

CHERT

A dense, extremely hard, microcrystalline or cryptocrystalline siliceous sedimentary rock, consisting mainly of inter-locking quartz crystals, sub-microscopic and sometimes containing opal (amorphous silica). Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or as a siliceous replacement of pre-existing rocks. Flint is a variety of chert occurring as nodules in chalk and having a conchoidal fracture (Lapidus 1987:102).

CORE

A piece of stone used as a source for flake production. Cores are thus generally characterised by negative flake scars (Morwood and L'Oste-Brown 1995:162).

CORTEX

The natural weathered surface of rock, not the result of human activity (McCarthy 1976:101).

CREST

Landform element standing above all or most points in the adjacent terrain. Usually smoothly convex (Speight 1990:13).

DISTAL

The opposite end of an artefact to the platform end. The blade of an edge-ground axe or the working edge of other implements form the distal end (McCarthy 1976:101).

DORSAL

The face of a flake that was exposed on the core before removal of the flake (Phagan 1976:39).

DORSAL RIDGE

A ridge occurring on the dorsal face of a flake at the junction between two flake scars (Hiscock 1984).

DRAINAGE DEPRESSION

A level to gently inclined, long, narrow, shallow open depression with smoothly concave cross-section, rising to moderately inclined side slopes, eroded or aggraded by sheet wash (Speight 1990:30).

FEATHER TERMINATION

Is identified on the distal end of a flake that terminates in a sharp edge with a minimal margin. Feather terminations are an indicator of good knapping control (Crabtree 1972:64).

FLAKE

A piece of stone detached from a larger mass by the application of force and having a feather, hinge or step termination and a bulb of percussion. A platform may be present if the proximal end is unbroken (Crabtree 1972:64).

FLAKED PIECE

Chipped artefacts with negative flake scars which cannot be classified as a flake, core or retouched flake (Hiscock 1988:64).

FOCAL PLATFORM

A platform having a small area such that when viewed from above, most of the remaining body of the flake can be seen. Focalised platforms are produced by striking close to the platform edge (Witter 1992:110).

GREYWACKE

Sedimentary rock. A very hard, dark grey or greenish-grey, coarse-grained sandstone characterised by angular particles and rock fragments embedded in a clayey matrix (Lapidus 1987:265).

JASPER

A compact, microcrystalline variety of quartz. Its colours are variable, including white, grey, red, brown and black (Lapidus 1987:308).

LANDFORM ELEMENT

A topographic feature of 40m. or more in maximum dimension which forms part of a larger unit, the landform pattern (Speight 1990:9).

LATERAL MARGINS

The sides of an artefact- between the proximal and distal ends (McCarthy 1976:101).

LENGTH

Maximum dimension of a core or flaked piece in any direction; maximum distance along the percussion axis of a flake from the platform to the distal margin (Witter 1986:2).

META-SEDIMENT

A metamorphosed sedimentary rock in which the original texture is still recognisable (Lapidus 1987:345).

MUDSTONE

A commonly-used synonym for Mudrock. A fine-grained sedimentary rock composed chiefly of particles in the silt-clay size range. Mudrock/mudstone is a general term used to distinguish the finer-grained sedimentary rocks from sandstones or limestones (Lapidus 1987:362).

MULTI-PLATFORM CORE

A core with at least one negative scar running in a different direction to the remainder. Multi-directional scars indicate that the core has been rotated to get the most economical use of the raw material (Hiscock 1986:49).

NEGATIVE FLAKE SCAR

Concave surface resulting from the removal of a flake (Phagan 1976:39).

NUCLEAR TOOL

A core which, rather than being specifically used to supply flakes to be used as tools, is itself the tool. A nuclear tool is thus a core-like tool that did not originate as a flake (Witter 1992:30).

OVERPASS TERMINATION

Is identified on the distal end of a flake whose fracture plane (ventral surface) curves markedly away from the core face (dorsal surface) and continues directly into the core, removing the base of the core and giving the flake a J shape in longitudinal cross section (Hiscock 1988:86).

PEBBLE

Stone worn and rounded by water and other natural forces (McCarthy 1976:101).

RETOUCH

The alteration to the primary termination of a flake caused by deliberate secondary flaking in order to sharpen or modify the edge (Crabtree 1972:89).

RIDGE

A compound landform element comprising a narrow spine crest and its immediately adjoining slope with the spine length being greater than the width (Packard 1992:100).

SANDSTONE

A sedimentary rock composed of sand-sized grains, mainly of quartz, in a matrix of clay or silt, and bound together by a cement that may be carbonate (Lapidus 1987:449).

SCARRED TREE

Trees that have been scarred by Aboriginal people through the deliberate removal of bark or wood for utilitarian purposes, including collection of raw materials for the production of shelters, canoes, containers and other implements, toe-holds to assist tree climbing, and cuttings made during the course of food resource exploitation (Long 2005).

SHELL MIDDEN

Middens are Aboriginal open campsites which are dominated by shellfish remains. They are generally found near water and differ from natural shell beds in that they comprise predominantly mature specimens of edible mollusc species. They may also contain animal bone, stone artefacts, and charcoal and ash from cooking fires (Byrne 1989:10).

SILTSTONE

A fine-grained sedimentary rock principally composed of silt-grade material. Intermediate between sandstone and shale, siltstone contains less clay than shale and lacks its fissility and fine laminations (Lapidus 1987:474).

SPUR

Landform element comprising a lower, subsidiary ridge leading down from a locally dominant ridge or crest (Packard 1992:100).

STONE ARTEFACT

Fragment of stone which generally possesses one or more of the following characteristics:

- Positive or negative ring crack
- Distinct positive or negative bulb of force
- Definite erillure scar in position beneath a platform
- Definite remnants of flake scars (i.e.dorsal scars and ridges)

These traits indicate the application of an external force to a core, and are characteristic of the spalls removed by humans using direct percussion. Stone artefacts which have none of the above may be identified as such if they possess ground facet/s characteristic of human industry (Hiscock 1984:128).

THICKNESS

The greatest dimension perpendicular to both the length and width of an artefact (Witter 1986:2).

VOLCANIC ROCK

Very fine-grained or glassy igneous rock produced by volcanic action at or near the earth's surface, either extruded as lava or expelled explosively (Lapidus 1987:535).

WIDTH

The maximum distance between the lateral margins of an artefact, measured at right angles to the length (Witter 1986:2).

Glossary References

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APPENDIX A. Aboriginal stakeholder correspondence



Coffs Harbour & District Local Aboriginal Land Council

Cnr Pacific Highway & Arthur Street, Coffs Harbour 2450
PO Box 6150, Coffs Harbour Plaza NSW 2450
Phone: (02) 6652 8740 Fax: (02) 6652 5923

27th September 2010

Attention: Jackie Collins

Adise Heritage Consultants Pty Ltd
11 Camden Head Road
Dunbogan NSW 2443

**Re: Aboriginal Cultural Heritage Assessment Report – Sapphire to Woolgoolga
Pacific Highway Upgrade Arrawarra Section.**

Dear Jackie,

Thank you for providing the Coffs Harbour and District Local Aboriginal Land Council (Council) with a draft report of results and recommendations for an Aboriginal Cultural Heritage assessment undertaken as part of the Sapphire to Woolgoolga Pacific Highway upgrade within the Arrawarra Beach Road interchange section.

After careful consideration and subsequent discussions in relation to the draft report results and recommendations, I am able to confirm that the draft report accurately reflects the discussions and recommendations discussed during the field assessment processes.

In summary the Council supports this report in its current form and holds no additions or alterations to the report in its current form.

Once again thank you for your assistance in this matter, and Council looks forward to working with you on future Cultural Heritage projects within our Land Council boundaries.

If you have any questions in relation to this matter, please do not hesitate to contact me on the number listed above.

Yours truly,

Chris Spencer
Chief Executive Officer



Garlambirla Guuyu-girrwa Corporation

**PO Box 6904,
Coffs Harbour NSW 2450**
ABN 20 419 562 138

Sandra Rowe
CONTACT / SECRETARY
Telephone: 0401 201 662

29th July, 2010

Jacqueline Collins
11 Camden Head Road
DUNDOGAN NSW 2443

Dear Jacqui,

**PACIFIC HIGHWAY UPGRADE SAPPHIRE TO WOOLGOOLGA ABORIGINAL
HERITAGE ASSESSMENT OF PROJECT AREA, ARRAWARRA**

Thank you for the Draft Report on the above. I have read the enclosed and note your recommendations regarding artefacts found during the said investigation, which reflects those of the members of the stakeholder groups and endorse the report accordingly.

If you have any questions regarding this matter, please feel free to contact me on **0401 201 662**.

Respectfully,

Sandra Rowe
Contact Person/Secretary



Bagawa Birra Murri
Aboriginal Corporation
31 Soren Larsen Crs
Boambee East NSW 2452
Ph: 0405340910 -66584878

6th August 2010
Attention : Jacqi Collins

Adise Heritage Consultants
11 Camden Head Road
Dunbogan NSW 2443

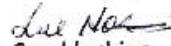
**Re: Cultural Heritage Assessment-Pacific Highway to
Woolgoolga Upgrade**

Dear Jacqi

Thank you for providing a draft copy of the recommendation of the Cultural Heritage assessment for the above mentioned properties performed by Ms Sue Hoskins.

The Bagawa Birra Murri Aboriginal Corporation performed Cultural Heritage assessments on the 29th October 2009.
After reviewing your report and consultations during the assessment the Bagawa Birra Murri Aboriginal Corporation is in agreement that the report recommendations reflect best interest of practical management in relation to Aboriginal Cultural Heritage.

If you have any further questions in relation to this matter please do not hesitate to contact me on the numbers listed above.

Yours Truly

Sue Hoskins
Chairperson



**YARRAWARRA
ABORIGINAL CORPORATION**

Lot 170 Red Rock Road,
Corindi Beach.
NSW 2456

Ph: 02 66 407 100 Fax: 02 66 407 199
Email: admin@yarrawarra.org.au

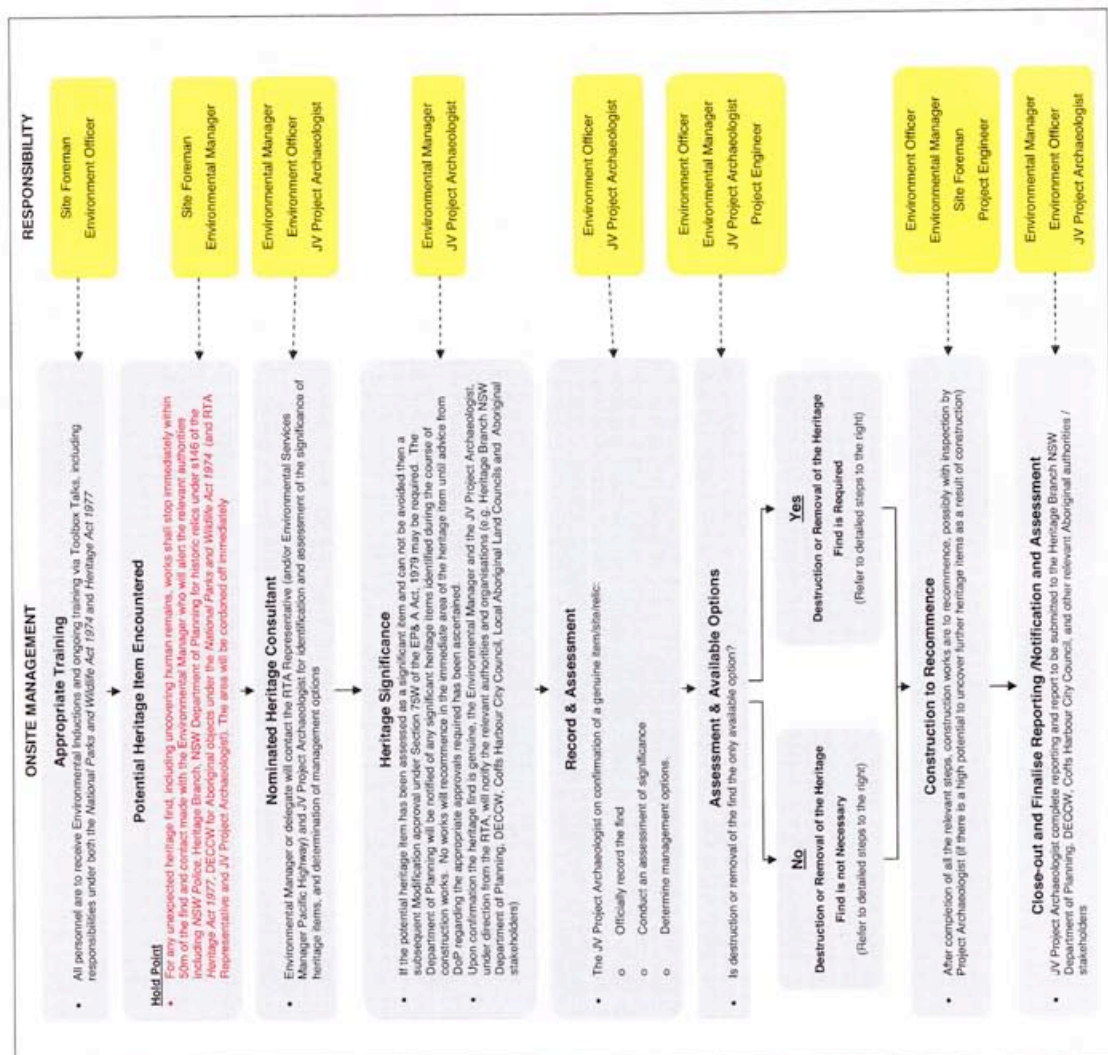
**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT OF PROJECT AREA
ARRAWARRA**

I Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit, Yarrowarra Aboriginal Corporation) and Milton Duroux (Garby Elder), attended the full field survey of the study Area on the 29th of October 2009. On the day of the survey we found one scatter of eight artifacts, it was recommended by me and Milton, that we hold no constraints on the above project, as long as it stays within the proposed study area and we agree on all four recommendations within this report.

Kind regards
Tim Cowan
11/08/2010

APPENDIX B. JV Construction Heritage Management Plan Appendix D- Heritage Management Tool

Heritage Management Tool



- Objective**
- To correctly implement all measures to ensure that in the event of a heritage find that the item is preserved until assessment of its significance has been undertaken.
- Legislation / Standards / Guidelines**
- Heritage Act, 1977
 - Protection of the Environment Operations Act, 1997
 - National Parks and Wildlife Act, 1974
 - NSW Environmental Planning and Assessment Act 1979 (EP&A Act)
- Monitoring / Recording**
- Environment Officer is to undertake environmental inspections of the construction zone and maintain a record.
- Assessment of Available Options**
- Environmental Manager with Engineers and support from JV Project Archaeologist will assess the requirements and the necessity to disturb/destroy find.
- No - Destruction or removal of the heritage find is NOT necessary**
- If the removal or destruction of the heritage find is not required the following steps should be undertaken:
- Protect the area, by completely fencing off the area with signage or similar
 - Include the find and its sensitivity within Project Inductions and Tool box talks
 - Archaeological protective works to be inspected by the relevant authorities if required.
- Yes - Destruction or removal of the heritage find IS required**
- If the potential heritage item has been assessed as a significant item and can not be avoided then a subsequent Modification approval under Section 75W of the EP&A Act, 1979 may be required. The Department of Planning will be notified of any significant heritage items identified during the course of construction works. No works will recommence in the immediate area of the heritage item until advice from DoP regarding the appropriate approvals required has been ascertained.
- If it is concluded that the destruction or removal of the heritage find is required, consult with the RTA Representative and relevant authorities to determine the methodology. Management methods for Aboriginal and Non-Aboriginal items will be in accordance with the Salvage and Curation Strategy. Authorities may include:
- Department of Planning
 - Heritage Branch NSW Department of Planning in relation to non-Aboriginal Heritage
 - Department of Environment Climate Change and Water
 - Environmental Representative
 - Coffs Harbour City Council
 - Coffs Harbour and District Local Aboriginal Land Council
 - Yarrararra Aboriginal Corporation, Garby Elders, Bagawa Birra Murr Aboriginal Corporation and Garlambilla Guryu Girewa Elders Aboriginal Corporation.
- Removal works and works within the vicinity of the find will be conducted in accordance with good practice and any recommended management actions.
- (GO TO STEP "Construction to Recommence")**
- Construction to Recommence**
- After completion of all the relevant steps, construction works may recommence, under the supervision of the JV Project Archaeologist (if there is a high potential to uncover further heritage items as a result of construction).
- Close-out and Finalise Reporting / Notification and Assessment**
- JV Project Archaeologist to complete reporting in accordance with appropriate Heritage Branch and Local Council (if relevant) guidelines.
- Report to be submitted to the Heritage Branch NSW Department of Planning, DECCW, Coffs Harbour Council, and other relevant Aboriginal authorities / councils / stakeholders.

APPENDIX C. JV Construction Heritage Management Plan Appendix C- Salvage and Curation Methodology

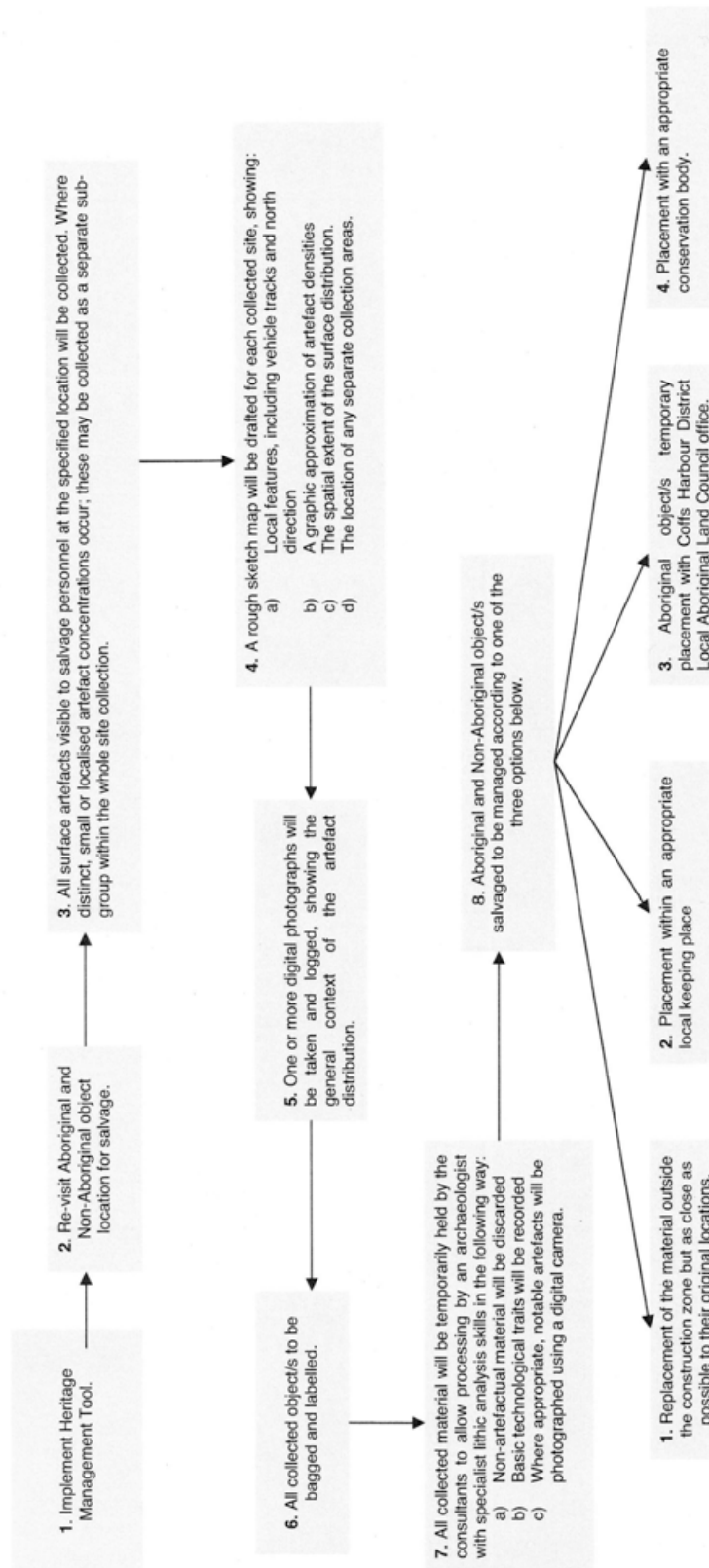


Figure 1: Salvage and curation methodology flowchart

APPENDIX D. DECCW AHIMS basic search results



AHIMS Web Services (AWS) Cover Letter

Your Ref Number : S2WA2

ADISE Pty Ltd

Date: 10 February 2011

Attention: Jacqueline Collins

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 517500 - 518000,
Northings : 6673900 - 6674700 with a Buffer of 0 meters. Additional Info : conducted by Jacqueline Collins on 10
February 2011**

A search of the DECCW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(http://www.nsw.gov.au/gazette\)](http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from DECCW's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- AHIMS records information about Aboriginal sites that have been provided to DECCW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

APPENDIX E. DECCW AHIMS comprehensive search results

(CONFIDENTIAL- not to be included in public documents)
