Upgrading the Pacific Highway

# Wells Crossing to Iluka Road

# Glenugie upgrade

## Environmental assessment

Submissions report

October 2009

RTA/Pub.09.425

NSW Roads and Traffic Authority

Upgrading the Pacific Highway

# Wells Crossing to Iluka Road

# Glenugie upgrade

Environmental assessment submissions report

October 2009

ISBN 978-1-921692-28-4

# Contents



# List of Tables



# List of Figures

# 1 Introduction and background

## 1.1 The project

The proposed upgrade of the Pacific Highway at Glenugie (the project) is part of the Pacific Highway Upgrade Program being implemented by the NSW Roads and Traffic Authority (RTA). The project is about seven kilometres in length, extending northwards from Franklins Road to just south of Eight Mile Lane. The northern end of the project is about 68 km north of Coffs Harbour and 15 km south of Grafton. The project is part of the larger Wells Crossing to Iluka Road upgrade proposal and follows the preferred alignment for this proposal between Franklins Road and Eight Mile Lane.

The project for which approval is being sought involves a full motorway style (class M) upgrade. Approval is also being sought to stage the upgrade. A brief description of the full motorway style upgrade and likely initial staging proposals is provided below. A more detailed description of the project is provided in Volume 1 of the Glenugie Upgrade Environmental Assessment, prepared by the RTA in August 2009.

### 1.1.1 The full motorway style upgrade proposal

The full motorway style upgrade would run parallel to the eastern side of the existing Pacific Highway between Franklins Road and Eight Mile Lane. It would comprise a dual carriageway road, about seven kilometres in length, with two lanes in each direction. The road median would also be wide enough to accommodate a future upgrade to three lanes in each direction if required. The existing Pacific Highway would be retained as a local access road.

As part of the project, a new forestry service road would be constructed to maintain operational access to Glenugie State Forest. This new forestry service road would run on the eastern side of the upgraded highway from Eight Mile Lane to Lookout Road, parallel to the new section of highway and just outside the highway road reserve corridor.

### 1.1.2 Likely initial staging

Based on available funding the likely initial staging would comprise a combination of arterial and motorway style highway as follows:

- A section of motorway style highway, about 2.5 km in length, on the northern part of the project route. The existing highway would become a local access road at this location.
- A section of arterial style highway in the southern part of the project route, about four kilometres in length comprising:
    - A new two lane carriageway to carry southbound traffic.
    - Upgrading the existing two-way two-lane highway to a two-lane northbound carriageway to carry northbound traffic.

The proposed forestry service road (described above for the full motorway

style upgrade) would also be constructed as part of the initial staging. Additionally, some works may be required to improve the performance of the existing highway where it would become the northbound carriageway.

The principal driver for the project is to improve road safety along the Glenugie section of the Pacific Highway. The project would also add to the travel efficiency benefits provided by other recent Pacific Highway upgrades.

## 1.2 Statutory context

The Wells Crossing to Iluka Road upgrade has been declared to be a project to which Part 3A of the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act) applies. It has also been declared as critical infrastructure under the EP&A Act. The project, being part of the Wells Crossing to Iluka Road upgrade proposal, also falls within these declarations. In accordance with Part 3A of the EP&A Act, an environmental assessment was prepared by the RTA in August 2009 to assess the potential impacts of the project.

## 1.3 Environmental assessment exhibition

The environmental assessment was placed on public display for 30 days commencing 12 August 2009. During the environmental assessment exhibition period, the community, government agencies and other interested parties were invited to make written submissions on the project to the Department of Planning.

The environmental assessment was made available on the Department of Planning website (http://www.planning.nsw.gov.au) and the RTA project website (www.rta.nsw.gov.au/pacific [click on Wells Crossing to Iluka Road]). It was also available for viewing at the following locations:

- Department of Planning, Head Office, 23-33 Bridge Street, Sydney (Monday - Friday, 8.30am - 4.30pm).
- RTA Pacific Highway Office, 21 Prince Street, Grafton (Monday - Friday, 8.30am - 4.30pm).
- Grafton Community Centre, 59 Duke Street, Grafton (Monday - Friday, 8.30am - 4.30pm).
- Clarence Valley Council, 2 Prince Street, Grafton (Monday - Friday, 8.30am - 4.30pm).
- Coldstream Gallery, 5 Coldstream Street, Ulmarra (shopfront window).
- Tucabia Village store, 12 Cordini Street, Tucabia (Monday - Sunday, 7am - 7pm).
- Wooli Post Office, 89 Carraboi Street, Wooli (shopfront window).
- Yamba Chamber of Commerce noticeboard, corner Yamba and Coldstream streets, Yamba.
- Brooms Head Post Office, Ocean Road, Brooms Head (shopfront window).
- Tyndale Roadhouse, Pacific Highway, Tyndale (shopfront window).

- United Service Station, Lot 41 Pacific Highway, Halfway Creek.

The RTA Pacific Highway Office display location was staffed to enable community members to ask questions and gain further information about the project and assessment process.

Consultation with key stakeholders continued throughout, and in some cases beyond, the exhibition period.

## 1.4 Purpose of the document

Nine submissions were made during the exhibition of the environmental assessment. The Director-General of Planning provided copies of the submissions to the RTA. In accordance with Section 75H(6) of the EP&A Act, the Director-General requires the RTA to address the issues raised in the submissions. If the response to the issues raised requires changes to the project to minimise its environmental impact, the Director-General requires a preferred project report to be prepared and the statement of commitments to be revised.

This report includes the RTA's responses to the issues raised in submissions (Chapter 2), details of additional assessment carried out since the exhibition of the environmental assessment (Chapter 3), and a revised statement of commitments (Chapter 4).

# 2 Response to submissions

## 2.1 Respondents

Nine submissions were received in response to the exhibition of the environmental assessment. Of the nine submissions, three were from State Government agencies, five were from community-based environmental organisations and one was from an individual representing environmental interests.

Each submission has been examined individually to understand the issues being raised. The issues raised in the submissions have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided.

Appendix A includes a table listing each submission by number and cross referencing the section of this report where the issues raised are addressed. Submissions are numbered according to the numbering system from the initial Department of Planning logging process.

## 2.2 Overview of issues raised

### 2.2.1 NSW Government agencies

Submissions were received from the following State Government agencies:

- NSW Department of Environment, Climate Change and Water (DECCW).
- NSW Office of Water (part of DECCW).
- Industry and Investment NSW (I&I NSW).

Submissions received from the government agencies focussed predominantly on their particular discipline areas. Recommendations for conditions of approval and amendments to the Statement of Commitments were also made.

The DECCW submission provides comment on key issues, including ecology, Aboriginal heritage, noise and construction issues, in particular water management. An important focus of the DECCW submission was proposals regarding amendments to the Statement of Commitments and recommendations regarding the Conditions of Approval.

The NSW Office of Water submission highlighted the need to obtain the requisite licences for water extraction and for the implementation of approach management guidelines for any work within 40 m of water courses.

The submission from I&I NSW focused on general construction impacts and management, the potential impacts on fluvial geomorphology and the ongoing forestry operations within the Glenugie State Forest, including the use

of the timber that would be harvested as part of the project.

### 2.2.2 Community groups and individuals

The remaining six submissions were received from community groups and individuals. Issues raised included:

- Prioritisation of the Glenugie section ahead of other highway sections.
- Alternatives to the construction of a Class M upgrade.
- Clearing of native vegetation.
- Potential ecological impacts, particularly on *Melaleuca irbyana* and *Eucalyptus tetrapleura*, as well as a range of threatened fauna species.
- Assessment of cumulative biodiversity impacts.
- Peak oil, greenhouse gas emissions and climate change.

## 2.3 Strategic and project need

### 2.3.1 Program prioritisation

**Submission numbers**

1 – Clarence Environment Centre (CEC)
3 – Climate Change Australia (CCA)
6 – National Parks Association (NPA)

**Summary of issues raised**

The submissions raised concerns regarding the prioritisation of the Glenugie section ahead of other highway sections.

**Response**

The Glenugie section was selected for upgrade for the following reasons:

- This section of highway was identified as a high priority for safety improvements following a recent number of crashes in the area. In addition this section of existing Pacific Highway is characterised by poor horizontal and vertical geometry, narrow shoulders and numerous traffic hazards close to the highway.
- The implementation of the Pacific Highway Upgrade Program is dependent on funding from the Australian and State governments. The proposed Glenugie upgrade could be constructed with the funding that is currently available. This funding is immediately available for a section of highway north of Woolgoolga.
- The upgrade of the Glenugie section fits strategically with future plans for the upgrade of the Wells Crossing to Iluka Road section.
- The accident rate along this section of road is 25 accidents per million vehicle kilometres travelled (MVKT), which exceeds the Pacific Highway target of 15 accidents per MVKT.

### 2.3.2 Program and project objectives

**Submission numbers**

1 – Clarence Environment Centre (CEC)

**Summary of issues raised**

This submission stated that two of the objectives of the Pacific Highway Upgrade Program, those regarding "supports economic development" and "manage the project in accordance with the principles of ESD" are in conflict.

It was also noted that the RTA provides a "highly emotive" overarching vision for the Pacific highway upgrade, which aims to provide "...a sweeping, green highway providing panoramic views to the Great Dividing Range and the forests, farmlands and coastline of the Pacific Ocean...". In relation to this, the submission states that "at no stage of the Wells Crossing to Iluka Road realignment will motorists catch a glimpse of the ocean and precious little will be seen of the Great Dividing Range".

**Response**

In response to this comment, the following points are raised:

- The concept of ESD assumes that economic development (as opposed to economic growth) can be undertaken in a sustainable manner, being in a manner that maintains ecological processes on which life depends. Achievement of ESD requires adherence to a set of four principles, in particular:
  - The precautionary principle.
  - Inter-generational equity.
  - Conservation of biological diversity and ecological integrity.
  - Improved valuation and pricing of environmental resources.
- The Pacific Highway Upgrade Program supports population growth and economic development on the mid-north and north coast of NSW and is being planned and implemented in consideration of the four principles of ESD. At a project level, the principles of ESD have been considered in the route selection and concept design development processes for the Wells Crossing to Iluka Road upgrade proposal. This included consideration of ecological and social impacts and the corresponding requirements for impact avoidance and mitigation for the Glenugie section.
- The principles of ESD have been further considered during the environmental assessment for the Glenugie section. This has resulted in identification, within the environmental assessment report, of the impact mitigation and management measures to be incorporated into the design, construction and operational phases of the project.

In response to the comment on the RTA's overarching vision for the Pacific Highway upgrade, the quoted text referred to in the submission (that is, "...a sweeping, green highway providing panoramic views to the Great Dividing

Range and the forests, farmlands and coastline of the Pacific Ocean...") is not contained within the Glenugie upgrade environmental assessment. The quoted text is originally from the Pacific Highway Urban Design Framework, RTA 2004 and also appeared in the Wells Crossing to Iluka Road Concept Design Report, RTA 2009. It is a vision that is applied to Pacific Highway Upgrade Program as a whole, which extends from Hexham to the Queensland border. The Great Dividing Range and the Pacific Ocean can be viewed from some sections of the Pacific Highway including areas on the Wells Crossing to Iluka Road project.

## 2.4 Project justification

### 2.4.1 Road safety benefits

**Submission numbers**

1 – Clarence Environment Centre (CEC)
6 – National Parks Association (NPA)

**Summary of issues raised**

The CEC disagrees with the RTA's claim that the upgrade will improve road safety and reduce the road accident rate. (1)

The NPA considers that the practice of upgrading short sections of highway to motorway standard has an adverse effect on road safety because, after travelling on roads built for 110 km/h, motorists do not typically slow down enough to safely travel on the sections in between. (6)

**Response**

The Glenugie upgrade is designed to provide a high standard and safe dual carriageway highway that caters for the current and forecast traffic growth. It is important to note here, that the forecast growth in traffic volume (on which the upgrade design is based) would occur independently of the proposed upgrade and will exacerbate existing road safety issues if a road upgrade is not implemented. The new highway will be signposted at 100 km/h until adjacent sections are completed. The appropriateness of the posted speed limit would also be subject to review during the operational phase.

Both the upgraded sections of highway and the adjoining sections of highway will be sign-posted with speed limits appropriate to the respective road standards and traffic conditions. The new highway will be signposted at 100 km/h until adjacent sections are completed. Road safety and driver behaviour are issues of concerns for the RTA. The upgrade of the Pacific Highway to dual carriageway is a government response to safety concerns on existing two lane two way sections. Driver behaviour is a key issue for road safety, however compliance with signposted speed limits is a matter for the NSW Police Force.

### 2.4.2 Reduction in travel time and transport costs

**Submission numbers**

1 – Clarence Environment Centre (CEC)
2 - Individual

**Summary of issues raised**

- An inland corridor via Summerland Way would be a more efficient alternative to the upgrading of the Pacific Highway.
- The traffic data used in the justification of the project are questionable. (1,2)

**Response**

In response to the comment on the inland corridor, the following points are noted:

- The Glenugie upgrade is about 13 km south of the start of the Summerland Way. The Summerland Way starts at Grafton and extends northwards to the Queensland border via Casino and Kyogle.
- The RTA's Technical Review of the inland corridor via Summerland Way (RTA, 2006) found that an upgrade of the Pacific Highway would provide a more cost-effective solution for future traffic and transport needs. Specifically, it was concluded that the inland corridor via Summerland Way would not provide a viable alternative to upgrading the Pacific Highway between Grafton and Tyagarah/Ewingsdale for the following reasons:
  - It would not take traffic off the Pacific Highway.
  - The traffic that would use the Summerland Way would not justify the cost.
  - It would cost more than the Pacific Highway upgrade.
  - Since the majority of traffic would remain on the Pacific Highway, the Pacific Highway would require continued investment in terms of maintenance and improvements.
  - In summary, the Pacific Highway would require upgrading even if the Summerland Way was built.

Further information on the RTA's Technical Review of the inland corridor is available on the RTA's website (http://www.rta.nsw.gov.au).

The traffic data was obtained from traffic counters placed within the project length during the months of May and June 2009. This data was verified using RTA Count Station Number 04.2, located on the Pacific Highway approximately 8.4 km south of Grafton. Station Number 04.2 is a permanent counting station which has been collecting traffic volume data for over ten years.

### 2.4.3 Peak oil and climate change

**Submission numbers**

2 - Individual
3 – Climate Change Australia (CCA)
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

Concern that the proposed upgrade and environmental assessment do not consider the concept of 'peak oil', being the point when oil production 'peaks' (in turn corresponding to the point when half of the worlds easy oil reserves have been exhausted) and global oil supplies subsequently begin to decline.

Concern that, due to future likely decrease in oil and energy supplies associated with 'peak oil' and the climate change challenge, the funding earmarked for the project should be spent on upgrading rail transport.

Concern that the RTA is "pushing for wide motorways and triplication of the existing highway through forest", given the NSW Government's commitment and recognised need to drastically reduce greenhouse gas emissions, the concept of 'peak oil' and the importance of forests as carbon stores. Similar concerns in relation to 'peak oil' and greenhouse gas emissions were expressed by the CVCC. Submission 2 also contended that the environmental assessment does not consider the government's greenhouse gas reduction targets.

Further issues were raised in relation to greenhouse gas emissions and climate change. These are discussed and responded to in Section 2.13.

**Response**

The demand for road transport will continue for both economic and social reasons. Despite efforts to limit demand for road transport, it is expected that the need for transport will continue to grow as the Australian and NSW economies continue to expand. Nevertheless, governments and industry are taking the view that it is prudent to consider that oil production may 'peak' and then decline. This could increase the cost and reduce the availability of transport fuels and construction materials derived from oil.

For transport, the solutions to the problem of 'peak oil' are similar to those for climate change. Alternatives to fossil fuels need to be found and transport must become more energy efficient. There are moves to establish alternatives to oil as a fuel for transport and to improve energy efficiency. This will enable the economic benefits provided by road transport to continue to be delivered with a reduced need for fossil fuels. Similar action is being taken, through recycling and investigation of alternative materials, to reduce the need for construction products derived from fossil fuels.

Many of the actions to deal with climate change, and issues involving 'peak

oil', are being addressed at a national level. Specifically, NSW is working collaboratively with the Commonwealth to:

- Introduce fuel efficiency standards for cars and assist the car industry to produce more efficient fuel efficient vehicles.
- Address distortions that create incentives for greater private vehicle use.

The proposed national Carbon Pollution Reduction Scheme will also play a key role in addressing climate change.

Additionally, the programs outlined in the Sydney Metropolitan Strategy, the State Infrastructure Strategy and the Urban Transport Strategy will reduce transport demand, reduce congestion and facilitate use of public transport. The Sustainable Government Policy commits the RTA and other government fleets to the use of E10 blends (or other alternative fuels) and to environment performance score targets. The RTA is also doing its part through the promotion of E10 and the use of Hybrid and LPG powered vehicles in its fleet.

Major vehicle manufacturers have announced plans to sell electric powered vehicles in Australia. The RTA is monitoring these developments and will facilitate the introduction of these vehicles as they become available. The RTA is also participating with Austroads and industry in research and trials with the goal of developing more sustainable road construction materials and practices and reducing reliance on products derived from oil. As road transport is a significant and necessary element of the NSW economy, that also provides many social benefits, the RTA will continue to ensure that all potential impacts on this system, such as peak oil, are identified and action is taken to manage these risks.

In response to the concerns raised in the submissions in relation to the need for a six lane highway, it is noted that the proposed upgrade has been designed on the basis of forecast traffic growth, which would occur independently of the upgrade. Although sufficient land to accommodate a six lane highway would be reserved, the proposal is to construct a new section of four lane highway with a likely initial staging option incorporating the existing highway. A third lane in each direction would only be added if needed to meet future traffic demands. It is prudent at this stage, however, based on the forecast traffic growth and regional demands, to plan for the full six lane upgrade.

### 2.4.4 Overall environmental impacts and ESD

**Submission numbers**

1 – Clarence Environment Centre (CEC)
2 – Individual
6 – National Parks Association (NPA)

**Summary of issues raised**

These submissions are concerned that the proposed clearing of a 150 m wide corridor to construct a highway that measures 50 m wide does not minimise

environmental impacts and is not in accordance with the principles of ESD. (1, 6)

An issue for submission number 2 is that the environmental assessment contains no quantification of sustainability targets and achievements.

**Response**

The project does not require clearing of a 150 m wide corridor. The road footprint width generally ranges from approximately 40 m wide to 80 m in some cuttings. There is one cutting that will require a footprint of around 90 m for around 400 m in length. The total clearing required for the project is approximately 85 ha. Every effort will be made at the detailed design stage to further minimise clearing. It is envisaged that the project would be of similar width to the Pacific Highway at Halfway Creek when the new carriageways are not on fill or in a cutting. The median width of the Pacific Highway upgrade at Halfway Creek is 11 m, and 12 m for the Glenugie upgrade.

Table 11.3 of the environmental assessment describes how the Pacific Highway upgrade and the project have been developed in consideration of ESD principles. The RTA considers that the preferred route identified for the Wells Crossing to Iluka Road upgrade (of which this project forms part) provides the best balance across environmental, social, functional and cost criteria, as compared to other route options considered.

### 2.4.5 Project alternatives

**Submission numbers**

1 – Clarence Environment Centre (CEC)
3 – Climate Change Australia (CCA)
6 – National Parks Association (NPA)
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

The respondents raised the following concerns:

- The upgrade should be to an arterial standard rather than a motorway standard.
- The existing highway should be used for one of the carriageways of the upgraded highway, with a new carriageway running parallel to or close to the existing highway.
- There should be no increase in the width of the highway corridor to allow for the future construction of a third lane in each direction.

**Response**

The upgrade of the current highway to a two-lane dual carriageway was considered during the options development for the Wells Crossing to Iluka Road upgrade proposal. The outcome of this investigation demonstrated that incorporating the existing highway into the full length of the proposed

upgrade section would have a number of disadvantages. Specifically, the vertical and horizontal alignment of the existing Pacific Highway along most of the proposed Glenugie upgrade section does not meet the current standards for the Pacific Highway Upgrade Program. Substantial reconstruction of the existing highway would therefore be required to incorporate the full length of the Glenugie section into either a Class A or Class M upgrade. Additional disadvantages include:

- High construction costs associated with working under traffic.
- Road safety issues for both highway users and construction workers associated with working under traffic.

The central median for an arterial or motorway style upgrade would provide the room for an additional two lanes in the future, if required. Any additional lanes would be subject to further environmental assessment and approval.

### 2.4.6 Cost benefit analysis

**Submission numbers**

2 - Individual
6 – National Parks Association (NPA)

**Summary of issues raised**

These submissions stateds that the environmental assessment should have included a cost benefit analysis.

**Response**

The project forms part of the overall Pacific Highway Upgrade Program objective to complete duplication (four-lane divided highway standard) of the Pacific Highway. An overall road user Benefit Cost Ratio of 1.7 has been calculated for the program based on completion of all remaining works (as at June 2009) by the end of 2016.

## 2.5 Community consultation

**Submission numbers**

1 – Clarence Environment Centre (CEC)

**Summary of issues raised**

This submission is concerned that while the RTA claims to have conducted extensive community consultation, none of the four environmental groups active in the Clarence Valley (CEC, National Parks Association, Clarence Valley Conservation Coalition, and Valley Watch) approve of the preferred route that was adopted by the RTA. (1)

**Response**

The preferred route for the Glenugie upgrade is part of the part of the preferred route for the Wells Crossing to Iluka Road Pacific Highway upgrade.

The route options development process for the Wells Crossing to Iluka Road upgrade commenced in 2004. This included community and stakeholder consultation, including consultation leading up to the identification of a short list of route options. The short listed route options were described and assessed in the *Route Options Development Report* (RTA 2005). The report was made available for public and agency review and comment. About 1600 submissions were received and addressed in a *Route Options Submissions Summary Report* (RTA 2006). Two of these submissions were from environmental groups in the Clarence Valley.

The issues raised in submissions were considered in a value management workshop in March 2006. The workshop involved community and stakeholder participants. *A Value Management Workshop Report* (RTA 2006) was publicly released.

The preferred route for the Wells Crossing to Iluka Road upgrade was based on the value management workshop results, stakeholder submissions and technical investigations. The preferred route was announced by the NSW Minister for Roads, and placed on public display in September 2006.

Section 6.3.2 of the environmental assessment (Table 6-3) contains a summary of the consultation activities during the development and selection of the preferred route. The RTA considers that there has been extensive consultation since the start of project planning in 2004.

Concerning the objection to the preferred route identified for the Wells Crossing to Iluka Road upgrade (of which this project forms part), RTA considers that the preferred route provides the best balance across environmental, social, functional and cost criteria, as compared to other route options considered. While the RTA recognises the concerns raised, particularly with respect to the potential ecological impacts associated with the upgrade, these need to be balanced against the social, functional and cost considerations that underpin the project and program objectives.

## 2.6 Ecology

### 2.6.1 General

**Submission numbers**

1 – Clarence Environment Centre (CEC)
6 – National Parks Association (NPA)

**Summary of issues raised**

The following issues were raised in submissions:

- The RTA's practice of "clearing wide swathes of forest and then re-planting some 50% of it after work is completed" should be stopped as it fails to take into account the two hundred year plus time span required for a forest to mature to the point where tree hollows develop. (1)
- There is contradictory information about the amount of land to be

cleared. The EPBC Act Referral states 85 ha. The Preliminary Environmental Assessment states 110 ha. (1)

- Concern was expressed that the biological working paper for the Wells Crossing to Iluka Road proposal identified 125 threatened terrestrial flora and fauna species occurring along the 80 km route yet the environmental assessment for Glenugie identifies only six species "potentially affected by the project". It was also noted that there is nothing "potential" about the destruction of over 6,000 Square-fruited Ironbarks. (1)
- It is noted that, while a high proportion of the NSW North Coast Bioregion is protected in conservation reserves, the majority of the conserved areas contain either coastal ecosystems or sandstone communities and do not contain the dry sclerophyll components represented in Glenugie State Forest. (1)
- The environmental assessment uses disputed information in attempting to minimise the significance of impacts on vegetation communities and habitat, rather than seriously trying to minimise impacts by reviewing the road design. (6)

**Response**

The RTA is committed to limiting the extent of clearing for the project and to providing appropriate biodiversity offsets. Clearing would be limited to what is required for construction and maintenance of the road. The biodiversity offset strategy for the project would be finalised in consultation with the DECCW and Department of Planning (refer to Section 2.6.6 for further detail).

The upgrade has been located as close as possible to the existing highway to minimise the overall amount of clearing required. Measures to mitigate impacts associated with habitat fragmentation have been proposed in the environmental assessment and would be implemented as part of the project. These measures include the provision of fauna crossing structures, including fauna underpasses and overhead rope crossings.

It is noted that the submission by the CEC points out contradictions between the Preliminary Environmental Assessment (PEA) and information in subsequently prepared documents, including the environmental assessment and the EPBC Act Referral. The reason for this discrepancy is that, after the preparation of the PEA, a more detailed ecological assessment was conducted, which resulted in design refinements and a corresponding reduction in the amount of vegetation to be cleared. The amount of clearing required has been revised to 85 ha as stated in section 4.2.2 of the Environmental Assessment.

The claim by the CEC that the environmental assessment for Glenugie identifies only six species "potentially affected by the project" is incorrect. Table 7-1-7 of the Environmental Assessment provides details of the threatened species potentially impacted.

The conservation status of all significant vegetation communities affected by

the project was considered.

The Wells Crossing to Iluka Road concept design report addresses a significantly larger area and range of habitat types than the Glenugie upgrade. The ecological investigations for the environmental assessment were focused on an identified road corridor concept and provided detail in relation to the location of threatened species and their habitat and likely fauna movement corridors. This detail was specifically gathered prior to developing the final road design and was integral in informing decisions regarding the final road design with respect to minimising impacts on flora and fauna species and populations and in the design of mitigation measures to further reduce residual impacts on biodiversity.

Notwithstanding the fact that the vegetation types identified may not be well represented in conservation reserves of the North Coast Bioregion, they have not been listed as endangered or vulnerable ecological communities under the provisions of the *Threatened Species Conservation Act* 1995. The conservation status of vegetation communities and species in the project area was assessed accordingly with respect to Schedule 1, 1A and 2 of the TSC Act.

In response to the suggestion by the NPA that the environmental assessment uses disputed information in an attempt to minimise the significance of impacts on vegetation communities and habitat, the following points are noted:

- The environmental assessment was undertaken in accordance with DECC (2004) survey and assessment guidelines. The assessments were undertaken by a team of qualified ecologists with expertise in both flora and fauna assessment. The assessment included searches of available data sets and published reports, and comprehensive surveys.
- The RTA considers that the best information currently available was used and presented in an accurate manner to assess the potential impacts of the project, to facilitate an informed decision. Further detail and information sources for individual threatened species are included in Sections 2.6.2 and 2.6.5 below.

Section 4.2.2 of the environmental assessment confirms that 85 ha of land would be cleared for this project. Further attempts to minimise the area of clearing will be undertaken as part of the detailed design process.

### 2.6.2 Impacts on Melaleuca irbyana

**Submission numbers**

1 – Clarence Environment Centre (CEC)
4 – Yuragir Landcare Group (YLG)
6 – National Parks Association (NPA)
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

The submissions expressed concern about the adequacy of the assessment of impacts on *Melaleuca irbyana*. (1, 6, 7)

One submission questioned why the upgrade couldn't run closer to the existing highway, noting that an upgrade that incorporates the existing highway would reduce impacts on vegetation and, in particular, avoid damage to *Melaleuca irbyana*. (4)

In view of the potential impacts on *Melaleuca irbyana*, the Yuragir Landcare Group request that they be provided funding to collect seed/cuttings prior to the roadworks. This would enable them to propagate this species for replanting back into the impacted area and thereby sustain its provenance. (4)

**Response**

Records of the species were initially accessed from the DECCW Atlas of NSW Wildlife and DPI database. Targeted surveys for threatened species, including *Melaleuca irbyana* were subsequently conducted across the entire route footprint, including wet areas, riparian and elevated habitats such that the identified areas of potential impact and number of trees impacted is considered accurate. The environmental assessment and Working Paper both note that the Glenugie State Forest is the southern limit of the species. Moreover, there are a number of groups identified in Glenugie State Forest.

The mitigation measures provided in the environmental assessment refer to the preparation of a management plan for this species aimed at the ongoing viability of the species in the locality. The plan would include specific actions for the collection of seed and cuttings from the trees prior to construction as well as other individuals in the broader region to ensure the maintenance of genetically viability within the population. Propagated individuals would be planted in proximity to their original site location, but outside of the project footprint, and monitoring during and post construction to identify the success of the methods used and to facilitate adaptive management.

The project would potentially result in the removal of between 5-10 trees at this location, although 20-25 trees will remain in situ, providing a continued seed source for future rehabilitation efforts. The project will not remove the population as protection and restoration measures will ensure its continuance at this location.

In response to submission number 4, it is noted that the route options were assessed in terms of a range of criteria, including biophysical, social, economic, and technical/ engineering factors. Adverse and positive effects were considered for all factors, including threatened fauna and flora. The preferred route selected is the one that is considered to offer the best solution, on balance, based on the combined consideration of all factors. Road alignment is constrained to a certain extent by design standards, which place limits on road curvature and grade in the interests of both safety and traffic flow. This limits the extent to which native vegetation and other sensitive

areas can be avoided.

The RTA appreciates this offer to collect seed and cuttings, and will contact the Yuragir Landcare Group to discuss further.

### 2.6.3 Impacts on Eucalyptus tetrapleura

**Submission numbers**

1 – Clarence Environment Centre (CEC)
6 – National Parks Association (NPA)
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

The following issues were raised in relation to impacts on *Eucalyptus tetrapleura*:

- The environmental assessment provides inaccurate population estimates for *E. tetrapleura* and attempts to 'play down' the impacts by conveying the impression that it is widespread. (1, 6, 7)
- The environmental assessment conveys the impression that *E. tetrapleura* is afforded protection in state forests. It is stated that, within state forests, a minimum of 90 per cent of individuals must be protected from forestry activities. What isn't explained is that the 10 per cent destruction allowance can occur during each logging cycle, which is currently about every 10 years. It is argued that the populations in state forests are therefore not protected, but under threat. (1)
- The Glenugie State Forest is the stronghold for this species, not a sub-population as implied in the EPBC Act Referral. (1, 6)
- The true significance of the Glenugie population is highlighted by the fact that the number of individual *E. tetrapleura* that would be removed for the project (6,156) is nearly equal to the claimed total number of individuals located within conservation reserves (6,477). The significance of this impact is even greater given that the reported population sizes within conservation reserves are believed to be highly inflated. (1, 6)
- The impacts of the Glenugie upgrade should not be considered in isolation to the impacts of the next stage to the south, which will see the destruction of many more individual specimens of *E. tetrapleura* and other rare and threatened species. (6)
- The environmental assessment identifies a population of this species in the Wells Crossing Flora Reserve but does not identify the fact that this particular population will be impacted by a future Pacific Highway upgrade. (7)
- It is necessary to consider the importance of this species in the local ecosystem, in particular as a critical winter food source for the vulnerable Grey-headed Flying Fox, the Little Lorikeet and the endangered Swift Parrot. (7)
- The assessment of *E. tetrapleura* should be re-visited. (1, 6, 7)

**Response**

In terms of *E. tetrapleura,* the environmental assessment had two objectives:

- To identify the size and geographic extent of the 'local population' based on a systematic field assessment.
- To identify where practicable the size and extent of the 'regional population' based on review of available data and consultation, followed by targeted field assessments where gaps in knowledge were identified.

DECC (2007) defines the local population as the population that occurs in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area. This definition was used to identify the 'Glenugie' population of *E. tetrapleura*, as a discrete subset, or 'sub-population' of the total 'regional population' of this species. The Glenugie population occurs within portions of Glenugie State Forest, Wells Crossing Flora Reserve and Yuraygir National Park.

In defining the regional population, the environmental assessment noted that *E. tetrapleura* is endemic to the coastal lowlands and foothills from near Glenreagh in the south to Casino in the north, occurring within a range of approximately 100 km north-south and 50 km east-west. Within this range, the current known distribution is patchy although it is reasonable to consider the species will occur at other locations.

Data on the size of other local populations was obtained firstly by a review of previous survey reports, including the environmental impact statement prepared for Shannon Creek Dam and relevant National Park Plans of Management, as well as consultation with DECCW (for locations in national parks and nature reserves) and DPI (now I&I, for locations in state forests). In some instances these sources provided estimates of the area occupied by the species, however no data on population size was available. Targeted surveys were conducted where practicable to fill these gaps in knowledge, which included a survey of Chambigne Nature Reserve.

For populations outside of the project area, abundance estimates were based on transect data (to identify density estimates) and identification of typical habitat associations or niche. These results were applied to vegetation community, aerial photography and contour data to predict the area of occupancy and overall population size. This differed from the survey of the Glenugie population which physically identified the extent of the population via ground-truthing. Scientific sampling of transect data in conjunction with habitat data is widely used and accepted as an efficient means of developing predictive models of species distribution and abundance, particularly over very large areas. The mean transect data was expressed with a standard deviation to validate the results.

The assessment of impacts on this species was done in accordance with the guidelines provided under Part 3A of the *Environmental Planning and Assessment Act* 1979 (DEC and DPI 2005). In determining the extent and

magnitude of the impact of the project, the environmental assessment and EPBC Referral acknowledged that the 'Glenugie population' is the largest population of this species. The assessment also considered the significance of the predicted loss from the population in terms of affecting the overall long-term viability of the population and indeed maintaining genetic diversity within other populations.

Although it is estimated that 6,156 individual *E. tetrapleura* occur within the project footprint, a further 147,000 are estimated to be present within six kilometres of the footprint. This indicates there is ample opportunity to offset the loss of *E. tetrapleura*.

The presence of *E. tetrapluera* south of the project area is noted and the species was identified in the preferred route report for the Woolgoolga to Wells Crossing Pacific Highway Upgrade as occurring in this area. This project has been developed to a concept design level, which includes preliminary environmental studies. Detailed surveys of the species have not been conducted to provide an accurate assessment of cumulative impact. The potential presence of the species was noted by studies for the project and will need to be considered in any subsequent environmental assessment and final design for the project, such that every attempt is made to minimise the impacts on this species.

The forestry prescriptions covering the conservation and management of *E. tetrapleura* in State Forests have been developed with consideration of the recruitment of juvenile trees, such that within any resting periods between logging cycles (i.e. ten years), new individuals would be expected to propagate and join the population.

The results of the landscape assessment and targeted surveys for *E. tetrapleura* for the Glenugie project were considered in recommending appropriate options to offset the impacts on these species.

The impacts of the proposed upgrade on the Grey-headed Flying Fox, Little Lorikeet and endangered Swift Parrot have been assessed using seven part tests and are not considered to be significant. The seven part test for the Little Lorikeet is included in Section 3.3 of this report.

Studies are sufficient and it is not intended to carry out further assessment of *E. tetrapleura*. However, opportunities to reduce clearing, including *E. tetrapleura*, would be investigated during detailed design.

### 2.6.4 Impacts on other threatened species

**Submission numbers**

1 – Clarence Environment Centre (CEC)
6 – National Parks Association
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

The following issues were raised in relation to impacts on other threatened species:

- The assessment of impacts on the following species is not adequate: microbat species (1), Grey-headed Flying Fox (1), Swift Parrot (1, 6) and Little Lorikeet (6).
- The author of the ecology working paper does not appear to understand that the Swift Parrot is migratory, breeding only in Tasmania, and that winter food resources during migration are critical. (1)
- The study area contains several winter flowering species and is known to be within the winter foraging range of the Swift Parrot. (6)
- The Spotted Gum is considered to be crucial to the survival of the Swift Parrot and this is the dominant species in the area that would be cleared for the project. (1)
- The Little Lorikeet is listed in Appendix E of the ecology working paper yet there is no assessment of impacts on this species despite it being listed as vulnerable under the TSC Act. (6)
- All threatened species have been listed because their numbers are in decline with the primary cause being habitat loss. How can any further removal of habitat be described as a "sustainable loss"? (1)
- It is noted that the Bush Stone-curlew is known to occur in the study area within Glenugie State Forest. This information is not reflected in the environmental assessment. (1, 6, 7)
- The Bush Stone-curlew will be affected by the habitat loss and fragmentation resulting from the project. (6)
- The Koala is known to occur in the study area. This information is not reflected in the environmental assessment. (7)
- Despite the proposed underpasses and glider crossings, the proposed upgrade will be a major barrier to fauna movement. (7)

**Response**

***Bush Stone Curlew***

Although not specifically sighted, in accordance with the precautionary principle, the environmental assessment assumes the presence of the Bush Stone Curlew. Table 4-5 in the environmental assessment notes that the species presence is inferred from a review of regional records and habitat assessment. There is a least one historic record from the northern end of Glenugie State Forest. The species is recorded in sparsely grassed, lightly timbered, open forest or woodland and in the study area would be associated with Spotted Gum / Ironbark / Grey Box open forest which occupy the large majority of the landscape through Glenugie State Forest and surrounding areas.

Table 5-2 of the environmental assessment also notes that as a precautionary measure the loss of vegetation has potential to remove shelter and foraging resources for the Bush Stone Curlew. The number of animals affected in relation to the size of local and regional populations is not known, however

records are widespread and it could be reasonably expected that the proportion of the population impacted would be minor and not lead to a significant impact on the population as a whole. Potential habitat will remain throughout Glenugie State Forest outside of the project area and purpose built fauna crossing structures have been included in the project to minimise the barrier effect of the project for the Bush Stone Curlew. An assessment of significance was prepared for this species (refer Appendix B of the Working Paper).

***Koala***

The presence of Koala was inferred from a review of regional records and habitat assessment (Table 4-2 of the environmental assessment). There were no DECCW records of Koalas, nor was any evidence of Koalas recorded in the study area, despite extensive searches throughout suitable habitat. The presence of Forest Red Gum (*E. tereticornis*) and Small-fruited Grey Gum (*E. propinqua*) in very low densities suggests that the habitat is suitable to support small populations of Koalas or dispersing and transient individuals, however the study area is considered unsuitable to support a significant population.

***Swift Parrot***

In relation to the Swift Parrot, the Working Paper (Appendix B) notes that the study area would constitute non-breeding habitat for a proportion of the population, however the study area is not considered a critical area for the Swift Parrot. The habitat is only marginal and higher value habitats occur elsewhere in the region.

Records from the study area are relatively continuous extending over the last 30 years indicating that the region may constitute seasonally important foraging and refuge habitat for Swift Parrot, particularly during inland droughts. The current potential for Swift Parrot to occur based on the presence of potential foraging habitat is expected to remain after completion of the project such that foraging and movement activities in the region would not be significantly impacted.

***Grey-headed Flying-fox***

In relation to the Grey-headed Flying-fox, the Working Paper states (Appendix B) that the species occurs widely throughout the Clarence Valley and surrounding areas. There were no camps or roost sites identified in the study area. There are extensive areas of potential foraging habitat for the species throughout the region and the clearing of 85 ha of potential foraging habitat for this species represents a relatively minor impact for this species in the locality. In relation to the available habitat in adjacent land surrounding areas, the project is not considered likely to affect this species at the local level.

***Microbats***

The environmental assessment and Working Paper addresses the significance of impacts from the project on seven hollow-roosting bats and five cave roosting bats which are considered to potentially occur in the study area. These assessments concluded that comparable habitats are very well

represented throughout the locality and regional area and it is unlikely that the project would have a significant impact on the foraging or roosting life-cycle events for a local population of these bat species and continued foraging over the site and foraging and roosting on adjacent lands could be reasonably expected.

***Little Lorikeet***

The Little Lorikeet was not listed under the *Threatened Species Conservation Act, 1995* at the time of the field surveys and preparation of the Working Paper (April-June 2009). A seven part test to assess potential impacts the Little Lorikeet has been prepared, and is included in Section 3.3 of this report.

The study area provides breeding and foraging habitat for this species. However, it is a nomadic species, occurring widely across the region and other parts of NSW. A number of individuals may be affected by the project, but the potential for the species to occur will remain because of the wide-spread presence of suitable habitat. The life cycle and foraging habitats are unlikely to be affected.

### 2.6.5 Cumulative impacts

**Submission numbers**

1 – Clarence Environment Centre (CEC)
6 – National Parks Association

**Summary of issues raised**

The following issues were raised in relation to cumulative impacts:

- The cumulative impacts of the project on *E. tetrapleura* have not been quantified or adequately assessed. (1)
- The cumulative impacts of the Glenugie upgrade and the next stage to the south should be considered together before works on the Glenugie section are approved. (6)
- The cumulative impacts of subsequent Pacific Highway upgrades need to be considered in the assessment of significance of impacts on threatened fauna. (1)

**Response**

It is recognised that the Pacific Highway Upgrade programme as a whole would have cumulative impacts on biodiversity. Impacts would be offset by the development of a biodiversity offset strategy relative to each project. Any such strategy would be based on the objective of maintaining or improving biodiversity values in the project area in the long-term.

In respect of the *E. Tetrapleura* and other threatened species populations and communities, offset strategies would be developed for the Glenugie upgrade.

Regarding *E. tetrapluera*, there is potential for it to be impacted south of the

Glenugie project area, as discussed in Section 2.6.3 above. The species was identified in the preferred route report for the Woolgoolga to Wells Crossing Pacific Highway Upgrade as occurring in this area. This project has been developed to a concept design level, which includes preliminary environmental studies. Detailed surveys of the species have not been conducted to provide an accurate assessment of cumulative impact. The potential presence of the species was noted by studies for the project and will need to be considered in any subsequent environmental assessment and final design for the project, such that every attempt is made to minimise the impacts on this species. North of the Glenugie upgrade, the concept design for the Pacific Highway upgrade is not known to encounter any further populations or individuals of *E. tetrapleura*.

### 2.6.6 Biodiversity offsets

**Submission numbers**

1 – Clarence Environment Centre (CEC)

**Summary of issues raised**

The suggested offset proposals to protect nearby land that already contains *E. tetrapleura* and *M. irbyana* are flawed.

**Response**

The RTA is committed to providing appropriate biodiversity offsets. The RTA referred the project to the Commonwealth Department of Environment, Water, Heritage and the Arts due to the impact on *E Tetrapleura*, which is listed as a "vulnerable" under the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC). A number of alternative mechanisms were identified to offset the impact on *E Tetrapleura*, including:

- Management by DECC or DPI (Forests NSW):
  - Purchase of freehold property and transfer into the NSW National Parks estate.
  - Purchase of freehold property and transfer into the NSW State Forests estate, with a management zoning of Zone 1 (Special Protection).
  - Negotiation with Forests NSW to extend management zone 1 (Special Protection) to land supporting E. tetrapleura in management Zone 4 (General Management).
- Management by RTA:
  - Negotiation with Forests NSW to transfer land currently identified as Zone 4 (General Management) Forests NSW land and preserve in a 'road reserve' under RTA management.
- Management by private landholders:
  - Negotiation of a conservation agreement under the National Parks and Wildlife Act 1974 or Nature Conservation Trust Act 2001 with private landholder/s.
  - Purchase of freehold property and on-selling with a conservation

agreement attached.

The biodiversity offset strategy would be finalised in consultation with the DECCW, I&I NSW, DEWHA and DoP.

## 2.7 Channel structure – receiving environments

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)
8 – Industry and Investment NSW (I&I NSW)

**Summary of issues raised**

The environmental assessment does not provide adequate detail to determine whether a comprehensive geomorphic assessment of channel structure for all receiving waterways was undertaken to address the DGRs. The environmental assessment only provides a general overview of the geomorphic condition within the proposed development area, which limits the ability to review the assessment findings and determine baseline condition at the site. A stand-alone detailed report is recommended to address the DGRs. (8)

DECCW proposed amendments to the Statement of Commitment regarding channel structure.

**Response**

The geomorphic assessment of channel structure and receiving environments was undertaken, both upstream and downstream of the highway. Areas of instability and potential concern are identified in the environmental assessment, as are site specific impact mitigation and management measures.

The erosion and headward extension of the drainage network upstream of the existing highway indicates that the landscape is generally erodible and sensitive to disturbance. The results of the field study indicated that the majority of the existing erosion and head cutting is unlikely to have resulted from the construction and operation of the existing highway. Rather, the ongoing erosion of the creek network is most likely a result of runoff from the upstream catchment during intense storm events. The main reason for this conclusion is the observation that bed erosion, headcutting and general rejuvenation of the stream network appear to be relatively recent phenomena compared with the estimated age of the existing highway. Thus, although it is possible that general disturbance to the streams' profile occurred during the construction of the existing highway, associated erosion would reasonably have been expected to have worked its way out of the system in the intervening years, and new stream profiles established. As the existing highway now effectively provides grade control for the stream network that crosses it, there does not appear to be any obvious mechanism by which the existing highway could cause continuing erosion on the

upstream side.

The other mechanisms that could initiate erosion are increased flow discharge and/or flow velocity and/or changed overland flow patterns, which can occur in response to processes such as changes in rainfall volume/intensity or increased runoff due to changed vegetation cover, construction activity, fires and land use change and the like. Although it was difficult to determine the extent to which any of these parameters may have changed over time, it was considered that changes to flow patterns and changes to land cover characteristics were more likely explanations. It should be noted that subtle changes to any parameters that control erosion processes (such as rainfall, land use change) can cause geomorphic thresholds to be crossed triggering new (and sometime unexpected) phases of erosion or deposition. In the absence of a detailed history of land use development, rainfall and flow patterns, and erosion processes for Glenugie Creek and the Ephemeral Creeks, it is unlikely that the hypothesis presented above can be verified.

A response to the proposed amendment to the statement of commitments is provided in Section 2.14 below.

## 2.8 Operational traffic and transport

**Submission numbers**

1 – Clarence Environment Centre (CEC)

**Summary of issues raised**

The proposed full length motorway upgrade will leave local traffic to battle the existing substandard conditions on the existing highway. (1)

**Response**

A motorway style upgrade as described in Chapter 4 of the environmental assessment would leave the existing highway in place for use by local traffic. This allows for the separation of high speed through traffic and low speed local traffic. The existing highway in this situation would likely be signposted at a lower speed and would carry substantially lower volumes, around 1.5% of total traffic, for relatively short distances. Heavy vehicles would travel on the new highway. The combinations of all these factors would provide for a safer road environment.

## 2.9 Operational noise

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)

**Summary of issues raised**

DECCW noted that they accept the criteria used by the RTA in the assessment of the operational noise impacts of the project. The DECCW also noted that they accept the modelling approach used in the noise impact

assessment, however concerns were raised that the model calibration approach was not overly accurate and therefore recommend that additional model calibration be carried out as part of the detailed design phase. It was recommended that the project approval include requirements for preparation of an Operational Noise Management Plan and compliance monitoring.

**Response**

The traffic data used for the validation of the noise model is considered to be representative of the AADT data for the specified section of the highway. The noise monitoring was undertaken during a period when no abnormal traffic patterns are likely to exist (i.e. outside school holiday period). Comparisons for similar times of the year based on earlier traffic studies indicate that this period is representative of a traffic flow that is equivalent to 98% of the AADT values.

Given the predicted level of impact at the eight residential locations and the substantial reductions in noise levels at these location coupled with the notion that a doubling of the AADT figures used in the validation would only generate a 3 dB(A) variation in the predicted outcomes, further justification of the model validation is not considered necessary.

The environmental assessment concluded that there are no operational noise impacts and thus there is no requirement for an Operational Noise Management Plan. The environmental assessment commits to carrying out compliance monitoring.

It is recognised that if the vertical/horizontal alignment for the Glenugie upgrade is refined during the detailed design, this would require the noise model to be rerun to confirm any operational noise impacts. Accordingly a new statement of commitment (ON 2), has been added which states that "*The RTA would confirm potential operational noise impacts should the design be refined at the detailed design stage*".

## 2.10 Aboriginal heritage

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)

**Summary of issues raised**

The DECCW noted that while the cultural heritage working paper (Appendix E to the environmental assessment) relies heavily on the results of past surveys, the earlier surveys appear to have been comprehensive and no sites of Aboriginal significance have been found along the Glenugie section. Consultation with the local Aboriginal community is consistent with DECCW guidelines.

DECCW proposed amendments to the Statement of Commitment regarding cultural heritage.

**Response**

The RTA note the DECCW advice that consultation with the local Aboriginal community is consistent with DECCW guidelines.

A response to DECCW's proposed amendments to the statement of commitments is provided in Section 2.14.

## 2.11 General construction impacts

### 2.11.1 General

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)

**Summary of issues raised**

The DECCW acknowledged that the ultimate footprint of the full motorway style upgrade would be larger than the proposed initial staging but questioned which potential impacts as a result of the likely initial staging have been considered and how this may have influenced impact mitigation. The DECCW consider that, as there is no real indication of the proposed timing for each stage of the project through to the full motorway style upgrade, the potential impacts of staging are unclear.

The DECCW proposed amendments to the statement of commitments to address this issue.

**Response**

The environmental assessment considers the impacts of both the likely initial staging and the full motorway style upgrade proposal. The impact mitigation measures described in Chapter 7 of the environmental assessment apply to, and will be implemented for both the likely initial staging and the full motorway style upgrade proposal, regardless of the timing.

The construction of the four kilometres northbound carriageway in the southern section of project to complete the Class M upgrade would be completed when funding becomes available.

The response to the proposed amendments to the statement of commitments is provided in Section 2.14.

### 2.11.2 Construction noise

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)

**Summary of issues raised**

DECCW note that the construction noise assessment contained in the environmental assessment uses an outdated guideline and that construction noise needs to be assessed using the Interim Construction Noise Guideline.

Additional recommendations are made regarding conditions of approval for construction noise.

**Response**

The environmental assessment was prepared in accordance with the *Environmental Noise Management Manual*, which was current during the preparation of the environmental assessment. The *Interim Construction Noise Guideline* was released after the environmental assessment was submitted to the Department of Planning for exhibition.

Although the *Interim Construction Noise Guideline* was not specifically referenced in the construction noise impact report, the proposed approach and management measures are consistent with the requirements of the guidelines. The *Interim Construction Noise Guideline* identifies four steps for the management of noise on a project, which are:

- Identify sensitive land uses that may be affected.
- Identify hours for the proposed construction works.
- Identify noise impacts at sensitive land uses.
- Select and apply the best work practices to minimise noise impacts.

These four steps are substantially covered in the assessment of construction noise for the Pacific Highway Glenugie Upgrade:

- The eight project receiver locations have been identified in Section 7.4.1 of the environmental assessment.
- The proposed construction hours are identified in Section 4.7.7 of the environmental assessment generally conform to the standard hours of construction. Due to the proximity of the nearest receivers to the Project alignment, there is potential for extending these hours to reduce the overall construction timeframe without significant impact on residential receivers.
- Section 7.6.1 of the environmental assessment identifies potential noise impacts based on typical construction scenarios for road projects. These include batching plant, vibration and blast impacts.
- Exceedances of the noise goals under certain conditions may occur and these impacts should be managed in accordance with recommendations in Section 7.6.1 of the report.

**Table 2-1 DECCW Noise Guideline Comparison**

**Comparison of previous and interim guidelines**

| Previous guideline | Interim guideline |
|---|---|
| **Recommended standard hours** | |
| Monday to Friday 7am to 6pm<br>Saturdays 8am to 1pm<br>No work on Sundays or public holidays | No change from previous |
| **Choice of assessment method** | |
| No choice – only numeric noise criteria given | Choice of either qualitative assessment for projects under three weeks, or quantitative assessment for major projects |
| **Noise levels** | |
| **Noise goal** | **Noise management level** |
| **0 to 4 weeks**<br>Background + 20 dB(A) | **Short-term infrastructure maintenance**<br>Qualitative assessment – apply work practices in checklist at all times of the day<br>**Major construction projects**<br>Recommended standard hours:<br>Background + 10 dB(A) and $L_{Aeq}$ 75 dB(A)<br>Outside recommended standard hours:<br>Background + 5 dB(A) |
| **5 to 26 weeks**<br>Background + 10 dB(A) | |
| **Greater than 26 weeks**<br>Background + 5 dB(A) | |
| **Guidance on work practices** | |
| No guidance | Extensive list of options for work practices, based on world-wide review of best approaches |
| **Examples on applying guideline** | |
| No examples | Six case studies based on real-life projects.<br>Also worked examples throughout the Guideline. |
| **Ground-borne noise levels** | |
| No guidance | Evening internal level $L_{Aeq}$ 40 dB(A)<br>Night internal level $L_{Aeq}$ 35 dB(A) |

Source – www.environment.nsw.gov.au/resources/**noise**/09406cnginfo.pdf

**Table 2-1** provides an extract from the DECCW discussion paper outlining differences between the interim and previous guidelines. This table confirms that there are no materially substantial differences in the assessment criteria. It should be noted that using an $L_{A10}$ + 5 approach as opposed to an $L_{Aeq}$ +10 approach to noise goals would give approximately the same value.

Since the objectives of the interim guidelines have been met through the above approach, particularly regarding impact assessment against a conservative noise goal and the recommended implementation of suitable noise management measures, completing the construction noise assessment

in accordance with recently superseded guidelines is not considered to represent an increased risk of noise impacts on sensitive receivers.

### 2.11.3 Erosion, sedimentation, water quality and riparian management

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)
8 – Industry and Investment NSW (I&I NSW)
9 – NSW Office of Water (part of DECCW)

**Summary of issues raised**

The following issues were raised in submissions relating to erosion, sedimentation, water quality and riparian management issues:

- It is not clear how the environmental assessment determined the actual groundwater level of 13.5m and where this measure was taken from. The environmental assessment states that the project would not have any adverse impacts on groundwater but does not provide any real justification for this. A new statement of commitment was proposed to address this issue. (5)
- Further information is required to specifically outline how construction of the project at watercourse crossings will be undertaken and managed to minimise the potential for impacts on fish passage and water quality. (8)
- A number of recommendations were made regarding conditions of approval for the project. These included recommendations for assessment of waterways in accordance with Fairfull and Witherridge (2003) and recommendations for waterway crossings. (8)
- Appropriate water licences must be obtained for sourcing ground and surface water for the development. (9)
- Any works within 40 metres of a watercourse should be consistent with State policy and Guidelines. In this regard, the former Department of Water and Energy's *Guidelines for Controlled Activities* (2008), outline the management requirements for works within 40 metres of a watercourse. All works within riparian areas should be undertaken with minimal disturbance and erosion, utilise appropriate sediment control measures, provide adequate drainage, maintain hydrological flow regimes and ensure appropriate rehabilitation and revegetation. (9)

**Response**

Groundwater depth measurements were obtained during geotechnical investigations undertaken for the concept design development for the Wells Crossing to Iluka Road upgrade proposal. The depth measurement of 13.5 m was taken at the proposed road cutting near Lookout Road, which would be the deepest cutting for the project. After some design refinements the cutting near Lookout Road would be about 10 m in depth, which is above the measured depth of groundwater at this location. All other cuttings would be shallower than this. On this basis, it is considered unlikely that groundwater would present significant issues for the project or that the project would have

a significant impact on any groundwater resources. More detailed geotechnical investigations are to be undertaken prior to construction.

Section 7.6.3 of the environmental assessment contains the following information on groundwater:

- Geotechnical investigations undertaken at the proposed Lookout Road cutting location indicate that the water table is about 13.5 m below the natural ground surface. The Lookout Road cutting would be about 10 m deep and is the deepest cutting proposed for the project.
- Groundwater seepage may be encountered during excavation. Adverse impacts on groundwater systems (including groundwater resources and groundwater dependent ecosystems) are not expected. The project does not impact any licenced groundwater boreholes.

Information (including information on impact mitigation measures) on fish passage and fish habitat was included in Sections 7.1.1, 7.1.2 and 7.1.3 of the environmental assessment. Fish habitat within the project area has been assessed in accordance with Fairfull and Witheridge (2003) and has been found to be Class 2 or Class 3. There is no Class 1 fish habitat that has the potential to be impacted by the project. Details of how construction will be undertaken at water course crossings will be finalised during the detailed design phase of the project in accordance with the impact mitigation measures proposed in the environmental assessment, the Statement of Commitments and the Ministers Conditions of Approval.

Licences for groundwater extraction will be obtained as necessary. Any works within 40 m of a watercourse would be consistent with the former Department of Water and Energy's *Guidelines for Controlled Activities*.

A response to the proposed statement of commitment is provided in Section 2.14.

## 2.12 Land use and socio-economic impacts

**Submission numbers**

8 – Industry and Investment NSW (I&I NSW)

**Summary of issues raised**

The following points were noted in the submission by I&I NSW:

- The RTA should consult with I&I NSW Forestry division and consider the use of the timber resource for harvestable timer.
- Access should be maintained to enable continued forestry operations, fire management and recreation during construction and operation.

**Response**

Noted. The following impact mitigation measures are currently proposed in Section 8.2.3 of the environmental assessment:

- Land acquisition or exchange would be in accordance with the provisions of the *Forestry Act* 1916.

- Harvestable timber would be removed from within the footprint of the project prior to commencement of construction.
- In consultation with the I&I NSW Forestry division, access to and within State Forest land would be provided for forestry purposes.

It is important to note that the project includes construction of a new forestry service road to maintain operational access to Glenugie State Forest on the eastern side of the upgrade (see Chapter 4 of the environmental assessment). The existing highway would provide access on the western side of the upgrade.

Access to Glenugie State Forest for forestry operations would be maintained during construction in consultation with I&I NSW.

## 2.13 Greenhouse gas emissions and climate change

**Submission numbers**

1 – Clarence Environment Centre (CEC)
2 - Individual
3 – Climate Change Australia (CCA)
7 – Clarence Valley Conservation Coalition (CVCC)

**Summary of issues raised**

The following issues were raised in relation to greenhouse gas emissions and climate change:

- The claim that the upgrade of the Glenugie section will lead to a reduction in greenhouse gas emissions is disputed (1, 2, 3).
- It is not currently a congested section of the highway so the upgrade will have little or no effect on the efficiency of vehicle travel. As vehicle speeds on this section of highway are always in excess of 80 km/h and typically close to 100 km/h, increasing speeds associated with the upgrade to a motorway standard road will encourage more road use, and result in an increase in fuel use and emissions per vehicle km travelled (1, 3, 7).
- The figures for construction and operational greenhouse gas emissions given in the environmental assessment were disputed. Specifically, it was argued that the environmental assessment uses outdated figures for the carbon content of an average forest. The dry forests in the project area may store the equivalent of 1,750 tonnes of CO2 per hectare. It is therefore likely that the clearing of 85 ha for the Glenugie upgrade would equate to about 150,000 tonnes of CO2 being released. By contrast the report states that less than 20,000 tonnes of CO2 will be released due to vegetation loss, with another 6,000 tonnes presumably released from the vehicles used to clear the vegetation (CCA have assumed that this explain the discrepancy between the CO2 figures given in the text and Table 8-3-1). It appears the figures used by the RTA are wrong by an order of magnitude (3).
- The emissions associated with lighting and air conditioning at the

construction site have not been considered (3).

- Greenhouse gas emissions associated with transporting materials to the construction site, the production of concrete, and the procurement of raw materials, have not been considered (3).

**Response**

**Traffic Emissions**

Traffic emission estimates for the operation of the project were calculated based on:

- Forecast daily traffic volumes.
- Travel distance along the length of the project.
- Fuel consumption rates for petrol and diesel powered vehicles as published by the Department of Climate Change (DCC), formerly as the Australian Greenhouse Office.
- Greenhouse gas emission factors for fuel as published by the DCC.

Forecast daily traffic volumes for 2012 and 2022 were estimated using a growth rate of 2.9 per cent per year, for the existing highway (without the project) and with the project in place (Table 8-3-2 in the Environmental Assessment). The number of vehicles using the upgraded highway was estimated to be slightly less than the numbers using the existing highway without the upgrade. This is because the volume of traffic using the existing highway as an access road in the future is not expected to increase.

As a result of the slight reduction in traffic volumes and assuming the same travel distance of seven kilometres for both the upgraded highway and the highway without the upgrade, it was estimated that there would be a minor decrease in emissions with the project in place, relative to the no upgrade scenario.

There are a range of other factors that may affect traffic emissions. If the posted speed limit is increased from to 100 km/h to 110 km/h, there from may be some increase in fuel use, and greenhouse gas emissions. However this will be offset partly by the increased efficiency of traffic movement due to a more direct alignment, reduced gradient and improved curvature. As explained in the response in Section 2.4.1, the new highway will be signposted at 100 km/h until adjacent sections are completed.

**Construction Emissions**

The RTA acknowledges the use of an average figure (64 tonnes of carbon per hectare) underestimates the carbon storage capacity of some Australian forests. Using the Department of Climate Change tool for estimating greenhouse emissions, some 230 tonnes of carbon per ha are estimated to be stored in the dry sclerophyll forests on the area of the project.

The value of $CO_{2\text{-e.}}$ emissions produced from vegetation removal in Table 8-3-1 was based on a preliminary area to be cleared of 110 ha whereas the value

stated in the text was based on a refined area to be cleared of 85 ha. The estimated lost sequestration was subsequently updated in the text but not in Table 8-3-1, hence the discrepancy. A new approximate value of emissions based on 85 ha to be cleared and 230 tonnes per ha is approximately 71,750 tonnes of $CO_2$ being released into the atmosphere.

The RTA is acquiring about 100 ha of Glenugie State Forest, which is to offset by a negotiated land exchange with NSW Forests. The exchange area, adjacent to Coopernook State Forest, is largely cleared land. It is to be replanted and used for forestry purposes.

The fuel use associated with all earthworks activities, including the transport of construction materials to site, was estimated at 8.7 million litres. No further information on fuel usage for construction activities was available at the time of the environmental assessment preparation. Similarly, at this stage of the project, no data were available on energy usage associated with lighting or air conditioning, or on the quantities of concrete required. As stated in the Environmental Assessment, a more comprehensive assessment of greenhouse emissions will be carried out following the development of a detailed construction schedule. This will include assessment of the greenhouse gas emissions associated with the manufacture and transport of materials used in construction and the energy used for on-site activities.

Further response in relation to peak oil and climate change is provided in Section 2.4.3.

## 2.14 Statement of commitments

**Submission numbers**

5 – NSW Department of Environment, Climate Change and Water (DECCW)
8 – Industry and Investment NSW (I&I NSW)

**Summary of issues raised**

The following issues were raised in submissions:

- The mitigation measures proposed throughout the environmental assessment are not reflected in the Statement of Commitments (SoCs). The proposed mitigation measures should be included in the SoCs or alternatively included as conditions of approval. (5, 8).
- The DECCW proposed a number of new SoCs and various amendments to existing SoCs.

**Response**

The SoCs in the environmental assessment describe the environmental outcomes that the RTA would achieve. The details of the site-specific impact mitigation measures that the RTA would implement to achieve these environmental outcomes are described in Chapter 7 of the environmental assessment.

The tables below provide a response to the DECCW's suggestions for new

SoCs and changes to existing SoCs.

| Suggested SoC amendments | Response |
|---|---|
| **Environmental management** | |
| Amendment to SoC EM2:<br>*"A Construction Environment Management Plan (CEMP) will be prepared and implemented prior to construction to guide project delivery. The CEMP shall outline the environment management practices and procedures that are to be followed during construction, incorporating as a minimum the impact mitigation and management measures outlined in the EA, and shall be prepared in accordance with Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004)."* | These requirements are addressed by the existing SoC EM2. |
| **Ecology** | |
| Amendment to SoC E2:<br>"A qualified ecologist will identify vegetation to be retained within the construction corridor (including *Eucalyptus tetrapleura*, *Melaleuca irbyana* and endangered ecological communities) and clearly delineate this vegetation on works plans<br>• *Erect before the start of construction, and retain in good working order for the duration of the construction and site restoration periods, protective fencing to mark the limits of clearing (i.e. `no go' areas) so that vehicles and other activities associated with construction, such as construction compounds and stockpile sites, do not enter adjacent areas of vegetation, particularly in areas where threatened flora species and endangered ecological communities are present."* | These requirements are addressed by the existing SoC E2. The RTA notes the importance of implementing and maintaining site delineation measures. |

| Suggested SoC amendments | Response |
|---|---|
| As SoC E3 deals with induction of site personnel it should be moved and included in the SOCs dealing with '*compliance and continuous improvement*' in '*environmental management*'. The wording should be made more inclusive. | SoC E3 will become SoC EM3 and will be revised to read as follows:<br>"Site inductions will inform and instruct construction staff of the requirements for flora and fauna protection (including *Eucalyptus tetrapleura*, *Melaleuca irbyana* and EECs) in the construction corridor." |
| The dimensions of the box culvert structures for dedicated and combined fauna structures should be resolved prior to project approval. | SoC E5 (previously E6) will be amended to specify a box culvert height of 2.4 m for dedicated and combined fauna structures. Provision of a median break will be investigated. A new SoC will be included as follows:<br>"The RTA will set bed levels for culverts and ledges for combined fauna structures, and median breaks in consultation with DECCW and I&I NSW." |
| Amendment to SoC E7:<br>"Fauna exclusion fencing to be provided to direct fauna towards designed fauna crossing structures in proximity of Glenugie Creek and nine Mile Creek covering 90 per cent of the proposed upgrade at the following locations:<br>– Chainage 3500 through to 8000, a distance of 4.5 km.<br>– Chainage 9000 to 1010, a further distance of 2.0 km<br>• *Fauna signage to be erected to notify road users they are traversing a high fauna impact area."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. Fauna signage will be implemented in accordance with RTA guidelines. |

| Suggested SoC amendments | Response |
|---|---|
| Amendment to SoC E9:<br>*"Water quality in Glenugie Creek and other drainage lines impacted by the development will be protected by a chain of erosion and sediment controls, with sediment basins representing the end point of the control system. Locations of sediment basins and erosion and sedimentation controls to be defined in the Soil and Water sub-plan and designed according to Volume 1 and 2 of Managing Urban Stormwater – Soils and Construction `Blue Book'."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |
| Amendment to SoC E12:<br>*"Monitoring should be undertaken for a minimum ~~12 months~~ two year period after construction ~~will help~~ to assess the effectiveness of fauna and flora impact mitigation measures and the need for additional measures."* | SoC to be amended as requested. |
| **Channel structure** | |
| Amendment to SoC CS1:<br>*"Detailed design guiding construction will limit impacts on upstream and downstream channel structure for all receiving environments (in particular key focus areas of channel instability) through identification, location and installation of appropriate bed and bank protection and energy dissipation measures to prevent mobilisation of headcuts and identified channel instabilities within the receiving drainage network (i.e. drainage lines that receive runoff from the development)."* | This requirement is covered by existing SoC CS1. |
| Amendment to SoC CS2:<br>*"Stream bank and bed erosion controls will be designed in accordance with Volume 1 and 2 of Managing Urban Stormwater – Soils and Construction `Blue Book', with specific construction methods for instream works and controls to be developed and implemented in consultation with relevant government agencies."* | This requirement is covered by existing SoC CS2. |

| Suggested SoC amendments | Response |
|---|---|
| **General construction issues** | |
| Amendment to SoC SW2:<br>*"Detailed design will refine the requirements for construction erosion and sediment control, including the requirements for works within and adjacent to waterways. Erosion and sediment controls will be designed according to Volume 1 and 2 of Managing Urban Stormwater – Soils and Construction `Blue Book'. Sediment basin sizing will take into account site specific landscape factors, sensitivities of receiving environments and habitat values in and around basin locations, with 80$^{th}$ percentile 5 day rainfall depths representing the minimum requirement. Final sediment basin sizes will be determined via a multi agency inspection on site with reference to the detailed design."* | This requirement is covered in existing SoC SW2 and reference documents. |
| Amendment to SoC SW3:<br>*"Water quality will be monitored upstream and downstream of the project site during construction to determine the effectiveness of mitigation strategies. Should water quality controls prove to be ineffective, alternative strategies or measures will be investigated."* | This requirement is covered in existing SoC SW3 and reference documents. |
| **Air quality** | |
| Amendment to SoC AQ2:<br>*"Baseline dust deposition monitoring will be undertaken and dust deposition gauges will be installed at sensitive locations to determine effectiveness of dust suppression measures. Should dust suppression measures prove to be ineffective, alternative strategies or measures will be investigated and implemented."* | Control of dust is covered by existing SoC AQ1. The project is located in a forested, rural environment and taking into account the current SoC and management measures the new SoC is not agreed with. |

| Proposed new SoC | Response |
|---|---|
| **Aboriginal heritage** | |
| New Proposed SoC:<br>*"If human remains are located during development associated works, the works are to halt in the immediate area to prevent any further impacts to the find or finds. The local police and the DECCW are to be notified. If the remains are found to of Aboriginal origin and the police consider the site not an investigation site for criminal activities, the DECCW is to be contacted and notified of the situation. Works are not to resume in the designated area until approval in writing from either the Police or the DECCW."* | Actions taken in response to discovery of human remains would be in accordance with legislative requirements. The requirements would be specified in the project CEMP. These requirements are addressed under existing SoC AH1. |
| New Proposed SoC:<br>*"If Aboriginal cultural evidence is uncovered due to the development activities, the site is to be registered in the Aboriginal Heritage Information Management System (AHIMS) (Managed by the DECCW) and the management outcome for the site also included in the information provided to the AHIMS. It is recommended that the community representatives for the development be included an any management outcome decided for the site with all information required for informed consent being given to the representatives for this purpose."* | The procedures that would be followed if any new sites are discovered would be specified in the project CEMP. Any new sites discovered would be registered in the DECCW AHIMS in accordance with legal requirements. These requirements are addressed under existing SoC AH1. |
| New Proposed SoC:<br>*"An Aboriginal Cultural Education program should be developed and delivered as part of the induction of personnel and contractors involved in the construction activities on site. The program should be developed in collaboration with the Aboriginal community."* | These requirements are addressed under existing SoC AH2. |

| Proposed new SoC | Response |
|---|---|
| New Proposed SoC:<br>*"An Aboriginal Cultural Heritage Management Plan (ACHMP) is developed for the proposed project area in accordance with the NSW Government's Aboriginal Participation in Construction Guidelines. This should form part of the proposed Construction and Operational Environmental Management Plan. The ACHMP must be developed and implemented in consultation with the Aboriginal community and must specify the policies and actions required to mitigate and manage the potential impacts of the proposal on Aboriginal heritage. The ACHMP should address, but not be limited to, the following:*<br>• *Procedures for ongoing Aboriginal consultation and involvement including pre-construction surveys following initial site clearing.*<br>• *Management strategies, including salvage and monitoring methodologies.*<br>• *Reinforcing the need to avoid, wherever possible, any sites identified.*<br><br>*Protection in perpetuity of any negotiated keeping places within the project area."* | The following new SoCs will be added to address the issues raised:<br>"An ACHMP would be developed for the project in consultation with DECCW and in accordance with the RTA's procedure for Aboriginal cultural heritage consultation and investigation. This would form part of the proposed CEMP." (AH3)<br><br>"Aboriginal employment opportunities during the construction of the project would be in accordance with the NSW Government's *Aboriginal Participation in Construction* guidelines." (AH4) |

| Proposed new SoC | Response |
|---|---|
| **Ecology** | |
| New Proposed SoC:<br>*"Three dedicated fauna underpass crossings are to be constructed to provide for fauna species movement and habitat connectivity. The three dedicated fauna underpass structures will be a minimum of RCBC with clearance height of 2.4m with, if possible, a median break between the northbound and southbound carriageways, which is vegetated with suitable endemic flora species and habitat features. Egress is to be safe of hazards, such as service roads. Dedicated fauna passages are to be constructed to avoid inundation or ponding of water."* | These requirements will be addressed by the amendments to SoC E5 (see above). |
| New Proposed SoC:<br>*"Five combined fauna and drainage structures are as a minimum to be RCBC with a minimum internal clearance height of 2.4m in the dry passage cell. Combined drainage structures are to have at least one cell dedicated to dry fauna passage. Construction must ensure that base flow does not inundate the fauna passage cell."* | These requirements will be addressed by the amendments to SoC E5 (see above). |
| New Proposed SoC:<br>*"To facilitate the movement of arboreal fauna species three canopy rope crossings will be provided across the new alignment and one across the existing Pacific Highway at locations indicated within the Environmental Assessment. Final locations of the arboreal crossings and limits of clearing in the vicinity of these crossings shall be determined in consultation with DECCW and DII."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |

| Proposed new SoC | Response |
|---|---|
| New Proposed SoC:<br>*"Flagging of Melaleuca irbyana and Eucalyptus tetrapleura plants to be retained along the edges of the project footprint will be in place before clearing for construction. Strict protocols will be developed and implemented to avoid direct impacts on Melaleuca irbyana and Eucalyptus tetrapleura where possible including those adjacent to the road."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |
| New Proposed SoC:<br>*"A rehabilitation / translocation strategy is to be prepared for Melaleuca irbyana. The strategy is to detail methods, timing, planting location, maintenance and monitoring requirements. The strategy is to be implemented in the project footprint prior to and during construction. The strategy should be developed in consultation with DECCW and in accordance with relevant guidelines such as Guidelines for the Translocation of Threatened Plants in Australia (Vallee et. Al. 2004).* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |
| New Proposed SoC:<br>*"Surveys will be undertaken within the proposed road corridor, prior to construction, to target cryptic rare and threatened flora species. Species to include but not limited to Cryptostylis hunteriana, Caesia parviflora var. minor, Maundia triglochinoides, Centranthera cochinchinensis, and Tylophora woollsii. The targeted seasonal surveys for cryptic flora should be undertaken in consultation with the DECCW and DEWHA."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |

| Proposed new SoC | Response |
|---|---|
| New Proposed SoC:<br>"*A monitoring strategy will be prepared, in consultation with DECCW and Department of Industry and Investment (DII), detailing the scope and purpose of monitoring, frequency of surveys, timing of surveys and target species (inclusive of but not limited to flora: Melaleuca irbyana and Eucalyptus tetrapleura; and fauna: Petaurus australis, Aepyprymnus rufescens, Phascogale tapotafa and Burhinus grallarius)*." | The new proposed SoC will be adopted. |
| New Proposed SoC:<br>*"A weed management strategy is to be developed and implemented across all stages of the project. New edge areas will be treated as a priority with the removal of all weed species as they become present until the full M class motorway is operational."* | These requirements are covered by existing impact mitigation measures in Chapter 7 of the environmental assessment. |
| New Proposed SoC:*"If during the course of construction, the Proponent becomes aware of the presence of threatened species not identified and assessed in the EA or Representations Report and which are likely to be affected, the Proponent must:*<br>• *immediately cease all work likely to affect the threatened species:*<br>• *inform the Director – North East Branch of DECCW and/or Director of D11 as relevant; and*<br>• *not recommence work likely to affect the threatened species until receiving advice from the DECCW and/or D11, as relevant, to do so."* | Actions taken in response to discovery of additional threatened species not previously identified in the environmental assessment would be in accordance with legislative requirements. These requirements would be specified in the project CEMP |

| Proposed new SoC | Response |
|---|---|
| New Proposed SoC:<br>*"Pre-clearance surveys will be undertaken to identify all important features for threatened fauna directly located within the road footprint so that these can be avoided during construction or timed for appropriate removal so that impacts to fauna are minimised. This includes but is not limited to any nests of the Square-tailed Kite (Lophoictinia isura), Glossy Black-Cockatoo (Calyptorhynchus lathami) or Large Forest Owls and any den sites for the Yellow-bellied Glider (Petaurus australis) which may occur in the corridor."* | This requirement is covered by the impact mitigation measures in Chapter 7 of the environmental assessment. |
| New Proposed SoC:<br>*"A biodiversity offset strategy will be developed in consultation with Department of Environment, Water, Heritage and the Arts, DECCW, Department of Industry and Investment (Forests NSW) and the Department of Planning. The biodiversity offset package will focus on the principle of maintaining or improving biodiversity values in the project area over the long-term."* | This requirement is covered by existing SoC E10. |
| **Channel structure** | |
| New Proposed SoC:<br>*"Monitoring during and post construction to be undertaken in order to assess continued stability of the drainage network, performance of controls and to identify potential trigger points for rehabilitation. Monitoring to be undertaken at 12 months and 24 months after completion of construction, with immediate rehabilitation to be undertaken if required."* | The impact mitigation and management measures that would be implemented for channel structure would be maintained by the contractor during the contract period and subsequently by the RTA. |

| Proposed new SoC | Response |
|---|---|
| **General construction issues** | |
| New Proposed SoC:<br>*"Project staging proposals will ensure environmental impacts from partial implementation of ultimate design are minimised and avoided where possible. Detailed design and project CEMP will outline staging steps and proposed timelines until full completion, detailing impact mitigation measures for identified areas affected by staging and delays in delivery."* | The impact mitigation measures described in Chapter 7 of the environmental assessment apply to, and will be implemented for, both the likely initial staging and the full motorway upgrade proposal. |
| New Proposed SoC:<br>*"There will be progressive revegetation of all disturbed areas associated with construction at the earliest possible time, in particular but not limited to exposed areas within riparian corridors, drainage lines, cut and fill batters and areas of dispersive soils."* | This requirement is covered by the existing impact mitigation measures described in Chapter 7 of the environmental assessment. |
| New Proposed SoC:<br>*"Potential changes to groundwater from earthworks associated with deep cuttings below known groundwater levels will be investigated. In particular, verification of the actual groundwater level at the major cut and the relative levels of groundwater at other minor cuts approaching drainage line / waterway crossings. Where a potential change is identified, the nature of change and any resultant impacts will be determined and where necessary, measures to manage the changes will be designed and implemented in consultation with relevant government agencies."* | Based on groundwater depths identified during concept design development, and described in the environmental assessment, adverse impacts on groundwater systems are not expected to occur. Further geotechnical investigations carried out during detailed design will confirm groundwater levels and any associated project impacts. |

## 2.15 Environmental management

**Submission numbers**

1 – Clarence Environment Centre (CEC)
5 – NSW Department of Environment, Climate Change and Water (DECCW)

8 – Industry and Investment NSW (I&I NSW)

**Summary of issues raised**

The CEC expressed a lack of confidence in the RTA's commitment to implement the impact mitigation measures proposed in the environmental assessment. Compliance monitoring is required. (1)

The submissions from DECCW and I&I NSW raised the following issues:

- Any CEMP, including any Framework CEMP, should be approved by the DoP, rather than by the proponent or its contractors. (5)
- The existing Framework CEMP is merely a general guiding document for a CEMP and is not an adequate base document for approval. (5)
- A project CEMP should be developed in consultation with relevant agencies and stakeholders when all the required information is available. (5, 8)
- The information currently provided in the Framework CEMP should be re-classified as a CEMP guideline to be used to inform the CEMP and sub-plan development. (5)
- Specific comments were made on the existing Framework CEMP (Appendix G to the environmental assessment), including comments suggesting wording changes. (5)
- I&I NSW recommend that a Project CEMP be developed, rather than a Framework CEMP. (8)

**Response**

All appropriate impact mitigation measures will be developed and included in the CEMP, and implemented during construction of the project. The requirement for compliance monitoring will be a condition of approval. A commitment to this is already reflected in the Statement of Commitments. RTA has extensive experience in condition of approval compliance monitoring as outlined in pre construction, construction, pre operation and operational compliance reports.

The intention of the Framework CEMP was to provide a general overview of what would be covered in the CEMP. A detailed CEMP will be developed in accordance with the Framework CEMP and in consultation with the relevant agencies in line with current projects and approved by DoP.

# 3 Project changes and additional information

## 3.1 Proposed ancillary site

Section 4.4.3 of the environmental assessment defined the preliminary locations of ancillary facilities required for the project. As part of the initial stages of the detailed design developed following the display of the environmental assessment, it was concluded that an additional ancillary site is likely to be required for a construction compound, and if necessary a concrete batching plant and asphalt batch plant. This site is located at the northern end of the project. Available areas for ancillary activities on the project are very limited mainly because of the extensive vegetation on the project and are also constrained by the existing Pacific Highway and the need for safe access to ancillary sites. The location of the proposed site is shown in **Figure 3-1**.

### 3.1.1 Access to the site

As identified in **Figure 3-1**, the proposed ancillary site would be accessed off the existing Pacific Highway via an access track that connects with the existing intersection with Shields Road. It is likely that the existing Shields Road intersection would be upgraded to accommodate the new access track. Minor formation works and line marking on the existing highway from about chainage 8600 to 9300 may also be required as part of the intersection works. From Shields Road, the proposed access track follows the alignment of the existing forest access track before connecting with the proposed ancillary site.

The upgraded Shields Road intersection would provide safe access into the proposed ancillary site, and would also provide good sight distance for construction traffic and motorists using the existing highway.

### 3.1.2 Site assessment

Section 4.4.3 of the environmental assessment specifies the criteria used to select the potential ancillary sites. An assessment of the proposed new ancillary site against the assessment criteria is as follows:

**At least 40 m distant from the nearest waterway**

The nearest waterway is approximately 40 m east of the proposed stockpile area of the ancillary site. No other waterways are within the vicinity of the proposed stockpile site. All ancillary sites would be managed in strict compliance with sediment and erosion protocols.

**Of low ecological and heritage conservation significance**

The vegetation community at the proposed ancillary site location is of low ecological significance. The proposed ancillary site would require clearing of approximately 3.7 ha. Following completion of construction, the cleared

areas would be re-vegetated using native species. This clearing is not additional to the total area of 85 ha to be cleared for the project. The 85ha of vegetation to be cleared is a conservative estimate, as it is expected that during detailed design, opportunities to reduce the area to be cleared will be identified. Part of this may be the indicative ancillary site location identified in Section 4.4.3 of the environmental assessment, and as shown by hatching on **Figure 3-1** in this report.

The proposed ancillary site does not include any identified threatened plant species nor endangered ecological communities. No threatened fauna have been identified in the area, although it may provide habitat for threatened fauna. The site has also been selected based on the principle of utilising areas to the west of the proposed upgrade rather than those on the eastern side where possible, given the opportunity to maintain greater vegetation continuity with the forest to the east.

An Aboriginal and cultural heritage assessment was undertaken for the project and was included in Chapter 7 of the environmental assessment. A 150 m corridor along the project was surveyed which incorporated the area required for the proposed ancillary sites. Based on those investigations, the proposed ancillary site would not impact on Aboriginal and cultural heritage.

**At least 100m distant from residential dwellings and other land uses that may be sensitive to noise.**

The proposed ancillary site is more than 100 m from a residence on the western side of the existing Pacific Highway. This distance includes a vegetated buffer area.

The predominant noise source in the proposed ancillary site would be vehicle movements, staff transport and material delivery. However, either a concrete batching plant, or an asphalt plant (or both) may also be co-located at the proposed site. Table 7-6-4 in the environmental assessment outlines potential noise sources from the operation of a concrete batching plant. They are representative of those from an asphalt plant. Noise sources are typically associated with aggregate loading, mixing drums, a generator and other operational processes. The plants would be located towards the eastern or southern sides of the compound site, as far as possible away from the sensitive receiver.

The vegetated buffer would be retained for visual screening along the western boundary of the proposed ancillary site with the existing highway. No noise or dust emitting activities would be undertaken in the vegetated buffer.

No additional construction noise management measures are necessary. The actual batching selected would require further assessment during detailed design,

## 3.2 Additional information

A seven part test of significance for the Little Lorikeet has been prepared as

the species has been listed as vulnerable under the *Threatened Species Act* (TSC Act) since the field work and preparation of the ecology working paper for the project. The seven part test addresses potential impacts on the species.

**Little Lorikeet *Glossopsitta pusilla* (vulnerable species, TSC Act)**

***How is the project likely to affect the lifecycle of a threatened species and/or population?***

Little Lorikeets are known to occupy a diversity of forest and woodland habitats, including old-growth and logged forests, and remnant woodland patches and roadside vegetation (Pizzey & Knight 1997, DECC 2008). The species is generally considered to be nomadic, with irregular large or small influxes of individuals occurring at any time of year, apparently related to food availability (DECC 2008). However, they do exhibit some site fidelity, with breeding pairs resident from April to December, and even during their non-resident period some individuals will return to the nest area for short periods if there is some tree-flowering in the vicinity.

They feed in small flocks, often with other species of lorikeet, primarily on nectar and pollen in the tree canopy. They prefer profusely flowering eucalypts but will also feed in other species such as melaleucas and mistletoes. The species breeds in tree hollows in living trees, during May to September, raising clutches of three to five eggs (DECC 2008). They likely commence breeding at one year, and live for approximately 10 years in the wild.

Major threats to Little Lorikeets are loss of breeding sites and food resources from ongoing land clearing. Loss of nest trees from road-side verges, often associated with road works, remains an ongoing threat (DECC 2008).

The study area would constitute breeding and non-breeding habitat for the Little Lorikeet in New South Wales. The loss of hollow-bearing and feed trees would directly affect the species opportunity to feed and breed in the area. However the study area is not considered a critical area for the Little Lorikeet as extensive areas of suitable habitat occur elsewhere in the region. The current potential for the species to occur based on the presence of potential foraging and breeding habitat is expected to remain after completion of the project such that foraging, movement and other life-cycle attributes would not be impacted.

***How is the project likely to affect the habitat of a threatened species, population or ecological community?***

In considering the potential habitat for the species in the study area, it is likely that all the open forest habitats present at the study area, provide opportunities for foraging and breeding. The project would remove up to 74.7 ha of dry open forest and 5.1 ha of woodland. This loss is considered low and of little significance to populations of the Little Lorikeet. Large areas of high quality habitat are represented outside the road footprint in several regional State Forests, conservation reserves and rural properties. The potential for continued visitation to the region is expected following construction of the project.

***Does the project affect any threatened species or populations that are at the limit of its known distribution?***

The distribution of the Little Lorikeet extends from just north of Cairns, around the east of Australia, to Adelaide (DECC 2008). In NSW the species is distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range. Hence the study area is not at the limit of the species known distribution.

***How is the project likely to affect current disturbance regimes?***

A range of disturbance regimes currently exist and reflect the historical and current land-uses of the study area, examples include the loss of mature forest and tree hollows, weed invasion, inappropriate fire regimes, draining of swamps, increased nutrient and sediment loads into aquatic habitats, and the presence of introduced predators. The introduction of a new road has the potential to further affect some of these disturbance regimes via additional vegetation clearing and altering of hydrological regimes. The route selection process was designed to minimise the severity of disturbance regimes by appropriate placement of the corridor. Further measures to reduce the residual impacts include construction and operational management practices, drainage design and sediment control, weed management and rehabilitation. The inclusion of these measures suggests minimal additional affect of the disturbance regimes beyond the current situation.

***How is the project likely to affect habitat connectivity?***

The landscape surrounding the study area supports several very large areas of habitat associated with the production forests of Glenugie State Forest, Newfoundland State Forest and conservation reserves such as Yuragir National Park in addition to natural vegetation on private rural properties. This is a reflection of the low fertile soil types and terrain which is not suited to agriculture in contrast to the fertile soils on the Clarence River floodplain which have resulted in extensive clearing and fragmentation of vegetation. The habitat to the west of the project area becomes increasingly more fragmented in lower elevated lands and private property while Glenugie State Forest continues extensively to the east of the project area.

Impacts associated with the barrier effect of new roads are well documented. This factor has potential to impact on typical fauna movements in the vicinity of the road, in turn negatively impacting on important life-cycle events such as foraging, breeding and dispersal. The new road would contribute to the cumulative reduction in habitat connectivity similar to the existing Pacific Highway in this location and would have the greatest potential impact on ground-dwelling terrestrial fauna and species with large home-ranges such as the Spotted-tailed Quoll. More mobile species such as bats and birds have better opportunities to move across the landscape and access habitat fragmented by roads. Measures to reduce the impact on connectivity have been considered in the development of a biodiversity mitigation strategy and include the provision of dedicated fauna underpass structures and over pass structures (canopy ropes) as well as fauna exclusion fencing and revegetation of road verges. These features have been strategically located at important habitat areas and linkages in the landscape that reflect the habitat assessment data and predicted distribution

of threatened fauna.

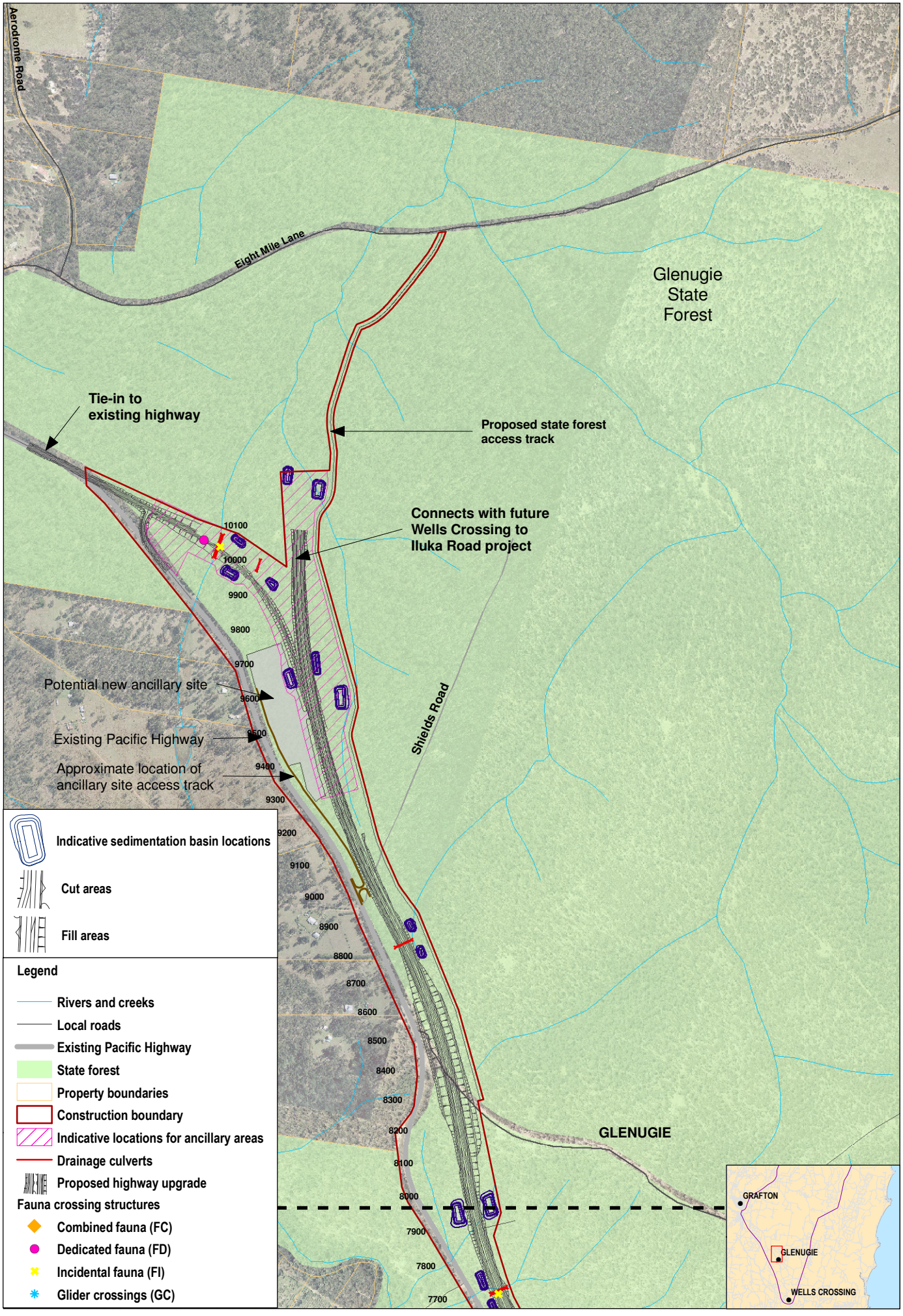
The Little Lorikeet is a nomadic species accustomed to moving through fragmented landscapes to exploit patchily distributed resources throughout its range. Hence, although the proposed road upgrade may further fragment habitat, the species will likely find the type and distance of fragmentation proposed no barrier to its movements for foraging and breeding.

***How is the project likely to affect critical habitat?***

No critical habitat has been identified for this species.

## 3.3 Further design refinement

As outlined in Section 4.3.4 of the Environmental Assessment detailed design would be prepared on the project prior to construction. The detail design would confirm the project and would further explore opportunity to refine the design and minimise impacts.




Data Sources
Streetworks, LPI 2008
Aerial: 2007

**Figure 3-1 : Proposed location of potential new ancillary site**

0 500
A4 1:15,000 Metres

# 4 Revised statement of commitments

A number of revisions have been made to the statement of commitments as a result of environmental assessment submissions. Additions are indicated as blue underlined text, while deletions are indicated as ~~strike through~~ text.

- **Table 4-1 Revised statement of commitments**

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| **Environmental management** | | | | |
| Compliance and continuous improvement in environmental management | EM1 | The head contractor for the project will have an ISO141 accredited environmental management system, including a performance and compliance auditing program. | Pre-construction and construction | ISO141:24.<br>*RTA QA Specification G36 – Environmental Protection*. |
| | EM2 | Suitably qualified and experienced personnel will develop and implement project specific environmental management plans and procedures incorporating, as a minimum, the impact mitigation and management measures identified in the environmental assessment. | Pre-construction and construction | *RTA QA Specification G36 – Environmental Protection.*<br>Relevant RTA policies and specifications.<br>Appendix G of the environmental assessment. |
| | EM3 | Site inductions will inform and instruct construction staff of the requirements for fauna and flora protection (including *Eucalyptus tetrapleura*, *Melaleuca irbyana* and EECs) in the construction corridor. | Pre-construction and construction | DECC (2004b). |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| **Community consultation** | | | | |
| Informed community | CC1 | Keeping the community informed will include:<br>• Regular project updates.<br>• Prior notice of project activities.<br>• Changes to traffic and access and works outside standard working hours.<br>• Contact details for enquiries.<br>Targeted consultation with affected individuals or groups (eg. Forests NSW and other affected stakeholders) will occur as necessary. | Pre-construction and construction | RTA (2008b).<br>*AS 4269 Complaints Handling.*<br>Chapter 6 of the environmental assessment. |
| Effective management of community complaints | CC2 | Complaint management will include:<br>• A published 24 hour toll free complaints number.<br>• Directions on how to register a complaint.<br>• Acknowledgment of complaints within eight working hours.<br>• Complaint recording.<br>• Tracking of complaints until resolution. | Pre-construction and construction | RTA (2008b).<br>*AS 4269 Complaints Handling.*<br>Chapter 6 of the environmental assessment. |
| **Ecology** | | | | |
| Minimise impacts on flora and fauna | E1 | Restrict clearing of native vegetation to the minimum area necessary for construction. | Pre-construction and construction | Section 7.1 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| | E2 | A qualified ecologist will identify vegetation to be retained within the construction corridor (including *Eucalyptus tetrapleura*, *Melaleuca irbyana* and endangered ecological communities) and clearly delineate this vegetation on work plans. Flagging/fencing, erected before the start of construction, will delineate this vegetation on the project site for the duration of the construction and site restoration periods. | Pre-construction and construction | Section 7.1 of the environmental assessment. DECC (2004b). Australian Network for Plant Conservation guidelines (Vallee *et.al., 2004*). |
| | ~~E3~~ | ~~Site inductions will inform and instruct construction staff of the requirements for vegetation retention in the construction corridor.~~ | ~~Pre-construction and construction~~ | ~~DECC (2004b).~~ |
| Minimise impacts on fauna | E4~~3~~ | A suitably qualified ecologist will undertake pre-clearance surveys, including searches of nests and hollow bearing trees, to identify fauna species at risk of injury that require relocating to alternative, nearby suitable habitat. Follow-up inspections immediately before clearing and during construction will confirm that the sites subject to pre-clearance surveys remain free of fauna. | Pre construction and construction | Section 7.1 of the environmental assessment. *RTA QA Specification G36 - Environmental Protection.* |
| | E5~~4~~ | Appropriate natural and artificial habitat features and resources (such as hollow-bearing trees, hollow logs, nest boxes and bush rocks) placed in areas adjacent to the project site will provide alternative habitat for displaced fauna. This will include relocation of natural habitat features within the project site. | Pre construction and construction | Section 7.1 of the environmental assessment. Australian Network for Plant Conservation guidelines (Vallee *et.al., 2004*). |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| Provide for habitat connectivity | E6~~5~~ | Fauna crossings to be constructed as part of the project will provide for fauna movement and habitat connectivity. Crossings will be appropriate to the key species occurring in the locality (eg. dry crossings for *Rufus bettong*). A box culvert height of 2.4 m will be specified for dedicated and a combined fauna structures. | Pre-construction and construction | Section 7.1 of the environmental assessment. |
| | E6 | The RTA will set bed levels for culverts and ledges for combined fauna structures, and median breaks in consultation with DECCW and I&I NSW. | Pre-construction and construction | Section 7.1 of the environmental assessment. |
| | E7 | Fauna exclusion fencing to be provided at appropriate locations along the proposed upgrade route will direct fauna towards designed fauna crossing structures. | Pre-construction and construction | Section 7.1 of the environmental assessment. |
| Minimise impacts on aquatic ecosystems, including aquatic habitat and fish species | E8 | Design and construction of waterway crossings will be in accordance with the fish habitat classification of each waterway and in consultation with the Department of Primary Industries (Aquatic Habitat Protection Unit). | Pre-construction | Fairfull and Witheridge (2003).<br>NSW Fisheries (1999).<br>NSW Fisheries (2004). |
| | E9 | Water quality in Glenugie Creek and other local waterways will be protected with sediment basins. Indicative locations of sediment basins are given in the environmental assessment. | pre-construction, construction and operation | Chapter 4 of the environmental assessment. |
| Provide offsets for unavoidable impacts on important vegetation and habitat | E10 | Development of a biodiversity offset agreement will occur in consultation with the Department of Environment and Climate Change (DECC) and Forests NSW. | Pre-construction and construction | Section 7.1 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| | E11 | Plantings of *Melaleuca irbyana* and *Eucalyptus tetrapleura* in areas of suitable habitat adjacent to the project site will follow from seed collection and propagation. | Pre-construction and construction | Australian Network for Plant Conservation guidelines (Vallee *et.al., 2004*). |
| Effective flora and fauna impact mitigation and management measures | E12 | Monitoring for a minimum ~~12 month~~ two year period after construction ~~will help~~ to assess the effectiveness of fauna and flora impact mitigation measures and the need for additional measures. | Operation | Section 7.1 of the environmental assessment. |
| | E13 | A monitoring strategy will be prepared, in consultation with DECCW and I&I NSW, detailing the scope and purpose of monitoring, frequency of surveys, timing of surveys and target species (inclusive of but not limited to flora: *Melaleuca irbyana* and *Eucalyptus tetrapleura*; and fauna: *Petaurus australis, Aepyprymnus rufescens, Phascogale tapotafa* and *Burhinus grallarius*). | Operation | Section 7.1 of the environmental assessment. |
| **Channel structure** | | | | |
| Minimise impacts on channel structure | CS1 | Detailed design will limit impacts on upstream and downstream channel structure (eg. through culvert sizing and other design features to control flow intensity and direction). | Pre-construction, construction and operation | Section 7.2 of the environmental assessment. |
| | CS2 | Stream bank/bed erosion controls will be in accordance with the 'Blue Book'. | Pre-construction, construction and operation | Landcom (2004) and DECC (2008a).<br>Sections 7.2 and 7.6.3 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| **Operational traffic and transport** | | | | |
| Maintain State Forest access | OT1 | Where the project affects access to State Forest land, the provision of a new service access route of equivalent standard will be provided in consultation with the Department of Primary Industries, Forests NSW. The retention of access to and within State Forest lands adjacent to the project site is necessary for forestry operations, which include logging, fire management and recreation. | Pre-construction and operation | RTA (2003). *RTA QA Specification G10 Control of Traffic.* RTA Land Acquisition Policy. Chapter 4 and Section 7.3 of the environmental assessment. *Land Acquisition (Just Terms Compensation) Act* 1991. |
| Maintain access to local road network | OT2 | Detailed design will provide for on-going, uninterrupted access to and operation of the local road network. | Pre-construction and operation | Section 7.3 of the environmental assessment. |
| **Operational noise and vibration** | | | | |
| Confirmation of operational noise impacts | ON1 | Monitoring 12 months after completion of construction will indicate the need for any feasible and reasonable noise mitigation and management measures. | Operation | DECC-EPA (1999). RTA (2001). |
| | ON2 | The RTA would confirm potential operational noise impacts should the design be refined at the detailed design stage. | Operation | DECC-EPA (1999). RTA (2001). |
| **Aboriginal cultural heritage** | | | | |
| Minimise impacts on any previously unidentified Aboriginal objects or suspected human remains | AH1 | Protocols developed for the project will facilitate appropriate protection and management of any Aboriginal objects or suspected human remains found during construction. These protocols will include an appropriate level of Aboriginal consultation, as required. | Pre-construction and construction | RTA (2008a). Section 7.5 of the environmental assessment. Appendix E of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| | AH2 | All construction personnel will receive training in the management of Aboriginal cultural materials, including legal obligations, the application of protocols, and the recognition of Aboriginal cultural materials. | Pre-construction and construction | RTA (2008a).<br>*National Parks and Wildlife Act* 1974.<br>Section 7.5 of the environmental assessment.<br>Appendix E of the environmental assessment. |
| | AH3 | An Aboriginal Cultural Heritage Management Plan (ACHMP) would be developed for the project in consultation with DECCW and in accordance with the RTA's procedure for Aboriginal cultural heritage consultation and investigation. This would form part of the proposed CEMP. | Pre-construction and construction | Section 7.5 of the environmental assessment.<br>Appendix E of the environmental assessment |
| | AH4 | Aboriginal employment opportunities during construction of the project would be in accordance with the NSW Government's Aboriginal Participation in Construction Guidelines | Pre-construction and construction | *Aboriginal Participation in Construction Guidelines* |
| **General construction issues: Construction noise** | | | | |
| Minimise construction noise and vibration and associated impacts | CN1 | Construction would be confined to approved construction hours, which will be specified in the approved Construction Environmental Management Plan for the project. | Construction | Section 4.4.7 and Section 7.6.1 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| | CN2 | Potentially affected sensitive receivers are to be given adequate prior notice of the construction program, kept informed throughout the construction period, and provided with a name and contact number for construction noise information and complaints. A specific notification procedure would be developed for any blasting activities. Any noise complaints will be dealt with through a standard complaints management procedure identified in the community consultation plan. | Construction | ANZECC (1990).<br>German Standard *DIN 4150 Part 3 Structural Vibration in Buildings (Effects on Structures).*<br>DECC (2006).<br>RTA (2008b). |
| | CN3 | Construction noise and vibration would be minimised as far as practical through the implementation of all feasible and reasonable measures. | | RTA (2001).<br>DECC *Environmental Noise Control Manual.*<br>EPA (1999). |
| | CN4 | Construction staff training would cover noise mitigation techniques. | | Section 7.6.1 of the environmental assessment. |
| | CN5 | Monitoring would be carried out at sensitive receiver locations to assess the need for additional impact mitigation measures. Where potential or actual exceedances of noise goals are identified, additional feasible and reasonable best practice noise management measures will be considered and investigated. | Construction | RTA (2001).<br>DECC *Environmental Noise Control Manual.*<br>EPA (1999). |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| **General construction issues: Construction traffic** | | | | |
| Minimise impacts on Pacific Highway and local traffic | CT1 | Construction vehicle movements and work programs will incorporate traffic control measures to minimise traffic and transport impacts on local roads and the existing Pacific Highway. | Pre-construction and construction | RTA (2003). *RTA QA Specification G10 Control of Traffic.* RTA (2008b). Section 7.6.2 of the environmental assessment. |
| Minimise impacts on local roads | CT2 | Any use of non-arterial roads by construction traffic will require preparation of pre-construction and post-construction dilapidation reports, with copies to go to the relevant roads authority. Repair of any damage resulting from construction (normal wear and tear), will occur, unless alternative arrangements are made with the relevant roads authority. | Construction and post-construction | RTA (2003). *RTA QA Specification G10 Control of Traffic.* RTA (2008b). Section 7.6.2 of the environmental assessment. |
| Minimise impacts on access | CT3 | Construction vehicle movements and work programs will incorporate traffic control measures to maintain access to properties and Glenugie State Forest. | Construction | *RTA Traffic Control at Work Sites (*RTA 2003*).* *RTA QA Specification G10 Control of Traffic.* Section 7.6.2 of the environmental assessment. |
| **General construction issues: Erosion, sedimentation, water quality and riparian management** | | | | |
| Minimise potential for soil erosion | SW1 | Restrict the area of soil exposure and disturbance to the minimum amount necessary for construction. | Construction | *RTA QA Specification G40 Clearing and Grubbing.* |
| | SW2 | Detailed design will refine the requirements for construction erosion and sediment control, including the requirements for works within and adjacent to waterways. | Pre- construction | Landcom (2004). DECC (2008a). Section 7.6.3 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| Effective erosion and sediment control measures | SW3 | Monitoring of water quality upstream and downstream of the project site during construction will assess the effectiveness of impact mitigation and management strategies. Implementation of additional feasible and reasonable management measures would then occur, if found to be necessary. | Pre-construction and construction | Landcom (2004).<br>DECC (2008a).<br>Section 7.6.3 of the environmental assessment.<br>*RTA QA Specification G38 Soil and Water Management.*<br>*RTA QA Specification G39 Soil and Water Management (Erosion and Sediment Control Plan).* |
| **Non-Aboriginal heritage** | | | | |
| Minimise impacts on non-Aboriginal heritage | NH1 | There will be an archival recording of the remnant section of the 1915 branch rail line to be impacted by the project before the start of construction. The recording will follow Department of Planning (Heritage Branch) guidelines. | Pre-construction | *Heritage Act 1977.*<br>NSW Heritage Office (1998).<br>Section 8.1 of the environmental assessment. |
| | NH2 | Protocols developed for the project will facilitate appropriate protection and management of any previously unidentified relics or suspected human remains found during construction. The protocols will include stopping all works in the vicinity of the find, notification of relevant stakeholders and implementation of an appropriate management strategy. | Pre-construction and construction | *Heritage Act 1977.*<br>Section 8.1 of the environmental assessment.<br>Appendix E of the environmental assessment. |
| | NH3 | All construction personnel will receive training in the management of (non-Aboriginal) relics, including legal obligations, the application of protocols, and the recognition of relics. | Pre-construction and construction | *Heritage Act 1977.*<br>Appendix E of the environmental assessment. |
| **Land use and socio-economic impacts** | | | | |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| Appropriate compensation paid for property acquisition | L1 | Negotiation of all property acquisitions will be in accordance with the RTA's *Land Acquisition Policy Statement.*<br>Compensation assessment will be in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991.* | Pre-construction | RTA *Land Acquisition Policy Statement.*<br>*Land Acquisition (Just Terms Compensation) Act* 1991. |
| Minimise impacts on forestry operations | L2 | Forests NSW will have access to State Forest land identified for acquisition by the RTA to remove any harvestable timber before the start of construction. | Pre-construction, construction and operation | RTA (2008b).<br>Section 8.2 of the environmental assessment |
| Disruption of utilities and services minimised | L3 | Identification of utilities and services potentially affected by construction, including requirements for diversion, protection and/or support, will occur before the start of construction. Consultation with the service providers will determine the requirements for service alterations and disruptions, including the requirements for advice to customers. | Pre-construction and construction | RTA (2008b).<br>Section 8.2 of the environmental assessment |
| **Greenhouse gas and climate change** | | | | |
| Minimise greenhouse gas emissions and energy consumption | G1 | Wherever feasible and reasonable, detailed design will consider whole of life reductions in greenhouse gas emissions and energy consumption. | Pre-construction and construction | AS/NZS 1158:1.1.25. |
| | G2 | The adoption of energy efficient work practices, including selection of materials and equipment, will minimise energy use and green house gas emissions associated with construction where feasible and reasonable. | Preconstruction and construction | Section 8.3 of the environmental assessment. |

| Outcome | Ref No. | Key action | Timing | Reference documents |
|---|---|---|---|---|
| **Visual and landscape impacts** | | | | |
| Landscape character of the project study area maintained and enhanced | V1 | The detailed design of built elements and landscapes will be in accordance with the visual and urban design objectives and principles of the project. | Pre-construction | RTA (2004b).<br>RTA (2005b).<br>Sections 7.1 and 8.4 of the environmental assessment.<br>RTA *Landscape Guidelines* |
| Visual impacts minimised | V2 | Species used in landscaping will comprise native and locally indigenous plants. | Pre-construction and construction | Sections 7.1 and 8.4 of the environmental assessment. |
| **Air quality** | | | | |
| Air quality impacts minimised | AQ1 | Dust controls will minimise dust impacts during construction | Pre-construction and construction | Section 8.5 of the environmental assessment |
| **Hazards and risks** | | | | |
| Minimise hazards and risks (construction) | HR1 | During construction, bunds will isolate hazardous liquids and materials, and sedimentation basins will contain spills. | Pre-construction and construction | Section 8.6 of the environmental assessment |
| Safe work site | HR2 | All occupational health and safety measures will be in accordance with relevant legislation. | Pre-construction and construction | Occupational and health legislation.<br>Section 8.6 of the environmental assessment |
| Minimise hazards and risks (operation) | HR3 | Permanent water quality basins will contain spills. | operation | Section 8.6 of the environmental assessment |
| **Waste management** | | | | |
| Minimise waste disposal | W1 | Waste management will avoid waste creation, reuse and recycle where possible, and dispose as a last resort | Pre-construction and construction | Section 8.7 of the environmental assessment |

# Appendix A – List of submissions and where issues have been addressed

| Submission No. | Name | Report reference |
|---|---|---|
| 1 | Clarence Environment Centre | 2.3.1, 2.3.2, 2.4.1, 2.4.2, 2.4.4, 2.4.5, 2.5, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5, 2.6.6, 2.8, 2.13, 2.15 |
| 2 | Individual | 2.4.2, 2.4.3, 2.4.4, 2.4.6, 2.13 |
| 3 | Climate Change Australia | 2.3.1, 2.4.3, 2.4.5, 2.13 |
| 4 | Yuragir Landcare Group | 2.6.2 |
| 5 | Department of Environment, Climate Change and Water, NSW (DECCW) | 2.7, 2.9, 2.10, 2.11.1, 2.11.2, 2.11.3, 2.14, 2.15 |
| 6 | National Parks Association | 2.3.1, 2.4.1, 2.4.4, 2.4.5, 2.4.6, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5 |
| 7 | Clarence valley Conservation Coalition | 2.4.3, 2.4.5, 2.6.2, 2.6.3, 2.6.4, 2.13 |
| 8 | Industry and Investment NSW | 2.7, 2.11.3, 2.12, 2.14, 2.15 |
| 9 | NSW Office of Water (part of DECCW) | 2.11.3 |