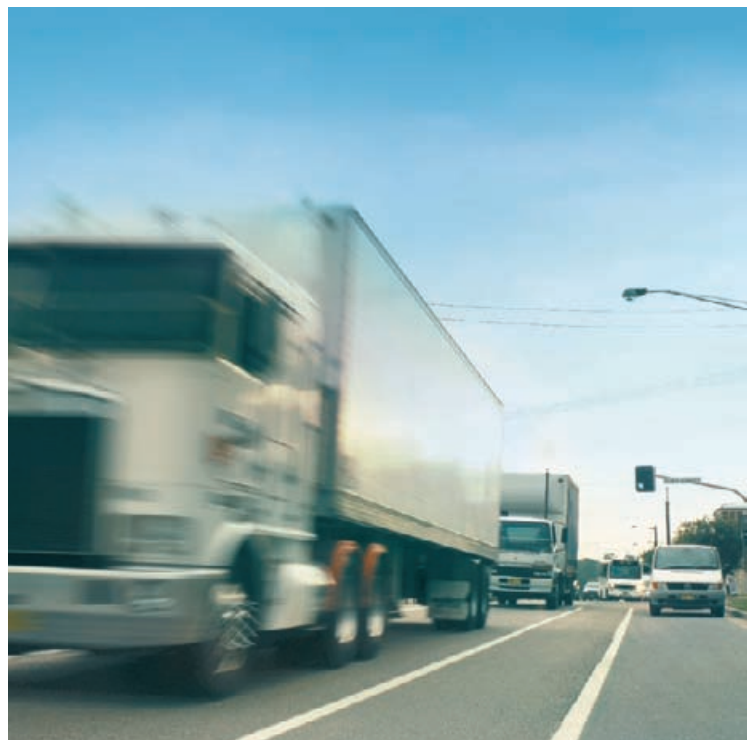


F3 Freeway to Branxton link

Modification to the Approved Project Environmental Assessment

MARCH 2007



**AusLink National Network
F3 to Branxton link**

**Modification to the Approved Project
Environmental Assessment**



Roads and Traffic Authority of NSW

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28 February 2007

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- Appendix 6 RTA Land Acquisition Policy

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Certification

This environmental assessment report provides a true and fair review of the proposed modification to the F3 to Branxton link.

Acacia Environmental Planning certifies that at the time of accepting the contract for preparation of this report, it had no contractual interest in the construction and/or operation of the F3 to Branxton link.

Signed: 

Norman Shapro

Director, Acacia Environmental Planning Pty Ltd

Date: 28 February 2007

I have examined this environmental assessment report and the certification by Acacia Environmental Planning and accept the environmental assessment report on behalf of the RTA.

Name Allan Bowditch
Designation Project Development Manager
Infrastructure Development

Signed 

Date 28 February 2007

References used in this report

References to previous organisations or titles in this report also mean their successor and current organisations or titles, as the case requires.

Reference in this report	Current organisation or title
<ul style="list-style-type: none"> Minister for Urban Affairs and Planning Minister for Infrastructure and Planning 	Minister for Planning
<ul style="list-style-type: none"> Department of Urban Affairs and Planning PlanningNSW Department of Infrastructure, Planning and Natural Resources 	Department of Planning
<ul style="list-style-type: none"> Director-General of the Department of Urban Affairs and Planning Director-General of PlanningNSW Director-General of the Department of Infrastructure, Planning and Natural Resources 	Director-General of the Department of Planning
<ul style="list-style-type: none"> Director-General of National Parks and Wildlife 	Director-General of the Department of Environment and Conservation
<ul style="list-style-type: none"> Australian Government Department of the Environment and Heritage 	Department of the Environment and Water Resources

Acknowledgements

Acacia Environmental Planning acknowledges the assistance of Messrs Allan Bowditch, Phil Davies, David Ledlin, Stuart Hill and Phil Vine of the RTA, and Dr Rhidian Harrington and Messrs Robert Suansri and Nathan Smith of Biosis Research in preparing this report.

Further changes may be proposed

Some aspects of the detailed concept design may change following the public display of the F3 to Branxton link and/or the results of additional engineering and environmental investigations now being undertaken. The community will be informed of additional changes that may be proposed by the RTA.

Summary

Background

On behalf of the Australian and NSW governments, the Roads and Traffic Authority of NSW (RTA) proposes to construct a highway link between the F3 Freeway and Branxton (the F3 to Branxton link or the Link). The F3 to Branxton link was granted concurrence by the Director-General of National Parks and Wildlife and approval by the Minister for Planning in 2001. On 1 August 2005, the Minister's approval became a project approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This is the Approved Project.

Review of the concept design

The RTA has undertaken an extensive review of the concept design (see the Glossary for definitions), on which the Minister's approval is based. The review identified ways to reduce impacts and identified the extent and impact of ancillary infrastructure needed to construct the Approved Project. The RTA proposes to make 15 design changes to the Approved Project. Overall, they would reduce impacts on flora and fauna, as well as improve other traffic network, engineering and environmental outcomes.

The proposed modification

The RTA has determined that three of the 15 proposed design changes, the location of some water quality controls and boundary fencing, and the total area of native vegetation that would be cleared would not be consistent with the Minister's approval:

- The proposed design change to the Sugarloaf alignment would eliminate a fauna crossing at Stockrington Road and would be inconsistent with Condition of Approval 54.
- The proposed design change to the Kurri Kurri interchange would sever Stanford Road and would be inconsistent with the interchange's function in the Approved Project.
- The realignment of the Approved Project between Tuckers Lane and Black Creek and the construction of a grade-separate interchange would reduce traffic flows in Branxton and alter socioeconomic impacts. These impacts did not arise in the Approved Project and have not been considered by the community.
- The construction of some road-related ancillary infrastructure, such as water quality controls and boundary fencing, would occur in locations with high conservation significance for flora and would not be consistent with Condition of Approval 129(vii).

- Due to the recognition of native vegetation clearing for road-related ancillary infrastructure, a requirement of Condition of Concurrence 4, the 168 ha clearing limit in Condition of Approval 60 would be exceeded.

Findings

The environmental assessment in this report focuses on new or changed impacts from the proposed modification that the existing Conditions of Approval or Conditions of Concurrence may or could not have anticipated.

- The proposed modification would have similar environmental impacts on soil and water quality, acid sulphate soils, aquatic flora and fauna, Aboriginal and European cultural heritage, air quality, context sensitive design and landscaping, risks and hazards, waste management, contractor work sites, and cumulative effects as those of the Approved Project. The existing environmental requirements in the Conditions of Approval and Conditions of Concurrence would be adequate to manage or minimise these impacts.
- The proposed modification would reduce clearing of native vegetation and improve ecological outcomes by eliminating a major barrier to fauna connectivity in the Sugarloaf Range. Overall, the detailed concept design, which includes the proposed modification, would reduce total native vegetation clearing by 11 ha to 157 ha. The Sugarloaf realignment would have a significant impact on *Tetratheca juncea* but when compared to the Approved Project, the impact on this species would be substantially reduced. The recognition of road-related ancillary infrastructure would increase clearing of native vegetation from 157 ha to 182 ha.
- The proposed modification would change the location of road traffic noise sources. A noise assessment (Atkins Acoustics and Associates Pty Ltd 2007) identified noise controls that would be needed to satisfy relevant road traffic noise criteria at, among other locations, the Kurri Kurri interchange and from Tuckers Lane to Black Creek.
- The proposed modification would sever Stanford Road, which is used as a shortcut between Stanford Merthyr and Heddon Greta, at the Kurri Kurri interchange. The alternative route following State Roads would increase the maximum travel distance by 2.5 km and an average trip would increase by about three minutes. Therefore, private transport costs would increase for travellers who now use this route.
- The proposed modification would reduce the need for traffic, and in particular heavy vehicles, to travel through Branxton. It would therefore improve residential and business amenity, reduce road traffic noise and vibration, decrease vehicle emissions, and improve pedestrian safety in Branxton. However, businesses that are dependent

on regional or highway-related traffic may experience a loss of business after the Link is opened.

- The proposed modification would affect one additional property east of Branxton that is not affected by the Approved Project. It would change the location of the road acquisition boundary on six properties that are affected by the Approved Project. Two properties that the RTA previously acquired would no longer be required. The RTA would acquire all land needed for the proposed modification in accordance with the RTA's *Land Acquisition Policy* (see Appendix 6) with compensation determined under the *Land Acquisition (Just Terms Compensation) Act 1991*.
- The proposed modification would improve traffic flow and therefore reduce travel time and delays at the Kurri Kurri interchange. The Branxton interchange would significantly improve road user safety by eliminating the at-grade intersection west of Branxton between the New England Highway and the Link and replacing it with a grade-separated, free-flow interchange located between Branxton and Greta. The Branxton interchange and the connection to Wine Country Drive would eliminate the need in the concept design for traffic to travel within Branxton to access either the New England Highway or the Link.
- Due to the likely impact of the proposed modification on *Tetratheca juncea*¹, the RTA would refer the proposed modification to the Australian Government Department of the Environment and Heritage under the EPBC Act.

Environmental safeguards

The Conditions of Approval and Concurrence that apply to the Approved Project would apply to the proposed modification. They are comprehensive and would be adequate to manage the change in the location, magnitude and extent of potential adverse environmental impacts that could be caused by constructing and operating the F3 to Branxton link, as modified. For these reasons, the RTA does not propose additional commitments to safeguard the environment.

Legislative requirements and approvals

The RTA would require an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* to construct the F3 to Branxton link. The RTA would need to give notice of its intention to dredge or reclaim water land under Section 199 of the *Fisheries Management Act 1994*.

¹ The Sugarloaf realignment element of the proposed modification would affect *Tetratheca juncea*. Design changes that are consistent with the Minister's approval would affect *Eucalyptus parramattensis* ssp. *decadens* and *Grevillia parviflora*. The RTA would include all three species in the referral to the Department of the Environment and Heritage.

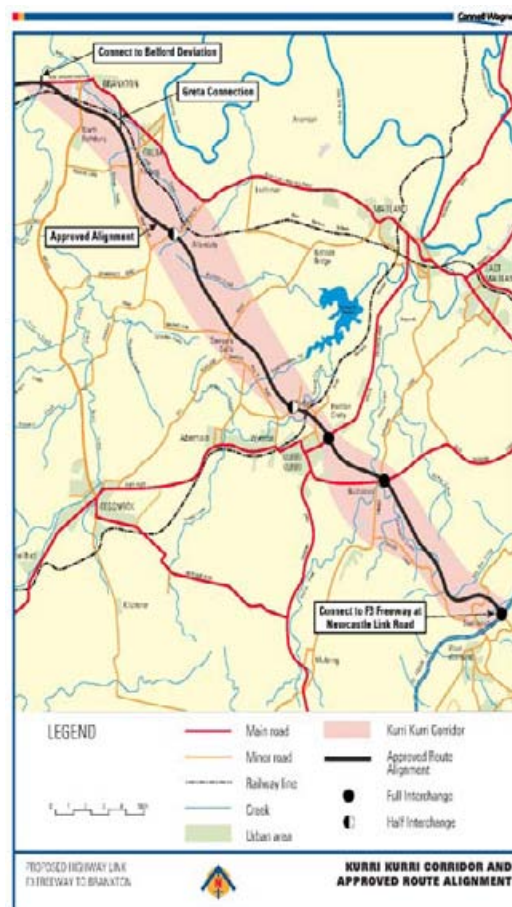
1 Introduction

1.1 The Approved Project

On behalf of the Australian and NSW governments, the Roads and Traffic Authority of NSW (RTA) proposes to construct a highway link between the F3 Freeway and Branxton (the F3 to Branxton link or the Link). The F3 to Branxton link would provide about 40 km of new dual carriageway between the F3 Freeway at Seahampton and the New England Highway west of Branxton. Figure 1 shows the location of the F3 to Branxton link.

The F3 to Branxton link was an activity that was assessed and determined under Part 5 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). It is within the Cessnock, Lake Macquarie, Maitland and Singleton local government areas.

Figure 1 Location of the F3 to Branxton link



In June 1995, Connell Wagner (1995) finalised the environmental impact statement (the EIS) for the RTA. Following introduction of the *Threatened Species Conservation Act 1995* (TSC Act) and consideration of impacts on threatened fauna, Connell Wagner (2001) finalised a fauna impact statement in January 1997 (the FIS). The RTA commissioned additional studies, including two reviews of environmental factors on detailed route selection between Allandale and Greta in 1998 and 2000.

The Director-General of the then National Parks and Wildlife granted concurrence subject to 15 conditions on 3 October 2001. The then Minister for Urban Affairs and Planning approved the F3 to Branxton link on 7 November 2001, subject to 129 conditions. On 1 August 2005, the Minister’s approval became a project approval under Part 3A of the *Environmental Planning and Assessment Act*

1979 (EP&A Act). This is the Approved Project. At the request of the RTA, the Minister modified the approval on 31 July 2006 to permit staged construction (but not opening). The F3 to Branxton link is included in the Australian Government’s AusLink National

Land Transport Plan. The RTA is progressing detailed design development, utility adjustments and property acquisition. The Link is subject to agreed funding between the Australian and NSW governments.

Conditions of Approval and Conditions of Concurrence are presented in Appendix 1 and Appendix 2.

1.2 Review of the concept design

As discussed in Section 3, the RTA has undertaken an extensive review of the concept design (see the Glossary for definitions), on which the Minister's approval is based. The review identified ways to reduce impacts and identified the extent and impact of road-related ancillary infrastructure needed to construct the Approved Project.

The review identified 15 design changes that the RTA proposes to make to the Approved Project. Overall, they would reduce impacts on flora and fauna, as well as improve other traffic network, engineering and environmental outcomes. The RTA has also identified three types of road-related ancillary infrastructure -- construction and maintenance access, boundary and fauna exclusion fencing, and water quality controls -- that would require clearing of native vegetation.

The detailed concept design (see the Glossary for definitions) is the concept design for the Approved Project that incorporates the 15 proposed design changes and road-related ancillary infrastructure.

1.3 The proposed modification

The F3 to Branxton link has a project approval under Part 3A EP&A Act. Section 75W regulates the modification of a project approved by the Minister. The RTA may modify the approved project, and will not need to obtain the Minister's modification of an approval, if the project as modified will be consistent with the Minister's approval.

The RTA prepared a consistency review for the 15 proposed design changes and the road-related ancillary infrastructure (Acacia Environmental Planning 2007). Based on the consistency review, the RTA has determined that three of the 15 proposed design changes, and the location of some water quality controls and boundary fencing, would be inconsistent with the Minister's approval:

- The proposed design change to the Sugarloaf alignment would eliminate a fauna crossing at Stockrington Road and would be inconsistent with Condition of Approval 54. The proposed design change would require modification of Condition of Approval 1 and deletion of Condition of Approval 54.
- The proposed design change to the Kurri Kurri interchange would sever Stanford Road and would be inconsistent with the interchange's function. The proposed design change would require modification of Condition of Approval 1.

- The realignment of the Approved Project between Tuckers Lane and Black Creek and the construction of a grade-separate interchange would reduce traffic flows in Branxton and alter socioeconomic impacts. These impacts did not arise in the Approved Project and have not been considered by the community. The proposed design change would require modification of Condition of Approval 1.
- The construction of some road-related ancillary infrastructure, such as water quality controls and boundary fencing, would occur in locations with high conservation significance for flora and would be inconsistent with Condition of Approval 129(vii). This would require a modification to Condition of Approval 129.
- Due to the recognition of vegetation clearing for road-related ancillary infrastructure, a requirement of Condition of Concurrence 4, the 168 ha clearing limit in Condition of Approval 60 would also be exceeded. This would require a modification to Condition of Approval 60.

Collectively, the three proposed design changes, the construction of water quality controls and boundary fencing in locations containing high conservation significance for flora, and the exceedance of the clearing limit in Condition of Approval 60 are the proposed modification to the Approved Project. Section 2 describes the proposed modification. Appendix 3 shows plans of the proposed modification.

1.4 Purpose of this report

This report is an environmental assessment that has three objectives:

1. To describe the proposed modification to the Approved Project and establish why it is needed.
2. To assess the environmental impacts of the proposed modification.
3. To identify environmental safeguards that the RTA would implement to reduce or avoid harmful impacts arising from the proposed modification.

The RTA will provide this report to the NSW Department of Environment and Conservation (DEC) to satisfy Condition of Approval 112 and Condition of Concurrence 2.

1.5 Comparative assessments of vegetation clearing

The concept design for the Approved Project was not sufficiently detailed to accurately determine the extent of vegetation clearing. It did not include fully developed footprints for interchanges and ramps, and it excluded ancillary road-related infrastructure and utility relocations. Consequently, the vegetation clearing areas in Conditions of Approval 60 and 61 understate the vegetation clearing that would occur to construct the Approved Project. Condition of Concurrence 4 acknowledges these limitations with respect to road-related ancillary infrastructure.

Section 4.4 assesses the proposed modification's impacts on flora and fauna. Among other things, it identifies the change in vegetation clearing between the concept design for the Approved Project and the detailed concept design, which incorporates the proposed modification. Some elements of the detailed concept design may show an increase in vegetation clearing when compared to their equivalent elements in the concept design. However, if an accurate clearing footprint had been developed for the concept design, these elements of the detailed concept design would have similar or smaller vegetation clearing footprints.

2 Description of the proposed modification

The Approved Project is based on the concept design prepared for the EIS, as modified after exhibition of the RTA's Representations Report (2001) to reduce the overall environmental impacts of the F3 to Branxton link. The proposed modification is based on the RTA's detailed concept design. Appendix 3 presents the plans of the detailed concept design for the elements of the proposed modification.

2.1 Sugarloaf realignment (Ch 900 to 4500)

Approved project

The F3 to Branxton link crosses steep terrain in the Sugarloaf Range and requires five major cuts and six deep fills to maintain an acceptable longitudinal grade. It crosses under Stockrington Road in a cut and cover tunnel and crosses over Blue Gum Creek and the heritage railway on a bridge. The cut and cover tunnel would be designed to support Stockrington Road, a 500 mm diameter high pressure gas main, an Optus optical fibre cable and a surface fauna crossing². The design speed of the F3 to Branxton link in the Sugarloaf Range is 100 km/h.

To minimise the extent of clearing caused by earthworks, the Approved Project proposed steep cut/fill batters (cuts 0.5h:1v; fills 1h:1v). Recent geotechnical investigations show that the material to be excavated from cuts is of poor quality. Cut batters need to be no steeper than 2h:1v where weathered claystones or interbedded coals and claystones occur and the upper sections of the cut batters need to be no steeper than 3h:1v. The base of the cutting at Ch 3700 (also referred to as Skyline Ridge) is in solid sandstone and 0.5h:1v cut batters are acceptable.

Fill batters would need to be no steeper than 2h:1v. Flatter cut/fill batters would increase clearing of native vegetation by 16 ha. Construction of structurally supported batters at the slopes originally proposed in the Approved Project would be feasible, however it would have a greater cost and risk when compared to the concept design presented in the EIS.

Cessnock City Council has granted development consent for the operation of an extractive industry north of the Link. The development would upgrade an existing track that crosses the Link at Ch 4250. No provision for an underpass was made in the Approved Project.

² The surface fauna crossing on top of the cut and cover tunnel is referred to as a "fauna overpass" in Condition of Approval 54 and other documents. However, there is no overpass structure – there is only the covered tunnel in which the F3 to Branxton link passes under Stockrington Road.

Proposed design change

Key triggers: geotechnical limitations, improved ecological outcomes

The F3 to Branxton link would follow a shorter and straighter alignment. The grade line would be raised to reduce the magnitude of cuts between Stockrington Road and Skyline Ridge. Three bridges with a combined length of 840 m would be used to span three deep valleys and eliminate three large fills. The length of the proposed design change between Ch 900 and 4500 would be reduced by about 250 m when compared to the Approved Project. The design speed of the Link in the Sugarloaf Range would increase to 110 km/h.

The proposed cut and cover tunnel at Stockrington Road would be replaced by a single span bridge over the highway that would not function as a dedicated fauna overpass. The access track to the extractive industry would be realigned to cross under the F3 to Branxton link at Ch 4350. The realignment would increase its length by about 80 m. Figure 2 shows the footprints of the concept and the detailed concept designs for this element of the proposed modification.

2.2 Kurri Kurri interchange (Ch 13800)

Approved project

The Kurri Kurri interchange is a double-roundabout diamond interchange. Main Road (Main Road 195), which links Kurri Kurri with Heddon Greta, crosses over the Approved Project on a single bridge. Onload and offload ramps from both carriageways of the Approved Project connect to two roundabouts at the ramp terminals on Main Road and accommodate all traffic movements.

The Approved Project severs Stanford Road. To accommodate traffic between Stanford Merthyr and Heddon Greta, the Approved Project realigns Stanford Road to join with the western roundabout at Main Road.

Proposed design change

Key trigger: reduced vegetation clearing

The Kurri Kurri interchange would be a two-lane, grade-separated, elliptical roundabout. Main Road would cross over the Approved Project on the two bridges of the elliptical roundabout. Onload and offload ramps from both carriageways of the Approved Project would connect to Main Road at the roundabout and accommodate all traffic movements.

The proposed design change would sever Stanford Road. Cul-de-sacs would be constructed on Stanford Road and redundant pavement would be scarified to promote vegetation regeneration. Access to the golf course from Main Road and Stanford Road would be maintained. Direct access between Stanford Merthyr and Heddon Greta would be closed. Indirect access would be maintained between Stanford Merthyr and Heddon Greta using State Roads. Figure 3 shows the footprints of the concept and detailed concept designs for this element of the proposed modification.

Figure 2 Sugarloaf realignment

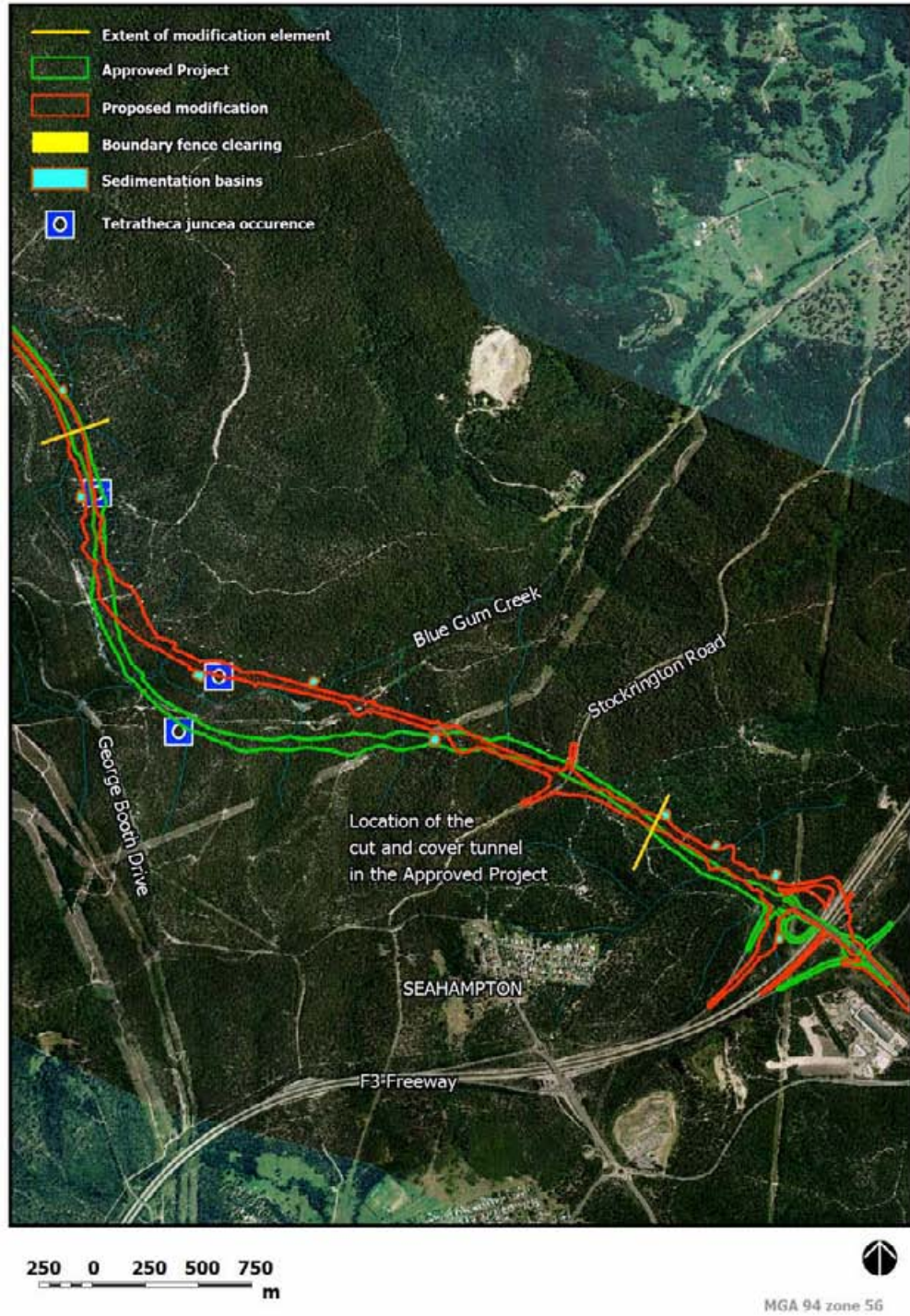
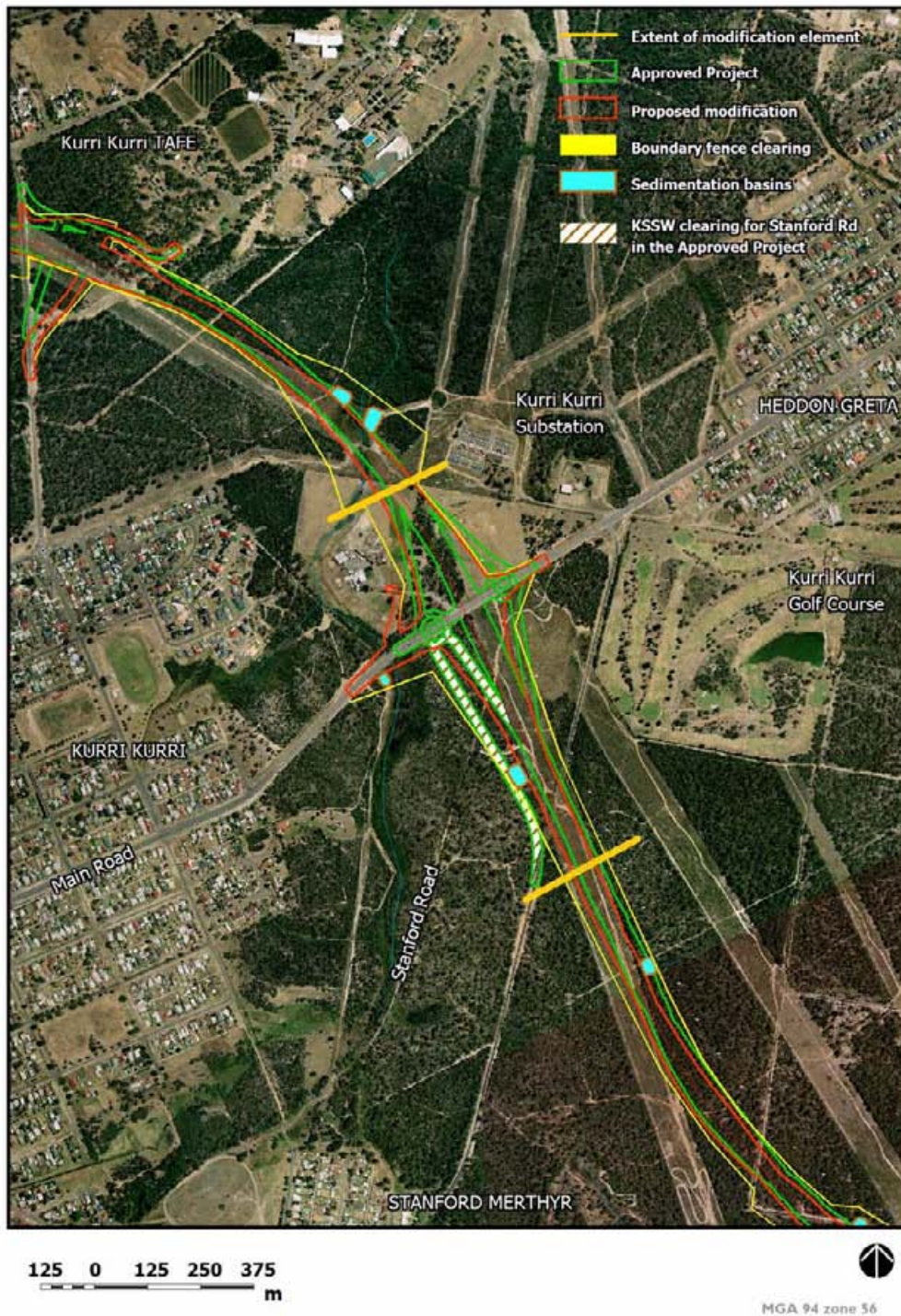


Figure 3 Kurri Kurri interchange



2.3 Tuckers Lane to Black Creek (Ch 31800 to 39500)

Approved project

The F3 to Branxton link crosses under Tuckers Lane and generally runs parallel to the Main Northern Railway. A northbound offload ramp crosses over the F3 to Branxton link and the Main Northern Railway and extends to an at-grade T-intersection with the New England Highway at Greta. A southbound link and onload ramp extend from the Greta T-intersection over the Main Northern Railway to the F3 to Branxton link.

The F3 to Branxton link crosses under Wine Country Drive and crosses over a private railway spur and the Main Northern Railway to the west of the former coal loading site. It then crosses over Black Creek and joins the existing dual carriageways of the New England Highway near Standen Drive. The section of the New England Highway west of Branxton joins the Link at an at-grade T-intersection.

Longitudinal fauna corridors³ must be provided at the crossings at Tuckers Lane and Wine Country Drive.

Proposed design change

Key triggers: improved traffic safety, optimisation of traffic movements, reduced vegetation clearing

The alignment of the Tuckers Lane bridge would be moved up to 30 m to the north to facilitate construction under traffic. The connections to Greta would be removed and would reduce clearing of threatened species habitat.

A two-lane, grade-separated, elliptical roundabout (the Branxton interchange) would be located to the east of Wine Country Drive to provide full access from the Link to the New England Highway between Greta and Branxton.

The northern arm of the Branxton interchange would cross the Main Northern Railway and Anvil Creek and connect to the New England Highway east of Branxton. The section of the New England Highway between the northern arm and Branxton would be re-aligned to connect at an at-grade T-intersection. The southern arm of the Branxton interchange would connect to Wine Country Drive at an at-grade roundabout.

Wine Country Drive would cross over the F3 to Branxton link on a new bridge and the Main Northern Railway on the existing bridge. The alignment of the Wine Country Drive bridge would be moved up to about 10 m to the west to facilitate construction under traffic.

Between Wine Country Drive and west Branxton, the Link would be moved to the south to cross the Main Northern Railway and a private spur line at a less acute angle, resulting in shorter and lower bridges than the Approved Design.

³ The RTA Representations Report (2001) refers to longitudinal fauna corridors. The corridor refers to the area between the toe of the bridge abutment and the carriageways of the F3 to Branxton link.

After crossing the Main Northern Railway, the F3 to Branxton link would traverse the former coal loading site and would cross Black Creek on new bridges before joining the existing dual carriageway of the New England Highway near Standen Drive.

The proposed design change would replace the at-grade T-intersection west of Branxton with an intersection providing only eastbound left-in/left-out movements. A combined heavy and light vehicle rest area would be located on both sides of the Link, to the north of the Main Northern Railway. Longitudinal fauna corridors proposed at bridges over the Link at Tuckers Lane and Wine Country Drive would not be provided. Figure 4 shows the footprints of the concept and detailed concept designs for this element of the proposed modification.

2.4 Road-related ancillary infrastructure

The Approved Project did not identify the location or scope of fencing⁴, water quality controls or construction and maintenance access within the road corridor (called road-related ancillary infrastructure). Road-related ancillary infrastructure would extend clearing of native vegetation and habitat which was not considered in the Approved Project.

Boundary fencing

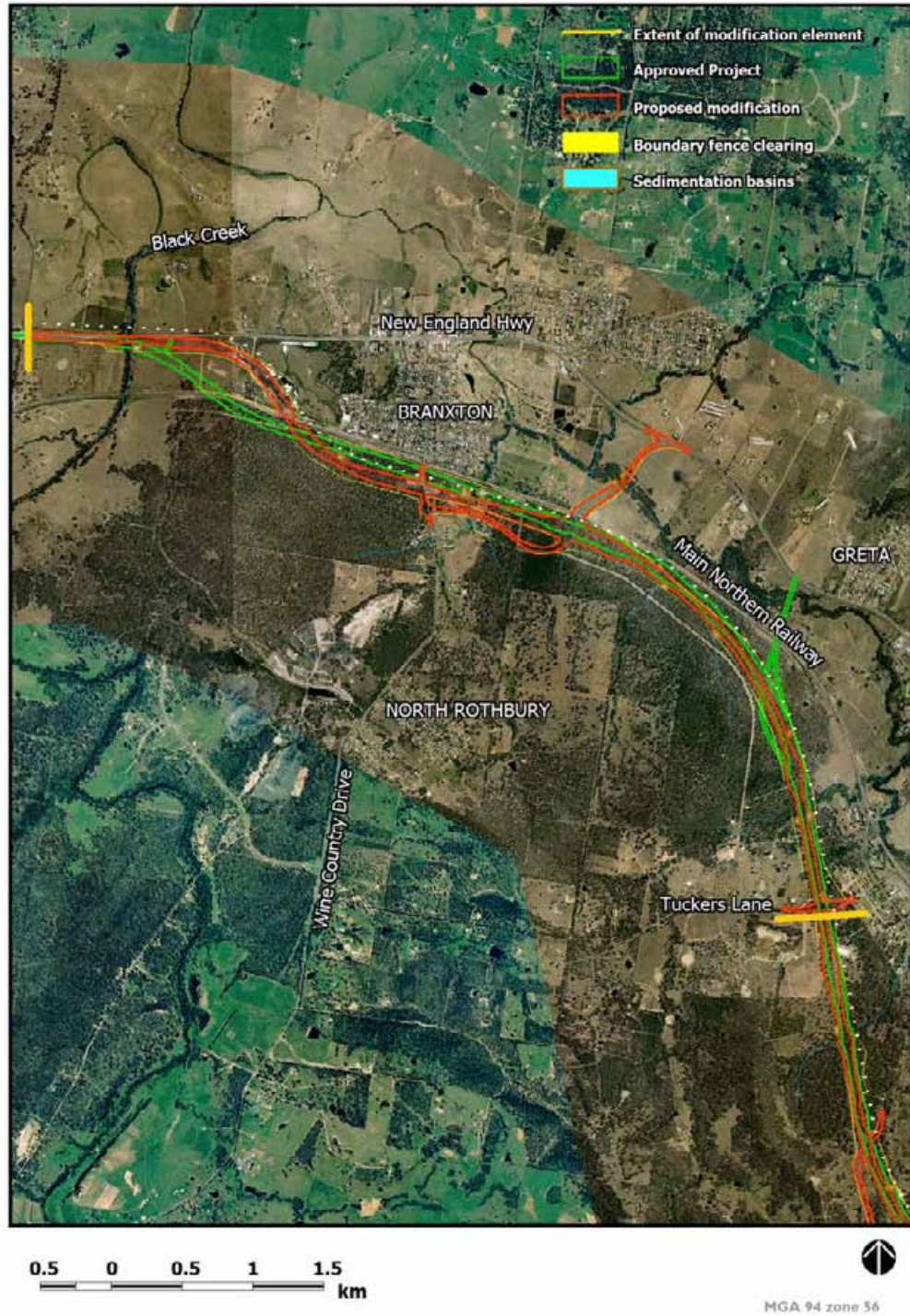
The RTA generally installs boundary fencing on freeways to discourage public access to the road reserve, and in rural areas, to deter access by stock or feral animals. In some cases, such as large rural areas in one ownership or on Crown land, the RTA may not install boundary fencing.

The RTA proposes to install boundary fencing from Ch 7000 near Surveyors Creek to the tie-in to the New England Highway west of Black Creek. Boundary fencing would not be installed in the Sugarloaf Range between the F3 Freeway and Ch 7000 due to the general inaccessibility of the area.

Boundary fencing would be located 300 mm in from the road reserve boundary so that the fence can be installed without the need to gain access from adjoining properties. An area extending from the fence towards the carriageways for 3.7 m would be cleared to provide construction and maintenance access for the boundary fencing and other ancillary infrastructure such as drains, sedimentation basins, cut batters, fill embankments and signage. In some locations, underground and overhead electricity services may be located in the area cleared for the boundary fencing. Boundary fencing would require clearing of 18.2 ha of native vegetation, of which about 16.8 ha would be in four endangered ecological communities.

⁴ The F3 to Branxton link will require both boundary fencing and fauna exclusion fencing. All fauna exclusion fencing would be located within the construction and maintenance access area of the road clearing footprint and would not increase the clearing of native vegetation.

Figure 4 Tuckers Lane to Black Creek



Water quality controls

The F3 to Branxton link requires stormwater drainage systems to convey upstream stormwater under the F3 to Branxton link where it can be discharged to downstream drainage systems. Stormwater drainage systems must also convey runoff from the road reserve to downstream drainage systems.

The RTA designs and operates gravity stormwater drainage systems following the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction* and the *RTA Road Design Guide*. Water quality is managed by using a variety of controls. The largest controls are generally sedimentation or water quality control basins. Subcatchments and topography determine their size and location.

Fifty-nine permanent stormwater basins are needed for the detailed concept design. They have three purposes:

- To allow sediments in runoff from construction areas to be separated prior to discharge.
- To reduce the concentrations of some pollutants, primarily hydrocarbons and nutrients, in runoff from bridges and carriageways.
- To store contaminated runoff that may be produced after spills or accidents until the contaminated runoff can be removed or decontaminated. The available storage is dependent on the existing water level prior to the contaminated runoff entering the basin.

Due to topography, about 30 sedimentation basins would need to be located on land that has high conservation significance for flora to allow gravity discharges to natural watercourses or drainage lines. Most if not all of the permanent basins would also be used by the construction contractor to manage construction water quality. The 30 sedimentation basins would require clearing of about 6.4 ha of native vegetation, of which about 4.2 ha would be in endangered ecological communities.

3 Need for the proposed modification

3.1 Overview

The Concurrence Report by the Director-General of National Parks and Wildlife (NPWS 2001) noted that due to a lack of detailed design information, it was not possible to determine if impacts on threatened flora and fauna could be reduced by modifying the concept design. Condition of Concurrence 3 requires the RTA to refine the design to reduce direct and indirect impacts on flora and fauna. Condition of Concurrence 2 requires the RTA to gain approval from the Director-General for design changes and modifications that could affect threatened species, populations or endangered ecological communities. Condition of Concurrence 4 requires the RTA to assess the impacts of road-related ancillary infrastructure (fencing, water quality controls, access and utility relocations) that had not been identified in the concept design.

The Section 115C report by the Director-General of the Department of Urban Affairs and Planning (DUAP 2001) noted that there was scope to reduce direct and indirect impacts on flora and fauna when the detailed design was prepared. Condition of Approval 53 requires the RTA to engage an independent road design specialist and ecologist to review the detailed design to further reduce direct and indirect impacts on flora and fauna. Condition of Approval 54 requires the RTA to provide a dedicated fauna overpass at Stockrington Road unless it is not possible to provide the fauna overpass at this location, or the proposed multi-function overpass is an effective and appropriate design.

The RTA, and the project's independent ecologist and road designer, have undertaken an extensive review of the concept design for the Approved Project, on which the Minister's approval is based, to investigate ways to reduce the impacts of the Approved Project. They have developed 15 proposed design changes. Overall, they would reduce impacts on flora and fauna, as well as improving other traffic network, engineering and environmental outcomes.

The report *Independent Design Review Conditions of Approval 53 and 54* (Acacia Environmental Planning 2007a) describes the 15 proposed design changes and road-related ancillary infrastructure, and documents the independent reviews by the road designer and ecologist. The report demonstrates that the proposed design changes (excluding road-related ancillary infrastructure) would reduce the overall direct and indirect impacts on flora and fauna when compared to the Approved Project. The elements of the proposed modification at the Sugarloaf realignment, the Kurri Kurri interchange and from Tuckers Lane to Black Creek would produce better ecological outcomes than the Approved Project.

3.2 Sugarloaf realignment

The concept design in the Sugarloaf section of the Approved Project has two deficiencies:

- **Ecological impact:** The five major cuts and six deep fills in Sugarloaf section of the Approved Project would be a major barrier to fauna movement in an important regional wildlife corridor. Blue Gum, Burnt and Minmi creeks, and other unnamed watercourses, also provide fauna connectivity in riparian corridors in the Sugarloaf Range. While Condition of Approval 54, which requires the dedicated fauna overpass at Stockrington Road, would partly mitigate the loss of fauna connectivity, it is unlikely to be effective (Acacia Environmental Planning 2007a). In addition, a significant population of the threatened species *Tetratheca juncea* would be cleared near Ch 3200.
- **Constructability:** Geotechnical investigations prepared by the RTA show that the material in the large cuts cannot be steeply battered unless costly structural systems are used. If the cuts were flattened to a more stable profile, the area of native vegetation that would be cleared would increase.

The proposed design change for the Sugarloaf realignment would eliminate these deficiencies. The three bridges would eliminate three deep fills over existing watercourses and would provide three large riparian corridors for fauna movement under the Link. The change to the alignment would avoid the significant population of *T. juncea*, although one smaller population would be cleared near Ch 3100. The three bridges would also eliminate the major cuts where steep batters are not practical due to poor material quality.

3.3 Kurri Kurri interchange

The concept design at the Kurri Kurri interchange realigns Stanford Road to join with the western roundabout at Main Road to maintain a direct connection between Stanford Merthyr and Heddon Greta. The realignment of Stanford Road requires clearing in the Kurri Sand Swamp Woodland (KSSW), an endangered ecological community that contains *Eucalyptus parramattensis* ssp. *decadens*, a threatened plant. The recognition of road-related ancillary infrastructure, as discussed in Section 2.4, also increases clearing in KSSW.

The removal of the realignment of Stanford Road to the Kurri Kurri interchange would provide better ecological outcomes: it would reduce clearing in KSSW by 1.7 ha and assist the RTA in satisfying Condition of Approval 61; and it would eliminate existing vehicle access that facilitates unauthorised dumping in KSSW.

3.4 Tuckers Lane to Black Creek

In the Approved Project, there are two at-grade T-intersections between the New England Highway and the F3 to Branxton link. There is no connection between the F3 to Branxton link and Wine Country Drive. It is undesirable to use at-grade intersections to connect major roads such as the New England Highway and the Link.

The RTA proposes to improve the connections between the F3 to Branxton link and the New England Highway by providing a central, grade-separated interchange southeast of Branxton. It would connect to the New England Highway at an at-grade T-intersection (with priority given to high-traffic volume movements) and Wine Country Drive at a roundabout. An at-grade left-in, left-out T-intersection would provide low traffic volume access between the Link and the New England Highway, west of Branxton.

When compared to the Approved Project, the proposed design change between Tuckers Lane and Black Creek would more safely and efficiently accommodate high volumes of traffic between the F3 to Branxton link, and the New England Highway and Wine Country Drive.

3.5 Condition of Approval 129 - Road-related ancillary infrastructure

Condition of Approval 129 requires ancillary infrastructure (such as sedimentation basins) to be located in areas that have low conservation significance for flora, fauna and heritage and that do not require any clearing of native vegetation beyond that which must be cleared for the F3 to Branxton link. Parts of the Link corridor traverse endangered ecological communities. Endangered ecological communities contain vegetation with high conservation significance for flora.

Gravity-based stormwater drainage systems must respond to local topography. Thirty sedimentation basins would be partly or wholly constructed in locations that would require clearing in four endangered ecological communities. The RTA has reduced the footprints of these sedimentation basins as far as practical.

Boundary fencing must follow the road reserve boundary and would traverse endangered ecological communities listed. The RTA has reduced the clearing areas for boundary fencing as far as practical.

There are no practical alternatives to manage construction and operational water quality, and secure the RTA road reserve.

3.6 Condition of Approval 60 – Limit to clearing of native vegetation

The road construction footprint of the Approved Project would clear 168 ha of native vegetation. As noted in Section 1.5, this figure underestimates the clearing that would be needed to construct the Approved Project.

While the RTA has reduced the road construction footprint when compared to the Approved Project, the recognition of road-related ancillary infrastructure, as required by Condition of Concurrence 4, would increase the clearing of native vegetation to 182 ha. This would exceed the limit of 168 ha in Condition of Approval 60.

There are no further practical design options that could be considered that would reduce clearing of native vegetation by the 14 ha needed to comply with Condition of Approval 60.

4 Environmental assessment of the proposed modification

4.1 Approach to environmental assessment

The EIS and FIS prepared by Connell Wagner (1995, 1997) and the Representations Report (RTA 2001) provide substantial information on the environmental impacts of the Approved Project and the safeguards that would be implemented to reduce or avoid adverse impacts.

The Conditions of Approval and Conditions of Concurrence would apply to the Approved Project and to any design changes or modifications that the RTA proposes. The environmental assessment in this report focuses on new or changed impacts from the proposed modification that the existing Conditions of Approval or Conditions of Concurrence may or could not have anticipated.

Consequently, for those aspects of the proposed modification that have similar environmental impacts to those of the Approved Project, the RTA does not propose to implement additional safeguards. It would implement the existing environmental requirements in the Conditions of Approval and Conditions of Concurrence.

4.2 Soil and water quality

Description

The F3 to Branxton link crosses three coal measure groups: the Greta Coal Measures, the Tomago Coal Measures and the Newcastle Coal Measures. At least nine disused underground coal mines occur under or near the F3 to Branxton link. The F3 to Branxton link crosses directly over disused mines in the Sugarloaf Range, Heddon Greta and Greta.

The F3 to Branxton link crosses approximately 16 soil types. Loams over silty clay loams occur across the Sugarloaf Range and progress to alluvial soils on the floodplain at the base of the Range and in swamps and wider stream valleys. The remainder of the Link crosses podsols, generally with a clayey subsoil. These soils are susceptible to erosion.

The F3 to Branxton link traverses numerous small creeks and watercourses, and three large creek systems at Wallis Creek, Swamp Creek and Black Creek. All of these creeks are affected by backwater from the Hunter River during major floods. The F3 to Branxton link would cross watercourses and creeks on either culverts or bridges. Their detailed design specifications would be determined by catchment hydrology and hydraulic modelling. The flood design standard adopted for the F3 to Branxton link is to be flood free in a 1% annual exceedance probability flood event.

Water quality in the vicinity of the Link is affected by past and present land uses in the catchments, including urban development, agriculture, roads, landfill waste disposal, mining and industry. Water quality testing undertaken in 1994 and 1995 showed that water quality was generally good, however faecal coliform counts exceeded ANZECC 1992 water quality standards at some locations. Bores in the area have varying depth and salinity ranges from brackish to very saline. Bore water is used for domestic and stock supplies, and for agricultural irrigation (Connell Wagner 1995).

Impacts

During construction of the Approved Project, clearing, earthworks, utility adjustments, and landscaping will expose soils and may cause erosion and sedimentation in downstream drainage paths and surface water. The operation of vehicles on roads allows a variety of pollutants, including particulates, nutrients, heavy metals, sulphates and organic matter to enter watercourses from road drainage. Many pollutants are carried in sediments from runoff.

The proposed Sugarloaf realignment design change would eliminate three major cuts and fills. Consequently, it would substantially reduce the magnitude and extent of clearing and earthworks and potential erosion and sedimentation impacts in Blue Gum and Minmi creeks and their tributaries during construction. The elimination of large cut batters would also reduce ongoing erosion and sedimentation caused by weathering.

The proposed design changes at the Kurri Kurri interchange and the Tuckers Lane to Black Creek realignment would not substantially alter construction or operational erosion and sedimentation impacts on soil or water quality. The use of temporary and permanent water quality controls (shown in the detailed concept design in Appendix 3) is consistent with current water quality management procedures and the Conditions of Approval.

The increase in the total clearing footprint, due to the recognition of road-related ancillary infrastructure, would extend the area that would be exposed during construction.

Existing environmental requirements

Condition of Approval 87 requires the RTA to prepare a detailed Soil and Water Management Sub Plan in accordance with the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction* and where appropriate, the former Department of Land and Water Conservation's publication *Constructed Wetlands Manual*. The Plan must form a part of the CEMP required by Condition of Approval 24.

Condition of Approval 88 requires the Soil and Water Management Sub Plan to address a range of issues including: management of stormwater on the quality of surface and groundwater; details of short and long-term measures to minimise soil erosion and sediment discharge (including the locations and sizes of sedimentation basins); management of impacts on watercourses; identification of sources of water pollution and remedial actions to minimise discharges of these pollutants; water quality monitoring

before, during and after construction; contingency plans for fuel and other spills; and a program for reporting the effectiveness of soil and water quality management systems.

Condition of Approval 89 requires the Soil and Water Management Sub Plan to include strategies for managing the extent of exposed ground surfaces during construction and progressive site rehabilitation requirements. Conditions of Approval 92 and 94 require the RTA to design, construct and operate stormwater drainage, erosion, sedimentation and water pollution control systems and facilities in accordance with certain guidelines. Condition of Approval 122 requires the RTA to prepare a Spoil Management Sub Plan to show how spoil would be handled, stockpiled, reused and disposed. Additional Conditions of Approval require inspection and monitoring of all drainage systems.

The existing Conditions of Approval are comprehensive and would be adequate to manage impacts on soil and water quality from construction and operation of the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.3 Acid sulphate soils

Impacts

Potential acid sulphate soils can be exposed by excavation or lowering the water table, and produce acid runoff that harms aquatic ecosystems.

Based on mapping provided to the RTA by the former Department of Land and Water Conservation, the occurrence of potential acid sulphate soils is limited to an area between Wallis and Surveyors creeks and Averys Lane, from Ch 10400 to Ch 11400. They have a low probability of occurrence. Two sedimentation basins east of Averys Lane would be located in this area. Geotechnical investigations undertaken by the RTA in 2004 and 2005 indicated that acid sulphate soils are not present in the road corridor. The proposed modification would not substantially alter the likelihood of encountering or exposing acid sulphate soils.

Existing environmental requirements

Condition of Approval 30 requires the RTA to prepare Construction Method Statements for all construction methods and major construction work sites as part of the Construction Environmental Management Plan (CEMP) required by Condition of Approval 24. The Statements must, among other things, address the detection and management of acid sulphate soils. The RTA would follow its acid sulphate soils testing procedures and the procedures outlined in ASSMAC (1998) to detect and manage potential and actual acid sulphate soils. The existing Conditions of Approval would be adequate to manage impacts from the exposure of potential or actual acid sulphate soils.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.4 Terrestrial flora and fauna

Vegetation mapping

2001 vegetation mapping

Vegetation clearing figures that were presented in the EIS (Connell Wagner 1995) and the Representations Report (RTA 2001) were based on vegetation polygons delineated from aerial photography and limited ground-truthing. Although the vegetation polygons within the concept design footprint were delineated, they were not delineated for the surrounding areas. These vegetation polygons are referred to as the *2001 mapping*. Clearing limits in Conditions of Approval 60 and 61 were taken from Table 3.1 in Appendix K of the Representations Report (RTA 2001) and are derived from the 2001 mapping.

2005 vegetation mapping

Since 2001, Biosis Research has used Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS) vegetation mapping and updated it using 2003/2004 high-resolution aerial photography to better define vegetation community boundaries. Biosis Research has also updated the mapping to incorporate: the results of targeted flora surveys and selected ground-truthing; and threatened species and endangered ecological communities that have been gazetted since the approval in 2001. The updated LHCCREMS vegetation mapping is referred to as the *2005 mapping*.

Comparative assessments

To enable like-with-like comparisons between the concept design and the detailed concept design, the clearing footprint of the concept design was mapped onto the 2005 mapping. The detailed concept design would reduce the road clearing footprint when compared to the concept design⁵. Total vegetation clearing would increase due to the recognition of road-related ancillary infrastructure required by Condition of Concurrence 4. Table 1 summaries vegetation clearing figures for the concept design, and the 15 proposed design changes and road-related ancillary infrastructure (which include the elements of the proposed modification). The concept design with the 15 proposed design changes would reduce clearing of endangered ecological communities by 12 ha.

⁵ See Section 1.5. The concept design does not include modelled interchanges and ramps and therefore the clearing footprint of the concept design understates realistic vegetation clearing. Some elements of the detailed concept design may show an increase in vegetation clearing when compared to the equivalent element in the concept design.

Table 1 Summary of native vegetation clearing

Vegetation community	EEC	2001 Mapping		2005 Mapping		2005 Mapping		+	2005 Mapping		=	2005 Mapping	
		Concept Design ¹	Concept Design	Concept Design	Concept Design with 15 proposed design changes	Road-related ancillary infrastructure	Detailed Concept Design ²						
Alluvial Tall Moist Forest	No	9.1	6.6	7.6	1.0	8.6							
Central Hunter Ironbark-Spotted Gum Grey Box Forest	No	Not defined	8.8	7.7	1.0	8.8							
Central Hunter Riparian Forest	Yes	0.6	6.2	4.9	1.0	5.9							
Coastal Foothills Spotted Gum-Ironbark Forest	No	22.5	13.3	9.7	0.5	10.2							
Coastal Plains Smooth-barked Apple Woodland	No	19.4	12.1	16.9	1.0	17.9							
Hunter Lowland Redgum Forest	Yes	16.1	15.6	13.7	3.1	16.8							
Hunter Valley Moist Forest	No	Not defined	1.0	0.9	0.2	1.2							
Kurri Sand Swamp Woodland	Yes	33.7	28.5	26.6	7.1	33.7							
Lower Hunter Spotted Gum-Ironbark Forest	Yes	67.0	75.0	68.5	9.8	78.3							
All native vegetation (rounded to nearest hectare)		168	167	157	25	182							

Note 1: Taken from Table 3.1 in Appendix K of the Representations Report (RTA 2001). Conditions of Approval 60 and 61 are based on these figures.

Note 2: The detailed concept design is the concept design incorporating the 15 proposed design changes and road-related ancillary infrastructure.

All figures except column totals in hectares and rounded to the nearest tenth hectare. Column totals rounded to the nearest hectare.

Impacts

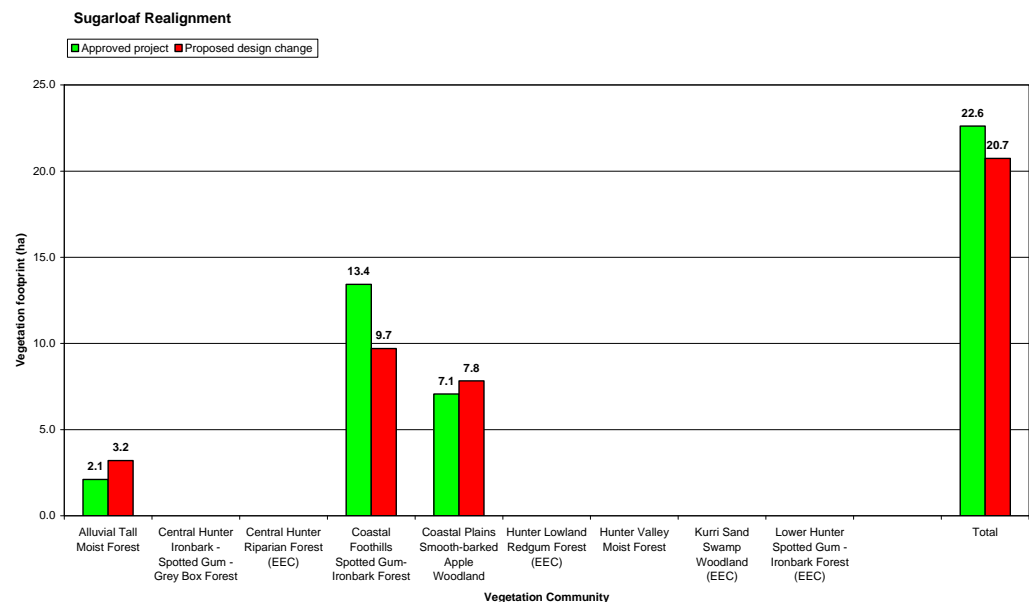
Biosis Research (Harrington, et al 2007) assessed the impacts of the 15 proposed design changes to the Approved Project, and the impacts of the detailed concept design (the Approved Project including the 15 proposed design changes and road-related ancillary infrastructure) as a whole, on threatened terrestrial flora and fauna. Impacts related to the proposed modification are summarised below.

Sugarloaf realignment

The Sugarloaf realignment would reduce impacts on *Tetratheca juncea*, listed as threatened under the TSC Act and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). It would avoid a significant sub-population of 123 clumps of *T. juncea* although it would affect two sub-populations of 2 and 33 clumps. The impact, although reduced, would still be significant under the TSC Act and may be referred to the Australian Government under the *Environment Protection & Biodiversity Conservation Act 1999*, as discussed in Section 5.5 (Harrington, et al 2007). The Sugarloaf realignment would not affect any other threatened plants or endangered ecological communities under the TSC Act.

Figure 5 shows that this element of the proposed modification would have a positive ecological outcome because it would reduce clearing and would be likely to reduce impacts on ecological values when compared to the Approved Project.

Figure 5 Sugarloaf realignment, native vegetation clearing changes



The concept design in the Approved Project will disrupt fauna connectivity in a regional fauna corridor identified by the DEC. Burnt Creek and the three unnamed gullies between Stockrington Road ridge and Blue Gum Creek provide important riparian habitat within this regional corridor. When compared with the Approved Project, the

Sugarloaf realignment would have substantially less impact on fauna connectivity as uninterrupted riparian vegetation along the creek lines would be maintained. It would also maintain key wildlife links along the Sugarloaf Range and associated creek valleys.

Vegetation clearing would only be required for the bridge pylons and access tracks to the pylons. The use of high bridges on the Sugarloaf realignment would allow a native plant understorey to recolonise areas disturbed during construction. It would also allow fauna species to move through this habitat linkage, including gliders, macropods and birds.

This element of the proposed modification would have a positive ecological outcome because it would reduce clearing and is considered likely to reduce impacts on ecological values when compared to the Approved Project.

Kurri Kurri interchange

The concept design for the Kurri Kurri interchange in the Approved Project will directly affect *Eucalyptus parramattensis* ssp. *decadens* and *Grevillea parviflora* ssp. *parviflora*, both threatened species, and Kurri Sand Swamp Woodland, an Endangered Ecological Community. No threatened animal species have been recorded near the interchange, although Squirrel Gliders have been recorded in the Kurri Kurri area.

The concept design for the Kurri Kurri interchange in the Approved Project has a clearing footprint of 3.1 ha of Kurri Sand Swamp Woodland, based on the 2005 mapping. It shows that areas between the ramps and main carriageway would not be cleared, however this is not give a realistic assessment of the clearing required. Consequently, it understates vegetation clearing.

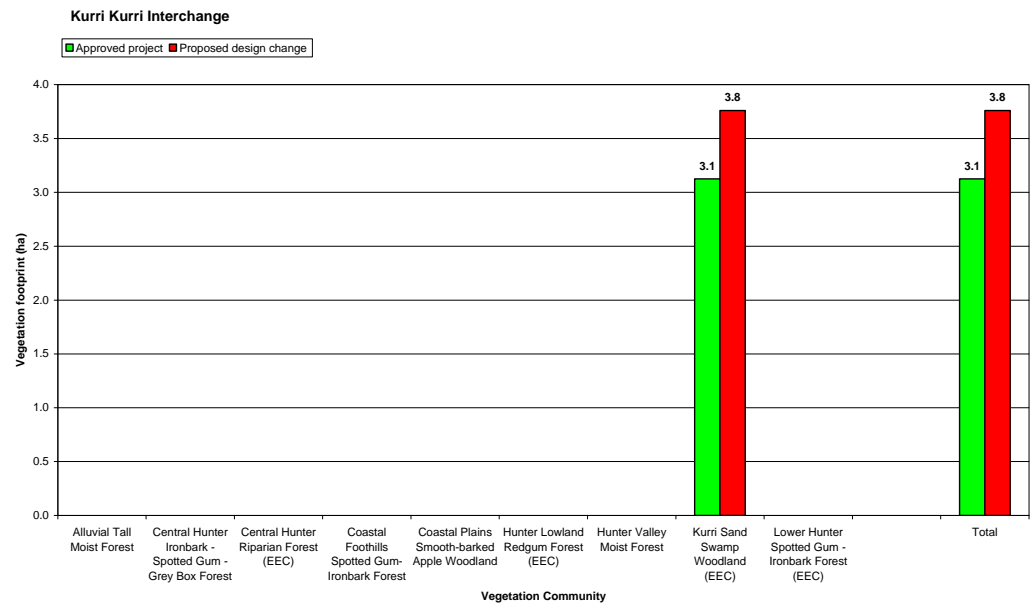
Figure 6 shows that this element of the proposed modification would have a clearing footprint in Kurri Sand Swamp Woodland of 3.8 ha, an increase of 0.7 ha. Although not apparent from these figures, the proposed modification at the Kurri Kurri interchange would have a positive ecological outcome due to reduced vegetation clearing and fragmentation.

The closure and revegetation of Stanford Road between the Kurri Kurri Golf Course and Stanford Merthyr would allow Kurri Sand Swamp Woodland to regenerate. It would also eliminate existing vehicle access that facilitates rubbish dumping.

Tuckers Lane to Black Creek

The concept design for the Approved Project will directly affect Hunter Lowland Redgum Forest, Central Hunter Riparian Rainforest and Lower Hunter Spotted Gum - Ironbark Forest, all of which are EECs under the TSC Act. No threatened plant species were recorded within the footprint of this element of the proposed modification. The Grey-crowned Babbler *Pomatostomus temporalis*, a threatened species under the TSC Act, has been previously detected in this section (Harrington, et al 2007).

Figure 6 Kurri Kurri interchange, native vegetation clearing changes

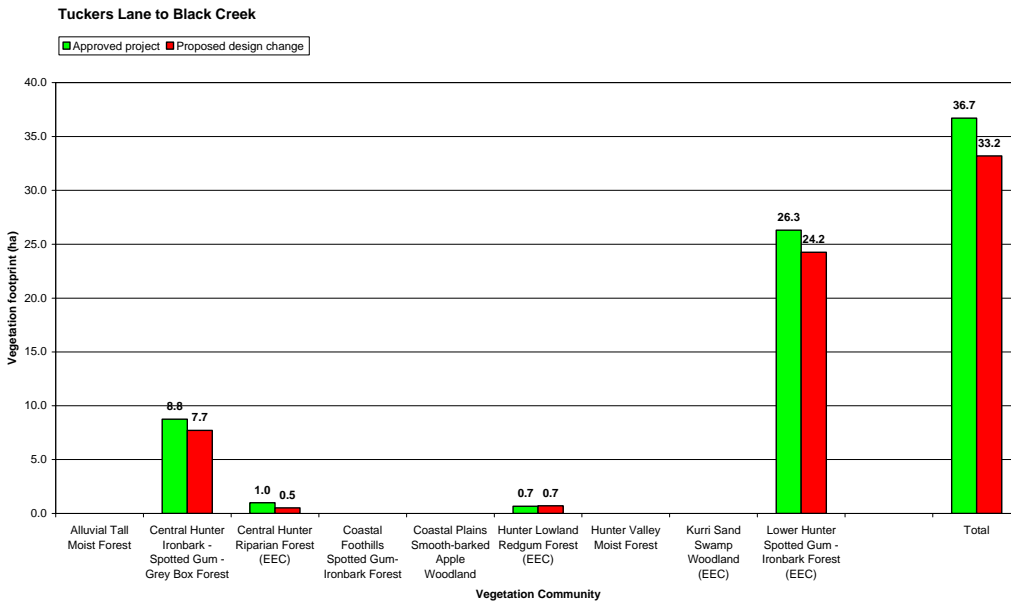


The vegetation surrounding the proposed design change consists of a significant area of disturbed Lower Hunter Spotted Gum - Ironbark Forest and Central Hunter Ironbark - Spotted Gum-Grey Box Forest, a small patch of heavily disturbed and regenerating Hunter Lowland Redgum Forest, and a small patch of disturbed Central Hunter Riparian Forest. Although cleared pastures, roads and a railway already fragment this habitat, it provides a string of forest refugia in what is a mostly cleared area.

The proposed Branxton interchange would slightly decrease fauna connectivity in an east-west direction within the forest patch. However, connectivity in the vicinity is already disrupted. Agricultural land and Wine Country Drive separate woodland patches on either side of Wine Country Drive and are barriers to fauna movement. Additionally, no threatened mammals occur in the immediate vicinity of the proposed Branxton interchange. Apart from birds, the only fauna likely to move through this region are macropods. Most fauna movements between the forest patches on either side of Wine Country Drive would occur south of the proposed Branxton interchange, where the woodland is continuous (although sparse) at North Rothbury.

This element of the proposed design change would affect moderate quality Lower Hunter Spotted Gum - Ironbark Forest and Central Hunter Ironbark - Spotted Gum-Grey Box Forest, and poor quality Hunter Lowland Redgum Forest, as well as Central Hunter Riparian Forest along Anvil and Black Creeks. Figure 7 shows that the proposed design change would have a positive ecological outcome because it would reduce clearing in three of the four endangered ecological communities.

Figure 7 Tuckers Lane to Black Creek, native vegetation clearing changes



Road-related ancillary infrastructure

A total of 6.4 ha of native vegetation in nine vegetation communities, of which 4.2 ha would be in four endangered ecological communities listed under the TSC Act, would be cleared for sedimentation basins. Table 2 shows details on vegetation clearing for sedimentation basins. Basins average about 1,500 m² in area. Appendix 3 shows the location of all sedimentation basins.

Table 2 Clearing of native vegetation for sedimentation basins

Vegetation community	Area (ha) ¹
Alluvial Tall Moist Forest	0.5
Central Hunter Ironbark-Spotted Gum-Grey Box Forest	0.2
Central Hunter Riparian Forest (EEC)	0.4
Coastal Foothills Spotted Gum-Ironbark Forest	0.5
Coastal Plains Smooth-barked Apple Woodland	1.0
Hunter Lowland Redgum Forest (EEC)	0.6
Hunter Valley Moist Forest	0.1
Kurri Sand Swamp Woodland (EEC)	1.9
Lower Hunter Spotted Gum - Ironbark Forest (EEC)	1.3
Total	6.4

Note 1: The column total differs from the sum of the components due to rounding.

Boundary fencing

A total of 18.2 ha of native vegetation in seven vegetation communities, of which 16.8 ha would be in four endangered ecological communities listed under the TSC Act, would be cleared to install boundary fencing. Table 3 shows details on vegetation clearing for

boundary fencing. Boundary fencing would have a clearing width of four metres per lineal metre of fence. Appendix 3 shows the location of all sedimentation basins.

Table 3 Clearing of native vegetation for boundary fencing

Vegetation community	Area (ha)
Alluvial Tall Moist Forest	0.4
Central Hunter Ironbark-Spotted Gum-Grey Box Forest	0.9
Central Hunter Riparian Forest (EEC)	0.6
Coastal Foothills Spotted Gum-Ironbark Forest	0
Coastal Plains Smooth-barked Apple Woodland	0
Hunter Lowland Redgum Forest (EEC)	2.4
Hunter Valley Moist Forest	0.2
Kurri Sand Swamp Woodland (EEC)	5.2
Lower Hunter Spotted Gum - Ironbark Forest (EEC)	8.5
Total	18.2

Overview of threatened species and endangered ecological communities

Table 4 summarises the threatened species and endangered ecological communities where a significant impact (following the assessment process of the TSC Act) was likely to occur for the Approved Project and the detailed concept design, which includes the proposed modification (Harrington, et al 2007). It demonstrates that the detailed concept design would reduce the number of threatened animal species for which a significant impact under the TSC Act is likely to occur. The final determination for the Hunter Lowland Redgum Forest occurred in December 2002, after the F3 to Branxton link was granted concurrence.

Existing environmental requirements

Condition of Approval requires the RTA to prepare and implement a Flora and Fauna Management Sub Plan that must be consistent with Condition of Concurrence 15. The Sub Plan must be included in the CEMP required by Condition of Approval 24. The Sub Plan must address, among other things, strategies for seed collection and revegetation, a fauna risk assessment and suitable impact mitigation, and a weed management strategy.

Condition of Approval 52 requires the RTA to update the Additional Flora and Fauna Assessment in the Representations Report (RTA 2001). Biosis Research prepared a draft report that was provided to the DEC for comment. A report was finalised in 2005 to address comments raised by the DEC on the draft report (Harrington, et al 2005a).

Conditions of Approval 49 and 50, and Condition of Concurrence 13, require the RTA to provide a habitat package that compensates for the direct and indirect impacts on vegetation and habitat. The RTA and the NSW Department of Environment and Conservation have broadly agreed on compensatory habitat areas that take into account the changes to impacts on vegetation and habitat from the 15 proposed design changes, including the proposed modification.

Table 4 Species for which a significant impact is likely to occur

	RTA 2001 ¹	Concurrence ²	Harrington, et al 2005a ³	Harrington, et al 2007 ⁴
EEC	Kurri Sand Swamp Woodland	Kurri Sand Swamp Woodland	<ul style="list-style-type: none"> • Kurri Sand Swamp Woodland • Hunter Lowland Redgum Forest 	<ul style="list-style-type: none"> • Kurri Sand Swamp Woodland • Hunter Lowland Redgum Forest
Threatened plant	<ul style="list-style-type: none"> • <i>Eucalyptus parramattensis</i> ssp. <i>decadens</i> • <i>Persoonia pauciflora</i> 	<ul style="list-style-type: none"> • <i>Eucalyptus parramattensis</i> ssp. <i>decadens</i> • <i>Grevillea parviflora</i> ssp. <i>parviflora</i> • <i>Persoonia pauciflora</i> 	<ul style="list-style-type: none"> • <i>Eucalyptus parramattensis</i> ssp. <i>decadens</i> • <i>Grevillea parviflora</i> ssp. <i>parviflora</i> • <i>Tetratheca juncea</i> 	<ul style="list-style-type: none"> • <i>Eucalyptus parramattensis</i> ssp. <i>decadens</i> • <i>Grevillea parviflora</i> ssp. <i>parviflora</i> • <i>Tetratheca juncea</i>
Threatened animal	<ul style="list-style-type: none"> • Yellow-bellied Sheath-tail-bat • Eastern Little Mastiff-bat • Large Bent-wing Bat • Little Bent-wing Bat • Greater Broad- nosed Bat • Large-eared Pied Bat • Green and Golden Bell Frog 	<ul style="list-style-type: none"> • Yellow-bellied Sheath-tail-bat • Eastern Little Mastiff-bat • Large Bent-wing Bat • Little Bent-wing Bat • Greater Broad- nosed Bat • Large-eared Pied Bat • Green and Golden Bell Frog • Powerful Owl • Masked Owl 	<ul style="list-style-type: none"> • Yellow-bellied Sheath-tail-bat • Eastern Little Mastiff-bat • Large Bent-wing Bat • Little Bent-wing Bat • Greater Broad- nosed Bat • Large-eared Pied Bat • Woodland Birds (Brown Trecreeper, Speckled Warbler, Hooded Robin, Diamond Firetail and Grey-crowned Babbler) • Olive Whistler 	
Total	1 EEC 2 plants 7 animals	1 EEC 3 plants 9 animals	2 EECs 3 plants 12 animals	2 EECs 3 plants no animals

Note 1: Additional Flora and Fauna Assessment, Appendix F of the Representations Report (RTA 2001)

Note 2: Director-General's Concurrence Report (NPWS 2001)

Note 3: Update to the Additional Flora and Fauna Assessment, October 2005

Note 4: Threatened species assessment for the proposed design changes, including the proposed modification

Condition of Approval 54 requires the RTA to provide a dedicated fauna overpass at Stockrington Road unless it is not possible to provide the fauna overpass at this location, or the proposed multi-function overpass is an effective and appropriate design. Condition of Approval 55 requires the RTA to provide opportunities for the safe crossing of gliders. Condition of Approval 57 requires the RTA to identify and mark all remnant native vegetation, and threatened plants and communities, and to undertake pre-clearing surveys, to minimise disturbance to plants and animals during construction.

The detailed concept design, including three elements of the proposed modification which are an integral component, would contribute to an overall reduction in direct and indirect impacts on vegetation. The proposed modification would cause the same types of impacts, in similar locations and within the same vegetation communities, as the construction and operation of the Approved Project is likely to cause. The existing Conditions of Approval and Concurrence are comprehensive and would be adequate to manage impacts on flora and fauna from construction and operation of the proposed modification. The proposed modification has been considered in the formulation of the compensatory habitat areas required by Conditions of Approval 49 and 50, and Condition of Concurrence 13. The effectiveness of the compensatory habitat would not be compromised by the proposed modification.

The use of bridges on the Sugarloaf realignment would provide better fauna connectivity than the dedicated fauna crossing required by Condition of Approval 54 at Stockrington Road.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.5 Aquatic flora and fauna

Biosis Research (Beitzel 2005) prepared a habitat assessment of the main waterway crossings for the detailed concept design, which includes three elements of the proposed modification. No threatened aquatic species, populations or endangered ecological communities were located during the surveys. In addition there are no threatened aquatic species, populations or endangered ecological communities listed under the *Fisheries Management Act 1994* and EPBC Act that have potential habitat within the F3 to Branxton link corridor.

Existing environmental requirements

There are no Conditions of Approval or Concurrence that specifically address management of impacts on aquatic flora or fauna. However, the existing environmental requirements noted in Section 4.4 would also apply to the management of aquatic flora and fauna impacts. In particular, the RTA must prepare the CEMP and Flora and Fauna Management Subplan in consultation with public authorities, including the Department of Primary Industries, to ensure that their requirements are addressed.

The proposed modification would cause the same types of impacts, in similar locations, as the construction and operation of the Approved Project is likely to cause. The existing Conditions of Approval and Concurrence are comprehensive and would be adequate to manage impacts on aquatic flora and fauna from construction and operation of the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.6 Noise and vibration

Construction impacts

The proposed modification would generally use the same construction methods and materials as the Approved Project and would not increase the duration of construction. The Sugarloaf realignment would substantially reduce the volume of earthworks, and therefore the duration and intensity of construction noise from earthworks, when compared to the Approved Project. However, it would introduce bridge construction noise. There are no noise-sensitive receivers in the Sugarloaf Range between Stockrington Road and Buttai.

Operational impacts

In 2001, Atkins Acoustics and Associates (Appendix E in RTA 2001) updated the assessment presented in the EIS (Connell Wagner 1995) using road traffic noise assessment criteria in the DEC *Environmental Criteria for Road Traffic Noise* and the RTA *Environmental Noise Management Manual*. In 2005, the RTA engaged Atkins Acoustics and Associates to update its 2001 assessment to include the most recent forecast traffic data for the F3 to Branxton link, the 15 proposed design changes (which include the proposed modification), and the forecast opening year of 2010.

The updated assessment (Atkins Acoustics and Associates Pty Ltd 2007) shows that relevant noise assessment goals would be exceeded at many noise receivers near the Link. However, the updated assessment finds that predicted road traffic noise exceedances in Kurri Kurri, the Allandale rural community, Greta and Branxton could be reduced to satisfy relevant noise criteria by installing a combination of earth mounds and roadside barriers.

Sugarloaf realignment

The Sugarloaf realignment, west of Stockrington Road, would move the source of road noise to the north by up to 350 m and therefore farther away from residences in Seahampton, the nearest settlement to the Link in the Sugarloaf area. There are no known noise receivers north of the Link between Seahampton and Buttai that could be affected by the change to the location of the alignment.

The EIS (Connell Wagner 1995) and the Representations Report (Appendix E in RTA 2001) considered impacts and mitigation for road traffic noise impacts. Road traffic noise mitigation is not required in the Sugarloaf Range.

Kurri Kurri interchange

The proposed modification at the Kurri Kurri interchange would not substantially change the location or height of road traffic noise sources when compared to the concept design in the Approved Project.

The EIS (Connell Wagner 1995) and the Representations Report (Appendix E in RTA 2001) considered impacts and mitigation for road traffic noise impacts at the Kurri Kurri interchange. Noise barriers are required next to the northbound carriageway, extending north from Main Road for 1,100 m, and next to the southbound carriageway, extending from Swamp Creek south for 1,550 m.

For the proposed modification at the Kurri Kurri interchange, Atkins Acoustics and Associates (2006) recommends 130 m of noise barrier three metres high along the southern approach to the Kurri Kurri interchange, and 900 m of noise barrier three meters high between Ch 13900 and 14800, on the southern side of the road corridor at Kurri Kurri.

Tuckers Lane to Black Creek

The proposed modification at Tuckers Lane to Black Creek would alter the location and height of traffic noise sources. It would remove noise sources from the connection to the New England Highway near Greta and introduce them in the proposed connection from the Branxton interchange to the New England Highway. It would also move noise sources closer to Branxton.

The Branxton interchange would divert regional traffic that would have travelled through Branxton on the New England Highway and Wine Country Drive and would therefore reduce road traffic noise in Branxton.

The EIS (Connell Wagner 1995) and the Representations Report (Appendix E in RTA 2001) considered impacts and mitigation for road traffic noise impacts between Tuckers Lane and Black Creek. A noise barrier is required next to the southbound carriageway along the Main Northern Railway, extending south from the railway bridge for 500 m.

For the proposed modification at Tuckers Lane to Black Creek, Atkins Acoustics and Associates (2006) recommends 800 m of noise barrier three metres high between Ch 31600 and 32400, along the eastern side of the road corridor near Tuckers Lane, and 1,200 m of noise barrier four meters high between Ch 36800 and 38000, on the northern side of the road corridor at Branxton.

Existing environmental requirements

For both the Approved Project and the proposed modification, relevant road traffic noise criteria would be exceeded and noise controls would be required. The assessment of road traffic noise impacts and mitigation must be in accordance with the RTA *Environmental Noise Management Manual* and the DEC *Environmental Criteria for Road Traffic Noise*.

The RTA must manage the construction noise and vibration impacts of the F3 to Branxton link. Condition of Approval 71 requires the RTA to prepare and implement a comprehensive Noise and Vibration Management Sub Plan. The Sub Plan must be included in the CEMP required by Condition of Approval 24. The Sub Plan must address, among other things, the management of noise and vibration during construction, construction noise monitoring, and complaint response.

Condition of Approval 72 requires the RTA to ensure that impulsive noise, such as rock breaking or sheet piling, is limited and to provide respite periods. Conditions of Approval 73 and 74 limit work hours and clarify activities that can be undertaken outside of work hours. Condition of Approval 75 requires the RTA to put construction noise mitigation measures in place before construction begins. Conditions of Approval 77 to 83 require the RTA to manage construction blasting and vibration impacts, including the provision of advance notice and reduced work hours.

The RTA must manage the operational noise impacts of the F3 to Branxton link. Condition of Approval 84 requires the RTA to prepare and implement a comprehensive Operational Noise Management Sub Plan. The Sub Plan must address, among other things, details of the type and location of operational noise mitigation measures that are needed to satisfy relevant guidelines and policies, predicted road traffic noise levels after opening of the Link, and monitoring to verify predicted impacts and compliance with relevant guidelines and policies. Condition of Approval 85 requires the RTA to monitor operational noise and assess the adequacy of noise mitigation measures one year after opening. If noise levels are higher than predicted levels, the RTA must consider additional mitigation.

The proposed modification would cause similar types of construction and operational noise impacts, in similar locations, as the construction and operation of the Approved Project is likely to cause. The existing Conditions of Approval are comprehensive and would be adequate to manage noise and vibration impacts from construction and operation of the proposed modification. The changes to operational noise impacts at the Kurri Kurri interchange, and between Tuckers Lane and Black Creek, would not be substantial. Effective noise mitigation following the requirements in the RTA *Environmental Noise Management Manual* and the DEC *Environmental Criteria for Road Traffic Noise* could be identified, assessed and validated, as required by Condition of Approval 84.

New safeguards

The noise and vibration impact assessment (Atkins Acoustics and Associates Pty Ltd 2007) recommends changes to the location and height of noise barriers discussed in the EIS (Connell Wagner 1995) and the Representations Report (Appendix E in RTA 2001). These recommendations would be included in the Noise and Vibration Management Plan of the CEMP. Other than implementing the Conditions of Approval and the recommendations in noise and vibration impact assessment, no additional safeguards are proposed.

4.7 Aboriginal heritage

Overview

The Minister's approval for the F3 to Branxton link requires that the RTA prepare an Aboriginal cultural heritage assessment and formulate management plans to minimise impacts on Aboriginal cultural heritage. To fulfil these requirements, the RTA engaged Umwelt (Australia) Pty Ltd (Umwelt) to design and manage an Aboriginal heritage program that addresses the Minister's requirements. The RTA has worked closely with six Aboriginal community groups who have an interest in the management of Aboriginal cultural heritage along the corridor of the F3 to Branxton link.

Umwelt and representatives of the six interested Aboriginal community groups participated in detailed surveys of the F3 to Branxton link corridor between 2004 and 2006. The surveys provided information on Aboriginal sites, potential archaeological deposits (PADs), and sites with cultural heritage value. In total, Umwelt identified 117 sites and potential archaeological deposits (Umwelt (Australia) Pty Ltd 2005):

- 30 isolated finds
- 51 artefact scatters
- 8 grinding groove sites,
- 23 potential archaeological deposits
- 3 stone arrangements
- 2 areas of cultural heritage value.

Aboriginal sites, PADs and areas with cultural heritage value are shown in Appendix 4.

Umwelt obtained approvals from the DEC needed to undertake subsurface investigations and archaeological salvage or artefact collection at Aboriginal sites (Umwelt (Australia) Pty Ltd 2005, Umwelt (Australia) Pty Ltd 2006). The surveys and management recommendations take in the areas surrounding the Sugarloaf realignment, the Kurri Kurri interchange, and from Tuckers Lane to Black Creek, including the connection from the Branxton interchange to the New England Highway.

One of the RTA's main objectives in the management of Aboriginal cultural heritage is to comprehensively investigate and, as the case requires, salvage, collect or conserve all Aboriginal sites and areas with cultural heritage value prior construction. This will avoid the need for representatives of the Aboriginal communities to monitor initial clearing, when it is difficult to manage safety and potential delays, and reduce the risk of disturbing Aboriginal objects once construction begins.

Impacts

Sugarloaf realignment

The Sugarloaf realignment would move this section of the Link to the north where it would cross Burnt Creek, Blue Gum Creek and other unnamed watercourses further downstream than the alignment in the concept design of the Approved Project.

Importantly, the Sugarloaf realignment would be downstream of two grinding groove sites that would have been affected by the alignment in the concept design. The downstream location would avoid potential damage to grinding groove sites caused by erosion and sedimentation from construction activities and operation of the F3 to Branxton link.

Six Aboriginal sites, one PAD and two areas of high cultural heritage value are located near or within the road reserve of the Sugarloaf realignment. Umwelt obtained approvals from the DEC needed to undertake subsurface investigations and artefact salvage or collection at these locations. The RTA proposes to implement recommended management strategies to conserve or partially conserve, or to minimise impacts on, the three Aboriginal sites and the two areas with cultural heritage value. No further salvage or collection is required from these sites (Umwelt (Australia) Pty Ltd 2006).

Kurri Kurri interchange

Swamp Creek RTA 2 (DEC Site Number 38-4-0814), an artefact scatter, is located next to a sedimentation basin and within the footprint of both the concept design and the proposed modification for the Kurri Kurri interchange. During surface collections undertaken by Umwelt, two artefacts were collected from Swamp Creek RTA 2. No further investigation, salvage or collection is required for this site (Umwelt (Australia) Pty Ltd 2006).

Tuckers Lane to Black Creek

The proposed modification between Tuckers Lane and Black Creek would extend the construction footprint of the Link and affect Aboriginal sites and PADs that would not have been affected by the concept design for the Approved Project. Conversely, the proposed modification would avoid impacts on some Aboriginal sites and PADs that will be affected by the concept design.

There are numerous Aboriginal sites and PADs located near or within the road reserve of the proposed modification from Tuckers Lane to Black Creek. All sites and PADs would be managed in accordance with Umwelt's recommendations (Umwelt (Australia) Pty Ltd 2005, Umwelt (Australia) Pty Ltd 2006). Recommendations for each Aboriginal site are based on previous surveys and investigations and include partial or total collection, salvage or conservation.

Existing environmental requirements

Conditions of Approval 100 to 112 concern cultural heritage management and the RTA must complete six tasks:

1. Coordinate and assist Aboriginal community groups with the preparation of Aboriginal Cultural Heritage Assessments (Conditions of Approval 108, 109).
2. Identify areas to be considered as heritage offsets (Condition of Approval 111).
3. Prepare a detailed research program and undertake a series of test excavations (Conditions of Approval 100, 101).
4. Identify and document management zones for the ongoing management of sites along the F3 to Branxton link corridor (Conditions of Approval 103, 106).
5. Prepare a Cultural Heritage Plan of Management (Conditions of Approval 110, 111).
6. Undertake a salvage program (Condition of Approval 102).

Condition of Approval 112 requires the RTA to notify the DEC of proposed variations to the alignment, design or construction of the Approved Project. This report will be provided to the DEC to satisfy this Condition.

Umwelt has completed Tasks 1 and 3, and has partially completed Tasks 2, 4, 5 and 6. All tasks except part of Task 6 (for the classification of artefacts) must be completed before construction begins.

The existing Conditions of Approval are comprehensive and would adequately manage additional impacts on Aboriginal cultural heritage that would occur if the three elements of the proposed modification were to proceed. The consideration of heritage offsets required in Condition of Approval 111 would be based on the detailed concept design that incorporates the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.8 European heritage***Descriptions of heritage items******Historic sites***

Six historic sites were identified during surveys undertaken between 2004 and 2005. Five of the six sites would not be affected by the proposed modification. An historic site containing three brick and sandstone culverts beneath the Main Northern Railway is located at Branxton near Ch 35900.

Richmond Vale Railway

Both the concept design and the Sugarloaf realignment cross the Richmond Vale Railway. A disused railway tunnel (referred to as Tunnel 140 in the EIS) on the Richmond Vale Railway is listed as an item of regional environmental heritage under the *Hunter Regional Environmental Plan (Heritage) 1989*. The Railway's earthworks, structures and ancillary equipment along the formation, including a corridor of land 100 metres wide centred on the railway track bed centreline, is listed as an item of environmental heritage under the *Cessnock Local Environmental Plan 1989*.

The concept design crosses the Richmond Vale Railway formation at a relatively flat angle; therefore the length of the crossing along the Railway formation is over 200 m. Further west, the concept design moves into a deep cut parallel to and adjoining Tunnel 139. Commitments made in the EIS (Connell Wagner 1995) and the Representations Report (RTA 2001) require the RTA to ensure that the integrity of Tunnel 139 is protected. The alignment of the concept design must be moved as far as possible away from Tunnel 139.

Conservation areas at Greta and Branxton

Parts of Greta and Branxton are identified as conservation areas under Clause 38 of the *Cessnock Local Environmental Plan 1989*. The construction footprint of the proposed modification between Tuckers Lane and Black Creek would not be located within or next to the boundaries of the two conservation areas.

Impacts

The Sugarloaf realignment would cross Tunnel 134 on the Richmond Vale Railway formation at an angle of about 45° between Bridges 2 and 3. The vertical separation between the road formation and the top of Tunnel 134 would be sufficient to ensure that the tunnel's structure would not be compromised by construction or operation of the F3 to Branxton link. The Sugarloaf realignment would have no impact on Tunnels 139 and 140 and would minimise impacts on the Richmond Vale Railway formation.

The proposed modification at Tuckers Lane to Black Creek would not affect the historic site at Branxton near Ch 35900.

Existing environmental requirements

Condition of Approval 113 requires the RTA to implement safeguards identified in Section 8.5 of the EIS (Connell Wagner 1995). Section 8.5 discusses protection of the Richmond Vale Railway Tunnel 139, the preparation of a conservation plan for the Greta Camp, the recording of abandoned quarries at Greta and landscaping mitigation at Branxton. Other commitments given in the EIS and the Representations Report (RTA 2001) require the RTA to minimise or avoid impacts during construction or operation on the Richmond Vale Railway formation and tunnels, the Greta Camp, and the quarries at Greta.

The *Heritage Act 1977* requires approval if a relic could be damaged or disturbed. The *Environment Protection & Biodiversity Conservation Act 1999* requires approval if there is likely to be an environmental impact on a matter of national environmental significance, including an impact on a National Heritage place.

The surveys for European heritage sites demonstrate that the proposed modification would not have an impact on relics protected under the *Heritage Act 1977* or other legislation.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.9 Socioeconomic impacts

Impacts

Sugarloaf realignment

Between Seahampton and Surveyors Creek in the Sugarloaf Range, the concept design traverses disused underground mines, and a mining or prospecting area (Connell Wagner 1995). The Sugarloaf realignment would not increase, intensify or extend the impacts of the Link on known extractive resources in the Sugarloaf Range when compared to those of the concept design.

When compared to the concept design, the Sugarloaf realignment would reduce travel distance by 250 m. This would reduce operating costs and travel time, and therefore increase the economic benefits of the Link.

Kurri Kurri interchange

Stanford Road provides a direct link between Stanford Merthyr and Heddon Greta, and destinations further north such as Maitland. Appendix 5 shows the local road network between Stanford Merthyr and Heddon Greta

The concept design severs Stanford Road. To accommodate traffic between Stanford Merthyr and Heddon Greta, the concept design realigns Stanford Road to join with the western roundabout at Main Road. This connection maintains a direct link between Stanford Merthyr and Heddon Greta, although it is slightly longer and therefore imposes a cost on travellers when compared to the existing alignment of Stanford Road.

Appendix 5 presents traffic counts on the local road network between September and November 2003. The traffic data show that vehicles use Stanford Road as a shortcut between Stanford Merthyr and Heddon Greta in preference to the longer route using State Roads. Number plate surveys taken during late 2003 show that 42% of northbound vehicles, and 63% of southbound vehicles, use Stanford Road and avoid the State Roads during the morning peak. During the afternoon peak, 33% of northbound vehicles, and 57% of southbound vehicles, use Stanford Road.

The proposed modification at the Kurri Kurri interchange would also sever Stanford Road. To reduce impacts on the Kurri Sand Swamp Woodland Endangered Ecological Community, the RTA would not realign Stanford Road to link with the Kurri Kurri interchange, as is the case in the concept design. Instead, Stanford Road would be closed and cul-de-sacs would be constructed, one near the southwest corner of the Kurri Kurri Golf Course, and at the limit of residential development at Stanford Merthyr. The existing pavement between the cul-de-sacs would be scarified and revegetated with species found in the Kurri Sand Swamp Woodland.

The proposed modification at the Kurri Kurri interchange would require travellers between Stanford Merthyr and Heddon Greta to follow the alternative route on State Roads (shown in Appendix 5). The maximum increase in travel distance for a one-way journey would be 2.5 km and the average trip would increase by about three minutes.

The proposed modification at the Kurri Kurri interchange would increase travel distance, travel time and therefore costs for travellers who now use Stanford Road as a shortcut between Kurri Kurri and Heddon Greta. Since the closure of Stanford Road would force traffic to use State Roads, and these roads have ample capacity to accommodate the increase in vehicle trips, the proposed modification would have little if any impact on the road network in Kurri Kurri.

Tuckers Lane to Black Creek

Figure 8 shows a plan of the road connections between the F3 to Branxton link and the New England Highway at Branxton in the Approved Project. Under the Approved Project, westbound traffic on the New England Highway (from Greta or further east), with a destination west of Branxton, must travel through Branxton to join the Link at Point 1A. Traffic on the New England Highway with a destination towards Newcastle must join the Link at Point 1B.

Figure 9 shows a plan of the road connections for the proposed modification. In contrast to the Approved Project, the same westbound traffic on the New England Highway would join the Link at point 2A. Traffic would not need to travel through Branxton, and the connection at point 2C would only be used for left-in, left-out movements from the Link eastbound to the New England Highway. In addition, traffic on Wine Country Drive could join the Link at Point 2B without travelling through Branxton. The proposed modification would allow westbound traffic on the New England Highway, and some traffic on Wine Country Drive, to bypass Branxton.

The RTA engaged the Centre for International Economics (CIE) to identify and assess the potential socioeconomic impacts on Branxton from the reduction of traffic in Branxton that would occur if this element of the proposed modification were to proceed. These impacts include the effects on demand for local goods and services, demand for housing and other social infrastructure, and community amenity, such as access to services, road safety, and local amenity (CIE 2005).

Figure 8 Road connections at Branxton and Greta – Approved Project

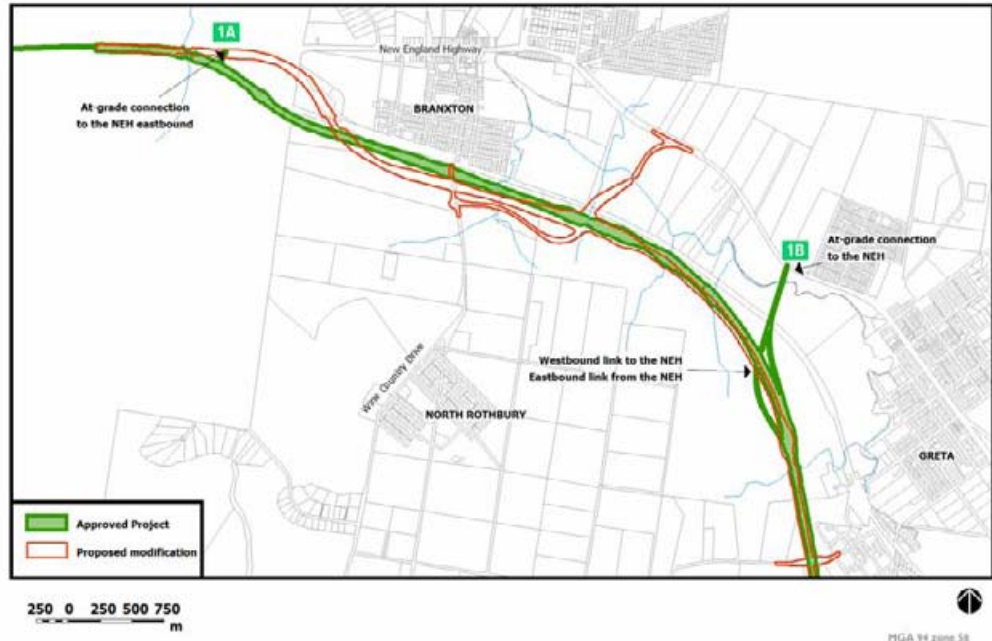
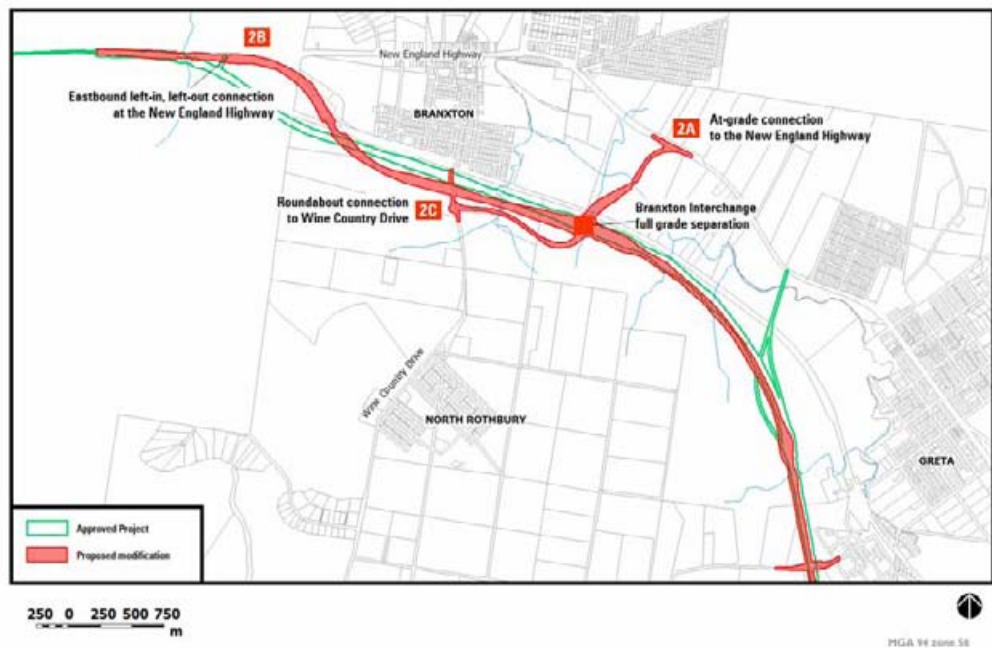


Figure 9 Road connections at Branxton and Greta - Proposed modification



The EIS (Connell Wagner 1995) predicted that when the F3 to Branxton link was opened, traffic volumes on the New England Highway through Branxton could decline to less than half or a third of the traffic volumes prior to opening. The RTA now estimates that the proposed modification would reduce traffic volumes through Branxton to about one-tenth of the traffic volumes prior to the opening.

The direct effect of the proposed modification would be the diversion of traffic off the New England Highway and residential streets in Branxton, and onto F3 to Branxton link. This would lead to a reduction in traffic flows through the Branxton shopping district. Given the travel time savings from using the Link, travellers and workers who do not have a reason to stop in Branxton or its surrounds are expected to bypass Branxton.

However, current trends in local population growth and tourism in the area suggest that an increase in sales to residents and tourists would partly offset any reduction in sales derived from highway traffic. Current local population growth is being driven by recent land releases within and around Branxton (which is expected to continue), and the NSW Government's metropolitan growth strategy.

The proposed modification at Tuckers Lane to Black Creek would result in travel time savings and reduced vehicle accidents totalling \$10.8 million in present value terms over 30 years. It would also result in reduced traffic noise and vibration within Branxton, improved air quality, reductions in vehicle operating costs, and improved access to community services. Impacts on property values are not likely to be observable.

The proposed modification would improve amenity in Branxton due to the elimination of heavy vehicle traffic, and would provide an opportunity for the business centre to establish itself as a tourist destination. Appropriate signage and ease of access from the Branxton interchange would encourage passing tourists to stop within Branxton.

The overall impact on Branxton businesses is likely to be felt in stages. In the immediate to short-term, some businesses may be at risk of a reduction in sales. The total reduction in revenue and associated employment impacts would depend on their reliance on sales from passing traffic and the proportion of workers who would stop purchasing goods within Branxton once the modification is opened. The strongest impacts would be felt by cafés and takeaway food outlets that do not have a strong local customer base but rely on passing workers' trade. This, in turn, would be determined by the substitutes available in other locations that satisfy the passing workers' needs on the way to and from work.

Many other businesses may also experience a short-term reduction in sales due to reduced opportunities for marketing along the New England Highway. The experience of other towns subject to bypasses suggests that negative impacts are likely to manifest in reduced employment hours, possibly only in the short-term and particularly for casual workers. This would be the case for businesses that currently open at very early hours of the morning to capture the breakfast trade.

However, the majority of businesses that CIE surveyed either felt that the modification would result in a negligible impact on their business or would be beneficial in the medium to long-term due to improved public amenity attracting new local residents. This was expected to be complemented by strong residential population growth and the scope for increased tourism within the local area.

CIE found a number of examples in their survey where businesses had recently changed their sales mix to account for an expected increase in locals sales due to recently-released residential land in Branxton and the surrounding area. After the CIE completed its report, the NSW Government released the *Lower Hunter Regional Strategy* in late 2006. It identifies a large area south of Branxton for residential development of up to 7,200 dwellings (NSW Government 2006).

Furthermore, some businesses noted that the modification would result in improved accessibility to community services and shops, and improved safety for pedestrians, enabling businesses to cultivate a tourist-friendly environment with a higher-quality streetscape. Some suggested that Branxton could be transformed into a popular tourist destination providing arts and crafts, once heavy traffic is diverted to the F3 to Branxton link.

Existing environmental requirements

There are no Conditions of Approval in the Approved Project or commitments made in the Representations Report (RTA 2001) that specifically regulate socioeconomic impacts.

The RTA would provide directional and tourist signage for the Link, including Branxton and Greta, in accordance with its current signage policies and guidelines.

The proposed modification at Tuckers Lane to Black Creek would have a range of impacts, both beneficial and adverse, on the communities of Branxton and Greta. The RTA considers that the overall, long-term impacts are likely to be neutral or positive, but it recognises that there may be immediate to short-term impacts on some businesses from the loss of trade.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.10 Land use and property effects

Impacts

Sugarloaf realignment

Both the concept design and this element of the proposed modification are within the central part of a large holding owned by Coal and Allied. The proposed modification would require less land due to its shorter length in the Sugarloaf Range. When compared

to the concept design for the Approved Project, the Sugarloaf realignment would not change the range of potential land uses in the residue of the Coal and Allied holding.

Kurri Kurri interchange

Both the concept design and this element of the proposed modification are within the current road acquisition boundary for the F3 to Branxton link. No additional land would be required. When compared to the concept design for the Approved Project, the proposed modification at the Kurri Kurri interchange would not change the range of potential land uses on adjoining properties.

Tuckers Lane to Black Creek

The RTA has acquired, or will acquire, land needed to accommodate the concept design for the Approved Project between Tuckers Lane and Black Creek. This element of the proposed modification would extend the road acquisition boundary onto one additional semi-rural property north of the Branxton interchange that was not previously affected by the concept design. It would change the location of the road acquisition boundary on six properties that were previously affected. Two properties that were required for the Approved Project would no longer be required for the proposed modification.

Pt Lot 1 DP 69213 would be severed by the link road between the Branxton interchange and the New England Highway. It is zoned 1(a) Rural under the *Cessnock Local Environmental Plan 1989* and was not identified as prime crop or pasture land in the EIS (Connell Wagner 1995). The RTA is currently negotiating with the property owner for total acquisition; once acquired, it would be lost to agricultural production. Figure 10 shows a plan of the properties that would be affected by the concept design and this element of the proposed modification.

Existing environmental requirements

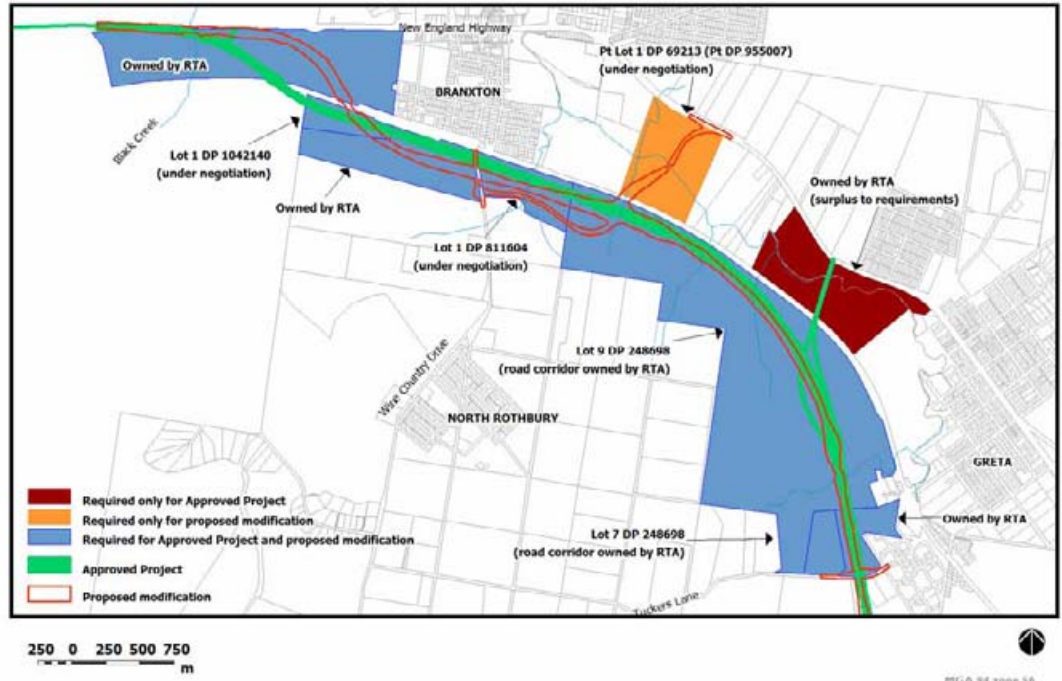
There are no Conditions of Approval that specifically regulate property acquisition or adjustments. Conditions of Approval 30 and 85 require that some plans in the Construction Environmental Management Plan give consideration to property acquisition if certain conditions arise.

The RTA must acquire all land needed to accommodate the Sugarloaf realignment and the Tuckers Lane to Black Creek elements of the proposed modification in accordance with the RTA's *Land Acquisition Policy* with compensation determined under the *Land Acquisition (Just Terms Compensation) Act 1991*. A copy of the RTA's Policy is presented in Appendix 6.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

Figure 10 Property acquisition areas



4.11 Air quality

Impacts

The techniques and methods that would be used to construction the concept design for the Approved Project would also be used to construct the detailed concept design. The proposed modification at the Sugarloaf Range, the Kurri Kurri interchange and between Tuckers Lane to Black Creek would not substantially extend the construction period or change the source of dust emissions in areas near dwellings.

The proposed modification would marginally decrease the total travel distance between the F3 Freeway and Black Creek and therefore reduce total vehicle emissions. The proposed modification would not substantially change the locations of vehicle emission sources or introduce pollutants in locations that would not have been affected by the concept design for the Approved Project.

Existing environmental requirements

Conditions of Approval 114 and 115 require the RTA to prepare an Air Quality Sub Plan and to ensure that where there is a risk of construction vehicles losing material, that they are maintained and covered to prevent any loss of load or from generating dust. The Air Quality Sub Plan must provide details of all measures that will be used to control dust during construction.

Condition of Approval 129 requires the RTA to ensure that construction compounds and material batching plants are located where they will not cause adverse impacts on, among other things, air quality. Other commitments given in the EIS and the Representations Report (RTA 2001) require the RTA to undertake maintenance of plant and machinery and to monitor air quality during construction to minimise adverse impacts on air quality.

The proposed modification would cause the same types of impacts, in similar locations, as the construction and operation of the Approved Project is likely to cause. The existing Conditions of Approval are comprehensive and would be adequate to manage impacts on air quality from construction and operation of the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.12 Traffic and transport

Impacts

The proposed modification would not change construction-related impacts on local traffic and access when compared to the concept design in the Approved Project.

Sugarloaf realignment

The proposed modification at the Sugarloaf realignment would follow a shorter and straighter route. The Sugarloaf realignment would reduce the overall length between Ch 900 and 4500 by 250 m but would not substantially alter travel times or network performance when compared to the concept design.

Kurri Kurri interchange

The proposed modification at the Kurri Kurri interchange would provide one large elliptical roundabout that would accommodate the same traffic movements between the F3 to Branxton link and Main Road as the concept design. It would improve traffic flow and therefore reduce travel time and delays through the interchange. The proposed modification would sever Stanford Road and the direct link between Stanford Merthyr and Heddon Greta, as discussed in Section 4.9.

Tuckers Lane to Black Creek

This element of the proposed modification would not substantially change the length of the carriageways between Tuckers Lane and Black Creek. However, it would significantly improve road user safety by eliminating the at-grade intersection west of Branxton between the New England Highway and the Link and replacing it with a grade-separated, free-flow interchange between Branxton and Greta. The proposed intersection between the connecting road from the Branxton interchange and the New England Highway would give priority to traffic circulating between the New England Highway, east of Branxton, and the Branxton interchange. The Branxton interchange and

the connection to Wine Country Drive would eliminate the need in the concept design for traffic to circulate within Branxton to access either the New England Highway or the Link.

When compared to the concept design, this element of the proposed modification would improve road user safety because it would eliminate one at-grade intersection. It would improve network performance by providing a grade-separated, free-flow interchange, and by prioritising traffic flow between the Branxton interchange and the New England Highway east of Branxton. It would improve road user and pedestrian safety, and network performance, by removing regional traffic from the local roads in Branxton.

Existing environmental requirements

Conditions of Approval 43 to 47 regulate construction-related impacts on local roads and property access. There are no Conditions of Approval that specifically regulate operational traffic.

The proposed modification would cause the same types of construction impacts as the construction of the Approved Project is likely to cause. The existing Conditions of Approval are comprehensive and would be adequate to manage construction impacts of the proposed modification on local roads and property access.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.13 Context sensitive design and landscaping

Impacts

The Approved Project will change the visual qualities of the landscapes through which it passes. When compared to the Approved Project, the proposed modification at the Sugarloaf Range, the Kurri Kurri interchange and between Tuckers Lane to Black Creek would alter the design features of the Approved Project.

Existing environmental requirements

Commitments in the Representations Report (RTA 2001) require the RTA to design the F3 to Branxton link, and in particular noise barriers that reduce road traffic noise levels, in a manner that is sympathetic and responds to local environmental features and contexts. The design of the F3 to Branxton link should reduce adverse visual impacts.

Condition of Approval 97 requires the RTA to prepare a detailed Landscape Sub Plan that addresses, among other things, proposed landscaping, plant selection, treatments and finishes of mounds, bunds, and structures, integration of landscaping and soil and water quality management, and lighting.

The RTA has engaged an urban design and landscaping consultant to integrate these requirements into suitable context-sensitive design and landscaping plans for the detailed concept design.

The existing Condition of Approval and commitments in the Representations Report would be adequate to achieve suitable context sensitive design and landscaping outcomes for the three elements of the proposed modification.

4.14 Risks and hazards

Impacts

The techniques and methods that would be used to construction the concept design for the Approved Project would also be used to construct the detailed concept design. The proposed modification would not substantially change the nature or degree of risks or hazards associated with the construction of a major road project.

The proposed grade-separated Branxton interchange, the roundabout at Wine Country Drive, and the reconfiguration of the New England Highway intersections east and west of Branxton would reduce the likelihood of vehicle collisions when compared to the at-grade intersections in the concept design of the Approved Project at Branxton. This would in turn reduce the potential for hazardous spills that could pollute Black or Anvil Creeks.

Existing environmental requirements

Conditions of Approval 117 to 121 require the RTA to prepare and implement a Hazards and Risk Management Sub Plan. The Sub Plan must identify hazards and risk associated with the F3 to Branxton link, proactive and reactive measures and contingency plans to be used in the event of a pollution incident, and an onsite construction refuelling protocol. Condition of Approval 119 requires the RTA to prepare and implement a Construction Safety Plan to manage hazardous incidents and public safety during construction. Condition of Approval 120 requires the RTA to prepare and implement an Emergency Plan to manage emergency events that may arise during construction or operation of the Link. Condition of Approval 121 requires the RTA to prepare and implement a Security and Crime Management Strategy to manage public access to, and to minimise the potential for crime near, the F3 to Branxton link corridor.

Other commitments given in the EIS and the Representations Report (RTA 2001) require the RTA to manage construction risks from the storage and use of oils and hazardous liquids, maintenance of plant and machinery, and to provide details of bunded areas for storage of liquids.

The existing Conditions of Approval are comprehensive and would be adequate to manage hazards and risks that could arise from construction and operation of the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.15 Waste management***Impacts***

The construction and operation of the concept design for the Approved Project will generate wastes. The proposed modification would not change the types or volumes of wastes that would be generated during construction or operation of the Link.

Existing environmental requirements

Condition of Approval 123 requires the RTA to reuse or recycle clean or treated spoil so that the need to import fill is minimised. Condition of Approval 124 requires the RTA to prepare and implement a Waste Management and Reuse Sub Plan. The Sub Plan must identify how wastes will be managed in accordance with the NSW Government's Water Reduction and Purchasing Policy. The Sub Plan must follow a hierarchy of avoid, reduce, reuse, recycle and dispose, and must provide detail on the handling, stockpiling and disposal of wastes.

The existing Conditions of Approval are comprehensive and would be adequate to manage wastes that could be generated during construction and operation of the proposed modification.

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.16 Contractor work sites and ancillary infrastructure***Impacts***

The proposed modification would not change the need for contractor work sites (compounds, offices, material storage areas, batch plants) or require that they be located in different areas than those that are likely to be used by a contractor for the concept design.

Road-related ancillary infrastructure (as defined in the Glossary) would need to be provided to allow the construction and operation of the Link. The proposed modification would not change the type of road-related ancillary infrastructure needed.

The construction of sedimentation basins and the installation of boundary fencing in locations that would require clearing of vegetation in endangered ecological communities would not satisfy Condition of Approval 129 and are discussed in Sections 2.4 and 3.3 of this report.

Existing environmental requirements

Condition of Approval 129 requires the RTA to locate batching plants, construction compounds and any other ancillary infrastructure (including sedimentation basins) in locations that satisfy nine criteria.

Other than for the construction of sedimentation basins and installation of boundary fencing that would require clearing of vegetation in endangered ecological communities, Condition of Approval 129 is comprehensive and would be adequate to manage impacts of construction work site and ancillary infrastructure needed to construct and operate the proposed modification

New safeguards

Other than implementing the Conditions of Approval, no additional safeguards are proposed.

4.17 Cumulative effects

Ecological effects

Under strategies that have or will be implemented by the NSW Government and councils in the Lower Hunter Valley, and development proposals at Kurri Kurri, Allandale and North Rothbury/Branxton that the RTA is aware of, native vegetation, including endangered ecological communities, and fauna habitat are likely to be cleared for development. The incremental loss of native vegetation would increase habitat fragmentation and could significantly affect endangered ecological communities and threatened fauna in the region. Developments, and the local and regional road network which supports them, could reduce the ability of fauna to move through remaining habitats in the region. The F3 to Branxton link would contribute to the incremental loss of vegetation and habitat fragmentation in the Lower Hunter Valley.

Socioeconomic effects

Strategic plans being prepared or implemented by the by the NSW Government and councils in the Lower Hunter Valley anticipate substantial population growth during the next 20 to 30 years. The growth in population cannot readily occur without adequate provision of infrastructure and public facilities and services.

The F3 to Branxton link will be an important component of the future road-based transportation system in the Lower Hunter Valley. The Australian and NSW governments have long recognised the importance of the F3 to Branxton link:

- It would improve the efficiency of the AusLink National Network between Sydney, Newcastle and Brisbane.
- It would create a high standard road for the Lower Hunter that would relieve congestion on the New England Highway and provide an east-west connection between the Newcastle regional centre and urban centres in the Lower Hunter.
- It would provide a more direct and efficient route for the movement of freight between the Upper Hunter and the Port of Newcastle.

The recently released Lower Hunter Regional Strategy by the NSW Department of Planning shows that the F3 to Branxton link would assist in the movement of freight from the northwest of NSW and the movement of people to and from the Upper Hunter.

The F3 to Branxton link has induced, and is likely to continue to induce, development that depends on, or is facilitated by, road-based transportation. It may accelerate land value appreciation and speculative development. It is also likely to be a key transportation component in the anticipated growth in the development of mineral and extractive resources in the Hunter Valley.

Physical effects

The F3 to Branxton link would have little impact on the use or conservation of natural resources such as groundwater, surface water or air.

The visual qualities of the Lower Hunter Valley will change with anticipated population growth and development. The F3 to Branxton link would contribute to the change in the visual qualities of the landscape in which it is located.

5

Environmental safeguards and legislative requirements

5.1 Environmental safeguards

The proposed modification would have a variety of environmental impacts that would be similar to those of the Approved Project. The Conditions of Approval and Concurrence that apply to the Approved Project would apply to the proposed modification. They are comprehensive and would be adequate to manage the change in the location, magnitude and extent of potential adverse environmental impacts that could be caused by constructing and operating the Link, as changed by the proposed modification.

Other than implementing the Conditions of Approval and the recommendations in Atkins Acoustics and Associates (2006), the RTA does not propose new commitments to safeguard the environment.

5.2 Approval, licence and permit requirements

Under transitional arrangements in Item 88 of Schedule 6 of the EP&A Act, Sections 75U and 75V of this Act do not apply to an activity previously approved by the Minister that is now a project approval under Part 3A.

The F3 to Branxton link is a *freeway* in Schedule 1 of the *Protection of the Environment Operations Act 1997* and is therefore a scheduled activity (premises-based). The RTA would require an Environment Protection Licence under Section 48 of this Act to construct a scheduled activity (premises-based).

The F3 to Branxton link would require excavation and/or filling in or near watercourses. The RTA must notify the Department of Primary Industries (DPI) of its intention to dredge and/or reclaim water land under Section 199 of the *Fisheries Management Act 1994*. To comply with Section 219 of this Act, the RTA must also ensure that drainage structures and bridges do not block fish passage in waterways.

5.3 Statutory planning instruments

Under Section 75R of the EP&A Act, Parts 4 and 5 of this Act, and environmental planning instruments (other than State Environmental Planning Policies), do not apply to or in respect of an approved project.

There are no State Environmental Planning Policies that would apply to or regulate the construction or operation of the Link, as changed by the proposed modification.

5.4 Legislative requirements

Table 5 shows NSW legislative requirements that apply, or may apply, to the construction and operation of the F3 to Branxton link, as modified by the proposed modification.

Table 5 NSW legislative requirements

Act	Approval, licence, permit or authority that may be required
<i>Contaminated Land Management Act 1997</i>	If contaminated land that presents “a significant risk of harm” is present, the RTA must notify the DEC.
<i>Environmentally Hazardous Chemicals Act 1985</i>	Requires a licence for activities involving chemicals or chemical wastes under a Chemical Control Order (dioxin or PCB wastes)
<i>Fisheries Management Act 1994</i>	The RTA must notify the Department of Primary Industries (NSW Fisheries) of its intention to undertake dredging or reclamation. The RTA must also ensure that it does not block fish passage when undertaking construction in watercourses.
<i>Heritage Act 1977</i>	If relics are disturbed or excavated, work must stop in the vicinity of the discovery so that further disturbance is prevented. The RTA would determine whether an excavation permit under Section 140 of the Heritage Act 1977 would be required before work continues.
<i>National Parks and Wildlife Act 1974</i>	If Aboriginal artefacts are discovered, work must stop in the vicinity of the discovery so that further disturbance is prevented. The RTA would notify the DEC and the relevant Aboriginal community groups and follow their requirements.
<i>Native Vegetation Act 2003</i>	The Native Vegetation Act 2003 generally requires consent for clearing native vegetation. An exemption in Clause 25(g) of this Act removes the need to obtain development consent for any clearing that is part of a Part 5 activity.
<i>Occupational Health and Safety Act 2000</i>	Keeping, selling, disposal, manufacturing, preparing for use, packing or using dangerous goods or explosives is regulated under Section 135A.
<i>Protection of the Environment Operations Act 1997</i>	The F3 to Branxton link meets the definition of a <i>freeway</i> in Schedule 1 of this Act and is therefore a scheduled activity (premises-based). The RTA would require an Environment Protection Licence under Section 48 of this Act to construct a scheduled activity (premises-based).
<i>Rivers and Foreshore Improvements Act 1948</i>	A permit under Part 3A of this Act is required to excavate or disturb land within 40 m of the bank of a waterway. Under Section 22H, the RTA is exempt from the need to obtain the permit, but must notify the Department of Natural Resources before such work is undertaken.
<i>Rural Fires Act 1977</i>	May require an approval for open burning from the local council or the Rural Fire Service.
<i>Threatened Species Conservation Act 1995</i> <i>Fisheries Management Act 1994</i>	If threatened species are discovered during construction, work must stop in the vicinity of the discovery so that further disturbance is prevented. The RTA would notify the DEC and follow their requirements.

5.5 Environment Protection & Biodiversity Conservation Act

Under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (the EPBC Act), a proponent requires the approval of the Minister for the Environment to undertake an action that could have a significant impact on matters of national environmental significance (NES). There are seven NES matters that must be considered under this Act

The Sugarloaf realignment could have an impact on *Tetratheca juncea*, listed as vulnerable under this Act. and the RTA may need to refer the proposed modification to the Australian Government Department of the Environment and Heritage (Harrington, et al 2007). The remaining elements of the proposed modification would not be likely to have an impact on NES matters.

Table 6 shows the seven matters of national environmental significance and the likely impact from the proposed changes.

Table 6 NES matters

Matter	Impact
World Heritage property	No impact. There are no World Heritage properties near the proposed modification or the F3 to Branxton link.
National Heritage place	No impact. There are no National Heritage places near the proposed modification.
Wetlands of international importance (Ramsar wetlands)	No impact. There are no wetlands of international importance near the proposed modification. The nearest Ramsar wetlands are the Hunter Estuary Wetlands (comprising the Kooragang Nature Reserve and the Shortland Wetlands), at least five kilometres northeast of the F3 to Branxton link and Newcastle interchange,
Commonwealth listed threatened species, migratory species or ecological communities	The proposed modification could have an impact on <i>Tetratheca juncea</i> . No impact on other threatened species, migratory species, or ecological communities.
Nuclear action	No impact. The proposed change does not constitute a nuclear action.
Commonwealth marine area	No impact. The proposed change would not affect Commonwealth marine areas.
Direct or indirect impact on Commonwealth land	No impact. The proposed change would not affect Commonwealth land.

6 Justification

6.1 Benefits

The proposed modification would reduce clearing of native vegetation and threatened species habitat at the Sugarloaf realignment and between Tuckers Lane and Black Creek. It would also reduce fragmentation and encourage regeneration of Kurri Sand Swamp Woodland following the closure of Stanford Road near the Kurri Kurri interchange. It would vastly improve fauna connectivity in the Sugarloaf Range when compared to the Approved Project.

The proposed modification would improve traffic safety and network performance at the Kurri Kurri and the Branxton interchanges. The Branxton interchange would be likely to attract more traffic from the local road network. Consequently, it would increase the road user economic benefits of the F3 to Branxton link and reduce traffic volumes on the local road network in Branxton.

The proposed modification would reduce the need for traffic, and in particular heavy vehicles, to circulate in Branxton. It would therefore improve residential and business amenity, reduce road traffic noise and vehicle pollution, and improve pedestrian safety in Branxton.

6.2 Adverse impacts

The recognition of road-related ancillary infrastructure would increase total clearing of native vegetation from 168 ha to 182 ha. Clearing for sedimentation basins and boundary fencing would increase clearing of native vegetation by 25 ha and endangered ecological communities by 21 ha. The RTA has minimised the clearing needed for road-related ancillary infrastructure as far as practical.

The proposed modification would sever Stanford Road and eliminate a direct route between Stanford Merthyr and Heddon Greta. The alternative route using State Roads would increase travel distance and duration and therefore private transport costs.

The proposed modification would reduce traffic in Branxton. Businesses that are dependent on regional or highway-related traffic are likely to experience an immediate to short-term loss of business. In the longer-term, the F3 to Branxton link would provide an opportunity for the business centre to establish itself as a tourist destination.

6.3 Conclusion

The proposed modification is justified because it would reduce ecological impacts and improve the transport effectiveness of the F3 to Branxton link. Adverse impacts could be effectively managed by implementing the Conditions of Approval and Concurrence.

7 References

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Umwelt (Australia) Pty Ltd 2006. *Proposed National Highway Link F3 to Branxton – Stage 3 Research Design and Methodology to Accompany a DEC Section 90 Consent Application*. Draft report dated March 2006.

Glossary

2001 mapping	Vegetation mapping used in 2001 to estimate vegetation clearing polygons for the concept design. The clearing limits in Conditions of Approval 60 and 61 in the Minister's approval are based on this mapping.
2005 mapping	Vegetation mapping prepared by Biosis Research. It is based on the LHCCREMS vegetation mapping. The mapping has been refined to incorporate data from ground-truthing along the F3 to Branxton link and vegetation community boundaries from 2003/2004 high resolution aerial photography.
Approved Project	The activity approved by the then Minister for Urban Affairs and Planning in November 2001. It is based on the concept design. Since 1 August 2005, the F3 to Branxton link is a project approved under Part 3A of the EP&A Act. At the request of the RTA, the Minister modified the approval on 31 July 2006 to permit staged construction (but not opening).
Ch	Chainage
Chainage	The measured distance in metres along the F3 to Branxton link from a starting point at the Newcastle interchange and ending at Branxton. Chainage numbers increase from east to west. Negative chainages refer to the section of the F3 to Branxton link that is east of the F3 Freeway.
Concept design	The conceptual road design on which the EIS, FIS and assessments in the Representations Report were based. The concept design does not include road-related ancillary infrastructure.
DEC	Department of Environment and Conservation (previously the NSW EPA and the NPWS)
Detailed concept design	The detailed conceptual road design that refines the concept design and incorporates 15 proposed design changes and road-related ancillary infrastructure.
EIS	Environmental Impact Statement prepared by Connell Wagner in 1995
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EPBC Act	<i>Environment Protection & Biodiversity Conservation Act 1999</i>
F3 to Branxton link	The Approved Project.
FIS	Fauna Impact Statement prepared by Connell Wagner in 1997
LHCCREMS	Lower Hunter and Central Coast Regional Environmental Management Strategy
LHCCREMS vegetation mapping	Vegetation mapping of the Hunter region catchment compiled for the Lower Hunter and Central Coast Regional Environmental Management Strategy.
Link	The F3 to Branxton link
NPWS	National Parks and Wildlife Service
PAD	Potential Archaeological Deposit
Proposed modification	The proposed modification has five elements: the Sugarloaf realignment, the Kurri Kurri interchange, Tuckers Lane to Black Creek, water quality controls in locations with high conservation significance for flora, and the exceedance of the clearing limit in Condition of Approval 60. The RTA has determined that these changes are inconsistent with the Minister's Approval.
Road-related ancillary infrastructure	Infrastructure needed to construct and operate the F3 to Branxton link. It includes boundary and fauna exclusion fencing, water quality controls, construction and maintenance access within the road corridor, and a constructability margin. Condition of Concurrence 4 requires the RTA to assess the impacts of clearing for road-related ancillary infrastructure.
Skyline Ridge	The cut in a ridge centred at Ch 3700.
TSC Act	<i>Threatened Species Conservation Act 1995</i>

