

***PROPOSED PACIFIC HIGHWAY
UPGRADE
COOPERNOOK TO MOORLAND***

Director-General's Report
Section 115C of the
Environmental Planning and Assessment Act 1979

May 2004

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FOREWORD

The Roads and Traffic Authority of NSW (RTA) proposes to upgrade the Pacific Highway by constructing approximately 10.2 kilometres of dual carriageway between Coopernook and Moorland about 22 kilometres north of Taree on the NSW north coast. The proposal was developed to address road safety and travel time concerns and forms part of the Pacific Highway Upgrade Program being jointly funded by the State and Commonwealth governments.

This report was prepared in accordance with Section 115C of the *Environmental Planning and Assessment Act 1979*, which requires that the Minister obtain a report from the Director General before making a decision about the proposal. The report's purpose is to review the proposal's environmental impact statement (EIS), issues raised in representations to the EIS's public exhibition, further information provided by the Proponent and any other information identified by the Department concerning the proposal's potential environmental impacts.

The report documents this independent assessment of the proposal. It concludes that the:

- ◆ proposal satisfies its objectives and is the best alternative of those considered; and
- ◆ proposal's potential environmental impacts can be mitigated to an acceptable level by adopting management measures identified in this report and reflected in the Recommended Conditions of Approval.

The proposal is recommended for approval subject to the recommended conditions.

Jennifer Westacott
Director General
Department of Infrastructure, Planning and Natural Resources

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GLOSSARY AND ABBREVIATIONS

Acid Sulfate Soils (ASS)	Naturally acid clays, mud and other sediments usually found in swamps and estuaries. These may become extremely acidic when drained and exposed to oxygen, and may produce acidic leachate and run-off.
Conditions of Approval	The Minister's Conditions of Approval for the activity
DEC	Department of Environment and Conservation, includes the functions of the former National Parks and Wildlife Service (NPWS) and the Environment Protection Authority (EPA)
DEH	Department of Environment and Heritage (Commonwealth)
Department, the	Department of Infrastructure, Planning and Natural Resources
Director-General, the	Director-General of the Department or delegate
EIS	Environmental Impact Statement Pacific Highway Upgrade Coopernook to Moorland. Prepared by Connell Wagner for the RTA, dated February 2000.
EMP	Environmental Management Plan
Floodplain	Flat large area of alluvium adjacent to a watercourse, characterised by frequent active erosion and aggregation by channelled and overbank stream flow
LALC	Local Aboriginal Land Council
Median	A strip of road not normally intended for use by traffic, which separates carriageways for traffic in opposite directions
Minister, the	Minister for Infrastructure and Planning
NSW Fisheries	Now part of the Department of Primary Industries
Representations Report	Representations Report Coopernook to Moorland Upgrade, dated 31 January 2001 and prepared by the RTA.
RTA	Roads and Traffic Authority

EXECUTIVE SUMMARY

The Proposal

The Roads and Traffic Authority (RTA) is proposing to upgrade approximately 10 km of the Pacific Highway between Coopernook and Moorland on the mid-north coast of NSW (about 20 km north of Taree). The proposal involves the construction of a divided carriageway with two lanes in each direction. It requires duplication of the existing alignment for 6.7 km and a new dual carriageway for 3.5 km. It connects to a newly upgraded section of the Highway to the south while upgrading options for the section to the north are currently under investigation.

The proposal has an estimated capital cost of \$59 million (2000 prices) and forms part of the joint Commonwealth and NSW Governments' Pacific Highway Upgrading Program. The proposal is located within the Greater Taree local government area. A locality map and preferred concept alignment of the proposal are given in Figures 1-1 and 1-2 respectively.

EIS Exhibition and Approval Process

The RTA, as Proponent, determined that the proposal has the potential to result in significant environmental impacts and accordingly prepared an environmental impact statement (EIS). As the RTA is both the Proponent and a determining authority for the proposal, and an EIS was prepared, the proposal is subject to assessment under Division 4, Part 5 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). Approval of the Minister is required before the proposal can be determined by the Minister for Roads.

An EIS for the proposal was publicly exhibited between 24 March 2000 and 10 May 2000. Nineteen representations were received in response to the EIS. Main issues raised in submissions were:

- ◆ flora and fauna
- ◆ access and safety
- ◆ noise and vibration
- ◆ air quality
- ◆ drainage, water quality, erosion and sediment control, and
- ◆ land use and community impacts

This Report was prepared in accordance with Section 115C of the EP&A Act which requires the Director-General to assess and report to the Minister on the proposal.

Project Justification

The proposal is part of the Pacific Highway Upgrading Program. The Upgrading Program is jointly funded by the Commonwealth and NSW Governments' with the main objectives to improve the safety and efficiency of the Highway. The existing Highway between Coopernook and Moorland generally has two-lanes, contains a sharp bend with restricted speed, and is susceptible to flooding. It is expected to operate at an unsatisfactory level of service during peak times by 2005. Traffic safety, particularly in the vicinity of the rail bridge near Long Point Road and the bend at Moorland (South) is a major concern.

The proposal would result in significant improvements to Highway/local road intersections by providing protected intersections, U-turn facilities and turning lanes. There would be an increase in the posted

speed limit along the upgraded route resulting in improvements to travel time for regional traffic. The provision of dual carriageways would reduce Highway congestion experienced during peak periods, which would also reduce travel times. The upgrading would also contribute to a continuity of road standards along the Highway.

Environmental Impact Assessment

The selection of the preferred route was undertaken in consultation with the community and key agencies to reduce environmental impacts to acceptable levels. The principles involved in the route selection process included:

- ◆ improving traffic performance and safety
- ◆ decreasing the susceptibility of the road to flooding, and
- ◆ minimising potential impacts on flora and fauna, businesses and properties.

The Department's assessment identified access and safety, noise and vibration, flora and fauna, hydrology and flooding, water quality, erosion and sediment control, and land use and community impacts as the proposal's key issues. These are discussed below.

Access and Safety

The Department and Greater Taree City Council raised concern about the safety of the two new intersections proposed between the new Highway and Moorland (North) and Moorland (South). These concerns were based on the short distance between the two intersections which meant that traffic between the two villages would travel at relatively slow speeds in comparison with the through Highway traffic.

The RTA modified the proposal to convert the two intersections into "sea-gull" type at-grade intersections. These would provide acceleration lanes for local traffic to merge into Highway traffic. The revised RTA proposal satisfactorily addressed the safety concerns.

A number of individuals and NSW State Forests raised concerns about changes to, or loss of access to their properties including proposals to re-connect severed portions of farms by the provision of underpasses. To manage these impacts a number of management measures and conditions of approval were proposed. These include that the proponent:

- ◆ consult with landowners regarding the provision of access points, and
- ◆ negotiate with landowners access arrangements for properties severed by the proposal.

Noise and Vibration

The proposal would increase road traffic noise levels at 26 properties in the study area with 25 of these already exposed to existing highway traffic noise. It would also reduce traffic noise at residential properties in Moorland (South) as well as 16 properties along the existing highway alignment. Overall the proposal would reduce the number of properties exposed to highway traffic noise.

The EIS and Representations Report leave uncertainty about the noise mitigation measures to be implemented and their effectiveness in meeting assessment criteria at individual residences. Consequently the Department recommends that an Operation Noise Management Report be prepared and submitted for the approval of the Director-General before construction to confirm that appropriate

noise measures are implemented. The report would include the identification of noise mitigation measures to be used, their method of evaluation and their effectiveness.

The Department also requires that the Proponent undertake operational noise monitoring to assess the adequacy of the implemented traffic noise mitigation measures. Should monitoring indicate a clear trend in traffic noise levels on the proposal higher than the criteria identified in the Operation Noise Management Report, the Proponent would be required to implement further mitigation measures in consultation with affected landowners.

The EIS indicates that construction activities would generate noise levels exceeding the construction noise goals at the nearest residences along the route. The Proponent would be required to prepare a Construction Noise and Vibration Management Sub Plan to manage and monitor construction noise.

Flora and Fauna

The proposal increases fragmentation of habitat, increases the barriers to movement of some species and results in the loss of approximately 7.5ha of forest communities, including the endangered ecological community, Lowland Rainforest on Floodplain. Some loss of riparian and aquatic vegetation may also be expected. Concerns about these effects were raised by DEC, NSW Fisheries, Environment Australia (now Department of Environment and Heritage), State Forests, several individuals, and the Department. These concerns related to the need for further assessment, and the effectiveness of proposed mitigation measures.

In response, the Representations Report included a supplementary report addressing flora and fauna concerns. It also detailed a number of modifications to the Proposal to reduce ecological impacts. To ensure flora and fauna management is considered during construction the Department recommended Conditions of Approval that included:

- ◆ further liaison with the DEC about the design and implementation of mitigation measures, and
- ◆ consolidation of the flora and fauna management proposals into a sub plan forming part of the construction environmental management plan.

Hydrology and Flooding, water quality, erosion and sediment control

The proposal would cross a number of creeks in the Manning River Catchment. Possible effects of the proposal were identified by the Proponent and in representations to be alterations to flooding patterns and adverse effects on water quality through sedimentation and pollution from stormwater run-off.

To manage these impacts management measures were identified in the recommended Conditions of Approval including:

- ◆ preparing and implementing a soil and water management plan (incorporating erosion and sedimentation control measures)
- ◆ designing waterway crossings in consultation with the DEC and NSW Fisheries, and
- ◆ preparing and implementing an acid sulfate soils management plan.

Land Use and Community Impacts

The proposal passes through an area of free draining red loam soils suitable for a diverse range of agricultural production including horticulture and pasture based enterprises. Several representations, including that from NSW Agriculture, had concerns about adverse impacts upon Class II agricultural land. Recommended Condition of Approval No 24 requires that the RTA minimise impacts on Class II agricultural land to ensure the ongoing viability of this type of land. The RTA also committed to include in land acquisition negotiations:

- ◆ the value of agricultural production
- ◆ the value of any loss of production or carrying capacity, and
- ◆ property adjustments to optimise the on-going viability of Class II agricultural land.

Greater Taree City Council also expressed concern that the proposal would fragment the community by placing the Highway between Moorland North and Moorland South. The Department notes that the proposal was selected as it performed better against economic, social and environmental factors than other options. The two villages are already separated by a floodplain with road connection via the existing Highway and the Department's assessment did not support Council's fragmentation concerns.

Conclusions and Recommendations

The proposal is a component of the Pacific Highway Upgrading Program. The existing section of the Highway is in poor condition and has a high accident rate. The proposal was developed to address these issues as well as the common Pacific Highway Upgrading aim of improved travel time.

The Department undertook an assessment of the proposal's impacts and identified areas where comprehensive mitigation measures would need to be implemented to ensure adverse impacts are mitigated to an acceptable level. Mitigation strategies for noise and vibration, flora and fauna, and land use and community impacts need to be amplified beyond those developed in the EIS to ensure an acceptable level of impact.

The Department recognises that the proposal would result in substantial benefits to the local community and the wider population. At a local level, the proposal would remove through traffic from Moorland (South). The proposal benefits travelling motorists through increased safety and reduced travel times.

The Department also recommended that the Proponent prepare comprehensive environmental management plans for the construction and operation of the proposal. Key elements of the recommended Conditions of Approval include the:

- ◆ preparation and implementation of comprehensive construction and operation EMPs
- ◆ establishing a Community Liaison Group to assist in managing impacts during construction and inputting to the design of operation mitigation
- ◆ the preparation of management plans for:
 - construction traffic
 - flora and fauna
 - noise and vibration
 - soil and water management
 - acid sulfate soils
 - indigenous heritage
 - dust management

- spoil disposal and waste management, and
- ◆ preparation of an urban design and landscape report before construction commences.

The Department's assessment concluded that, provided the recommended Conditions of Approval contained in Section 8 of this report were adopted, the proposal could be approved by the Minister.

1. INTRODUCTION

1.1 Nature of the Proposal

The Roads and Traffic Authority (RTA) proposes to upgrade the Pacific Highway between Cooperbrook and Moorland, a Highway section which commences about 22 kilometres north of Taree. The Project consists of:

- ◆ a dual carriageway for the length of the proposal
- ◆ a new bypass of the South Moorland village
- ◆ duplicating bridges over Two Mile, Pipe Clay and Holey Flat Creeks
- ◆ a new bridge over the North Coast Railway, and
- ◆ seven intersections with existing roads.

A locality map and preferred concept alignment of the proposal are given in Figures 1-1 and 1-2 respectively. The proposal's environmental impact statement (EIS) indicated a Project cost of \$56 million.

1.2 EIS Exhibition and Approval Process

The RTA, as Proponent, determined that the proposal has the potential to result in significant environmental impacts and accordingly prepared an EIS. The RTA is both the Proponent and a determining authority for the proposal. As an EIS was required for the proposal it is subject to assessment under Division 4, Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the approval of the Minister is required.

An EIS for the proposal was publicly exhibited between 24 March and 10 May 2000. The RTA received 19 representations to the EIS. Copies of all representations were forwarded to the Department as required by the EP&A Act, 1979.

1.3 Request for Approval of the Minister

In accordance with Section 115B of the EP&A Act, the RTA sought the approval of the Minister by way of letter dated 28 May 2001. The request for approval was accompanied by a Representations Report which presented the RTA's response to the issues raised in response to the public exhibition. The Representations Report proposes five minor modifications to the activity as described in the EIS.

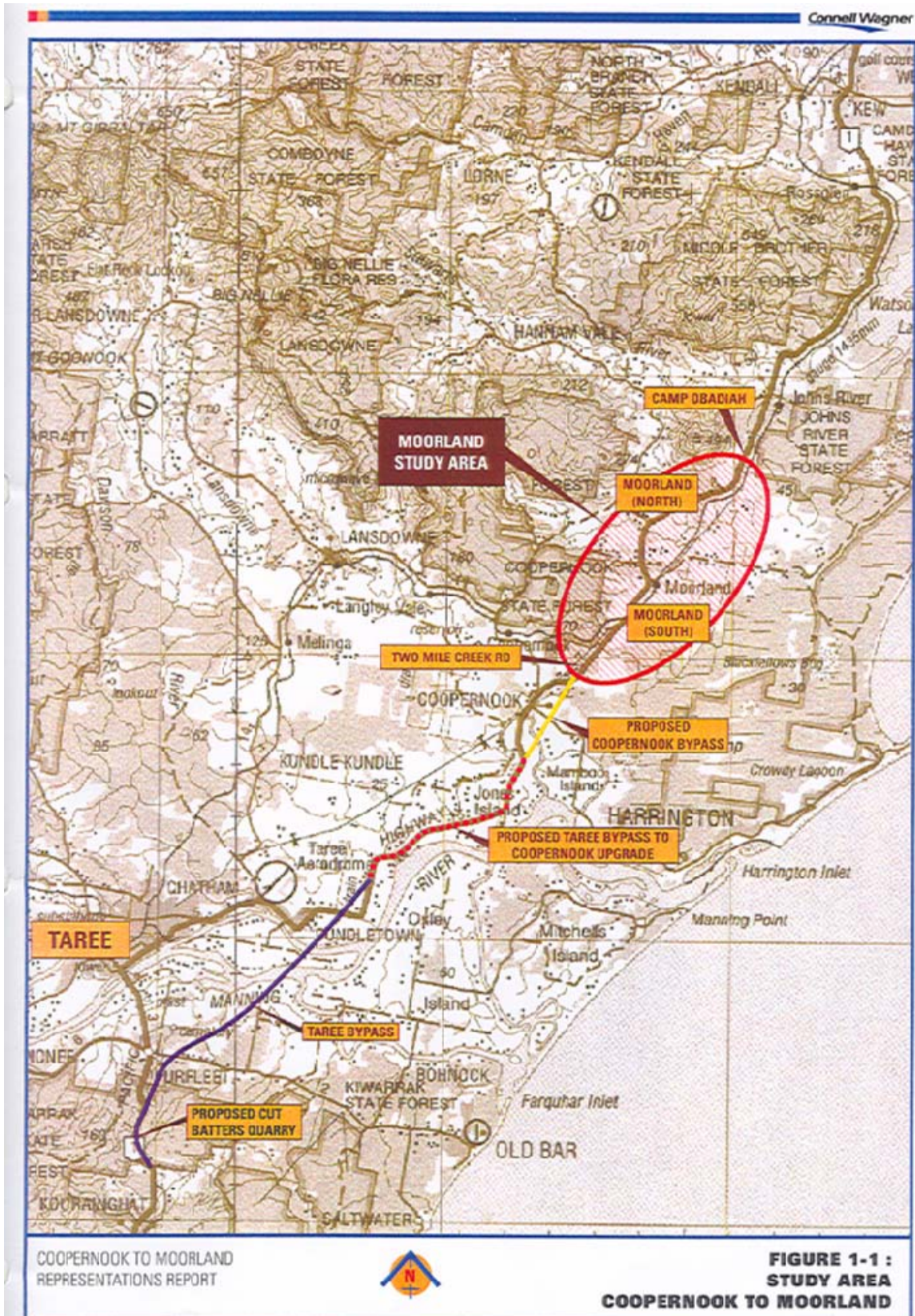
1.4 Purpose of this Report

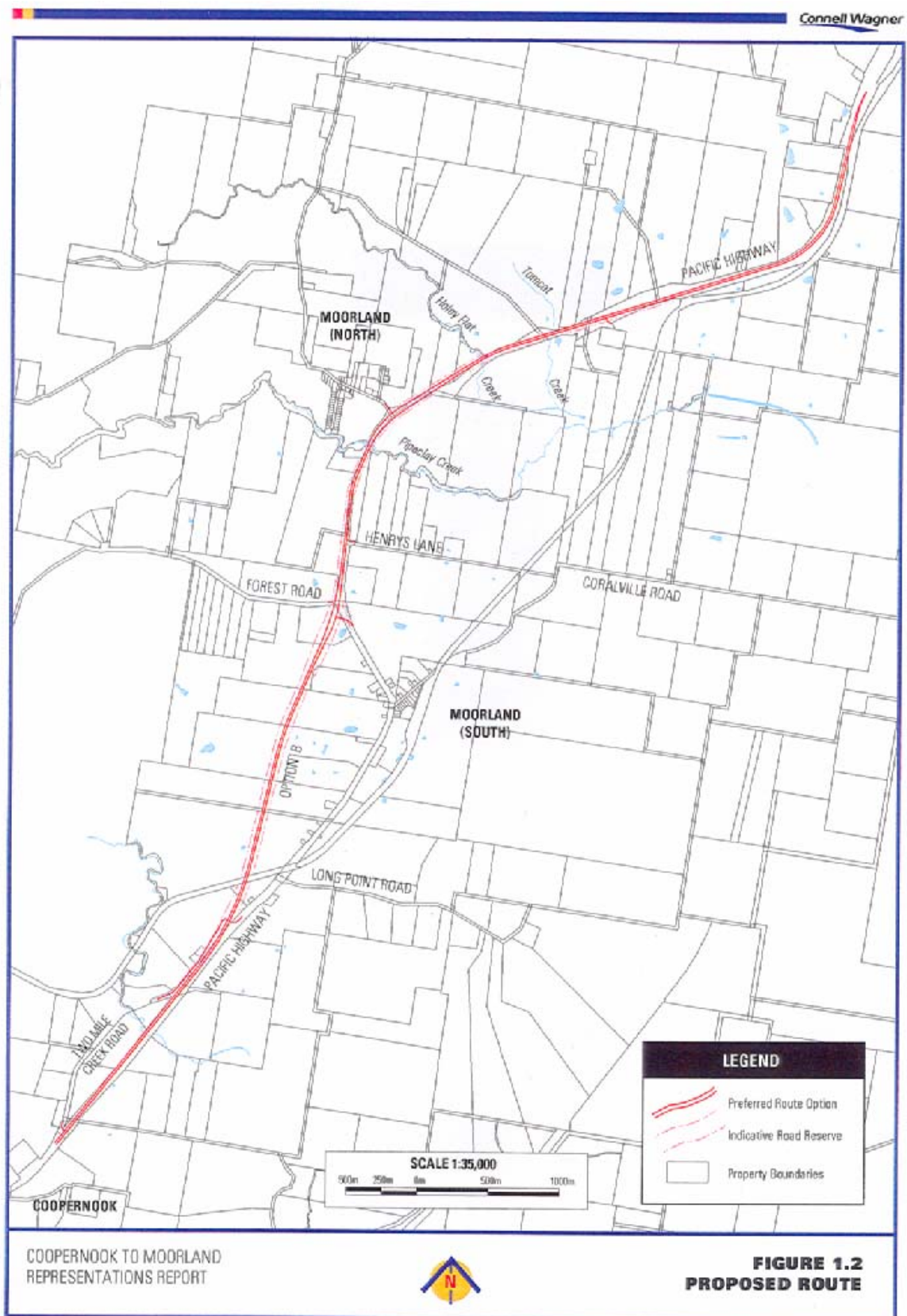
The purpose of this report is to review the:

- ◆ EIS for the proposal
- ◆ issues raised in representations to the public exhibition
- ◆ submissions made by the Proponent, and
- ◆ other matters pertinent to the potential impact of the proposal.

This report was prepared in accordance with Section 115C of the EP&A Act, which requires the Director-General of the Department to assess and report to the Minister on the proposal. This Report

documents the outcome of an independent environmental impact assessment by the Department accounting for all issues raised in representations to the EIS.





2. PROPOSAL DESCRIBED IN THE EIS

This section of the Report provides a description of the proposal described in the EIS. The purpose is to provide an overview of the information presented in the EIS and does not necessarily represent the views of the Department. Section 4 provides a discussion of the proposed modifications to the proposal following exhibition of the EIS. The Department's consideration of the modified proposal is provided in Sections 5 and 6.

2.1 Broad Design Considerations

The proposal involves upgrading the Pacific Highway between Cooperbrook and Moorland to dual carriageway standard over a distance of 10.2 km. It includes a duplication of the existing highway on its current alignment for 6.7 km and a new dual carriageway bypassing Moorland (South) village west of the existing alignment for 3.5 km. Another important design consideration was to maintain the links between the communities of Moorland (North) and Moorland (South).

Existing connections to the local road network are proposed to be upgraded with local widening provided. Access to the Highway from private properties would be maintained but direct right turns prevented. Formal intersections or U-turn bays for access, provided at approximately two kilometre intervals, would allow access in both directions.

The proposed alignment and important features of the proposal are illustrated in Figure 1-2. The following sections provide details of the key elements of the proposal.

2.2 Carriageway Design

The proposal was designed to comply with RTA design criteria. Table 2.1 outlines the key design features of the proposal.

Table 2.1: Key Design Features of the Proposal

FEATURE	MEASUREMENT
Design Speed	100 km/h - vertical 110 km/h - horizontal
Sign posted speed	110 km/h
Stopping Sight Distance (speed of 100 km/h)	175 m
Minimum radius of horizontal curves	600 m
Maximum gradient	4.5%
Area of footprint	31 ha
Width of footprint	
Minimum	35 m (incl. the existing Hwy)
Maximum	90 m (in a major cutting at 26km 3000)
Typical carriageway width	10 m (pavement width only)
Traffic lane	3.5 m
Shoulder width	2.5 m nearside; 0.5 m median side
Verge width	1.0 m
Median width	7 - 20 m
Pavement type	generally asphalt

2.3 Earthworks

The proposal is designed to achieve an earthworks balance (i.e. excavation and fill requirements are equal). Most major earthworks occur on the bypass section, between Two Mile Creek Straight and Forest Road, with cuts up to 10 m deep and fills up to 9 m high. Earthworks would be refined during final design.

Some construction materials would be imported including select fill and pavement materials. Imported materials would come from existing, registered quarries.

2.4 Waterway Crossings and Drainage Structures

The proposed highway upgrade crosses a number of small creeks that are part of the Manning River catchment, including Pipe Clay Creek, Holey Flat Creek, Tomcat Creek and Two Mile Creek. Drainage controls have been incorporated into the concept design for the proposal. The basic drainage design criterion is to maintain existing flood characteristics.

Where a new carriageway is to be constructed adjacent to the existing highway, the size of the existing drainage structure would be adopted or increased. Additional drainage culverts are also required close to crossings of Pipe Clay Creek, Holey Flat and Tomcat Creeks to cater for designed flood events.

Large drainage culverts are proposed on the bypass section at Moorland (South) and duplicate bridges would be required at the crossings of Two Mile Creek, Pipe Clay Creek and Holey Flat Creek. Additional culverts would also be required at six locations as part of the proposed highway upgrade.

In cut locations, table drains would collect stormwater runoff from the road surface and direct it towards the existing drainage. On embankments the runoff from the road surface would also be directed naturally or via batter drains to existing drainage lines. Within the median, collection of stormwater would be drained via gully pits and discharged via culverts.

Erosion and sediment controls would be implemented during construction and operation to protect downstream water quality.

2.5 Access Arrangements

There are approximately 30 private property accesses along the proposed upgrade. Local widening at each driveway would be undertaken to facilitate access and school bus pick up.

A dual carriageway with median would restrict access from the Highway to these properties to left-in, left-out only. Access in the other direction would be maintained by U-turn facilities. The maximum distance any landowner would need to travel north or south to a U-turn facility is 1.7 km.

Three underpasses would be constructed at three farm properties severed by the proposal. The underpasses would allow pedestrian, cattle and farm machinery access to both sides of the Highway.

2.6 Other Design Features

Other design features of the proposal include:

- ◆ emergency stops, rest areas and truck stops
- ◆ fauna passage and wildlife exclusion fencing

- ◆ farm machinery and cattle underpasses
- ◆ railway bridge structure
- ◆ fencing to prevent unauthorised access
- ◆ directional signage and tourist information, and
- ◆ signposting in accordance with RTA policy and in consultation with Greater Taree City Council.

2.7 Property Acquisition

The proposal involves the acquisition of two houses and approximately 31 ha of agricultural land. An additional 7 ha of land would also be acquired if total acquisition is negotiated for three of the affected properties. All land would be acquired in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*.

2.8 Construction Issues

The RTA identified the following main construction tasks:

- ◆ utility adjustments
- ◆ establishment of site compounds, boundary fencing, ancillary facilities and access tracks
- ◆ implementation of erosion and sediment control measures
- ◆ traffic management
- ◆ vegetation clearing
- ◆ stripping and storing of topsoil
- ◆ construction of drainage structures
- ◆ installation of cattle/farm machinery underpass structures
- ◆ excavation of earthworks
- ◆ hauling and compacting of excavated material
- ◆ establishment of concrete or bitumen batching plants
- ◆ construction of pavement
- ◆ installation of traffic management devices, signage and roadside furniture, and
- ◆ rehabilitation and landscaping on completion of work.

The contractor selected to undertake the works would develop the construction schedule in detail.

The RTA has proposed construction hours of 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm Saturday with no work on Sundays or public holidays.

The capital cost of the proposal is approximately \$56 million.

2.9 Justification, Alternatives Considered and Impacts Identified in the EIS

2.9.1 Justification and Need for the Proposal

In January 1996 the Commonwealth and NSW State Governments announced a joint commitment to a 10-year program to upgrade the Pacific Highway between Hexham and the Queensland border. A total of \$2.2 billion funding would be available for the Pacific Highway in the period of the agreement, 1996-2006.

Upgrading of the Pacific Highway between Cooperook and Moorland has been proposed to improve road geometry, travel speed, pavement width and flood immunity. The current alignment contains a

sharp bend in Moorland (South) where the speed limit is reduced from 100km/h to 80km/h and the road generally consists of a single carriageway. There has been continuing accident growth, particularly in the vicinity of Long Point Road, Moorland (South) and Henry's Lane. There is also an ongoing susceptibility to highway closure due to flooding across the Pipe Clay Creek/Holey Flat Creek floodplain.

Within the study area, there has been a large growth in traffic from 8,465 average annual daily vehicles (AADV) per day in 1990 to 11,042 AADV per day in 1998. Without the proposal, this section of the Pacific Highway is expected to operate at an unsatisfactory level of service with significant congestion during peak times by 2005.

The 2.5km bypass of Moorland (South) as part of this proposal would allow the diversion of a large amount of through traffic from the existing Highway alignment (estimated to be 90% of traffic). This would result in improved travel and safety conditions on the Highway and improved safety in the village. The upgrade has been designed to reduce the susceptibility of flooding across the roadway, minimising potential delays to traffic.

2.9.2 Consequences of Not Proceeding

The EIS identified the following to be the consequences of not proceeding with the proposal:

- ◆ deterioration of traffic conditions to unacceptable level
- ◆ an increase in accidents resulting in fatalities and/or injuries on the highway
- ◆ ongoing susceptibility to highway closure due to flooding across Pipe Clay Creek/Holey Flat Creek floodplain, and
- ◆ continuation and increase in impact on the amenity of the village of Moorland (South) resulting from the current highway alignment bisecting the village.

2.9.3 Alternatives Considered

The RTA has undertaken several highway planning studies of the Moorlands section including an Environmental Overview of a proposed traffic relief route at Moorland (1990). That study assessed different corridor options, which were presented to the community, and undertook preliminary environmental and planning assessments. These options were further considered in the EIS.

Identification of a suitable route began within a study area confined to approximately one kilometre east and west of the existing Highway. Seven potential options (referenced A to G) were identified within the study area, generally east of the existing Highway. The main constraints on any of the options were traffic performance and safety, flora and fauna, flooding impacts, effects on business and agribusiness, and effects on properties.

Preliminary investigations were conducted on the feasibility of the nominated options with respect to constructability, soil and geological constraints, hydrology and the availability of construction materials and embankment material. These investigations showed that the cumulative demand for imported fill resources among local Pacific Highway Upgrade projects would exceed the available fill supply. One of the options (Option E) required significant design changes to win further fill and as a result, was split into two options, Options E1 and E2 with Option E1 being the original. These options were shown on Figure 4-1 of the EIS.

Options were compared against a range of social and environmental factors using a weighted factor analysis approach with input from community and government stakeholders. Based on the analysis,

Option B performed best, with a clear distinction emerging between this option and the second best performing option E1.

Following community consultation, the eight potential route options were reduced to three. These options involved one western bypass of Moorland (South) (Option B) and two eastern bypasses (Options E1& E2). These three options were further assessed using a comparative road user economic assessment. The assessment analyses the efficiency of the use of road funding. Option B performed the best although all three options were economically viable. Option B achieved a Benefit-Cost Ratio of 2.24.

The EIS identified that the local community was divided in the selection of a preferred option. Support for Option B came from both businesses and individual landowners concerned with property and trade impacts (i.e. landowners along the Option E1/E2 alignments). Business owners in Moorland (South) were more supportive of Option B due to the perceived lesser effect on businesses. The community in general supports the impacts of the highway remaining mostly within the existing road reserve. Landowners affected by Option B stated a preference for Options E1/E2.

As a result of the route suitability investigation, Option B was preferred which follows a parallel alignment to the existing highway for 75% of its length, most of which would involve duplication of the existing highway.

2.9.4 Major Benefits and Adverse Impacts Identified in the EIS

Benefits identified in the EIS were:

- ◆ improved highway safety with the construction of dual carriageways
- ◆ greatly reduced highway closure from flooding of the Pipe Clay/Holey Flat Creek floodplain
- ◆ travel time savings and improved capacity for traffic growth
- ◆ improved road safety, noise and residential amenity at the village of Moorland (South), and
- ◆ reduced severance within Moorland (South) due to the reversion of the existing highway to a local service road.

The EIS recognised that the construction and operation of the proposal would create a range of adverse impacts including:

- ◆ the loss of small areas of native habitat
- ◆ agricultural and property severance
- ◆ increased noise and visual exposure of the Highway to a number of dwellings, and
- ◆ a short-term loss in trade to existing businesses which would be minimised in the long-term by improved signage and townscape improvements.

3. SUMMARY OF REPRESENTATIONS

Nineteen representations were received in response to the public exhibition of the EIS. These were from the following groups:

Commonwealth Government	2	Business	2
State Government	7	Individuals	7
Local Government	1		

The Representations Report contains a summary of the issues raised. The Department undertook its own examination of the representations and is satisfied that the RTA identified all key issues for consideration. Table 3.1 contains the Department's summary of the issues raised in representations.

Table 3.1: Issues Raised in Representations

Factor	Issue
Flora and fauna	<ul style="list-style-type: none"> - Measures required to mitigate fragmentation of habitat and barrier effects to fauna species - Additional survey and assessment required for threatened fauna species and the endangered ecological community Lowland Rainforest on Floodplain - Intensity of fisheries activities and industries not assessed
Access and safety	<ul style="list-style-type: none"> - Provision of accesses for a number of residents and State Forest - Widening underpasses for farm machinery and potential flooding of underpasses impeding access - Ongoing maintenance of access roads - Safety concerns for raising the speed limit to 110km/h between Forrest Road and Holey Flat Creek at Hannam Vale Road
Noise and vibration	<ul style="list-style-type: none"> - Lack of demonstration that all reasonable and feasible noise mitigation methods were considered - Absence of a sleep disturbance assessment - Noise impacts from a proposed Batching Plant - The need to liaise with potentially noise affected residents to gain approval to work outside "normal" hours - Potential impacts from noise on a violin teaching and restoring business
Air quality	<ul style="list-style-type: none"> - Impacts from dust associated with the proposed Batching Plant to adversely affect a residence - Long term impacts of exhaust emissions generated post commissioning on the productivity of two agricultural enterprises
Drainage, water quality, erosion and sediment control	<ul style="list-style-type: none"> - Drainage upgrade needed to improve access during flooding - Runoff and rainfall in the catchment would be greater than what was predicted in the EIS - Potential for pollutants in stormwater runoff to adversely affect organic produce in the study area - Sufficient space is needed for sediment basins - Methodology for the Acid Sulfate Soil Assessment was not provided

Factor	Issue
Land use and community impacts	<ul style="list-style-type: none">- Impacts on farm viability through loss of land- Compensation measures needed for forestry loss and fragmentation- Fragmentation of the community at Moorland (North) and Moorland (South), limiting best use and future development of the area

The National Parks and Wildlife Service (DEC) Cultural Heritage Division also raised a concern with respect to the possible need for an aboriginal archaeological assessment if Site 2 were chosen for the Batching Plant.

4. MODIFICATIONS TO THE PROPOSAL FOLLOWING EIS EXHIBITION

This Section describes the Proposal described in the Representations Report for which the Proponent has sought approval from the Minister for Infrastructure and Planning. The modifications to the proposal described in this Section were made by the Proponent following exhibition of the Environmental Impact Statement in response to the issues raised in representations and further investigations.

Modifications to the proposal were made by the RTA in response to the issues raised in representations to the EIS, additional correspondence since EIS exhibition, additional studies undertaken since the EIS and further development of design details. These are described in Sections 7 and 8 of the Representations Report. The modifications are summarised below.

- ◆ Fauna walkway

In response to concerns raised by the DEC, the RTA modified the proposal to include a fauna walkway at Pipe Clay Creek. The design of this walkway would be discussed further with the DEC during the detailed design phase.

- ◆ Reduction of carriageway footprint

The RTA modified the design to provide a slightly narrower carriageway separation near Pipe Clay Creek. This reduces the road's footprint and also reduces environmental impacts on the endangered ecological community, "Lowland Rainforest on Floodplain".

- ◆ Provision of fauna exclusion fencing

The RTA proposed the installation of fauna exclusion fencing at two locations, near to Cooperook State Forest and at Two Mile Creek. The exact location of this fencing was proposed to be determined in consultation with the DEC.

- ◆ Landscape strategy

After discussions with DEC, the RTA proposed compensatory planting of *Allocasuarina littoralis* to replace the area of habitat for the threatened Glossy Black-cockatoo required to be cleared for the proposal.

- ◆ Noise Attenuation

The RTA reviewed the number of buildings identified in the EIS to require noise treatment. The modified proposal is to provide noise treatment for fifteen buildings rather than sixteen buildings as stated in the EIS. This change was made following further investigations.

5. ASSESSMENT OF THE PROJECT'S KEY ISSUES

This Section of the Report provides the Department's assessment of the Proposal's key environmental impacts. The assessment is based on an examination of the EIS, issues raised in representations made during the exhibition period, the Proponent's Representations Report and, where required, further assessment by the Department.

It is important that this Section be read in conjunction with the Representations Report to understand how all issues raised in representations were addressed.

5.1 Access and Safety

5.1.1 Background

Moorland consists of two villages separated by the Pipe Clay Creek floodplain. They had a population in 1996 of around 290. Moorland (North) supports a post office and primary school while Moorland (South) contains several businesses including a large service station and truck stop.

The existing Highway generally consists of a two-lane undivided carriageway with several overtaking lanes. The current speed limit is generally 100 km/h with a reduction to 80 km/h where the Highway passes through Moorland (South). Moorland (North) is accessed from the Highway from a "T" intersection. The upgrade would provide for a design speed of 100 km/h and the EIS states that the proposal would be signposted at 110 km/h.

During construction the majority of the work would be programmed to ensure that traffic can continue to use the existing road. Construction and highway traffic management would be controlled according to a Traffic Management Plan which would ensure that property access is maintained throughout the construction phase. The RTA proposes to ensure that residents near the construction site are kept informed of potentially disruptive activities which would be managed under the construction EMP.

There are 30 existing private accesses onto the Highway which would be required to be maintained.

The EIS states that the bypass section would sever three farming properties. Underpasses are proposed to allow pedestrian, cattle and farm machinery access within these farms.

5.1.2 Issues

Nine representations raised concerns about access and safety. These included:

- ◆ safety concerns for raising the signposted speed limit to 110km/h
- ◆ provision of accesses for a number of residents and to Cooperook State Forest
- ◆ widening underpasses to better accommodate farm machinery, and
- ◆ potential flooding of underpasses impeding access.

The Department and Greater Taree City Council also raised concern about the safety of the two new intersections proposed between the new Highway and Moorland (North) and Moorland (South).

5.1.3 Consideration of Issues

Safety

The Department's concerns about the Highway design between Moorland (North) and Moorland (South) were based on the short distance (about 1.5 km) between the two intersections. The distance means that traffic between the two villages would travel at relatively slow speeds in comparison with the through Highway traffic. The intersections proposed by the RTA did not include acceleration or deceleration lanes, a design based on the expected low volumes of traffic between the two villages.

After completing the Representations Report the RTA re-evaluated traffic flows between the two villages. The RTA advised that the actual traffic between the two villages "is a much greater number than shown" in the EIS. Their revised figure indicated traffic in the order of 100 trips a day in each direction.

The RTA proposed to the Department (in a letter dated 16 July 2003) modifications to the proposal to improve the safety of travel between the two villages. The RTA proposes to convert the two intersections into "sea-gull" type at-grade intersections. These would provide acceleration lanes for local traffic to merge into Highway traffic.

The revised RTA proposal satisfactorily addressed the Department's concerns.

Design Speed

The EIS and Representations Report state that the highway upgrade was designed for a speed of 100 km/h and is proposed to be signposted to allow a speed of 110 km/h. In a facsimile of 3 July 2001 to the Department the RTA clarified the apparent discrepancy between designed and signposted speeds. The RTA advised that :

- ◆ the Highway concept design was designed for a minimum 110 km/h design speed for its horizontal alignment and a 100 km/h design speed for its vertical alignment
- ◆ the signposted speed is determined following a final safety audit upon completion of the work and prior to opening, and
- ◆ it may be possible to design the road for a 110 km/h vertical alignment, and that would be confirmed during detailed design.

The Department considers that this process would ensure that the signposted speed would reflect a safe operating speed.

Access

A number of individuals and NSW State Forests raised concerns about changes to, or loss of, access to their properties. Specific concerns include:

- ◆ a need for provision between the Highway and the railway line to gain access to Portion 1
- ◆ the cutting off of personal access to the Highway from Bradley's Lane
- ◆ the need for a common access point for Lots 3 and 5
- ◆ dangerous and inconvenient travel to gain access to Moorland village from Lots 20 and 22, and
- ◆ clarification of access arrangements to Forest Road for NSW State Forests.

The RTA responded to each of the above concerns in its Representations Report.

The Department considers that access issues can be adequately managed if the RTA ensured that any access way affected by the proposal was reinstated to an equivalent standard or adequate compensation is negotiated with the relevant landowner(s). These requirements are detailed in Recommended Condition of Approval No 23.

Three agricultural businesses also raised concerns about underpasses proposed to facilitate access between the two property sections formed by the proposal. These concerns related to the proposed width of the underpasses (which would not be wide enough for farm machinery) and the potential for the underpasses to be frequently flooded impeding cattle and machinery movement. Advice from NSW Agriculture also confirmed that the proposed underpasses would need to be:

- ◆ substantial structures capable of accommodating ready movement of livestock herds (e.g. 80 dairy cattle) at a time, as well as all forms of farm machinery
- ◆ self draining especially during prolonged wet periods
- ◆ designed and constructed to avoid erosion, and
- ◆ constructed of materials which do not contribute to cattle lameness, water quality problems, or cause feed intake problems.

To address these issues the RTA responded with a commitment to consult with the affected landowners to determine a suitable width for the underpasses to adequately allow machinery movement. The Department supports this commitment.

The RTA also provided details on the possibility of flooding in the underpasses. For a 1 in 20 year average recurrence interval flood event water depth in the underpasses was calculated to be 300 mm (sustained for a few hours) and for a 1 in 100 year ARI event 700mm (sustained for a few hours). Concern was expressed in the representations that the rainfall data used for these (and other) calculations is an underestimate as it is based on Taree's rainfall data which is less than Moorland's. The RTA stated that any small differences in the levels would not be expected to have a substantial effect on the analysis of the impacts.

In considering this analysis provided by the RTA as well as the concerns raised in the representations (including the daily usage requirements of the underpasses) the Department proposes that the RTA should as Recommended Condition of Approval No 27 consult with the affected landowners to determine suitable locations and sizes for the underpasses.

5.2 Noise and Vibration

5.2.1 Background

The noise assessment consisted of:

- ◆ monitoring to determine existing noise levels
- ◆ development and calibration of noise models to allow estimation of future traffic noise, and
- ◆ identification of noise affected residences and potential mitigation measures.

The EIS states that the selection of noise mitigation measures would be undertaken as part of the detailed road design.

The EIS concluded that road traffic noise levels are expected to increase at 26 properties in the study area with 25 of these already exposed to existing highway traffic noise. The analysis also identified that the proposal would result in a reduction in traffic noise at residential properties in Moorland (South) as well as 16 properties along the existing highway alignment. Overall the proposal would reduce the number of properties exposed to highway traffic noise.

The EIS identified that short and medium term construction noise goals were expected to be exceeded.

An assessment of the potential impacts of vibration on nearby structures concluded that it is unlikely that construction activities would give rise to vibration levels that exceed 5mm/sec. The EIS did detail that dilapidation surveys would be carried out on sensitive structures within 40 metres of any rock breaking or ground compaction and within 300 metres of any blasting activity. A monitoring program is also proposed to be implemented to control vibration impacts.

5.2.2 Issues

Issues raised by the DEC, the Department and several individuals related to the need for further assessment of noise impacts and details of the proposed mitigation measures. Of concern were:

- ◆ the lack of demonstration that all reasonable and feasible noise mitigation methods were considered
- ◆ the absence of a sleep disturbance assessment
- ◆ construction noise
- ◆ noise impacts from a proposed Batching Plant
- ◆ liaison with potentially noise affected residents during construction, and
- ◆ potential impacts from noise on a violin teaching and restoring business.

In response, the RTA prepared a supplementary noise report and a sleep disturbance assessment report.

The Representations Report detailed a number of modifications made to the Proposal following the public exhibition of the EIS. One modification is relevant to potential noise impacts, the decrease in the number of buildings identified for noise treatment from 16 to 15.

5.2.3 Consideration of Issues

Reasonable and Feasible Mitigation

The EIS and Representations Report identify and discuss a range of noise mitigation measures. Neither document contains a definitive discussion that all reasonable and feasible mitigation methods were considered in attempting to meet the assessment criteria. Similarly, where the criteria cannot be met there is limited discussion to justify any project specific criteria above the base criteria.

The RTA provided additional information in the Representations Report. Investigations into the "reasonableness" of providing mitigation measures for specific reference locations were completed. Where baseline goals were predicted to be exceeded investigations into the provision of architectural treatments and noise barriers were undertaken.

There is conflicting information in the EIS and Representations Report about which receivers would receive amelioration. Similarly there is a lack of clear definition of which measures would be implemented. The Department considers that the broad potential for noise impact is defined in the EIS

and Representations Report and the probable scale and nature of mitigation measures discussed. The Department appreciates that the noise impacts and noise mitigation measures will be dependent upon detailed design. It is this difficulty that leads to the lack of definitive commitment at the concept design stage available for the EIS and Representations Report.

To allow definition of noise impacts and identification of actual noise mitigation measures the Department recommends in Condition of Approval No 52 the preparation of an Operation Noise Management Report. That report would:

- ◆ predict noise at sensitive receivers based on the final design
- ◆ consider the noise mitigation measures that could be used and undertake an analysis to determine which are reasonable and feasible, and
- ◆ identify which measures would be implemented and consider these in the Urban Design and Landscaping details for the proposal.

The Operation Noise Management Report would require the approval of the Director General before construction commences. Recommended Conditions of Approval 50, 51 and 53 cover other aspects of operational noise. These include a requirement to monitor actual noise on the completed Highway and evaluate the effectiveness of implemented noise mitigation measures.

Construction Noise

Construction noise is a common issue for major road projects. The DEC advised that a licence would not be required for the proposal's construction. To manage construction noise and vibration during construction the Department recommends Conditions of Approval Nos 36 to 49. These cover issues such as:

- ◆ preparation of a construction noise and vibration management subplan
- ◆ construction hours
- ◆ vibration, and
- ◆ blasting.

These conditions are similar to those effectively used and implemented on other major road projects.

Absence of a Sleep Disturbance Assessment

As part of the Representations Report the RTA assessed the potential for sleep disturbance. That assessment identified that the potential for sleep disturbance would be greatest in residential areas exposed to noise from trucks:

- ◆ accessing and departing roads leading to the Moorland truck stop, and
- ◆ trucks using the proposed rest area (north of Hannam Vale Road).

In these areas seven residential properties could be affected by truck noise resulting in potential sleep disturbance. Five of these properties are located on the southern access road to Moorland, one on the northern access road and one to the west of the Highway truck rest area. The assessment concludes that sleep disturbance impacts would not be significant and could be minimised by a design that reduced the need for trucks to accelerate or brake.

The assessment also identified that at the bridge design stage consideration would be given for the selection of mechanical joints to minimise tyre slap noise.

The DEC indicated in correspondence to the RTA support for the Representation Report findings. The Department also considers that sleep disturbance from road traffic noise can be managed. Recommended Conditions of Approval Nos 50 to 53 are relevant to managing Highway traffic noise.

Noise impacts from a Proposed Batching Plant

One resident was concerned about the noise impacts from a batching plant possibly located in an RTA depot site. The RTA indicated in the Representations Report that it would be preferable to use another site, a privately owned quarry behind the RTA depot, which is further from the residence and which provides greater noise screening. The RTA has indicated that use of this site would be the construction Contractor's choice following negotiations between the contractor and the owner of the quarry.

The Department recommends Condition of Approval No 71 requiring that the RTA meet specified criteria about the location of construction facilities such as batching plants. These criteria include measures to minimise potential noise impacts.

Liaison with Potentially Noise Affected Residents by Construction

The DEC advised that the proposal's construction would not require a licence but advised that a Noise and Vibration Management Plan be prepared to address construction noise. The Plan should contain procedures for liaising with potentially noise impacted residents and gaining approval from these residents to work outside the "normal" hours. Procedures should also be included for advising the DEC of any proposed work outside "normal" hours.

This issue is managed through Recommended Condition of Approval No. 37 which requires that any work outside normal hours can only occur if identified and approved in the construction noise and vibration sub plan. That requires consultation between the RTA the DEC and affected community.

Potential impacts from noise on a violin teaching and restoring business

Concerns that the proposal may adversely affect a violin teaching and restoring business were raised by one resident. The RTA in response identified that noise levels are predicted to increase at the affected house by 1.7 dB(A) $L_{\text{aeq } 15\text{hr}}$, a level not perceptible to the human ear. The predicted increase does not exceed the project baseline or allowance goals for residential properties. The RTA has committed to undertake a compliance audit post commissioning to confirm or amend the noise predictions and determine the required response based on this audit.

5.3 Flora and Fauna

5.3.1 Background

Implementation of the proposal would increase the fragmentation of habitat and barrier effects to some species, as well as result in the loss of approximately 7.5 hectares of forest communities. The proposed extension of four waterway crossings would also result in the loss of riparian and aquatic vegetation, impacts to fish habitat, and create barriers that may affect fish passage.

The flora survey did not locate any threatened flora species or ecological communities of national or state conservation significance in the study area.

The terrestrial fauna survey recorded four threatened fauna species in the study area, the Common Bent-wing Bat, Little Bent-wing Bat, Sooty Owl, and Masked Owl. Assessments of significance under section 5A of the EP&A Act were carried out for these four species. These concluded that the construction and operation of the proposal would not have a significant impact on these species and that a species impact statement (SIS) was not required.

A further five threatened species of bat (Yellow-bellied Sheath-tail-bat, Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Southern Myotis), two threatened species of owls (Barking Owl and Powerful Owl), five threatened species of frogs (*Litoria aurea*; *Litoria brevipalmata*; *Mixophyes balbus*; *Mixophyes iteratus* and *Crinia tinnula*) and two threatened species of reptiles (*Hoplocephalus stephensii* and *Hoplocephalus bitorquatus*) were also assessed under section 5A of the EP&A Act. Those assessments concluded that there was unlikely to be a significant impact on these threatened species and that an SIS was not required.

The aquatic study recorded no threatened fish species and also considered that such species were highly unlikely to occur in the study area. As a precautionary measure, three assessments of significance were conducted for the Eastern Freshwater Cod, Oxleyan Pygmy Perch, and Honey Blue-eye Cod. Each assessment concluded that a significant impact on these species was unlikely and that a SIS was not required. These assessments of significance were not provided in the EIS.

The four main watercourses affected by the proposal were classified to determine the preferred waterway crossings for different fish habitats. Two Mile Creek, Holey Flat Creek and Pipe Clay Creek were classified as Class 2 - Moderate fish habitat (ephemeral to semi-permanent waterways that have clearly defined drainage channels – bridges required and proposed) and Tomcat Creek was classified as Class 3 - Minimal fish habitat (waterway with intermittent flow with none to minimal defined drainage channel – culvert required and proposed).

5.3.2 Issues

The issues raised by DEC, NSW Fisheries, Environment Australia (now Department of Environment and Heritage, DEH), State Forests, several individuals, and the Department in representations made during the EIS exhibition period, related to the need for further assessment, and the effectiveness of proposed mitigation measures. Key concerns were:

- ◆ there was inadequate consideration of threatened species and the endangered ecological community Lowland Rainforest on Floodplain
- ◆ insufficient measures were identified to mitigate further fragmentation of vegetation and barrier effects to fauna species, and
- ◆ a lack of assessment of the intensity of fisheries activities and industries.

The DEH also commented that the RTA may need to refer the proposal to the Commonwealth to clarify whether the provisions of the Commonwealth's legislation were satisfied.

In response, the RTA prepared a supplementary report addressing in particular the flora and fauna concerns of DEC and NSW Fisheries.

The Representations Report detailed a number of modifications made to the Proposal following the public exhibition of the concept design in the EIS. Four of the modifications were relevant to threatened

species and ecological communities known or considered likely to occur in the study area. These include:

- ◆ provision for a fauna walkway at Pipe Clay Creek
- ◆ reduction of footprint of carriageways by narrowing the carriageway separation at Pipe Clay Creek
- ◆ provision of fauna exclusion fencing, and
- ◆ compensatory plantings of *Allocasuarina littoralis*, a tree that provides a food resource for the threatened Glossy Black-cockatoo.

5.3.3 Consideration of Issues

Inadequate consideration of threatened species and ecological communities

DEC had concerns that there was insufficient survey effort for a range of threatened species and that the EIS had not considered threatened species known to occur in the area, particularly the Brush-tailed Phascogale, Koala, Glossy Black-cockatoo and Rose-crowned Fruit-dove. In response, the RTA prepared additional section 5A assessments of significance for seven fauna species and one endangered ecological community (Lowland Rainforest on Floodplain). The assessments of significance concluded that a significant impact on these species was unlikely, provided that additional mitigation measures were adopted.

Following consultation with DEC, additional mitigation measures were proposed by the RTA to minimise impacts on the Glossy Black-cockatoo and the endangered ecological community, Lowland Rainforest on Floodplain. These measures included additional planting of Glossy Black-cockatoo habitat and a reduction in the footprint of the carriageway to significantly reduce impacts to Lowland Rainforest on Floodplain.

The RTA also committed to monitoring road kills over the first 12 months following the project opening and would investigate the need for further mitigation measures following a review of the monitoring program.

The implementation of these mitigation measures is dependent upon detailed design and further investigations. Recommended Conditions of Approval Nos 29 to 32 require that the RTA implement these measures in consultation with the DEC. Recommended Conditions of Approval No 33 covers threatened species not identified or assessed in the EIS or Representations Report.

NSW Fisheries had concerns that the aquatic study of the EIS did not adequately document its methodology and that the section 5A assessments of significance for three threatened fish species were not provided. It was therefore difficult for NSW Fisheries to determine the adequacy of this study and the impacts on threatened fish species. In response the RTA provided details in the Representations Report of the survey techniques used, sample site locations and timing of sampling/field observations and the missing section 5A assessments.

NSW Fisheries reviewed the further information and advised that the outstanding issues were adequately addressed in the Representation Report. NSW Fisheries also recommended conditions that would ensure fish passage and aquatic habitats were minimally impacted.

The Department considers that potential impacts on aquatic species can be managed through the implementation of Recommended Conditions of Approval Nos 29 and 55. These conditions require the

proponent to consult with NSW Fisheries about the preparation of a flora and fauna management subplan and about the design and construction of bridges and culverts.

Insufficient measures to mitigate further fragmentation of vegetation and barrier effects to fauna species

The DEC, DEH and Australian Heritage Commission raised concerns regarding barrier effects to fauna species and fragmentation of vegetation. The RTA attempted to address these concerns through discussions with DEC.

Of particular concern were potential barriers to the movement of Koalas, a potential inhabitant of the study area. To minimise barrier effects, DEH and the Australian Heritage Commission suggested that fauna underpasses be located at Cooperook State Forest and Tomcat Creek where potential wildlife corridors are present. In their Representations Report, the RTA identified that it was not possible to locate a fauna underpass at Cooperook State Forest as the proposed highway would be in a cutting. A farm access underpass is proposed a short distance to the south and would also serve as a fauna underpass provided fauna fencing is installed to funnel fauna through. A fauna underpass at Tomcat Creek was also considered unnecessary as there was no vegetation to the east of the proposed highway in that location.

From discussions with DEC, the RTA has proposed to install a fauna underpass at Pipe Clay Creek and to maintain fauna access under the bridge at Two Mile Creek. The provision of fauna fencing at these locations is also proposed. Recommended Condition of Approval No.31 requires that the RTA obtain the advice of DEC for the design, location and construction of these measures.

To identify the impacts of the proposal on fauna, the RTA has proposed to monitor fauna road kills for 12 months following the opening of the upgraded road. The Department recommends in Condition of Approval Nos 29 and 31 that the RTA develop in consultation with the DEC:

- ◆ general strategies for monitoring impacts on flora and fauna; and
- ◆ specific strategies for monitoring fauna underpasses and fauna exclusion fencing.

Some fragmentation and degradation of habitat would occur as a result of the proposal with particular concern for the endangered ecological community, Lowland Rainforest on Floodplain. This endangered ecological community occurs at Pipe Clay Creek and Holey Flat Creek. The RTA has proposed a number of measures in the Representations Report to minimise impacts to this community, including a reduction in the footprint of the proposal, proposed plantings of this community in the new road corridor, relocation of the power line near Pipe Clay Creek, and the implementation of a Weed Management Strategy.

DEC indicated that provided these measures are implemented, there is unlikely to be a significant impact on the Lowland Rainforest Communities at Pipe Clay and Holey Flat Creeks. The Department is satisfied that the impacts on this endangered ecological community can be managed satisfactorily. Recommended Condition of Approval No 32 requires that the RTA develop specific measures to manage works in the vicinity of the community in consultation with the DEC.

Intensity of fisheries activities and industries not assessed

During consultation for the EIS preparation NSW Fisheries requested that the EIS assess the level of activity of aquaculture, commercial and recreational fishing within the study area, even if non-existent, and provide an assessment of the significance of this activity within the catchment concerned. That

information was not presented in the EIS. The RTA provided this information in the Representations Report indicating that there is no aquaculture in the study area and that the closest aquaculture industry is an estuarine fishery and oyster farming in the lower Manning River estuary more than seven kilometres downstream of the proposal. NSW Fisheries subsequently advised the Department that their concerns were addressed.

5.4 Hydrology and Flooding, Water Quality, Erosion and Sediment Control

5.4.1 Background

The proposal crosses a number of creeks that are part of the Manning River catchment, including Pipe Clay Creek (the major creek), Holey Flat Creek, Tomcat Creek and Two Mile Creek. Numerical computer modelling of the flooding characteristics of the creeks was undertaken to estimate flood levels and probabilities of occurrence. The predicted impacts of the proposal on peak flood levels are less than 100mm for the 1 in 20 year flood event and 200mm for the 1 in 100 year flood for the Pipe Clay/Holey Flat Creek floodplain. For the bypass section of the proposal (involving two crossings of a tributary of Two Mile Creek) these impacts are expected to be less than 100mm for the 1 in 5 year flood rising to approximately 500mm for the 1 in 100 year flood event.

Where a new carriageway would be constructed adjacent to the existing highway, an existing waterway area would be duplicated as a minimum. Additional drainage culverts would be required around Pipe Clay Creek, Holey Flat and Tomcat Creeks to cater for designed flood events. Large drainage culverts are required on the bypass section at Moorland (South) and a duplicate bridge is required at Two Mile Creek, Pipe Clay Creek and Holey Flat Creek. Additional culverts would be required at six locations as part of the proposed highway upgrade (as discussed in Section 2.4).

The EIS also identifies potential impacts to the existing local drainage network and proposes further detailed investigations into the proposed alterations to the local drainage network as part of the detailed design of the proposal.

5.4.2 Issues

Five representations raised concerns about water quality, erosion and sediment control while the Department was concerned about alterations to flooding characteristics. Issues raised included:

- ◆ alterations to flood characteristics
- ◆ potential for stormwater pollutants to affect organic produce
- ◆ concerns over space requirements for sediment basins, and
- ◆ the Acid Sulfate Soil Assessment.

5.4.3 Consideration of Issues

Alterations to Flood Characteristics

The EIS concludes that the proposal would not significantly alter flood characteristics. The Representations Report clarifies specific queries relating to flooding on specific properties and accesses. The Department accepts the flood analysis as presented.

To ensure that predicted alterations to flooding characteristics are confirmed during detailed design the Department recommends Condition of Approval No 54. This provides a definition for not worsening flood characteristics to apply during detailed design.

Potential for Stormwater Pollutants to Affect Organic Produce

Two representations expressed concern that stormwater pollution would adversely impact agricultural production.

The Department considers that the appropriate installation and monitoring of water quality management methods during construction and operation would manage any potential impacts. These requirements are stated in Recommended Conditions of Approval Nos 56 to 60. These conditions require:

- ◆ monitoring for groundwater impacts
- ◆ preparation of a construction soil and water management plan
- ◆ maintenance of operation water quality structures, and
- ◆ provision of detention systems for spills.

Sufficient Space for Sediment Basins

Concerns were raised by the Department and the DEC about the need to design and appropriately size proposed sediment basins as early as possible in the concept design phase. The RTA committed to determining the sizing and location of sediment basins before fixing the road reserve boundaries so that sufficient room is available for adequately sized and designed basins.

Acid Sulfate Soil Assessment

Both the Department and the DEC expressed concerns that the EIS did not include details of the methodology used for the acid sulfate soils (ASS) investigation. It was not possible to determine if the conclusion reached in the investigation (that ASS were not detected) was accurate.

The Department considers that it would be reasonable to require that an ASS management plan be prepared (before construction commences) in any area potentially affected by acid sulfate soils. This requirement is contained in Recommended Condition of Approval No 61.

5.5 Land Use and Community Impacts

5.5.1 Background

The proposal would directly affect land use, both agricultural and non-agricultural along the route alignment through the need to acquire land. More specifically the proposal would require the acquisition of two houses and approximately 31 ha of agricultural land. An additional 7 ha would also be acquired if total acquisition is negotiated for three of the affected properties. In total approximately 38 ha of land across 26 properties would need to be acquired to construct the proposal.

Of this 38 ha the EIS identified 11 ha of productive agricultural land. Four properties could be significantly affected (i.e. land loss and major property management impacts; significant amelioration required). The EIS includes details on the proposed management measures to minimise these impacts including:

- ◆ consultation and negotiation with affected landowners regarding property acquisitions, adjustments and access arrangements
- ◆ integrating feedback on acceptable suggested mitigation measures from the landowners into the road design, and
- ◆ reinstating private drainage.

The EIS also states that the proposal would result in a:

- ◆ reduction in the distance over which local and through traffic would be mixed on the highway
- ◆ safer connection between Moorland (South) and Moorland (North) due to improved intersection conditions with the existing highway, and
- ◆ reduction in the need to close the road between the two towns during flooding due to the proposed raising of the road levels in this area.

5.5.2 Issues

Land use and community issues were summarised as:

- ◆ impacts on farm viability through loss of high quality land
- ◆ compensation measures for forestry, and
- ◆ community fragmentation at Moorland North and Moorland South, limiting best use and future development of the area.

5.5.3 Consideration of Issues

Impact on Farm Viability

Three representations, including that of Greater Taree City Council, raised concern about the severing of several agricultural properties. The representations contend that the affected land is high quality agricultural land and the breakdown into smaller parcels may affect its on-going viable use. Several representations also raised concern about induced effects, such as increased exposure to wind, frost and pollution, adversely affecting the viability of their enterprises.

The Representations Report detailed the areas to be acquired for the proposal and included commitments to ensure that economic loss caused by resumption of land is taken into account in acquisition negotiations. The RTA committed to include in acquisition negotiations:

- ◆ the value of agricultural production
- ◆ the value of any loss of production or carrying capacity, and
- ◆ property adjustments to optimise the viability of the enterprises.

NSW Agriculture had concern about adverse impacts upon Class II agricultural land particularly in the section bypassing Moorland South. This area has free draining red loam soils and a favourable microclimate making it suitable for a diverse range of sustainable agricultural production including horticulture as well as pasture based enterprises. This combination is unique in the Manning Valley and the Hunter Region. Due to this potential level of impact NSW Agriculture advised that Option B (the proposal) appeared to have a more substantial impact on agricultural land than Options E1/E2 (the second ranked options).

In response the RTA advised:

- ◆ Option B would require less Class II/III land compared to Options E1/E2
- ◆ Option B would take slightly more Class II land compared to Options E1/E2, and

The RTA further clarified that Options E1/E2 would affect more Class II land than identified in the EIS. Within the project the only source of fill is through widening the road reserve in the Class II area through which Options E1/E2 passes. Based on this further information NSW Agriculture advised that it accepts Option B but requested that conditions be imposed to ensure that impacts on agricultural operations be minimised. Recommended Condition of Approval No 24 requires that the RTA minimise impacts on Class II agricultural land to ensure the ongoing viability of this type of agricultural land.

Compensation Measures for Forestry

State Forests highlighted that the proposal would affect approximately 8.5ha of Cooperook State Forest (3.1 ha would be transferred to RTA tenure and a further 5.4 ha would become isolated and non-viable for timber production). State Forests suggested a number of compensatory measures for this loss including direct compensation for the value of the land excluding the value of the currently standing timber resource. State Forests also stipulated that they retain all rights to timber products salvaged during construction.

The RTA advised it would either request that State Forests salvage timber ahead of construction or alternatively require the construction contractor to pass all salvageable timber to State Forests. The RTA has also committed to follow the relevant inter-governmental procedures for compensation during the acquisition stage. The Department considers that the commitments made by the RTA minimise the potential economic loss to State Forests.

Community Fragmentation at Moorland North and Moorland South

Greater Taree City Council expressed concern that the proposal would fragment the community by placing the Highway between Moorland North and Moorland South. Council advised that the two sections of Moorland are inextricably linked and the community would have to mix their local journeys with Highway traffic to continue to access services. The Council does not consider the proposal to be an acceptable solution to the existing problem and contends that Route Alignment Options E1/E2 which are at the edge of the existing community are a more acceptable solution.

The Department notes that the EIS and Representations Report identify that Option B:

- ◆ removes Highway traffic from Moorland South and maintains the existing bypass of Moorland North, and
- ◆ provides greater opportunity for businesses in Moorland South to maintain their existing Highway traffic related trade.

The Department notes that Option B was selected based on an overall better performance against economic, social and environmental factors than the other options. The two villages are already separated with connection via the existing Highway. The Department's assessment does not support Council's fragmentation concerns. Safety concerns about the connection between Moorland North and South were discussed earlier.

6. CONSIDERATION OF OTHER ISSUES

This Section of the Report provides the Department's assessment of the Proposal's other environmental impacts. The assessment is based on an examination of the EIS, issues raised in representations made during the exhibition period, the Proponent's Representations Report and, where required, further assessment by the Department.

It is important that this Section be read in conjunction with the Representations Report to understand how all issues raised in representations were addressed.

6.1 Business Impacts

Potential impacts of the proposal on existing businesses (non-agricultural) in Moorland (South) and Moorland (North) was assessed through surveys of both the business operators and their customers. Businesses were selected to take part in the survey because of their potential reliance on passing trade. The survey found that operators of businesses falling into the categories of truckstop/restaurant, café and service station perceived that between 80% and 90% of their transactions came from passing trade. These businesses employed 19 people of the 45 people employed by the 11 businesses which participated in the survey. The customer survey identified that almost two thirds of the customers in Moorland represented regular or repeat trade.

The EIS identified that changes in a business's accessibility from the highway could potentially adversely affect their viability. Access to Moorland (North) would not be affected by the proposal but businesses in Moorland (South) would be. Business operators estimated a loss of 50% in turnover should the bypass proceed. No representations to the EIS were received from businesses in Moorland (South) which may potentially lose trade as a result of the bypass.

The proposed bypass would be approximately 300 m from Moorland (South) and access to businesses would be from intersections between the new bypass and the existing highway. To mitigate business impacts the EIS identified measures such as the installation of standard RTA town entrance signage on the Highway to indicate the range of services available and increase awareness of the two centres. Landscape improvements were also proposed for the entrances to the towns to enhance and advertise the towns.

The Department recommends Condition of Approval No 21 requiring that the development of signage and treatment for the 'gateway' points to the two villages be undertaken in consultation with Greater Taree City Council and the community. Recommended Conditions of Approval No 34 also requires that the signage and village entrances be developed as part of the Highway's urban design and landscape treatment.

6.2 Visual Impact

The EIS contained a visual impact assessment (VIA) which identified the effects of the proposal on the existing visual amenity and identified a range of mitigation measures. The VIA identified that the proposal passes through a landscape that is quite scenic consisting of forest, farmland and floodplain. There are also distant views of South Brother Mountain, Charlies Hill, and Coopernook and Lansdowne State Forests.

The VIA concluded that the landscape would not be particularly sensitive to change in either landscape or visual terms as the proposed road follows the existing highway alignment for much of its length.

The greatest visual change would occur in the bypass section. This passes through cleared pasture and a section of forest and also requires a bridge over the North Coast Railway. Residences within 30-150m of the road corridor would be most affected particularly by partial loss of view and headlight glare. The other visual impacts of the proposal were largely attributed to the cuts and fills located along the route and the vegetation clearing that would be required.

The EIS nominated a series of landscaping strategies and urban design principles to mitigate the visual impacts of the proposal.

The Department concurs with the urban design and landscaping recommendations in the EIS. To minimise the visual impacts of the proposal the Department recommends Conditions of Approval Nos:

- ◆ 34 which requires preparation of an Urban Design and Landscape Report in consultation with Greater Taree City Council and the Community Liaison Group, and
- ◆ 35 requiring that all landscaping works implemented outside the road reserve be monitored and maintained by the Proponent for three years or as otherwise identified in the Urban Design and Landscape Report.

6.3 Air Quality

6.3.1 Background

The EIS noted that the main air quality concerns of the project during construction would be odour and dust generation. Odour could be an issue during bitumen paving but the EIS states that these impacts would be short-term and would not pose any major significant health risks. The EIS notes that dust emissions would be localised and confined to the construction phase of the project. Details of measures to mitigate dust impacts, other than stopping or relocating work during periods of high wind, were deferred to the detailed design stage.

Modelling was undertaken to determine the operational impacts of the proposal on air quality. In the absence of monitoring data specific to the study area, air quality data from the Bulahdelah Pacific Highway upgrade was adopted due to comparable land use and traffic conditions. Results indicated that emissions of carbon monoxide, nitrogen dioxide, hydrocarbons and particulate matter and lead would be all generally within the relevant criteria. The EIS concluded that air quality was likely to improve due to more economic vehicle speeds.

6.3.2 Issues

Four representations raised concerns about potential air quality impacts. Issues raised included the potential for:

- ◆ short-term impacts on air quality from dust and hydrocarbons generated during construction, including dust associated with a proposed concrete batching plant, and
- ◆ long-term impacts of exhaust emissions on agricultural productivity.

6.3.3 Consideration of Issues

Short-term Impacts on Air Quality from Dust and Hydrocarbons Generated during Construction

The Department noted that the potential exists for short-term air quality impacts to occur during construction. In response to this concern and the representation from the DEC that an Air Quality Management Plan must be prepared and implemented for the proposal the RTA has committed to the preparation and implementation of an Air Quality Management Sub Plan as part of the construction EMP. This Sub Plan would detail dust suppression measures and monitoring and is required in Recommended Condition of Approval Nos 64, 65 and 66.

Impacts from dust associated with the proposed Batching Plant could adversely affect a residence. The proposed location for the concrete batching plant was discussed in the noise impact section of this Director General's Report.

Long-term Impacts of Exhaust Emissions on Agricultural Productivity

The proposal would sever two properties whose owners raised concerns in representations that exhaust pollution would adversely affect their agricultural enterprises, particularly as they are both able to market their produce as organic.

The EIS air quality assessment examined this issue and identified that under "worst-case wind and dispersion scenarios" pollutants would not significantly increase in concentration at the two properties after the new Highway opens. The Department is satisfied with the RTA assessment of this issue.

6.4 Indigenous Heritage

The EIS indigenous heritage studies found no Aboriginal artefacts or other material evidence of Aboriginal activity. It concluded that the area had a low potential for archaeologically significant sites except at one location. This Potential Archaeological Deposit (PAD-1) was located on the southern side of Pipeclay Creek in a parcel of Crown Land.

DEC endorsed the recommended management measures for the proposal. Recommended Condition of Approval No 62 requires the preparation of an Indigenous Heritage Management Sub Plan in consultation with the DEC and Local Aboriginal Land Council. The plan includes:

- ◆ investigations for PAD-1, and
- ◆ a requirement to prepare procedures to be implemented should unidentified Aboriginal objects be uncovered during construction.

6.5 Non-Indigenous Heritage

The Heritage Study identified a number of non-indigenous heritage items within the study area. These include the Moorland Union Church, Moorland School, Moorland General Cemetery, two cottages, and numerous orange orchards that date back to early European settlement. Although only one of these items is protected under heritage legislation (the Moorland General Cemetery), one of the cottages was an item of local heritage significance. The proposed Highway alignment would bring the road closer to the cemetery but there would be no impact on its grounds and access to the cemetery would be improved.

The cottage with local heritage significance occurs within the road alignment and would need to be demolished. Both the Australian Heritage Commission (AHC) and the NSW Heritage Office agreed with the EIS recommendation to demolish the cottage (known as Barry Mob's cottage) after an archival recording.

The AHC indicated that natural forest remnants south of the Forest Road intersection were identified as part of the Regional Forest Agreement Process to have indicative natural heritage values for rare remnant vegetation communities and as a refuge. The AHC also recognised that the RTA attempted to select an alignment that minimised impacts to these values through restricting the area to be removed to the eastern periphery of the Cooperook State Forest. The eastern periphery has been progressively logged and supports few mature trees with hollows (potential habitat).

The Department considers that, based on the advice of the AHC and the Heritage Office, the potential impacts on non-indigenous heritage values are adequately managed. Recommended Condition of Approval No 63 specifies the actions that must be taken should historic relics be found during construction.

6.6 Other Issues

6.6.1 Location of Construction Facilities

A number of temporary ancillary facilities would be required as part of the proposal. These may include a concrete batching plant, stockpile sites and amenity and office compounds.

The location of ancillary facilities is a decision for the construction contractor. To ensure sites for these facilities are selected on the basis of a consistent set of criteria as contained in the Department recommended Condition of Approval No 71.

6.6.2 Construction Traffic

The EIS contained little information about the generation of construction traffic. The bulk earthworks were identified to be balanced but significant quantities of materials would be required to be imported for the road pavement.

The Department notes that no representations raised the issue of construction traffic.

To ensure that construction traffic impacts on local roads and the community are minimised the Department recommends the inclusion of Condition of Approval No 26 requiring the preparation of a Construction Traffic Management Sub Plan as part of the CEMP including a requirement to consult with Greater Taree City Council. Additionally, Recommended Condition of Approval No 25 requires that road dilapidation reports be prepared to assess the damage caused by construction traffic on local roads. Where damage has occurred the Proponent is required to repair the damage at its cost.

6.6.3 Spoil and Fill Management

The EIS contained little information about the overall quantities, movement and storage of earthworks and materials required for construction. To manage these activities and ensure they are considered for other issues such as construction noise and dust management the Department recommends preparation of a spoil management plan in Condition of Approval No 67. In addition, recommended

Condition of Approval No 68 requires that all excavated material be re-used or recycled where suitable in preference to importing fill.

6.7 Administrative, Environmental Management and Miscellaneous Conditions

The Department recommends a series of other Conditions of Approval as follows:

- ◆ Conditions of Approval Nos 1 to 10. These cover administrative, compliance and auditing requirements
- ◆ Conditions of Approval Nos 11 to 14. These specify the requirements for an Environmental Management Representative
- ◆ Conditions of Approval Nos 15 to 18. These cover broad communication and consultation with the community including establishing a Community Liaison Group, advertising the construction activities and establishing a complaints management system
- ◆ Conditions of Approval Nos 19 and 20. These require preparation of construction and operation environmental management plans
- ◆ Condition of Approval No 22 which covers the management of property damage
- ◆ Condition of Approval No 28 requires fencing of Highway rest areas to protect adjoining private property
- ◆ Condition of Approval No 69 which requires preparation of waste management and re-use plans, and
- ◆ Condition of Approval No 70 which requires that the RTA manage alterations to utilities and services.

7. CONCLUSIONS AND RECOMMENDATIONS

The State and Commonwealth Governments announced a joint *Pacific Highway Upgrading Program* to upgrade the Pacific Highway to deliver an improved road corridor. The benefit and justification of the overall upgrade lie in accident reduction, transport efficiency improvements and vehicle operating costs savings.

The proposal is part of the overall upgrading program and consists of the construction and operation of approximately 10 kilometres of dual carriageway on the Pacific Highway between Cooperbrook and Moorland. It includes a duplication of the existing highway on its current alignment for 6.7 km and a new dual carriageway bypassing Moorland (South) village west of the existing alignment for 3.5 km. Another important design consideration was to maintain the links between the communities of Moorland (North) and Moorland (South).

Nineteen representations were received in response to the public exhibition of the EIS. These were equally divided between government and, business and individuals. Key issues raised were:

- ◆ flora and fauna
- ◆ access and safety
- ◆ noise and vibration
- ◆ air quality
- ◆ drainage, water quality, erosion and sediment control, and
- ◆ land use and community impacts.

The Department believes that the proposed option is the best alternative of those considered. It provides the least overall impact based on consideration of a range of environmental, economic and social factors. The provision of urban design and landscaping measures and noise mitigation controls would help to minimise adverse impacts on residents.

The Department also recognises that the proposal has the potential to result in substantial benefits to the local community and wider population. At the local level the proposal would result in improved safety and amenity within Moorland South. More broadly the proposal would result in improved traffic efficiency and travel time savings on the Pacific Highway.

The Department has undertaken an assessment of the likely environmental impacts of the proposal. In particular it considered key issues associated with access and safety, noise and vibration, flora and fauna, hydrology and flooding, water quality, erosion and sediment control and land use and community impacts. The Department's review concluded that, provided comprehensive mitigation measures are implemented, the adverse impacts of the proposal could be reduced to an acceptable level.

The Department recommends that the Proponent prepare comprehensive Environmental Management Plans for the construction and operational stages of the proposal. The Plans are to describe how the mitigation measures contained in the EIS, Representations Report and the Recommended Conditions of Approval are to be practically implemented.

The Department's assessment concludes that, provided the Recommended Conditions of Approval are adopted, the proposal could be approved by the Minister.

8. RECOMMENDED CONDITIONS OF APPROVAL

This Section provides the Department's Recommended Conditions of Approval for the Activity under Section 115B(2) of the EP&A Act. These are based on the Department's assessment of the EIS, the representations made to the Department and supplementary information and advice provided.

It is noted that the EIS and Representations Report contain extensive information on procedures and mitigation strategies to be implemented to ameliorate impacts of the proposal. The recommended conditions of approval should therefore be implemented in conjunction with those procedures and mitigation measures specified in the EIS and the Representations Report. Where there is an inconsistency with the recommendations in the EIS or Representations Report, the Recommended Conditions will prevail.

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DEFINITIONS

Activity	The activity described in Schedule 1 of the Approval.
Approved Activity Area	The footprint of the Activity covered by the Conditions of Approval.
Conditions of Approval	The Minister's Conditions of Approval for the Activity
Construction	All work but does not include survey, acquisitions, fencing, test drilling/test excavations, building/road dilapidation surveys, minor clearing (except where endangered ecological communities or threatened flora or fauna species would be affected), establishing site compounds (in locations meeting the criteria of the Conditions of Approval), or other activities certified by the EMR to have minimal environmental impact (e.g. minor access roads, minor adjustments to services/utilities, etc.).
Department, the	Department of Infrastructure, Planning and Natural Resources
Directly Affected Landowner	Property owner identified in either or all the EIS, Representations Report or CEMP to require a mitigation measure to ameliorate an identified impact to their property.
Director-General, the	Director-General of the Department or delegate
Director-General's Agreement	The phrase "agreed to by the Director-General" in these Conditions of Approval means provision of written advice from the Director-General.

Director-General's Approval	<p>A written approval from the Director-General (or delegate).</p> <p>Where the Director-General's approval is required under a Condition of Approval the Director-General will endeavour to provide a response within one month of receiving an approval request. The Director-General may ask for additional information if the approval request is considered incomplete. When further information is requested the time taken for the Proponent to respond in writing will be added to the one month period.</p>
Director-General's Report	The report of the Director-General of the Department
EIS	Environmental Impact Statement (EIS) <i>Pacific Highway Upgrade Coopernook to Moorland</i> prepared for the RTA by Connell Wagner and dated February 2000.
Minister, the	Minister for Infrastructure and Planning
Operation	Means the Operation of the Activity, but does not include commissioning trials of equipment or temporary use of parts of the Activity during Construction.
Proponent	Roads and Traffic Authority
Publicly available	Easily accessed by a member of the general public (for example available on request at a display centre)
Reasonable and feasible	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.
Relevant Councils	Greater Taree City Council
Relevant Government Department.	These are to be identified by the Proponent. They will generally be selected from NSW Agriculture, the DEC, NSW Fisheries, the Heritage Office, the DIPNR and the NPWS.
Representations Report	<i>Representations Report Coopernook to Moorland Upgrade</i> prepared by RTA Environmental Technology for the RTA and dated January 2001

River	Has the meaning given under the <i>Water Management Act 2002</i> . In summary this is “any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved”.
Sensitive Receiver	Residence, school, health care facility (e.g. nursing home, hospital) and religious facility (e.g. church)
Structure	Any fixed, artificial object including residences, farm sheds, fences, dams, cable support structures, etc.

The following acronyms and abbreviations are used in this section:

ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Average Recurrence Interval
ASS	Acid Sulfate Soils
CEMP	Construction Environmental Management Plan
CLG	Community Liaison Group
dB(A)	Decibel, “A” weighted scale
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EP& A Act	Environmental Planning and Assessment Act 1979
GTCC	Greater Taree City Council
LALC	Local Aboriginal Land Council
LA90	The noise level exceeded for 90% of a monitoring period, also referred to as the background noise level
L _{Aeq} 9hour	Equivalent continuous (constant) sound level over a 9 hour period from 10pm to 7am
L _{Aeq} (15 hour)	Equivalent continuous (constant) sound level over a 15 hour period from 7am to 10pm
L _{Aeq} (15 mins)	Equivalent sound pressure level over a 15 minute interval
LA1(1 minute)	Sound pressure level exceeded for 1 per cent of the time measured over a 1 minute interval
LA10 (15 mins)	Sound pressure level exceeded for 10 per cent of the time over a 15 minute period
NPWS	National Parks and Wildlife Service
NVMP	Construction Noise and Vibration Management Sub Plan
OEMP	Operation Environmental Management Plan
PAD	Potential Archaeological Deposit
RTA	Roads and Traffic Authority

ADMINISTRATIVE

General

1. The Activity must be carried out consistent with the:
 - (a) procedures, safeguards and mitigation measures identified in the EIS as modified by the Representations Report;
 - (b) these Conditions.

These Conditions prevail in the event of any inconsistency with the requirements for the Construction and Operation of the Activity arising out of the documents described in (a) above.

These conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. The Proponent must comply with the terms and conditions of such approvals and licences.

2. The Proponent may elect to construct the Activity in separate construction contracts provided these are consistent with the approved Activity. Where separate construction contracts are proposed, the Proponent must submit a Staging Report to the Director-General at least four weeks before Construction commences (or within any other time agreed to by the Director-General). The Staging Report must:
 - (a) describe the construction contracts; and
 - (b) identify how the Conditions of Approval will be addressed in each construction contract.

Compliance

General

3. The Proponent must notify in writing the Director-General, relevant government departments and GTCC of the Activity's Construction commencement and also the Activity's Operation. Notification of these activities must be provided at least four weeks before the relevant commencement date unless otherwise agreed to by the Director-General.
4. It is the responsibility of the Proponent to ensure compliance with all Conditions of Approval and to implement any measures arising from the Conditions of Approval.
5. The Proponent must comply with any requirements of the Director-General arising from the Department's assessment of:
 - (a) any reports, plans or correspondence that are submitted to satisfy these Conditions of Approval; and
 - (b) the implementation of any actions or measures contained in these reports, plans or correspondence.

Pre-Construction Compliance Report

6. The Proponent must submit a *Pre-Construction Compliance Report* to the Director-General at least four weeks (or within any other time agreed to by the Director-General) before Construction commences.

The *Pre-Construction Compliance Report* must include:

- (a) details of how the conditions required to be addressed before Construction were complied with;
- (b) the time when each condition was complied with. This may include dates of submissions of any required reports and/or approval dates;
- (c) details of any approvals or licences issued by relevant government departments.

Pre-Operation Compliance Report

7. The Proponent must submit a *Pre-Operation Compliance Report* to the Director-General at least four weeks (or within any other time agreed to by the Director-General) before Operation commences.

The *Pre-Operation Compliance Report* must include:

- (a) details of how the conditions required to be addressed before Operation were complied with;
- (b) the time when each condition was complied with. This may include dates of submissions of any required reports and/or approval dates;
- (c) details of any approvals or licences issued by relevant government departments.

Construction Compliance Reports

8. The Proponent must provide the Director-General, Relevant Councils and any other government department nominated by the Director-General with Construction Compliance Reports. The EMR must review the Construction Compliance Reports before they are submitted to the Director-General and bring to the Director-General's attention any errors.

The first Construction Compliance Report must be submitted a maximum six months after Construction commences and subsequent reports at intervals of a maximum six months (or at any other time interval agreed to by the Director-General) for the duration of Construction.

The Construction Compliance Reports must include information on:

- (a) compliance with the CEMP and the Conditions of Approval;
- (b) compliance with any approvals or licences issued by Relevant Government Departments for the Construction phase of the Activity;
- (c) the implementation and effectiveness of environmental controls. The assessment of effectiveness should be based on a comparison of actual impacts against identified performance criteria;
- (d) environmental monitoring results, presented as a results summary and analysis;
- (e) the number and details of any complaints, including a summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature;

- (f) details of any review and amendments to the CEMP resulting from Construction during the six months; and
- (g) any other matter relating to compliance with the Conditions of Approval or as requested by the Director-General.

The Construction Compliance Reports must also be made Publicly Available.

Environmental Impact Audits

Environmental Impact Audit Report - Construction

9. An *Environmental Impact Audit Report - Construction* must be prepared and submitted to the Director-General a maximum three months after commissioning the Activity. The Report must also be submitted to any other relevant government department upon the request of the Director-General. The Report must:
 - (a) identify the major environmental controls used during Construction and assess their effectiveness;
 - (b) summarise the main management plans and processes implemented during Construction and assess the effectiveness of the outcomes;
 - (c) identify any innovations in construction methodology used to improve environmental management; and
 - (d) discuss the lessons learnt during Construction, including recommendations for future projects.

Environmental Impact Audit Report - Operation

10. An *Environmental Impact Audit Report - Operation* must be submitted to the Director-General a maximum 24 months after commissioning the Activity and at any additional periods that the Director-General may require. The Report must also be submitted to relevant government departments upon the request of the Director-General.

The Report must:

- (a) be certified by an independent person at the Proponent's expense. The certifier must be advised to the Director-General before the Environmental Impact Audit Report – Operation is prepared;
- (b) compare the Operation impact predictions made in the EIS, Representations Report and any supplementary studies with the actual impacts;
- (c) assess the suitability of implemented mitigation measures and safeguards;
- (d) assess compliance with the systems for Operation maintenance and monitoring;
- (e) discuss the results of consultation with the local community particularly any feedback or complaints; and
- (f) be made Publicly Available.

The Proponent must comply with all requirements of the Director-General concerning any measure arising from, or recommendations in, the Report.

Environmental Management Representative

11. The Proponent must request the Director-General's approval for the appointment of an Environmental Management Representative (EMR) at least three months before Construction commences (or within any other time agreed to by the Director-General). In its request the Proponent must provide the following information, the:
 - (a) qualifications and experience of the EMR including demonstration of general compliance with AS/NZS ISO 14012:1996 *Guidelines for Environmental Auditing : Qualification Criteria for Environmental Auditors* (or update);
 - (b) role and responsibility of the EMR;
 - (c) authority and independence (from the Proponent or its contractors) of the EMR including details of the Proponent's internal reporting structure; and
 - (d) resourcing of the EMR role. The EMR must be available:
 - i for sufficient time to undertake the EMR role. This timing shall be agreed between the Proponent and the EMR and advised to the Department in the request for approval;
 - ii at any other time requested by the Department; and
 - iii during any Construction activities identified in the CEMP to require the EMR's attendance.
12. The Director-General may at anytime immediately revoke the approval of an EMR appointment by providing written notice to the Proponent. Interim arrangements for EMR responsibility following the cancellation notice must be agreed in writing between the Department and the Proponent.
13. The Department may at anytime conduct an audit of any actions undertaken by the EMR and any approvals issued by the EMR. The Proponent:
 - (a) must facilitate and assist the Department in any such audit; and
 - (b) ensure that this requirement is included as a condition in the appointment of the EMR.
14. The EMR is authorised to:
 - (a) consider and advise the Department and the Proponent on matters specified in these Conditions of Approval and compliance with such;
 - (b) certify that work does not fall within the definition of Construction where clarification is requested by the Proponent;
 - (c) certify the CEMP;
 - (d) certify the OEMP;
 - (e) review the Proponent's induction and training program for all Construction personnel and monitor its implementation;
 - (f) periodically monitor the Proponent's activities to evaluate the compliance of Construction activities with the CEMP. Periodic monitoring must involve site inspections of active work sites at least fortnightly;
 - (g) provide a written report to the Proponent of non-conformances with the CEMP. Non conformances must be managed as identified in the CEMP;
 - (h) direct the Proponent to stop work immediately if, in the view of the EMR, an unacceptable impact on the environment is occurring or is likely to occur. The stop work direction may

be limited to specific activities causing an impact if the EMR can easily identify those activities. The EMR may also require that the Proponent initiate reasonable actions to avoid or minimise adverse impacts;

- (i) review corrective and preventative actions to ensure the implementation of recommendations made from audits and site inspections; and
- (j) certify that minor revisions to the CEMP are consistent with the approved CEMP; and
- (k) provide regular (as agreed with the Department) reports to the Department on matters relevant to the carrying out the EMR role including notifying the Director-General of any stop work notices.

The EMR must immediately advise the Proponent and the Director-General of any incidents relevant to these Conditions resulting from Construction that were not dealt with expediently or adequately by the Proponent.

COMMUNICATION AND CONSULTATION

Advertisement of Activities

15. Before Construction commences, and then at maximum three monthly intervals, the Proponent must advertise in relevant newspapers the: nature of the works proposed for the next three months; areas in which these works are proposed; Construction hours; and a contact telephone number.

The Proponent must ensure that the local community and businesses are advised (by means such as newsletters, leaflets, newspaper advertisements, community notice boards, etc.) of the Activity's progress. Information to be provided must include:

- (a) details of any traffic disruptions and controls;
 - (b) construction of temporary detours; and
 - (c) work approved to be undertaken outside the normal Construction hours, in particular noisy works, before such works are undertaken.
16. The Proponent must establish an Activity internet site before Construction commences and maintain the internet site a maximum 12 months after the Activity commences Operation. This internet site must contain:
- (a) periodic updates of work progress, consultation activities and a planned work schedules. The site must indicate the date of the last update and the frequency of the internet site updates;
 - (b) a description of relevant approval authorities and their areas of responsibility;
 - (c) a list of reports and plans that are publicly available under this Approval and the executive summaries of those reports;
 - (d) contact names and phone numbers of the Activity communications staff; and
 - (e) the 24 hour toll-free complaints contact telephone number.

Updates of work progress, construction activities and planned work schedules must be provided where significant changes in noise or traffic impacts are expected.

Community Liaison Group

17. A Community Liaison Group (CLG) must be formed and hold its first meeting before Construction commences. The CLG must be formed and operate in a manner consistent with the Guidelines provided in Attachment 1. It should include the EMR, representatives from the Proponent and its contractor, relevant community and business groups, community representatives and GTCC. The Director-General must be advised of the CLG membership following its formation.

Issues for discussion may include, but not be limited to detailed design, the construction environmental management plan and associated sub plans, Construction activities and any other issue considered relevant by the CLG.

The CLG may make comments and recommendations about the design and implementation of the Activity, which must be considered by the Proponent. The Proponent must report back to the CLG on its considerations. In the event of any dispute between the CLG and the Proponent, the Proponent's decision shall be considered final provided it is consistent with these Conditions of Approval.

Complaints Management System

18. The Proponent must implement a Complaints Management System before Construction commences. The System must include:
- (a) the name and contact details of the person(s) responsible for implementing and maintaining the Complaints Management System;
 - (b) adequate resources including people, communication facilities, transport etc.;
 - (c) a 24 hour, toll free telephone number listed with a telephone company and advertised. This telephone number must enable any member of the public to reach a person who can arrange a response to their complaint;
 - (d) a system to receive, log, track and respond to complaints within the specified timeframe. When a complaint cannot be responded to immediately, a follow-up verbal response on what action is proposed must be provided to the complainant within two hours during night-time works and 24 hours at other times;
 - (e) a process for the provision of a written response to the complainant within 10 days, if the complaint cannot be resolved by the initial or follow-up verbal response;
 - (f) a mediation system for complaints that are unable to be resolved. Where external or independent mediation is required, the mediator must be approved by the Director-General.

Information on all complaints received, including the means by which they were addressed and whether resolution was reached with or without mediation, must be included in the six-monthly *Construction Compliance Report* and must be made available to the Director-General on request.

ENVIRONMENTAL MANAGEMENT

Construction Environmental Management Plan

19. A Construction Environmental Management Plan (CEMP) must be prepared and implemented in accordance with the Conditions of Approval, all relevant Acts and Regulations and accepted best practice management procedures. The Proponent must obtain the Director-General's Approval

for the CEMP before Construction commences or within any other time agreed to by the Director-General. The CEMP must be certified by the EMR to comply with the Conditions of Approval before the Proponent seeks the Director-General's approval for the CEMP.

The CEMP must:

- (a) identify the Construction activities associated with all Construction sites, including staging and timing of the proposed works;
- (b) cover any relevant environmental elements identified by the Proponent, or its contractor, from their environmental due diligence investigations;
- (c) contain the Construction Sub Plans required by the Conditions of Approval;
- (d) be prepared following consultation with relevant government departments and GTCC;
- (e) be publicly available;
- (f) include a community consultation and notification strategy (including local community, Relevant Government Departments, GTCC), and complaint handling procedures;
- (g) include environmental management details such as:
 - i identification of statutory obligations which the Proponent is required to fulfil during Construction, including all approvals and licences;
 - ii an environmental management structure indicating the responsibility, authority and accountability for personnel relevant to the CEMP;
 - iii the role of the EMR;
 - iv details of the Construction personnel induction and training program;
 - v emergency response procedures;
- (h) include implementation details such as:
 - i identification of relevant environmental elements;
 - ii measures to avoid and/or control environmental impacts;
 - iii the tools to be used to implement the CEMP such as plans, schedules and work instructions;
- (i) include monitoring and review details such as:
 - i performance monitoring methods for all environmental elements;
 - ii auditing and corrective actions procedures;
 - iii CEMP review procedures.

The Proponent must ensure that the mitigation measures identified in the EIS, Representations Report and in these Conditions are incorporated into the CEMP.

Operation Environmental Management Plan

20. The Proponent must ensure that systems for Operation maintenance and monitoring are in place before opening the Activity to traffic. Those systems must be subject to consultation with relevant government departments and GTCC. The systems must be consistent with the Conditions of this Approval, all relevant Sub Plans, all relevant Acts and Regulations and accepted best practice management. The Proponent must obtain the approval of the Director-General for the systems before Operation commences or within any other time agreed to by the Director-General. The systems must be certified by the EMR to comply with the Conditions of Approval before the Proponent seeks the Director-General's approval.

The systems must address at least the following:

- (a) identification of the statutory and other obligations which the Proponent is required to fulfil, including all licences/approvals and consultations/agreements required from authorities

- and other stakeholders, and key legislation and policies which control the Proponent's Operation of the Activity;
- (b) identification of parameters to be monitored during Operation of the Activity which have the potential for cumulative effects to occur;
 - (c) monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental performance of the Activity during its Operation, including description of potential site impacts, performance criteria, specific tests and monitoring requirements, protocols (eg. frequency and location) and procedures to follow;
 - (d) steps the Proponent intends to take to ensure compliance with all plans and procedures. For example, in the event of a spill, how the Proponent shall ensure that all material spilled is removed as soon as practicable and within at least 24 hours;
 - (e) consultation requirements, including relevant government agencies, the local community and Councils, and complaints handling procedures; and
 - (f) strategies for managing the main environmental impacts including, but not limited to: noise; water quality; erosion and sedimentation; access and traffic; waste/resource management/removal/disposal; hydrology and flooding; visual screening; landscaping and rehabilitation; hazards and risks; and energy use, resource use and recycling.

Specific requirements for some of the main environmental system elements referred to in (f) must be as detailed under the Conditions of this approval and/or as required under any licence or approval. The arrangements must be publicly available.

SOCIAL AND ECONOMIC ISSUES

Economic Impacts

21. Before Construction commences, the proponent must initiate consultations with the CLG and GTCC to develop appropriate signage and treatment for Pacific Highway traffic on three "gateway" points: the junctions of the old and new highway to the north and south of Moorland South; and at the intersection of Hannam Vale Road with the highway. The signage policy must be developed to minimise the economic impact of the bypass by indicating the range of services available in Moorland South and Moorland North, taking into account the RTA's standard signposting policy.

Property and Land Use

22. Subject to landowner agreement, building condition surveys must be conducted on all structures within:
 - (a) 300 metres of blasting;
 - (b) 50 metres of Construction activities that generate vibration impacts; or
 - (c) any other criteria nominated by the EMR.

Building condition surveys must be undertaken at least four weeks before Construction occurs within the distance limits described in this condition.

The owners of all properties on which building condition surveys are to be undertaken must be advised at least 14 days before the surveys commence of the survey scope and methodology and the process for making a property damage claim. A copy of the survey must be given to each affected owner at least three weeks before Construction commences in the section of road

affecting the property. A register of all properties meeting the criteria must be maintained by the Proponent indicating whether the owner accepted or refused the survey offer. A copy of the register must be provided to the Director-General upon request.

23. The Proponent must ensure that accesses to properties are maintained throughout Construction. The Proponent must ensure that any legal property access affected by the Activity is reinstated to an equivalent standard or that alternate arrangements are negotiated with the relevant landowner(s).
24. The Proponent must consult on a regular basis with any directly affected landowners regarding any practical and cost-effective measures to minimise impacts. Agreed measures must be implemented according to a program agreed between the landowner and the Proponent. The Proponent must minimise impacts on Class II agricultural land to ensure the ongoing viability of this type of agricultural land taking into account the Activity.

Traffic and Access

25. Road dilapidation reports must be prepared for all roads (except the Pacific Highway) likely to be used by Construction traffic before Construction commences and after Construction is complete. Copies of the reports must be provided to GTCC. Any damage resulting from the Construction of the Activity, aside from that resulting from normal wear and tear, must be repaired at the cost of the Proponent.

All sections of reclassified road for which GTCC become responsible must be brought to standards negotiated between the Proponent and GTCC. The Proponent must negotiate with GTCC regarding contributions to costs for maintenance.

Note:

Nothing in this Condition shall be taken as restricting the Proponent from negotiating an alternative arrangement for damage to local roads with GTCC.

26. The Proponent must prepare a Construction Traffic Management Sub Plan as part of the CEMP in consultation with GTCC. The Sub Plan must include:
 - (a) identification of all public roads to be used by Construction traffic, in particular roads used to transport earthworks and pavement materials;
 - (b) the timing and duration of the use of these roads;
 - (c) impacts on existing traffic (including pedestrians, vehicles, cyclists and disabled persons) including the staging of Construction works to minimise lane closures during peak periods and traffic delays;
 - (d) access to Construction sites;
 - (e) truck ingress and egress routes, entry and exit locations and the nature of loads;
 - (f) temporary and interim traffic arrangements including intersection and property access;
 - (g) strategies to minimise Construction heavy vehicles travelling and/or queuing on local roads;
 - (h) a response plan for any Construction traffic incident; and
 - (i) monitoring, review and amendment mechanisms.

27. The Proponent must consult with all relevant landowners whose property will be severed by the Activity to determine suitable locations and sizes for the underpasses to allow for access. The underpasses must be self-draining (especially during prolonged wet periods), be designed and constructed to avoid erosion and cater for the use required by the landowner.
28. The Proponent must ensure that the rest areas are fenced so that road users cannot readily access adjacent private property.

FLORA AND FAUNA

29. As part of the CEMP, the Proponent must prepare a Flora and Fauna Management Sub Plan in consultation with relevant government departments and GTCC. The Sub Plan must include:
 - (a) methods to manage impacts on flora and fauna (terrestrial and aquatic) and their habitat which may be directly or indirectly affected by the Activity;
 - (b) performance goals against which to measure the success of the methods;
 - (c) ecological details including:
 - i plans showing: vegetation communities highlighting important fauna habitat areas and threatened species locations; areas to be cleared; and a clearing program. The plans must cover the Approved Activity Area and extend to vegetation in adjoining areas where this is both contiguous with the Construction footprint and contains important fauna habitat areas and/or threatened species;
 - ii procedures for vegetation clearing and soil management during Construction;
 - iii strategies for minimising vegetation clearance within the Approved Activity Area and protection of vegetated areas outside that area;
 - iv a habitat tree management program including fauna recovery procedures, potential for relocation of hollow bearing trees, compensatory management measures (such as replacement of lost hollows with nesting boxes);
 - v where possible, strategies for re-using individuals or populations of any threatened plant species directly affected by the Activity in rehabilitation works;
 - (d) rehabilitation details including:
 - i identification of the locally native species to be used in rehabilitation and landscaping works, including flora species suitable as a food resource for threatened fauna species;
 - ii the source of all seed or tubestock to be used in rehabilitation and landscaping works including the identification of seed sources within the Approved Activity Area. Seed of locally native species within the Approved Activity Area should be collected before Construction commences to provide seed stock for revegetation;
 - iii methods to re-use topsoil and cleared vegetation;
 - iv methods to ensure topsoils, and where relevant subsoils, are stripped, stored and placed back in their original sequence;
 - v measures to re-use surplus vegetation such as donation to community groups or distribution to the local community;
 - vi a program for the active management and maintenance of all preserved, planted and rehabilitated vegetation (including aquatic vegetation) including watering regimes, fencing, replacement of vegetation that may have died and weed management;
 - (e) a Weed Management Strategy including:
 - i weed identification;
 - ii weed eradication methods and protocols for the use of herbicides;
 - iii methods to treat and re-use weed infested topsoil;

- (f) a program for reporting on the effectiveness of terrestrial and aquatic flora and fauna management measures against performance goals. Management methods must be reviewed where found to be ineffective.
30. The source of seeds or planting material and the location and number of plantings of *Allocasuarina littoralis* must be determined in consultation with the DEC before construction commences.
31. The design of a fauna walkway along Pipe Clay Creek and the location of fauna exclusion fencing on the Activity must be determined in consultation with DEC. The effectiveness of the fauna walkway and fauna exclusion fencing must be monitored for a maximum 12 months after Operation commences in consultation with the DEC.
32. The following must be undertaken in consultation with the DEC to minimise effects on the endangered ecological community 'Lowland Rainforest on Floodplain':
- (a) consultation with an ecologist acceptable to DEC on construction and rehabilitation management measures in the vicinity of the community;
 - (b) sourcing and planting locally native rainforest species for landscaping works adjacent and within the road reserve between Pipe Clay Creek and the Rest Area, linking to Holey Flat Creek; and
 - (c) relocation of the power line near Pipe Clay Creek to minimise impacts to the community.
33. If during the course of Construction, the Proponent becomes aware of the presence of threatened species not identified and assessed in the EIS or Representations Report and which are likely to be affected, the Proponent must:
- (a) immediately cease all work likely to affect the threatened species;
 - (b) inform the Director-General of the DEC and/or Director of NSW Fisheries as relevant; and
 - (c) not recommence work likely to affect the threatened species until receiving advice from the DEC and/or NSW Fisheries to do so.

URBAN DESIGN AND LANDSCAPING

Urban Design and Landscape Report

34. The Proponent must prepare an *Urban Design and Landscape Report* before Construction commences and in consultation with GTCC and the CLG. The Report must present an integrated urban design concept for the Activity, applying all design principles established in the EIS, Representations Report and Conditions of Approval. The Proponent must obtain the approval of the Director-General for the Report before Construction commences or within any other time agreed to by the Director-General. The Report must include the design treatments for the:
- (a) three "gateways" located within the Activity;
 - (b) location and identification of existing and proposed vegetation;
 - (c) built elements including retaining walls, bridges and noise walls;
 - (d) pedestrian and cycle elements including footpaths and paving, pedestrian crossings and fixtures (e.g. tree guards, seating, lighting, fencing and signage);

The Report must also include the following information:

- (e) graphics for key elements such as sections, sketches, perspective views etc.;
- (f) a schedule of species to be used in landscaping. The derivation of the schedule must be explained including its relationship with the Activity's ecological studies;
- (g) details of the timing and progressive implementation of landscape works considering related environmental controls such as erosion and sedimentation controls and drainage; and
- (h) procedures and methods to monitor and maintain landscaped or rehabilitated areas both inside and outside the road reserve.

Maintenance

35. All landscape or rehabilitation works outside the road reserve must be monitored and maintained at the Proponent's expense for a period of three years following completion of any landscaping stage or as otherwise identified in the Urban Design and Landscape Report. The Proponent must implement any required remedial measures to maintain landscaping works to their design standard.

NOISE AND VIBRATION

Construction Noise and Vibration Management Sub Plan

36. The Proponent must prepare a detailed Construction Noise and Vibration Management Sub Plan as part of the CEMP. The Sub Plan must be prepared in consultation with the DEC, GTCC and the CLG and include:
- (a) identification of each work area, site compound and Construction depot;
 - (b) identification of the specific activities that will be carried out and associated noise sources for each work area, site compound and Construction depot;
 - (c) identification of all potentially affected sensitive receivers;
 - (d) the Construction noise objective specified in the Conditions of Approval;
 - (e) the Construction vibration criteria specified in the Conditions of Approval;
 - (f) determination of appropriate noise and vibration objectives for each identified sensitive receiver;
 - (g) noise and vibration monitoring, reporting and response procedures;
 - (h) assessment of potential noise and vibration from the proposed Construction methods including noise from Construction vehicles and any traffic diversions;
 - (i) analysis of feasible noise mitigation measures such as;
 - i maximising the offset distance between noisy plant items and sensitive receivers;
 - ii Construction timetabling, in particular for works outside standard hours, to minimise noise impacts. This may include time and duration restrictions and respite periods;
 - iii avoiding using noisy plant simultaneously and/or close together, adjacent to sensitive receivers;
 - iv orienting equipment away from sensitive receivers;
 - v carrying out loading and unloading away from sensitive receivers;
 - vi use of dampened tips on rock breakers;
 - vii use of portable enclosures around mobile and fixed plant where noise impacts are likely to be unacceptable;
 - viii using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators

- and trucks. Examples of appropriate noise source controls are provided in Section 5 of the RTA *Environmental Noise Management Manual*;
- ix selection of plant and equipment based on noise emission levels;
 - x use of alternative construction methods;
 - xi alternative arrangements with affected residents such as temporary relocation;
 - xii selecting site access points and roads as far as possible away from sensitive receivers; and
 - xiii use of spotters, Closed Circuit Television Monitors and 'smart' reversing alarms in place of traditional reversing alarms.
- (j) description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during Construction;
 - (k) justification for any activities outside the Construction hours specified in the Conditions of Approval. This includes identifying areas where Construction noise would not be audible at any sensitive receiver;
 - (l) a description of the approval process to be followed where Construction is required outside the Construction hours specified in the Conditions of Approval for traffic management reasons;
 - (m) procedures for notifying residents of Construction activities that are likely to affect their noise and vibration amenity;
 - (n) contingency plans to be implemented in the event of non-compliances and/or noise complaints; and
 - (o) education of Construction personnel about noise minimisation.

Construction Hours

37. Construction activity must be restricted to between the hours of 7:00 am to 6:00 pm (Monday to Friday), 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays.

Works may be undertaken outside these hours where:

- (a) the delivery of materials is required outside these hours by the Police or other authorities for safety reasons;
- (b) it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
- (c) the work is approved through the Construction Noise and Vibration Management Sub Plan.

Local residents must be informed of the timing and duration of work approved under item (c) at least 48 hours prior to commencement of that work.

Construction Noise Objective

38. The Construction noise objective for the Activity is to manage noise from Construction activities (as measured by a $L_{A10(15\text{minute})}$ descriptor) to not exceed the background L_{A90} noise level by more than 5dB(A) at any residence or other sensitive receiver. Background noise levels are those identified in the EIS or Representations Report or otherwise identified in the Construction Noise and Vibration Management Sub Plan. The Proponent must implement all feasible noise mitigation and management measures with the aim of achieving the Construction noise objective.

Any potential activities that may cause noise emissions that exceed the objective must be identified and managed in accordance with the Construction Noise and Vibration Management Sub Plan.

If the noise from a Construction activity is substantially tonal or impulsive in nature (as described in Chapter 4 of the NSW Industrial Noise Policy), 5dB(A) must be added to the measured Construction noise level when comparing the measured noise with the Construction noise objective.

Construction Noise Management

39. The Proponent must ensure that public address systems are not used on any Construction site outside the Construction hours detailed in the Conditions of Approval unless otherwise specified and approved in the Construction Noise and Vibration Management Sub Plan. Any public address system must be designed to minimise noise spillage off-site.
40. The Proponent must schedule rock breaking, rock hammering, sheet piling, pile driving and any similar activity only between the following hours unless otherwise approved in the Construction Noise and Vibration Management Sub Plan:
 - (a) 9 am to 12 pm and 2 pm to 5 pm Monday to Friday; and
 - (b) 9 am to 12 pm, Saturday
41. The Proponent must ensure that wherever practical, and where sensitive receivers may be affected, piling activities are completed using bored piles. If driven piles are required their use must be approved in the Construction Noise and Vibration Management Sub Plan.
42. The Proponent must consult with GTCC and directly affected landowners and, where reasonable and feasible, erect Operation noise mitigation measures at the start of Construction (or at other times during Construction) to minimise Construction noise impacts.
43. The Proponent must consult with education institutions and minimise the impact of noise generating Construction works in their vicinity. The Proponent must ensure that Construction works audible at an institution are not timetabled during important events, such as examination periods, unless arrangements acceptable to the affected institutions are made at no cost to the affected institutions.
44. The Proponent must consider the selection of mechanical joints in the design of the bridges to minimise noise impacts associated with those joints.

Vibration and Blasting

Vibration

45. Vibration caused by Construction and received at any residence or structure outside the Approved Activity Area must:
 - (a) for structural damage vibration be limited to German Standard DIN 4150 Part 3 *Structural Vibration in Buildings. Effects on Structures*; and
 - (b) for human exposure to vibration be limited to the evaluation criteria presented in British Standard BS 6841- *Guide to Evaluate Human Exposure to Vibration in Buildings* (1Hz to 80 Hz) for low probability of adverse comment.

These limits apply unless otherwise approved in the Construction Noise and Vibration Management Sub Plan.

Blasting

46. Blasting must only be undertaken between the hours of 9:00 am and 3:00 pm, Monday to Friday, and 9:00 am to 12:00 pm on Saturday.
47. The vibration level due to blasting activities must meet the requirements of any relevant DEC Licence. In general, the Guideline entitled *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC) shall be applicable.
48. The Proponent must undertake blasting trials if blasting is to be used. Results from the trials must be used to determine site-specific blast designs that will enable the performance criteria specified in the Construction Noise and Vibration Sub Plan to be satisfied.
49. The Proponent must make all reasonable attempts to advise occupants of residences located within 500 metres of a blast, of the blast. The advice must be provided at least 48 hours before a blast and include a schedule of blast time(s) and a telephone number and contact name.

Operation Noise Management

Operational Noise Criteria

50. The sound pressure level due to road traffic noise emissions when measured one metre from the façade of a residential building or any other sensitive receiver must be designed to meet the operational noise criteria for either redevelopment of an existing arterial road or a new arterial road. These are:
 - (a) existing arterial road
 - i $L_{Aeq15\text{ hour}}$ 60 dB(A) (7:00 am to 10:00 pm); and
 - ii $L_{Aeq9\text{ hour}}$ 55 dB(A) (10:00 pm to 7:00 am).
 - (b) new arterial road:
 - i $L_{Aeq15\text{ hour}}$ 55 dB(A) (7:00 am to 10:00 pm); and
 - ii $L_{Aeq9\text{ hour}}$ 50 dB(A) (10:00 pm to 7:00 am).

Generally the criteria for an existing arterial road apply except between stations 24200 and 26600 (EIS Figure 5.3). The applicable operation noise criteria must be identified in the Operation Noise Management Report.

51. The Proponent must provide noise treatment for all vacant land adjacent to the Activity which contains "existing noise sensitive development" as defined in Practice Note II of the RTA's *Environmental Noise Management Manual*.

Operation Noise Management Report

52. The Proponent must prepare an *Operation Noise Management Report* detailing its investigation of reasonable and feasible operation noise mitigation methods. The Proponent must obtain the approval of the Director-General for the Report before Construction commences or within any

other time agreed to by the Director-General. The report and investigation must be conducted in accordance with the NSW Government's *Environmental Criteria for Road Traffic Noise* and the RTA's *Environmental Noise Management Manual*. The report must include:

- (a) identification of Operation noise criteria in accordance with the Conditions of Approval;
- (b) identification of sensitive receivers;
- (c) predictions of noise levels at all sensitive receivers;
- (d) details of specific physical and managerial measures that could be used to control noise on this Activity;
- (e) details of reasonable and feasible noise mitigation measures. To assist in the decision of reasonable and feasible noise mitigation options for road traffic noise a Barrier Sensitivity Analysis must be conducted and presented in the report in accordance with Practice Note IV of the RTA *Environmental Noise Management Manual* for the entire Activity. The importance applied to aesthetic impacts (visual, shadowing etc.) and noise mitigation along the Activity must be determined in consultation with the CLG and directly affected residents;
- (f) the urban design issues relating to noise control measures;
- (g) identification of which noise mitigation measures will be implemented, including their location and type and when they are to be constructed; and
- (h) details of noise monitoring, reporting and response procedures.

Operation Noise Monitoring

53. Monitoring of Operation noise must be undertaken in accordance with Practice Note VIII of the RTA's *Environmental Noise Management Manual*. The Proponent must assess the adequacy of the implemented traffic noise mitigation measures between six months and one year after opening the Activity. Should the assessment indicate traffic noise levels exceeding those predicted in the *Operation Noise Management Report*, the Proponent must:
- (a) immediately advise the Director-General; and
 - (b) investigate and implement further reasonable and feasible mitigation measures in accordance with the NSW Government's *Environmental Criteria for Road Traffic Noise* and RTA's *Environmental Noise Management Manual*. The selection of these measures must be undertaken in consultation with directly affected landowners and/or occupiers and be consistent with the *Operation Noise Management Report*.

PHYSICAL ISSUES

Hydrology and Flooding

Inundation Levels

54. The Activity must be designed to "not worsen" the existing flooding characteristics in any river upstream or downstream of the Activity elements unless otherwise agreed with affected landholders and in consultation with DIPNR and GTCC. "Not worsen" shall be defined as:
- (a) impacts equal to or less than the predicted flood impacts shown on Figure 6.2 of the EIS; and
 - (b) a maximum increase in inundation time of one hour for any rainfall event.

Bridge and Culvert Design

55. The Proponent must consult the DEC and NSW Fisheries about the design of bridge and culvert construction. In undertaking bridge and culvert design and construction, the Proponent must:
- (a) investigate designing bridge structures suitable for fauna use in consultation with the DEC;
 - (b) not construct earth or rock fill platforms for driving piles unless otherwise agreed by NSW Fisheries;
 - (c) locate bridge abutments away from the edge of a river unless otherwise agreed by NSW Fisheries;
 - (d) ensure that there is no drop or 'waterfall' effect at the discharge from a structure;
 - (e) set the base of a culvert into (rather than on) the floodplain so that natural sediments can cover the bottom, providing a less alien habitat for fish passage; and
 - (f) provide a 'low flow channel' in the main flow cell of a box culvert to facilitate fish passage during periods of low flow in important (as defined by NSW Fisheries Guidelines) fish streams.

Groundwater

56. The Proponent must investigate the potential for the Activity to cause changes in the groundwater table before any major earthworks (defined as a cut or fill area with depth or height exceeding five metres). Where a potential for change is identified the Proponent must develop measures to safeguard and/or mitigate impacts and procedures to monitor changes in consultation with the DIPNR. The monitoring program must be implemented before any Construction activity which could potentially affect groundwater commences.

Soil and Water Management*Soil and Water Management Sub Plan*

57. As part of the Construction EMP, the Proponent must prepare a Soil and Water Management Sub Plan in consultation with relevant government departments and GTCC. The Sub Plan must:
- (a) where relevant, be consistent with the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction*, the RTA's *Guidelines for the Control of Erosion and Sedimentation in Roadworks* and the DIPNR *Constructed Wetlands Manual*;
 - (b) identify the Construction activities that could cause soil erosion or discharge sediment or water pollutants from the site;
 - (c) describe the management methods to minimise soil erosion or discharge of sediment or water pollutants from the site including a strategy to minimise the area of bare surfaces during Construction (such as progressive site rehabilitation);
 - (d) describe the location and capacity of all erosion and sediment control measures;
 - (e) identify the timing and conditions under which Construction stage controls will be decommissioned;
 - (f) include contingency plans to be implemented for events such as fuel spills; and
 - (g) identify how the effectiveness of the sediment and erosion control system will be monitored, reviewed and updated.
58. An appropriately qualified soil conservationist must be consulted according to a schedule identified in the Soil and Water Management Sub Plan to:

- (a) undertake inspections of temporary and permanent erosion and sedimentation control devices;
- (b) ensure that the most appropriate controls are being implemented;
- (c) check that controls are being maintained in an efficient condition; and
- (d) check that controls meet the requirements of any relevant approval/licence condition(s).

The results of these inspections and any follow-up actions must be reported in the *Construction Compliance Reports* required by the Conditions of Approval.

Operation Stage Control Measures

- 59. All Operation stage controls for stormwater drainage and water pollution must be located, designed, constructed, operated and maintained to meet the requirements of relevant government departments, including the DEC and GTCC. All controls, including wetland filters, grass filter strips and gross pollutant traps must be inspected regularly and maintained in a functional condition for the life of the Activity.
- 60. The Proponent must provide appropriate detention systems for containment of spills and materials arising from accidents that are consistent with the RTA's *Code of Practice for Water Management – Road Development and Management*.

Acid Sulfate Soils Management

- 61. As part of the CEMP the Proponent must prepare an Acid Sulfate Soil Management Sub Plan in consultation with relevant government departments. The Sub Plan must:
 - (a) be consistent with the *Acid Sulfate Soils Manual* (ASSMC, 1998);
 - (b) include a Contingency Plan to deal with the unexpected discovery of actual or potential acid sulphate soils; and
 - (c) include a water quality monitoring program.

The Proponent must ensure that the plan includes monitoring for acid sulfate soils on excavated material from below a surface elevation of 5 m AHD and monitoring of imported material with a potential to contain acid sulfate soils.

Heritage

Indigenous Heritage

- 62. As part of the CEMP the Proponent must prepare an Indigenous Heritage Management Sub Plan in consultation with the relevant Local Aboriginal Land Council and DEC. This Sub Plan must include:
 - (a) details of the archaeological investigations to be undertaken and any associated licences or approvals required. This includes a program of test excavation at archaeological site PAD 1;
 - (b) procedures to be implemented if previously unidentified Aboriginal objects are discovered during Construction; and
 - (c) an education program for all personnel on their obligations for Aboriginal cultural materials.

Historical Relics

63. If during the course of Construction the Proponent becomes aware of any unexpected historical relic(s), all work likely to affect the site(s) must cease immediately and the Heritage Council notified in accordance with the Heritage Act 1977.

Air Quality*Construction Air Quality Sub Plan*

64. A Dust Management Sub Plan must be prepared as part of the CEMP. The Sub Plan must identify:
- (a) potential sources of dust;
 - (b) dust management objectives consistent with DEC guidelines;
 - (c) a monitoring program to assess compliance with the identified objectives. Monitoring for relevant pollutants must be undertaken according to the Ambient Dust Monitoring Table below;
 - (d) mitigation measures to be implemented, including measures during weather conditions where high level dust episodes are probable (such as strong winds on hot, sunny days); and
 - (e) a progressive revegetation strategy for exposed surfaces with the aim of minimising exposed surfaces.

Table – Ambient Dust Monitoring

Pollutant	Units of Measure	Methods Averaging Period	Frequency	Sampling Method*
Dust deposition rate	g/m ² /month	Month Annual	Continuous	AM-19
Siting	-		-	AM-1

*NSW EPA, 2001, Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales

Construction

65. Construction vehicles using public roads must be maintained to prevent any loss of load, whether in the form of dust, liquid or soils. Facilities must be provided at exit points of all Construction sites/compounds to minimise tracking mud, dirt or other material onto a public road or footpath. In the event of any spillage, the Proponent must remove the spilled material as soon as practicable within the working day of the spillage.
66. The Proponent must ensure that all plant and equipment at the site, or used in connection with the Activity, are:
- (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

Spoil Disposal

Spoil Management Plan

67. As part of the CEMP the Proponent must prepare a Spoil and Fill Management Sub Plan. The Sub Plan must include:
- (a) details of the volumes of fill required in relation to staging of the Activity;
 - (b) how spoil and fill material will be sought, handled, stockpiled, re-used and disposed; and
 - (c) details of re-use/disposal sites and the volumes of spoil to be transported to each site.
68. All material excavated from the Construction must be re-used or recycled where suitable and if cost-effective to do so. The Proponent must ensure that re-use of material generated from Construction is maximised in preference to any import of fill.

Waste Management and Recycling Procedure

Waste Management and Re-use Sub Plan

69. As part of the Construction EMP the Proponent must prepare a Waste Management and Re-use Sub Plan. The Sub Plan must address the management of wastes during Construction in accordance with the NSW Government's *Waste Reduction and Purchasing Policy*. The Sub Plan must identify requirements for:
- (a) the application of the waste minimisation hierarchy principles of avoid-reduce-reuse-recycle-dispose;
 - (b) waste handling and storage;
 - (c) disposal of wastes. Specific details must be provided for cleared vegetation, contaminated materials, glass, metals and plastics, hydrocarbons (lubricants and fuels) and sanitary wastes;
 - (d) any waste material that is unable to be re-used, re-processed or recycled must be disposed at a facility licensed by the DEC to receive that type of waste; and
 - (e) implementation of energy conservation best practice.

Utilities and Services

70. The Proponent must identify the utilities and services (hereafter "services") potentially affected by Construction activities to determine requirements for diversion, protection and/or support. Alterations to services must be determined by negotiation between the Proponent and the service providers. The Proponent in consultation with service providers must ensure that disruption to services resulting from the Activity are minimised and advised to customers.

Location of Construction Facilities

71. The sites for Construction compounds and ancillary sites, such as temporary concrete batching plants, must satisfy the following criteria unless otherwise identified in the CEMP:
- (a) be located within the Approved Activity Area;
 - (b) have ready access to the road network;
 - (c) be located to minimise the need for heavy vehicles to travel through residential areas;

- (d) be sited on relatively level land;
- (e) be separated from nearest residences by at least 200 m (or at least 250 m for a temporary concrete batching plant);
- (f) not be within 100 m of, or drain directly to, SEPP 14 wetlands;
- (g) not be located within 100 m of a river;
- (h) be located above the 20 ARI flood level unless a contingency plan to manage flooding is prepared and implemented;
- (i) have low conservation significance for flora, fauna or heritage and must not require any vegetation clearing beyond that already required for the Activity; and
- (j) not affect the land use of adjacent properties.

The location of Construction compounds and ancillary sites must be identified in the CEMP and must include demonstration that the above criteria have been met.

ATTACHMENT 1

Guidelines for the Establishment of the Community Liaison Groups

The Proponent must consider the following when establishing a Community Liaison Group (CLG):

1. At its first meeting, the CLG must consider its interrelationship with any existing community liaison or consultative groups of adjoining or interrelated developments.
2. The members of the CLG must elect a person from the CLG to act as Chair of the CLG.
3. Representatives from relevant government departments or other individuals may be invited to attend meetings as required by the Chair.
4. Where determined necessary by the Chair, an independent note taker would be provided by the Chair at the expense of the Proponent.
5. The Proponent must, at its own expense:
 - a) nominate two (2) representatives to attend all meetings of the Committee;
 - b) provide to the CLG regular information on the progress of work and monitoring results;
 - c) promptly provide to the CLG such other information as the Chair of the CLG may reasonably request concerning the environmental performance of the development;
 - d) provide access for site inspections by the CLG; and
 - e) provide meeting facilities for the CLG, and take minutes of CLG meetings. These minutes, once endorsed by the Chair, must be available to CLG members within 14 days of the meeting.
6. Where reasonably required by the Chair the Proponent must arrange for specialist consultant(s) to explain technical information to the CLG.