

Chapter 21 Environmental mitigation and management

This chapter presents the mitigation measures identified in relation to specific impacts and an associated draft monitoring program. The mitigation measures, together with any requirements added during the determination process, would form the basis of a Project Environmental Management Plan to be developed for the Proposal. Additionally, a Construction Environmental Management Plan and an Operational Environmental Management Plan would be adopted for the Proposal.

21.1 Environmental Management

Summary of mitigation measures

The mitigation measures identified in this EIS are summarised in Table 21–1. These measures address adverse impacts anticipated during construction as well as after the opening of the Proposal.

Table 21–1 Summary of mitigation measures

Type of impact (EIS Chapter)	Mitigation measure
Ancillary construction activities Site compounds Concrete batching plants Asphalt batching plants Crushing plant Stockpile areas Spoil disposal areas (Chapter 7)	<p>Construction</p> <p>Soil erosion and sedimentation of water bodies:</p> <ul style="list-style-type: none"> • Area of disturbance to vegetation and topsoil would be reduced. <p>Water quality management:</p> <ul style="list-style-type: none"> • Buildings, containers, workshops, plant, materials stores and storage tanks would not be sited on the floodplain of watercourses unless unavoidable. • Clean runoff would be diverted around the site. • Environmental controls would be installed within and immediately downstream of disturbed areas. • Gravel hardstand would be provided as required. • Fuel and chemical storage areas would be bunded in accordance with DEC requirements. • Runoff from fuel storage and vehicle washdown areas would be contained and treated prior to discharge from site. • Spillages of materials would be promptly removed. <p>Air quality control:</p> <ul style="list-style-type: none"> • Unsealed areas would be watered during site and weather conditions conducive to dust generation. • Vehicles and machinery would be maintained regularly to ensure operation as designed. <p>Noise controls:</p> <ul style="list-style-type: none"> • DEC requirements would be complied with. • Noise levels would be regularly monitored. • Vehicles and machinery would be regularly maintained to ensure operation as designed, including noise levels. • Natural shielding would be used to mitigate noise impacts on any nearby residences.

Type of impact (EIS Chapter)	Mitigation measure
Geotechnical and soils (Chapter 8)	<ul style="list-style-type: none"> • Noise mitigation measures would be installed at nearby residences if required. <p>Waste management:</p> <ul style="list-style-type: none"> • Good site housekeeping to prevent littering/contamination would be required. • Liquid and solid waste would be removed by tanker or truck for disposal at an approved facility. <p>Landscape and visual impacts:</p> <ul style="list-style-type: none"> • Consider installation of colour co-ordinated shade cloth on perimeter fencing to reduce visual impact. • If site is particularly visible from key viewing points, supplementary planting external to perimeter fences would be considered. <p>Impacts on flora and fauna:</p> <ul style="list-style-type: none"> • Reduce area to be cleared. • Areas to be cleared would be inspected for presence of native fauna. • Consider installation of temporary fauna crossing points across access roads if required. • Rehabilitation/revegetation of sites would be required on completion of works
Water quality and hydrology (Chapter 9)	<p>Construction</p> <p>Erodible soils:</p> <ul style="list-style-type: none"> • Clearing would be minimised. • Topsoil would be retained in place in areas not being excavated. • Soil erosion protection measures would be used, such as those set out in <i>Managing Urban Stormwater: Soils and Construction 'Blue Book'</i> (Landcom 2004) and as advised by relevant agencies and/or RTA's soil consultants. • Design, implementation and management of sediment controls and basins would be responsive to the presence of erodible soils. • Revegetation and stabilisation would occur as soon as possible and in stages. <p>Acid sulfate soils</p> <ul style="list-style-type: none"> • An ASSMP would be prepared as part of the CEMP. <p>Construction</p> <ul style="list-style-type: none"> • A Soil and Water Management Plan (SWMP) would be prepared as part of the CEMP following consultation with DIPNR, DPI, DEC, Greater Taree City Council and Hastings Council. This would address soil erosion and sediment pollution, including measures to mitigate the potential for impacts on the water environment. • A Works Method Statement would be prepared providing detailed information on work methods for waterway structures and works near watercourses. • Erosion and Sediment Control Plans (ESCPs) would be prepared for different stages and sections of construction (e.g. for each river crossing). <p>Pollution</p> <ul style="list-style-type: none"> • Buildings, containers, workshops, plant, materials stores and storage tanks would not be sited on the floodplain of watercourses unless unavoidable. • Areas for storage of hazardous materials would be bunded and secure. • Works around and close to watercourses would be controlled and managed by measures such as no refuelling, controlled use of wet concrete and cement, and control of dust and spray. • Contingency plans and equipment would be in place in case of an uncontained spillage. • Steel or concrete piles for the bridges would be driven, to minimise the potential for groundwater drawdown or contamination.

Type of impact (EIS Chapter)	Mitigation measure
	<p>Erosion and sediment control</p> <ul style="list-style-type: none"> • Runoff from disturbed land would be directed to the sediment basin by a combination of toe drains and catch drains. For catchment areas where there are no basins, runoff would be discharged directly onto roadside areas adjacent to the road as diffuse overland flow. • Runoff from undisturbed areas would be diverted around the construction site. • Catch drains, toe drains and diversion drains would be lined where necessary and may also require riprap or other appropriate material in steep areas to control erosion and reduce velocities. • Sediment basins would be constructed prior to the commencement of topsoil stripping and be operational when construction begins. Catch/diversion drains would be installed prior to the commencement of heavy earthworks. • Captured stormwater runoff would be dosed with a chemical agent (i.e. flocculant) to achieve an acceptable quality for subsequent release. • With sedimentation basins that capture runoff from Type F soils, stormwater in the settling zone would be drained or pumped out within the time period adopted in the design of the basin (i.e. five days) following rainfall if the nominated water quality targets can be met. Flocculation would be employed where extended settling is likely to fail to meet this objective within the nominated (i.e. five day) time period. • The sedimentation basins would be cleaned out as necessary to ensure the build up of silt is removed. • Works such as culverts, permanent stream protection measures and wing walls would be installed as quickly as practicable and in the early stages of construction. • Grassed drainage lines and grass/shrub cover on the soil surface would be retained to minimise topsoil runoff when heavy construction commences. • Temporary windrows would be used to keep runoff from spilling over embankment batters, and used in combination with temporary batter drains to enable controlled discharge of runoff down battered slopes without causing erosion. • Controls would be implemented across the site to reduce site erosion and contain sediment. Sediment controls would include sediment fences, vegetation barriers, rock barriers and other containment devices. • Disturbed areas would be revegetated or sealed as soon as practical and areas of exposed soils should be minimised • Site-specific appropriate measures would be constructed around works in a watercourse to prevent water entering the area of works. • Erosion and sediment control measures would be regularly inspected and maintained. <p>Operation</p> <ul style="list-style-type: none"> • Retention of 21 permanent water quality control ponds as part of the permanent highway drainage system for the Proposal. • Ellis pipes would be provided on the water quality control ponds to prevent discharge of oil and grease products. • Regular inspection and maintenance of water quality control ponds and highway drainage systems would be undertaken. • Scour protection at the inlet/outlets of culverts would be provided to minimise scour erosion.
<p>Terrestrial flora and fauna (Chapter 10)</p>	<p>Construction</p> <p>A Flora and Fauna Management Plan (addressing both terrestrial and aquatic areas) would be prepared as part of the CEMP following consultation with DEC and DPI.</p> <p>The following mitigation measures would be implemented and are addressed in more detail in Chapter 10 and Working Paper No. 7:</p>

Type of impact (EIS Chapter)	Mitigation measure
	<ul style="list-style-type: none"> • The clearance and disturbance of fauna habitat (especially trees with hollows and shelter vegetation) would be minimised prior to and during construction - particular attention would be paid to temporary sites such as stockpile locations. • RTA guidelines and policy would be complied with during construction for fauna rescue, including procedures for clearing non-habitat and habitat trees, relocating rescued fauna and inclusion of wildlife specialists in the process. • Flora species used for landscaping would be considered such that wildlife is not attracted to them for feeding or other purposes. <p>Operation</p> <ul style="list-style-type: none"> • The risk of 'road kill' in the operation phase would be reduced by designing barriers to prevent fauna access to highways by such species as Koalas - these barriers would be designed in conjunction with fauna crossings and therefore not reduce connectivity between habitats located either side of the highway. • Vegetation would be prevented from hanging over barriers and encouraging wildlife to onto the highway. <p>State Forests, National Parks and SEPP 14 Wetlands</p> <p>Mitigation measures proposed for impacts due to clearance activities on the eastern edge of the Middle Brother State Forest are:</p> <ul style="list-style-type: none"> • pre-clearing inspection of all vegetation in the vicinity of the road corridor to avoid adverse impacts on individuals of native fauna species and to identify and mark plant species of conservation significance • implementation of stringent construction protocols which limit the extent of clearing within the road corridor to the minimum possible consistent with safe construction practice • collection and destruction of all weed material (if any) from the roadworks area • collection and shredding of cleared, weed-free native plant material and its redistribution into appropriate areas of native vegetation as directed by SFNSW • implementation of a dedicated rehabilitation and replanting program utilising appropriate plant species as recommended by DEC. <p>Other mitigation measures would include:</p> <ul style="list-style-type: none"> • retention and maintenance of the existing embankment between the present highway and SEPP 14 Wetland No. 544(a) • control of erosion and sediment discharge through 'best practice' management during the construction works • retention of topsoil where possible and use of retained topsoil for landscaping and rehabilitation • construction and use of water quality control ponds • incorporation of drainage measures into design • requirement that construction occurs strictly within specified boundaries, especially at the constrained section of highway adjacent to the Middle Brother National Park.
Aquatic ecology (Chapter 11)	<p>Construction</p> <ul style="list-style-type: none"> • A Flora and Fauna Management Plan (addressing both terrestrial and aquatic areas) would be prepared as part of the CEMP following consultation with DEC and DPI. • A Soil and Water Management Plan and an Erosion and Sediment Control Plan and would be developed in accordance with the 'Blue Book' (Landcom 2004) and the <i>Road Design Guide</i> (RTA 1996) to achieve best practice on erosion control and mitigation. Refer to Water Quality above. • An ASSMP in ASS risk areas would be prepared as part of the CEMP. • Should the removal of riparian vegetation be required, the DPI preferred 'cut stump' method would be used to mitigate potential bank scouring.

Type of impact (EIS Chapter)	Mitigation measure
	<ul style="list-style-type: none"> • Areas to be cleared of vegetation would be revegetated as soon as practicable after construction activities are complete and could include the use of geotextiles to help stabilise banks while vegetation becomes established. • The removal of snags would be kept to a minimum and if this is required the DPI preference is to relocate the snags at nearby in-stream points and leave them at their new positions once construction is complete to minimise habitat destruction. • The shortest possible time would be taken where work in watercourses is required (e.g. installation of culverts). • The construction of bridge duplication would be planned to allow a navigable path through the construction corridor to allow fishing vessel movement through the waterways at all times. <p>Operation</p> <ul style="list-style-type: none"> • Control measures to treat highway runoff including operational water would be maintained. • Control measures to direct highway runoff away from SEPP 14 and other wetlands and waterways would be maintained.
<p>Air quality (Chapter 12)</p>	<p>Construction</p> <p>An Air Quality Management Plan would be prepared as part of the CEMP. Mitigation measures would include the following:</p> <p>Exhaust emissions</p> <ul style="list-style-type: none"> • regular maintenance of construction plant, vehicles and equipment to ensure operation as designed, including exhaust emission requirements to meet existing air quality standards • prevention of unnecessary or inadvertent idling of engines. <p>Dust</p> <ul style="list-style-type: none"> • consultation with nearby residents prior to commencement of site clearing and major earthworks so that they are aware of the nature and timing of works • unsealed areas would be watered during site and weather conditions conducive to dust generation • stabilisation of exposed earthworks and disturbed areas as soon as possible (using practices such as revegetation, hydro seeding/mulching, sealing) • enclosing, shielding, or providing filters on plant likely to generate excessive quantities of dust (these may include the use of windbreaks, netting screens or semi-permeable fences) • under extreme wind conditions, stopping or relocating construction activities near sensitive receptors • monitoring of dust gauges to assess the success of measures implemented • covering all loads to and from the construction site travelling on public roads • installation of wheel wash equipment to clean wheels and undercarriages of all vehicles entering and leaving construction or work areas where required • management of on-site haul routes incorporating: <ul style="list-style-type: none"> - providing all-weather surfaces for main site haul roads where practicable - ensuring all-weather surfaces for routes and vehicle waiting areas are kept clean where practicable - watering trafficked sections as appropriate - ensuring traffic is restricted to watered or treated haul roads where possible to prevent inadvertent tracking or otherwise over areas of stripped or exposed ground - establishing and enforcing appropriate speed limits over unmade surfaces where dust is an issue

Type of impact (EIS Chapter)	Mitigation measure		
Visual impact (Chapter 13)	<ul style="list-style-type: none"> • roadside cleansing to keep public highway and footpaths clean from mud and dust as far as reasonably practicable • material storage management such as: <ul style="list-style-type: none"> - placing stockpile as far as reasonably practicable away from residential areas, places of public access and site buildings - pre-dampening, covering and revegetating long term stockpiles where possible - undertaking the mixing of large quantities of concrete in enclosed or shielded areas where practicable - establishing procedures for the treatment of the spillage of dusty or potentially dusty materials including prompt clearance of any such spillage. <p>Asphalt and concrete batch plant measures</p> <p>The following measures can help to maintain adequate air quality where batch plants (i.e. asphalt and concrete) are required for the manufacture of concrete and asphalt:</p> <ul style="list-style-type: none"> • using water sprays to reduce dust emissions during loading operations at the plant • restricting drop heights onto vehicles and conveyors • enclosing conveyor and transfer points and damping of conveyor loads • enclosing or shielding plant such as cement silos where possible • spraying internal roads with a water cart <p>Other emissions</p> <ul style="list-style-type: none"> • avoiding open burning or incineration of waste or plant materials unless approval obtained from DEC and/or Council • reduction of the number of materials handling operations • conduct of on-site cutting and grinding operations with equipment and techniques that reduce emissions and incorporate dust suppression measures • implementation of strategies to prevent, contain and manage any spills of volatile substances • location of any odour producing construction plant away from sensitive receptors and requirement that odour producing activities, such as laying asphalt, will be undertaken in the minimum required time near sensitive receptors. 		
Hazard and risk (Chapter 14)	<p>Construction</p> <ul style="list-style-type: none"> • Appropriate urban design elements would be integrated into the overall Proposal design in relation to: <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> - local character - bridges as gateways - crossings of waterways and infrastructure - embankments and cuttings </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> - water quality and runoff control - acoustic mitigation - signage - median treatments - lighting. </td> </tr> </table> <p>Operation</p> <ul style="list-style-type: none"> • Regular maintenance of landscaped areas would be undertaken. 	<ul style="list-style-type: none"> - local character - bridges as gateways - crossings of waterways and infrastructure - embankments and cuttings 	<ul style="list-style-type: none"> - water quality and runoff control - acoustic mitigation - signage - median treatments - lighting.
<ul style="list-style-type: none"> - local character - bridges as gateways - crossings of waterways and infrastructure - embankments and cuttings 	<ul style="list-style-type: none"> - water quality and runoff control - acoustic mitigation - signage - median treatments - lighting. 		
	<p>Construction</p> <ul style="list-style-type: none"> • Contractor would be required to undertake a risk assessment of proposed construction activities and develop appropriate work methods to manage identified risks to satisfactory levels. • Compliance with all legislative and standards requirements for the safe handling of hazardous substances and dangerous goods and to meet all relevant occupational health and safety requirements. <p>Operation</p> <ul style="list-style-type: none"> • See Water Quality control measures. • Storage areas for oils and other hazardous liquids would be bunded and any spillages collected for off-site disposal at a licensed facility. • Spillages would be captured in combined sediment/chemical basins. 		

Type of impact (EIS Chapter)	Mitigation measure
Cultural heritage (Chapter 15)	<p>A Cultural Heritage Management Plan would be prepared as part of the CEMP identifying all heritage recordings with conservation management requirements that are situated within or in close proximity to the road works. All management requirements such as disturbance prevention or boundary fencing would be included. Requirements would include:</p> <p>Aboriginal Heritage</p> <ul style="list-style-type: none"> • Consultation and liaison would be undertaken with LALC and community representatives during the pre-construction and construction periods. • A representative of the relevant LALC would be present during key excavations at sensitive sites identified in Section 15.4. • The possible Aboriginal scarred tree A16 would be conserved within the road easement. An accurate survey of the tree and its location relative to the edge of proposed earthworks would be conducted. A temporary fence would be constructed around the tree for the period of construction. The purpose of the fence would be to define a no-go and no-disturbance area, off limits to heavy machinery and materials storage. The retention of native vegetation around the tree would be maximised. • Temporary fencing would be erected between the site and the zone of construction activity to define no-go and no-disturbance areas to avoid risk of accidental impact from adjacent earthworks or machinery movements to sites A1, A3, and A14. • An application would be made to DEC for a Section 90 permit to disturb Aboriginal isolated find A6. • All excavation or ground disturbance within the potential archaeological deposits PAD2, 4, 5 and 6 would be monitored by an archaeologist and a representative of the relevant LALC. • Temporary fencing would be installed between PAD3 and the zone of construction activity. • The construction workforce would be briefed about legal obligations in relation to cultural heritage material. • In the event that Aboriginal Objects are exposed by construction activities then all work in the vicinity of the find would cease and advice sought from the DEC. Construction works in the area of the find would not recommence without receipt of a section 90 permit from the DEC. • In order to minimise impact on the Aboriginal cultural values of Middle Brother Mountain, the extent of all earthworks, ancillary works, and vegetation clearance along its basal landforms would be minimised where feasible and, where possible, located within areas of previous disturbance. <p>European Heritage</p> <ul style="list-style-type: none"> • Should European historic artefacts (older than 50 years) be found during construction, all works in the area that may impact on the find would cease and advice regarding appropriate actions would be sought immediately. • The construction workforce would be briefed in regard to legal obligations in relation to cultural heritage material. • Notification of the intent to impact sites H32, H34 and H36 would be submitted. An archival recording of site H32 would be conducted as part of the recording program for site H23, prior to its impact. • An application would be made for a section 139 permit, to allow for the direct impact of Site H23. An archival record of the site would be made prior to impact, and as a condition of the permit. • Heritage management strategies would be developed for sites H37 and H38 where and if necessary according to the results and findings of its concurrent RTA heritage study. • Excavated fluvial sediments in the active river beds of Stewarts and Camden Haven Rivers in the vicinity of proposed bridge works would be monitored by a suitably qualified archaeologist for any exposed maritime relics (where applicable). If relics are detected then further excavation may be required, pending advice from the NSW Heritage Office.

Type of impact (EIS Chapter)	Mitigation measure
Planning and land use (Chapter 16)	<p>Pre-construction</p> <ul style="list-style-type: none"> • RTA would acquire land required for construction of the Proposal and implement necessary adjustments to titles. • Liaison would occur with Greater Taree and Hastings Councils in relation to any required amendments to statutory planning controls. <p>Construction and operation</p> <ul style="list-style-type: none"> • Existing access for properties severed by the Proposal would be retained, or new access provided. • Loss of farming assets such as fences would be made good or replaced as per RTA policy. • Obstructions to fishing vessels in the waterways would be mitigated, such as planning bridge duplication to allow a navigable path through the construction corridor at all times.
Economic (Chapter 17)	<p>Operation</p> <ul style="list-style-type: none"> • Consistent with RTA guidelines, advance advisory signage would be provided on the highway to ensure travellers are aware of their stopping options and the facilities offered in both Johns River and Kew.
Social (Chapter 18)	<p>Refer to mitigation measures presented in relation to visual impact and noise (Chapters 13 and 19 respectively).</p>
Noise and vibration (Chapter 19)	<p>Construction</p> <ul style="list-style-type: none"> • A Construction Noise and Vibration Plan would be prepared. • Practices to reduce construction noise would include, but would not be limited to: <ul style="list-style-type: none"> - adherence to operating time limits and conditions - location of stationary plant (such as air compressors) as far away as possible from residential areas - using natural screening by topography - using site sheds and other temporary structures as screens - installing operational noise barriers as early as possible to provide ongoing screening from construction activities - choosing appropriate low-noise construction equipment and/or methods - careful programming and management of construction activities. • Mitigation measures to reduce impact of percussive piling may include: <ul style="list-style-type: none"> - using a resilient pad (dolly) between pile and hammer head and/or enclosing the hammer head in a temporary acoustic shroud - alternatively, using rotary bored or vibro-piling where it is consistent with the type of pile used and restrictions on soil disturbance. <p>Operation</p> <ul style="list-style-type: none"> • Noise barriers would be provided near Johns River, Kew and Herons Creek Public School. • Low-noise road pavement would be provided near Johns River, Kew and Herons Creek. • Architectural acoustic treatment would be provided to approximately 90 residences along the route.

21.2 Monitoring

Environmental management requires control and mitigation of potential adverse impacts through appropriate design and implementation of the Proposal. Monitoring programs would be established to ensure the effective implementation of the CEMP and the management of potentially adverse impacts. A guide to monitoring for the specific management measures set out above is provided in Table 21–2. Suggested parameters, methods, monitoring locations and the frequency of monitoring during the monitoring program are included.

Table 21–2 Monitoring framework

Impact/ parameter (EIS Chapter)	Method and frequency	Location	Benchmark/ standard	Response if benchmark not met or exceeded
Hazardous materials (Chapters 7 and 14)	Regular visual inspection* during construction	Storage areas Site compounds	Zero spills outside bunded area. Compliance with relevant legislation and standards.	Further training of people involved in the storage, handling and use of hazardous materials.
Waste management (Chapter 7) Presence of litter Amount and nature of recycling	Regular visual inspection during construction	Construction work areas, waste collection points, bridges, creeks, and drainage lines.	No visible uncontrolled waste. High proportion of feasible recycling of waste.	Clean up by personnel or contractor; increase recycling facilities; increase workforce awareness of waste minimisation and recycling processes.
Erosion and soil stability (Chapter 8)	During construction, regular visual inspection* and appropriate maintenance. After opening, visual inspection every three months and after major storms for a period of three years.	Downstream of construction areas at locations where EIS water quality samples taken.	Visible evidence of excessive deposition or erosion.	Identify source, modify, repair or increase erosion and sediment control devices if necessary.
Water quality (Chapters 9 and 11)	Visual inspection*: Regularly during construction then monthly until site stabilises in operation. Immediately following severe storm conditions such as high winds, heavy and/or prolonged rain events.	Sediment control basins	No visible litter, oil foam, or sediment	Identify causes. Investigate pollution control device design and operation and ensure regular maintenance or upgrade.

* Inspection/assessment to be carried out by personnel appropriately trained in the impact area.

Impact/ parameter (EIS Chapter)	Method and frequency	Location	Benchmark/ standard	Response if benchmark not met or exceeded
Water quality parameters (Chapters 9 and 11)	Field samples and standard laboratory analysis: Fortnightly during construction (focussed on wet weather periods) then monthly until site stabilises in operation.	The Camden Haven River and other waterways where disturbance of the creek/river bed will occur. Monitoring would focus on levels of dissolved oxygen, turbidity and pH.	Compliance with EIS or CEMP requirements.	Investigate cause of excessive levels and correct at source (if identified cause is related to the Proposal).
Flora and fauna habitat (Chapter 10)				
<i>Flora</i>				
Revegetation of disturbed areas	Twelve-monthly photographic record at specified locations and visual inspection.	Key areas such as State Forests and highly visible areas	Presence of revegetation species confirmed. Reduction in cover of weed species as applicable.	Additional seeding or planting and weed and pest control
Weed species, introduction, spread and infestation	Visual inspection* one month after commencement of construction, then as identified in the OEMP.	Access tracks, riverbanks, wetlands, creek banks and drainage lines.	No new noxious weeds or significant environmental weeds established. No expansion of existing weeds.	Identify problem areas and apply weed control measures.
<i>Fauna</i>				
Presence of nominated species (Green-thighed Frog)	Sightings register during construction. To be agreed with DEC and RTA in operation.	Where Green-thighed Frog located or potential habitat.	Recording of presence or absence of Green-thighed Frog.	Liaise with RTA and DEC.
Monitoring of fauna movement structures and fauna-proof fencing	To be agreed with DEC and RTA in operation.	At nominated fauna crossings	Recording of use of fauna crossings by relevant fauna	Modify structures to improve effectiveness
Aquatic ecology (Chapter 11) Impact of shading by bridge on aquatic ecology	After construction one-off visual inspection at 2 years.	Camden Haven River	The diversity and density of aquatic habitats would be monitored including areas shaded by the existing and newly constructed bridges and in areas of full sun.	Appropriate response to findings of monitoring to be determined.

* Inspection/assessment to be carried out by personnel appropriately trained in the impact area.

Impact/ parameter (EIS Chapter)	Method and frequency	Location	Benchmark/ standard	Response if benchmark not met or exceeded
Air Quality (Chapter 12)	Deposition gauges would be installed to determine dust levels. A minimum of three monitors would be required and would be tested monthly.	At identified sensitive receptors and/or nearest residences	Compliance with DEC goals (4 g/m ² per month over an annual average).	Review of dust mitigation measures
Cultural heritage (Chapter 15)	If bridge construction involves the excavation of fluvial sediments in the active beds of these rivers, and where the excavation methodology allows, content of excavated sediments should be monitored by a suitably qualified archaeologist.	Site of construction of bridges over Stewarts and Camden Haven Rivers	The objective of such a program is the recording and, where warranted, collection of any exposed maritime relics.	If relics are detected then further excavation should cease, pending advice from the NSW Heritage Office.
Noise				
(Chapter 19)				
Construction: DEC Construction Noise Standards	Measurement of traffic noise (both L _{Aeq,15hr} and L _{Aeq,9hr}) immediately prior to the commencement of construction	Nearby residences	Compliance with DEC criteria and RTA Environmental Noise Management Manual	Identify problem areas during construction and correct source.
Operation: DEC Environmental Criteria for Road Traffic Noise	Measurement of traffic noise levels 12 months after opening with normal operational traffic flows after noise barriers are constructed. Comparisons of the measured results with the predicted levels. Verification that road traffic noise levels are in accordance with the Proposal design noise levels.	As above Locations including in Johns River and Kew townships and at Herons Creek Public School	As above	Investigate adjustment to or need for additional noise attenuation measures.

* Inspection/assessment to be carried out by personnel appropriately trained in the impact area.

21.3 Environmental Management Plan Process

The RTA has established an environmental management system based on the *Environmental Management Systems Guideline* (NSW Government 1998c). The system enables the RTA to assess its overall environmental performance and to identify and manage environmental risks as they relate to individual projects. The environmental management system also enables the RTA to assess the environmental performance of its contractors against specifications and guidelines specific to roadwork and bridgework contracts. The major specification relevant to environmental management are *G36 Environmental Protection (Management System)*.

The RTA would prepare a Project EMP covering both the construction and operational periods that would specify all relevant environmental management obligations, nominate the party responsible for fulfilling each obligation, and the time when the obligation would be addressed. The environmental management obligations would derive from the conditions attached to the Proposal approval by the Minister for Infrastructure and Planning. Construction and operational environmental management plans would incorporate the relevant obligations in the Project EMP.

The Construction EMP (CEMP) would be prepared by the selected contractor, based on the above conditions and guidelines and liaison with relevant agencies and stakeholders. A typical CEMP would be structured as follows:

- introduction
- environmental policy statement and objectives
- contractor's quality management system
- environmental legislation, regulations and guidelines
- project management organisation chart
- responsibilities of key personnel
- subcontractors' obligations
- communication policy
- EMP review process
- environmental training
- document control
- non-conformance and corrective action procedures
- auditing of the EMP
- complaint handling procedures
- emergency response procedures
- discussion of the following environmental issues:
 - flora and fauna (including clearing and vegetation protection)
 - noise and vibration management
 - air quality management
 - soil and water management (erosion, sedimentation, surface and groundwater controls)
 - acid sulfate soils management
 - waste and resource use minimisation and management
 - cultural heritage resources
 - revegetation, landscaping and urban design
 - community relations (including complaints handling procedures)
 - traffic management.

21.4 Approvals and licences

The major approvals required for the Proposal are described in Chapter 2 (see Table 2-2). Once the Proposal is determined, compliance with the conditions of approval would be required as well as specific approvals for construction and operation of the Proposal under some or all of the State legislation as shown in Table 2-2. It is not anticipated that there would be any specific approvals required under Commonwealth legislation.