



Transport
Roads & Maritime
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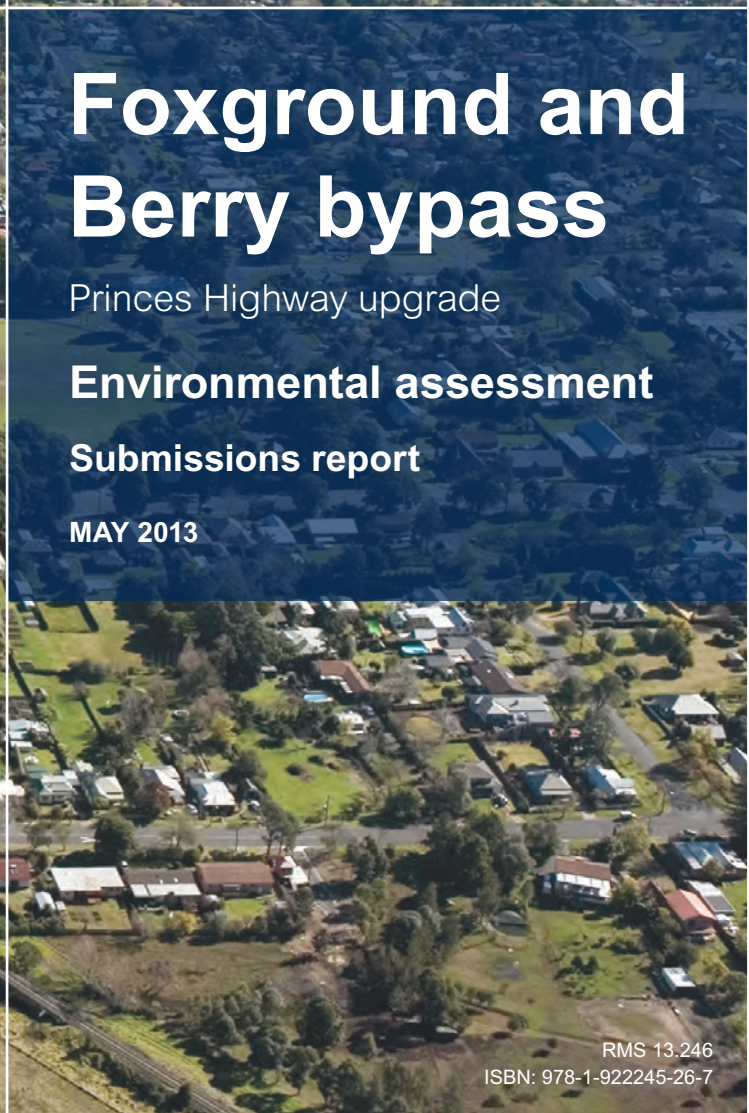
Foxground and Berry bypass

Princes Highway upgrade

Environmental assessment

Submissions report

MAY 2013



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Roads and Maritime Services

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Princes Highway upgrade

Submissions report

Prepared for

Roads and Maritime Services

Prepared by

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May 2013

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Executive summary

Roads and Maritime Services (RMS) proposes to upgrade 11.6 kilometres of the Princes Highway between Toolijooa Road north of Foxground and Schofield's Lane south of Berry, in New South Wales (NSW) (the project), to achieve a four lane divided highway (two lanes in each direction) with median separation. The project includes bypasses of Foxground and Berry.

In accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act), an environmental assessment was prepared to assess the potential impacts of the project. This was submitted to the Department of Planning and Infrastructure in November 2012.

The environmental assessment was exhibited for 34 days from Wednesday 14 November 2012 to Monday 17 December 2012. During the exhibition of the environmental assessment, 254 submissions were made, comprising five submissions from government agencies, three submissions from local councils and 246 submissions from the community. Detailed issues and responses to these issues are presented in **Chapter 2** of this report.

Submissions generally raised issues relating to:

- The options development process and justification for the preferred option, including issues relating to a bypass to the south of Berry.
- Traffic and transport, including modelling of predicted impacts, access options, road and pedestrian safety and various issues relating to Victoria Street.
- Noise and vibration, including construction activities and work hours, road traffic noise and noise mitigation measures.
- Biodiversity, including impacts on wildlife corridors, waterways and endangered ecological communities and fauna mitigation measures.
- Surface water, groundwater and flooding, including impacts on the quality of drinking water and flooding impacts.
- Landscape character and visual amenity, including loss of rural landscape character and visual impacts across the alignment.
- Aboriginal and non-Aboriginal (historic) heritage impacts, including historical significance of a property on North Street and construction impacts on Aboriginal and non-Aboriginal cultural sites.
- Land use and property impacts, including property acquisition, impacts on property values, property access and residual land use.
- Socio-economic impacts, including severance, amenity and lifestyle impacts, as well as a number of issues relating to Victoria Street.

The environmental assessment presented three options for the western end of Victoria Street, relating to whether Victoria Street should remain open or whether it should be closed. The environmental assessment presented the closure of Victoria Street as the preferred option. A number of submissions were received supporting or opposing this preferred option. Following consideration of the submission and in order to best respond to the information provided and opinions raised in the submissions, RMS decided to change the design to leave Victoria Street 'open' and provide a two-way road between Queen Street and Victoria Street. Further details are provided in **Section 3.11** of this report.

As detailed in **Chapter 3** of this report, a number of other design changes have also been implemented as a result of submissions received and consultation undertaken with land owners during and following the exhibition of the environmental assessment. These changes are generally related to property accesses and the diversion of Town Creek.

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Appendix A – Respondent details

Glossary of terms and abbreviations

Term	Meaning
µg/m	Micrograms per cubic metre.
A	
AADT	Average annual daily traffic The total volume of traffic passing a roadside observation point over a period of a year, divided by the number of days per year. It is calculated from mechanically obtained axle counts.
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, songlines, places) cultural practices and traditions associated with past and present day Aboriginal communities.
Aboriginal object	Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW.
Aboriginal stakeholders	Members of a local Aboriginal land council, Aboriginal groups or other Aboriginal people who have registered their interest with the RMS to be consulted about a proposed RMS project or activity.
Abutment	An end support of a bridge.
Acid sulfate soils	Naturally acid clays, mud and other sediments usually found in swamps and estuaries. They may become extremely acidic when drained and exposed to oxygen and may produce acidic leachate run-off that can pollute waters and liberate toxins.
Activity	This is broadly defined in the <i>Environmental Planning & Assessment Act 1979</i> and includes most physical undertakings of the RMS in construction and maintenance of roads and road infrastructure facilities. Activities are subject to assessment under Part 5 and Part 5.1 of the Act (or under Part 3A if declared by the Minister for Planning).
Adaptive management	A systematic, rigorous approach (such as monitoring) for deliberately learning from management actions with the intent to improve subsequent management policy or practice.
Aboriginal focus group	Aboriginal focus group meetings are held to consult with Aboriginal stakeholders who have registered their interest to be consulted regarding an RMS project.
Aboriginal heritage information management system.	A register of NSW Aboriginal heritage information maintained by OEH.
Aggregate	A uniform sized material from sand, gravel, rock or metallurgical slag by screening, blasting or crushing. Used in concrete production and for bitumen sealing.
AHD	Australian Height Datum The standard reference level used to express the relative height of various features. A height given in metres AHD is essentially the height above sea level. Mean sea level is set as zero elevation.
Alignment	The geometric layout (eg of a road) in plan (horizontal) and elevation (vertical).

Term	Meaning
Alluvial	Relating to, consisting of, or formed by sediment deposited by flowing water.
Alluvial groundwater systems	Groundwater that is present in permeable (unconsolidated) material, usually small rocks and gravel.
Alluvium	Unconsolidated deposit of gravel, sand or mud formed by water.
AM peak period	6-10am weekdays.
Ancillary	A subordinate part or element.
ANZECC	Australian and New Zealand Environment and Conservation Council.
Aquatic ecology	Flora and fauna that live in or on water for all or a substantial part of the life span (generally restricted to fresh/inland waters).
Aquifer	Geologic formation, group of formations, or part of a formation capable of transmitting and yielding quantities of water.
Arboreal	To live in, or be connected with, trees.
Archaeological site	A site with any material evidence of past Aboriginal or non-Aboriginal activity in which evidence of past activity is preserved.
Archaeology	The scientific study of human history, particularly the relics and cultural remains of the distant past.
ARI	Average recurrence interval. Used to describe the frequency or probability of floods occurring. (eg a 100 year ARI flood is a flood that occurs or is exceeded on average once every 100 years (100:1)).
Arterial roads	The main or trunk roads of the State road network.
AS	Australian Standard.
AS 1940	Australian Standard: Guide to the Storage and Handling of Flammable and Combustible Liquids.
AS 2436	Australian Standard: Noise Control on Construction, Maintenance and Demolition Sites.
AS 2885.1	Australian Standard: Pipelines – Gas and liquid petroleum – Design and Construction
AS 2922	Australian Standard: Ambient Air Guide for Siting of Sampling Units.
AS 3580.10.1	Australian Standard: Methods for Sampling and Analysis of Ambient Air.
AS 4269	Australian Standard: Complaints Handling
AS/NZS 1158	Australian/New Zealand Standard: Public Lighting Code
Asphalt or asphaltic concrete	A dense, continuously graded mixture of coarse and fine aggregates, mineral filler and bitumen usually produced hot in a mixing plant.
ASS	Acid sulphate soils.
ASSMP	Acid Sulfate Soil Management Plan.

Term	Meaning
At-grade	A road at ground level, not on an embankment or in a cutting. Opposite to grade separated.
Aquaplaning	When a build-up of water on the road surface leads to a loss of traction between the vehicle's tyres and the road.
B	
Background noise level	The ambient sound-pressure noise level in the absence of the sound under investigation exceeded for 90% of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.
Balanced earthworks	Earthworks in which the quantity of material taken from road cuttings along the road mathematically equals the fill required to construct the embankments in that length of road.
Base case	Also known as “do nothing” case. Used in evaluating projects to compare the cost and benefit of the existing road (the base case) with another or a number of other projects or options.
Batter	The constructed slope of road embankments and cuttings usually expressed as a ratio of x horizontal to 1 (one) vertical. A fill batter is where the road is above the existing surface on a filled embankment and refers to the sloping sides of the embankment. A cut batter is where the road is below the existing surface.
Baffle system	Water flow control devices.
Base flows	The amount of water that enters a waterway from groundwater.
Batch plant	A mixing plant that produces batches of concrete or asphalt.
BBAM	BioBanking Assessment Methodology
B-double	A heavy vehicle consisting of two trailers linked together with a fifth wheel.
Bebo arch	A pre-cast concrete arch system.
Bedrock	Rock of a substantial thickness and extent underlying a relatively soft and variable surface.
Bench	A ledge constructed in a batter or natural slope to provide sight distance around a curve, greater security against slip or to assist batter drainage.
Berry Equestrian Centre	Berry Equestrian Centre incorporating the Berry Riding Club
BioBanking	A market-based scheme that provides a streamlined biodiversity assessment process for development, a rigorous and credible offsetting scheme as well as an opportunity.
Bioretention system	System in which the bioretention process occurs, which removes contaminants and sediments from stormwater runoff.
Blasting	The use of explosive for excavating rock, demolition and other purposes.
Blue Book	<i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004)
Bollard	A concrete or steel barrier.
Bore	A cylindrical drill hole sunk into the ground from which water is pumped for use or monitoring.

Term	Meaning
Borehole	A hole produced in the ground by drilling for the investigation and assessment of soil and rock profiles.
Box culvert	A culvert of rectangular cross section.
BTUCA	Berry Township Urban Conservation Area.
Bund	A small embankment designed to retain water.
C	
Capacity	The nominal maximum number of vehicles that can travel along a road in a given time.
Carriageway	The portion of a roadway used by vehicles including shoulders and ancillary lanes.
Catchment	The area from which a surface watercourse or a groundwater system derives its water.
CEMP	Construction Environmental Management Plan. A site specific plan developed for the construction phase of a project to ensure that all contractors and sub-contractors comply with the environmental conditions of approval for the project and that environmental risks are properly managed.
Chainage	Any point on a control line selected to provide more detailed information about the cross-section or any other feature mentioned in the drawings. Also known as a station.
Clearing	The removal of vegetation or other obstacles at or above ground level.
Climbing lane	An auxiliary lane, usually on a long upgrade, primarily for the use of slow moving vehicles. Differs from overtaking lanes as linemarking does not initially direct all traffic to the left hand side of the road.
CMA	Catchment Management Authority
Compaction	An increase in density of a soil material by mechanical means such as rolling the surface layers or for deep compaction, driving sand piles, vibration or impact methods.
Compound curve	Circular curves of different radius curving in the same direction.
Compound site	Facilities used to support the operation of a construction site including (but not limited to) site offices, workshops, delivery areas, storage areas, crib sheds, staff vehicle parking, materials, plant and equipment.
Concentration (air quality)	Vehicles emit pollutants to the air, which are transported and diluted resulting in a volume of pollutant per volume of ambient air. Ambient air quality goals are expressed in terms of concentrations, which are measured in parts per million or micrograms per cubic metre.
Concept design	Initial functional layout of a road/road system or other infrastructure. Used to facilitate understanding of a project, establish feasibility, and provide a basis for estimating and to determine further investigations needed for detailed design.
Confluence	A point at which streams combine.
Constructability	The ease with which structures can be built.

Term	Meaning
CPTED	Crime prevention through environmental design.
Critical habitat	The habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.
Cul-de-sac	A street or road that is open for vehicular traffic at one end only.
Culvert	A stream or drain.
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact considered alone.
Cut	The material excavated from a cutting.
Cutting	Formation resulting from the construction of the road below existing ground level – the material is cut out or excavated.
D	
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DEC	NSW Department of Environment and Conservation (now OEH).
DECC	NSW Department of Environment and Climate Change (formerly DEC and now OEH).
DECCW	NSW Department of Environment, Climate Change and Water (formerly DEC, DECC and now OEH).
Decibel	A scale unit used in the comparison of powers and levels of sound energy. Used for measuring noise.
Design speed	A nominal speed which determines the geometric design features of a road.
Design year	The predicted year in which the design traffic would be reached.
Detour	An alternative route, using existing roads, made available to traffic during temporary closure of a road.
Development consent	Consent granted under Part 4 of the <i>Environmental Planning and Assessment Act 1979</i> . Usually relates to the approval of a development application by a local council.
Deviation	An alteration to the alignment of a portion of a road.
Dewatering	The removal of water from solid material or soil by wet classification, centrifugation, filtration or similar solid-liquid separation processes.
DGRs	Director-General's requirements. Requirements and specifications for an environmental assessment prepared by the Director-General of the Department of Planning under section 75F of the <i>Environmental Planning & Assessment Act 1979</i> .
Dilapidated	A premise that falls into a state of disrepair or deterioration.
DIPNR	NSW Department of Infrastructure Planning and Natural Resources (Now DP&I).

Term	Meaning
Discharge	The volumetric rate of water flow.
Diurnal	Daily
DLWC	NSW Department of Land and Water Conservation (now part of DPI)
DP	Deposited Plan. A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.
DPI	The NSW Department of Primary Industries now part of NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS).
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Drawdown	The lowering of the water table resulting from the loss of water from an aquifer.
Driveway	A defined area for vehicles to travel between a carriageway and a property adjacent or near to the road.
DTIRIS	NSW Department of Trade and Investment, Regional Infrastructure and Services, now known as NSW Trade and Investment.
E	
Environmental assessment	Environmental assessment. A focussed analysis undertaken for the purposes of Part 3A of the Environmental Planning and Assessment Act 1979, written generally to comply with the environmental assessment requirements (DGRs) issued by the Director-General of the Department of Planning.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
Ecology	The relationship between living things and the environment.
Ecosystem	A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic community and between the biotic components of the system.
Edge effects	A change in species composition, physical conditions or other ecological factors at the boundary between two ecosystems or the ecological changes that occur at the boundaries of ecosystems (including changes in species composition, gradients of moisture, sunlight, soil and air temperature, wind speed and other factors).
EEC	Endangered ecological community. An ecological community identified by relevant legislation that is likely to become extinct or is in immediate danger of extinction.
Embankment	An earthen structure where the road (or other infrastructure) subgrade level is above the natural surface.
Emission source	Source from which greenhouse gases are released.

Term	Meaning
EMP	Environmental management plan. A plan used to manage environmental impacts during each phase of project development. It is a synthesis of all proposed mitigation, management and monitoring actions, set to a timeline with defined responsibilities and follow up actions.
EMS	Environmental management system. A quality system that enables an organisation to identify, monitor and control its environmental aspects. An EMS is part of an overall management system, which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.
Environment	All aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings (from EP&A Act).
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW).
EPA	NSW Environment Protection Authority (formerly part of DECCW, now part of OEH).
Ephemeral	Existing for a short duration of time.
EPL	Environment Protection Licence.
Escarpment	A long, cliff-like ridge of rock commonly formed by faulting or fracturing of the earth's crust.
ESD	Ecologically sustainable development. As defined by the <i>Protection of the Environment Administration Act 1991</i> , requires the effective integration of economic and environmental considerations in decision making processes including: - The precautionary principle. - Inter-generational equity. - Conservation of biological diversity and ecological integrity. - Improved valuation, pricing and incentive mechanisms (includes polluter pays, full life cycle costs, cost effective pursuit of environmental goals).
Ethno-historic	The study of indigenous cultures and customs by examining historical records.
F	
Falling head test	A testing method used to determine the permeability of fine grained soils.
Fauna fencing	Exclusion fencing used to keep animals out of the road area.
Fill	The material placed in an embankment.
Flood mitigation	Measures taken to control or minimise the effects of flooding.
Fly ash	Particles produced as a by-product in coal fired power stations.
Footpath	The paved area in a footway.
Footprint	The extent of impact that a development makes on the land.
Formation	The final shape of the road after completion of earthworks but before placing any pavement layers.

Term	Meaning
Form letter	A standardised submission made by a number of stakeholders.
Fragmentation	The breaking up of continuous sections of ecosystems or landscape features.
Freeboard	The vertical distance from the top water level of a flood or creek to a specific location such as a road surface level or a ground level of a house.
G	
g/m ² /month	Grams per square metre per month.
Geomorphic	Of, or pertaining to, the earth or the forms of its surface.
Girder	A large structure or beam used for bridge building.
GPS	Global Positioning System.
Grade	1. The rate of longitudinal rise (or fall) with respect to the horizontal expressed as a percentage or ratio. 2. To trim or smooth an earth, gravel or other surface using a grader or similar implement.
Greenfield	Previously undeveloped land.
GHG	Greenhouse gas Greenhouse gases are those gases which reduce the loss of heat from the earth's atmosphere by absorbing infrared radiation. Six greenhouse gases are regulated by the Kyoto Protocol: Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous oxide (N ₂ O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF ₆). The emissions of greenhouse gases are reported in carbon dioxide equivalents (see above).
Ground cover	A low growing woody or herbaceous plant.
Ground vibration	The combined speed of ground oscillation at a point from a source of vibration such as a blast or vehicle.
Groundwater	Water that is held in the rocks and soil beneath the earth's surface.
Groundwater dependent ecosystem	An ecosystem that required access to groundwater in order to maintain its structure and function.
Grubbing	The removal of roots or stumps from below ground level.
H	
Ha	Hectare/s.
Ha-ha effect	A term in urban design that refers to a barrier, one side of which is concealed from view, designed to allow an unobstructed view from one side while maintaining a physical barrier in one direction.
Habitat	The place where a species, population or ecological community lives (whether permanently, periodically or occasionally). Habitats are measurable and can be described by their flora and physical components.
Haul road	A designated road, often temporary, used for moving materials (often used when new infrastructure is being constructed).

Term	Meaning
Heavy vehicle	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System.
Hydraulic conductivity	A measure of a soils ability to transmit water when subject to a hydraulic gradient.
Hydrocarbon	Any organic compound — gaseous, liquid or solid — consisting only of carbon and hydrogen.
Hydrology	The study of rainfall and surface water runoff processes.
I	
IFD	Intensity-Frequency-Duration
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Indigenous species	Plant species native to the area in which the project is located.
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways.
Intersection turning counts	The number of vehicles counted turning at an intersection.
Intrusive noise	An environmental noise source that may cause annoyance.
J	
Junction	A place where two or more roads meet.
L	
LA ₁₀	The noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below LA ₁₀ level for 90% of the time. The LA ₁₀ is a common noise descriptor for environmental noise and road traffic noise.
LA ₉₀	The noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below LA ₉₀ level for 10% of the time. This measure is commonly referred to as background noise level.
LA _{eq}	The equivalent continuous sound level. This is the energy average of the varying noise over the sample period and is equivalent to the level of constant noise which contains the same energy as the varying noise environment. This measure is a common measure of environmental noise and road traffic noise.
LA _{max}	The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.
Landscape	1. A tract of land. 2. A prospect or piece of scenery or land which may include villages, towns, cities and infrastructure.
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features.
Lane	A portion of the carriageway allotted for the use of a single line of vehicles.

Term	Meaning
Leachate	A liquid that drains from land or stockpiled material that contains elevated concentrations of material derived from the material through which it has passed.
Left-in and left-out	Restricted turning movements for vehicles entering and leaving the highway. Only left hand turns would be permitted due to the central median barrier to prevent conflicting traffic movements.
Light vehicle	A vehicle less than five tonnes gross.
Local provenance species	Species found growing in the locality of a project.
Local road	A road or street used primarily for access to abutting properties.
LoS	Level of service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
Lot	A parcel of land defined by measurement as a lot in a deposited plan (DP) or as a Crown portion or allotment.
M	
Macropod	A marsupial with long hind legs.
Median	The central reservation which separates carriageways from traffic travelling in the opposite direction.
Methodology	The method for analysis and evaluation of the relevant subject matter.
Micron	One millionth of a metre (abbreviation μ).
Mid-block	A general location on a road between two intersections.
Midden	A mound or deposit containing relics that indicates the site of a human settlement.
Mode	A type or method of transport movement – including for the road corridor: cars, buses, bikes and pedestrians.
Motorway	Fast, high volume controlled access roads. May be tolled or untolled.
MP	Member of Parliament.
N	
NCA	Noise Catchment Areas.
NOHC	Navin Officer Heritage Consultants.
Noise attenuation	Implementation of measures to reduce noise impacts.
Noise logger	A noise logger measures the noise level over the sample period and then determines LA1, LA10, LA90, LAmax and LAeq levels of the noise environment. The LA1, LA10 and LA90 levels are the levels exceeded for one per cent, 10 per cent and 90 per cent of the sample period respectively. The LAmax is indicative of maximum noise levels due to individual noise events. The LA90 is taken as the background noise level. The LAeq is the energy averaged noise level over a defined period.

Term	Meaning
Noxious weeds	A weed declared to be a noxious under section 7 of the Noxious Weed Act 1993.
NPWS	NSW National Parks and Wildlife Service (now OEH).
NSW	New South Wales.
O	
OEH	NSW Office of Environment and Heritage.
Offline construction	Sections of project that are to be constructed away from the existing highway.
Off-ramp	A short section of road which allows vehicles to enter or exit a highway.
On-ramp	A ramp by which one enters a limited-access highway.
Origin-destination surveys	A count of the number of vehicles travelling from one point to another.
Overtaking lane	An auxiliary lane provided to allow for slower vehicles to be overtaken. Line marked so that all traffic is initially directed into the left hand lane with the inner lane being used to overtake.
P	
Paramics	Traffic simulation modelling software.
Part 3A approvals (EP&A Act)	Major project approvals. Relates to the approval of a major project / critical infrastructure project under Part 3A of the <i>Environmental Planning and Assessment Act 1979</i> .
PASS	Potential acid sulfate soils.
Pavement	The portion of a carriageway placed above the subgrade for the support of, and to form a running surface for vehicular traffic.
Permeability	The capability of a porous rock or sediment to permit the flow of fluids through its pore spaces.
Petition	A submission representing a number of signatories.
PM	Particulate matter.
PM ₁₀	Particulate matter less than 10 microns in diameter.
PMF	Probable maximum flood. Largest flood that could theoretically occur at a particular location and defines the extent of flood prone land (the floodplain).
Pollutant	Any measured concentration of solid or liquid matter that is not naturally present in the environment.
Pool	Areas in a waterway with little or no flow.
Potentially directly affected	Potentially impacted by land acquisition.
Potentially indirectly affected	Within close proximity to the project, but not affected by property acquisition.

Term	Meaning
Productive agricultural land	Land with the best combination for soil, climate and topography for agricultural production as mapped by NSW Industry and Investment. Often shown in the maps accompanying regional planning strategies and local environmental plans.
Proponent	The person or organisation that proposes carrying out the project or activity.
Q	
Quarry	An open pit from which stone, sand, gravel or fill is taken.
R	
RBL	Rating background level. The median value of the assessment background levels value for the period over all of the days measured. There is therefore an RBL value for each period — daytime, evening and night-time.
Receiving waters	Bodies of water that receive runoff or wastewater discharges.
Receptor/receiver	An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, work place, school or other place where people spend some time. An elevated receptor is a point above ground level.
Reference design	A 'reference design' refers to a design developed beyond concept design with specified design improvements locked in as part of the environmental assessment, eg bridge joint types, number of bridge joints, column numbers and thickness.
Representative impact scenario	The <i>representative impact scenario</i> would see the project as described being undertaken but without the implementation proposed measures such as: Mitigation; on site management; minimisation of impacts; offsetting measures and monitoring procedures.
Revegetation	To revegetate an area by direct seeding with native species using manual or mechanical means such as hydromulching, strawmulching and tractor seeding.
Riffle	Areas in a waterway of broken water with rapid current.
Riparian	Relating to the banks of a natural waterway.
RMS	Roads and Maritime Services of New South Wales.
Road furniture	A general term covering all signs, street lights and protective devices for the control, guidance and safety of traffic and convenience of road users.
Road reserve	A legally defined area of land within which facilities such as roads, footpaths and associated features may be constructed for public travel.
Roadside	The area from the edge of the carriageway to the boundary of the road reserve.
Roundabout	An intersection where all traffic travels in one direction around a central island.
RTA	Roads and Traffic Authority of NSW (now RMS)

Term	Meaning
Run off	That part of the rainfall on a catchment which flows as surface discharge past a specified point.
S	
'Sandtrack'	An alternative route to the winding, hilly section of Princes Highway between Gerringong and Bomaderry (via Fern Street, Crooked River Road, Gerroa Road and Bolong Road).
Scour	The erosion of material by the action of flowing water.
Sediment	Material, both mineral and organic, that is being or has been moved from its site of origin by the action of wind, water or gravity and comes to rest either above or below water level.
Sediment/Sedimentation basin	An area where runoff water is ponded to allow sediment to be deposited.
Sedimentation	Deposition of sediment usually by water.
Select material zone (SMZ)	A road is broken up into a number of specified layers. The top layers are classified as 'base' and 'sub base' layers. The next level down is classified as a 'select zone' and the next layer below (SMZ), which is a selection of material from the site that has higher strength qualities. The 'upper zone of formation' (UZF), includes the 'select material'.
SEPP	State environmental planning policy.
Severance of land	The creation of a physical barrier between a property and an existing road access to that property, or between two sections of the same property.
Shared path	A pathway used for both cyclists and pedestrians, usually located on the side of the road.
Shoulder	The portion of the carriageway beyond the traffic lanes adjacent to and flush with the surface of the pavement.
SICPH CL	Southern Illawarra Coastal Plain and Hinterland Cultural Landscape.
Sight distance	The distance measured along the carriageway over which objects of defined height are visible to a driver whose eyes are at a specified height above the pavement surface level.
Site compound	Area enclosing construction machinery, stockpiles, site offices and other ancillary facilities.
Slag	Waste matter separated from metals during the smelting or refining of ore.
Socio-economic	Involving combination of social and economic matters.
Sound power level	A logarithmic measure of the sound power in comparison to a specified reference level.
Span	The distance between the centres of adjacent supports of a bridge.
Spoil	Surplus excavated material.
State heritage register	A register kept by the NSW Heritage Council which lists places, buildings, works, relics, moveable objects or precincts that the Minister for Planning considers are of State heritage significance.

Term	Meaning
Sterilisation of land	The project severs a property into fragments of a size or shape that causes the existing land use to become unviable. This would result in a change in land use.
Stockpile	Temporarily stored materials such as soil, sand, gravel and spoil/waste.
Street furniture	Objects and pieces of equipment installed on streets and roads for various purposes.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Sustainability	Considering present and future needs and costs.
Swale	A shallow, grass-lined drainage channel.
T	
Terrestrial	Living or growing on land (ie a terrestrial plant or animal).
Terrestrial ecology	Flora and fauna whose habitat on land as opposed to in water, or on the ground as opposed to on another plant.
TfNSW	Transport for NSW.
Threatened	As defined under the <i>Threatened Species Conservation Act 1994</i> , a species, population or ecological community that is likely to become extinct or is in immediate danger of extinction.
Tie-in point	A location where the highway connects with the local road network or a location where the upgraded highway connects with immediately adjacent sections of highway.
TIG	Technical Investigation Group.
Traffic Management Plan	Traffic Management Plan.
TRACKS	Strategic traffic modelling for current to future year growth rates.
TRACL	Toolijooa Ridge Aboriginal cultural landscape.
Tributary	A river or stream flowing into a larger river or lake.
TSC Act	NSW <i>Threatened Species Conservation Act 1995</i> .
U	
Underpass	A grade separation where the subject carriageway passes under an intersecting carriageway (or railway). A tunnel constructed for the use of pedestrians, cyclists, fauna and/or stock under the carriageway.
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments.
V	
Verge	That portion of the formation not covered by the carriageway, the median or the footpath.
VKT	Vehicle kilometres travelled.

Term	Meaning
Vulnerable	As defined under the <i>Threatened Species Conservation Act 1995</i> , a species that is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate.
W	
Water bearing strata	Ground layers below the standing water level.
Water table	The surface of saturation in an unconfined aquifer at which the pressure of the water is equal to that of the atmosphere.
Waterway	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent).
Wetland	A swamp or marsh in which the soil is frequently or permanently saturated with water, or under water.
Wetted width	The section of waterway channel that carries median flows.

1 Introduction and background

1.1 The project

Roads and Maritime Services (RMS) proposes to upgrade 11.6 kilometres of the Princes Highway between Toolijooa Road north of Foxground and Schofield's Lane south of Berry, in New South Wales (NSW) (the project), to achieve a four lane divided highway (two lanes in each direction) with median separation. The project includes bypasses of Foxground and Berry.

The project, as displayed in the environmental assessment, comprises the following key features:

- Construction of a four lane divided highway (two lanes in each direction) with median separation (wire rope barriers or concrete barriers where space is constrained, such as at bridge locations).
- Bypasses of the Foxground bends and the Berry township.
- Construction of around 6.6 kilometres of new highway where the project deviates from the existing highway alignment at Toolijooa Ridge, the Foxground bends and the Berry township.
- Provision for the possible widening of the highway (if required in the future) to six lanes within the road corridor and, in some areas, construction of the road formation to accommodate future additional lanes where safety considerations, traffic disruption and sub-optimal construction practices are to be avoided.
- Grade-separated interchanges at:
 - Toolijooa Road.
 - Austral Park Road.
 - Tindalls Lane.
 - East of Berry at the existing Princes Highway, referred to as the northern interchange for Berry.
 - West of Berry at Kangaroo Valley Road, referred to as the southern interchange for Berry.
- A major cutting at Toolijooa Ridge (around 900 metres long and up to 26 metres deep).
- Six lanes (two lanes plus a climbing lane in each direction) through the cutting at Toolijooa Ridge for a distance of 1.5 kilometres.
- Four new highway bridges:
 - Broughton Creek bridge 1, a four span concrete structure around 170 metres in length and nine metres in height.
 - Broughton Creek bridge 2, a three span concrete structure around 75 metres in length and eight metres in height.
 - Broughton Creek bridge 3, a six span concrete structure around 190 metres long and 13 metres in height.
 - A bridge at Berry, a 19 span concrete structure around 600 metres long and up to 12 metres in height.
- Three highway overbridges:
 - Austral Park Road interchange, providing southbound access to the highway.
 - Tindalls Lane interchange, providing southbound access to and from the highway.
 - Southern interchange for Berry, providing connectivity over the highway for Kangaroo Valley Road along its existing alignment.

- Eight underpasses including roads, drainage structures and fauna underpasses:
 - Toolijooa Road interchange, linking Toolijooa Road to the existing highway and providing northbound access to the upgrade.
 - Property access underpass in the vicinity of Toolijooa Ridge at chainage 8400.
 - Dedicated fauna underpass in the vicinity of Toolijooa Ridge at chainage 8450.
 - Property access underpass between Toolijooa Ridge and Broughton Creek at chainage 9475.
 - Combined drainage and fauna underpass in the vicinity of Austral Park Road at chainage 12800.
 - Combined drainage and fauna underpass in the vicinity of Tindalls Lane at chainage 13320.
 - Dedicated fauna underpass in the vicinity of Tindalls Lane at chainage 13675.
 - Property access underpass between the Tindalls Lane interchange and the northern interchange for Berry in the vicinity of at chainage 15100.
- Modifications to local roads, including Toolijooa Road, Austral Park Road, Gembrook Lane, Tindalls Lane, North Street, Queen Street, Kangaroo Valley Road, Hitchcocks Lane and Schofields Lane.
- Diversion of Town Creek into Bundewallah Creek upstream of its confluence with Connollys Creek and to the north of the project at Berry.
- Modification to about 47 existing property accesses.
- Provision of a bus stop at Toolijooa Road and retention of the existing bus stop at Tindalls Lane.
- Dedicated u-turn facilities at Mullers Lane, the existing highway at the Austral Park Road interchange, the extension to Austral Park Road, and Rawlings Lane.
- Roundabouts at the southern interchange for Berry and the Woodhill Mountain Road junction with the exiting Princes Highway.
- Two culs-de-sac on North Street and the western end of Victoria Street in Berry.
- Tie-in with the existing highway about 75 metres north of Toolijooa Road and about 440 metres south of Schofields Lane.
- Left in/left out only provisions for direct property accesses to the upgraded highway.
- Dedicated public space with shared pedestrian/cycle facilities along the southern side of the upgraded highway from the playing fields on North Street to Kangaroo Valley Road.
- Ancillary operational facilities, including permanent detention basins, stormwater treatment facilities and a permanent ancillary facility site for general road maintenance.

As a result of the community consultation during the display of the environmental assessment the following changes have been made to the project:

- Change of ownership status of property access road between chainage 9450 to chainage 9880 about 500 metres north of Broughton Creek crossing number one.
- Removal of turnaround facility on the Austral Park Road extension.
- Property access and boundary adjustment between chainage 11800 and chainage 12300, opposite Austral Park Road.
- Changed property access arrangement at chainage 12260, opposite Austral Park Road.
- Property access adjustment and flood mitigation between chainage 12820 and chainage 13150 about 550 metres south of the Austral Park Road interchange.

- Changed local road access arrangement for Gembrook Lane, opposite the Tindalls Lane interchange.
- Increased curve radius to optimise alignment at the Tindalls Lane interchange, chainage 13850.
- Changed property access at chainage 14430 at the southern end of the Tindalls Lane interchange.
- Removal of retaining wall and reshaping of a constructed dam at the northern interchange for Berry, between chainage 15500 and 15650.
- Realignment of the Town Creek diversion.
- Adoption of Victoria Street option 3 with the modifications presented in Chapter 4 of this report.
- Modified Schofields Lane intersection with the provision of an underpass with connecting property accesses.

An overview of the project is shown in **Figure 1-1**. A more detailed description of the project is available in Volume 1 *Foxground and Berry bypass environmental assessment* prepared for RMS by AECOM in November 2012.

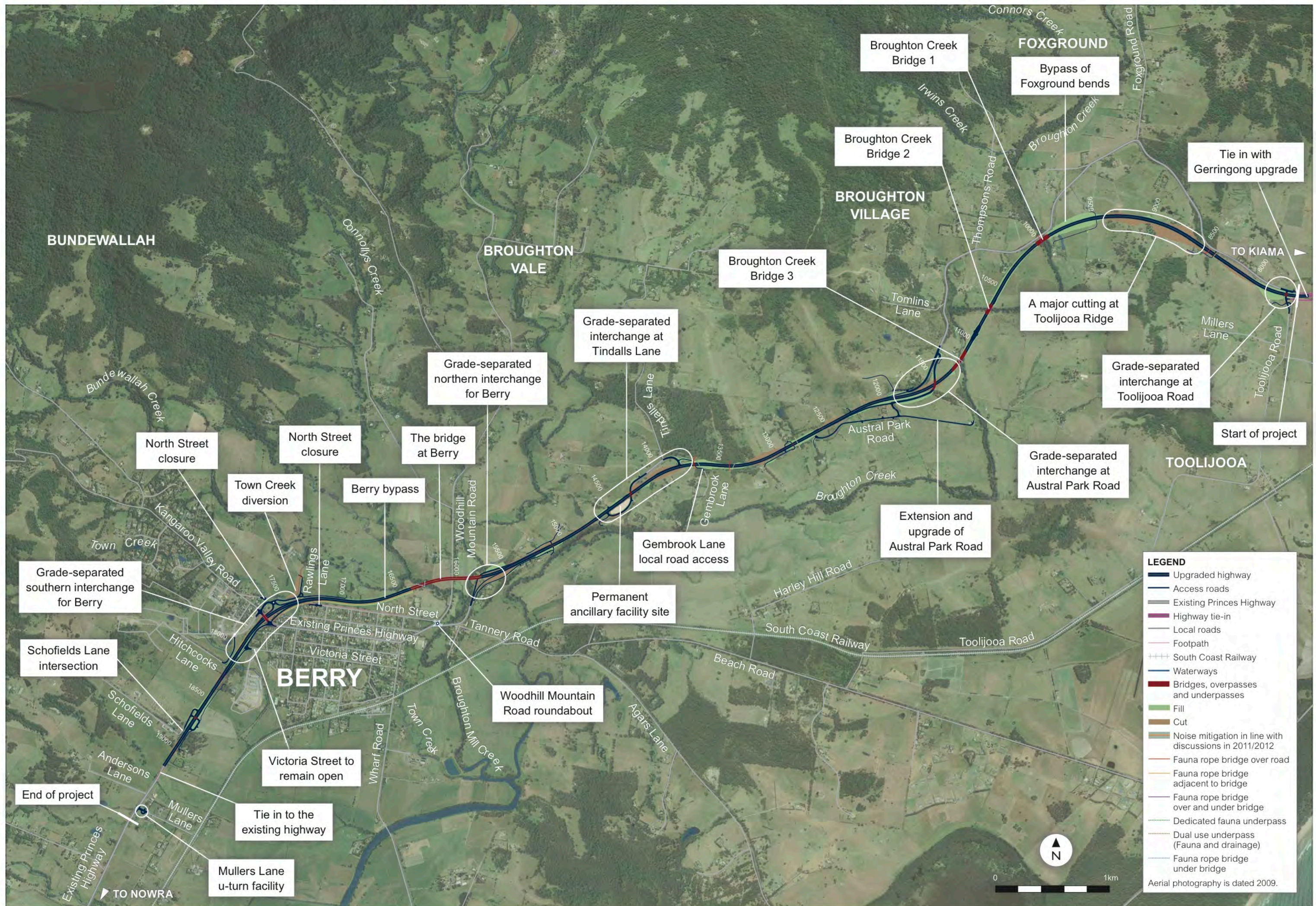


Figure 1-1 Overview of the project

1.2 Statutory context

RMS is seeking project approval for the project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Minister for Planning and Infrastructure declared under the then section 75B of the EP&A Act, by Order published in NSW Government Gazette No. 114 on 10 September 2010, that development for the purpose of the Foxground and Berry bypass is a project to which Part 3A of the EP&A Act applies.

Part 3A of the EP&A Act was repealed on 1 October 2011. The transitional provisions under Schedule 6A of the EP&A Act provide that the project is a transitional Part 3A project. Part 3A continues to operate in respect of transitional Part 3A projects.

In accordance with the requirements of the EP&A Act, an environmental assessment was prepared to assess the potential impacts of the project. This was submitted to the Department of Planning and Infrastructure in November 2012.

1.3 Environmental assessment exhibition

The environmental assessment was exhibited for 34 days from Wednesday 14 November 2012 to Monday 17 December 2012. The exhibition was advertised in local and metropolitan press (via print and radio), including:

- 94.9 Power FM Illawarra – 14 November and 5 December 2012.
- 96.5 Wave FM Wollongong and Illawarra – 14 November and 5 December 2012.
- Wollongong Advertiser – 14 November 2012.
- Illawarra Mercury – 14 November, 8 and 12 December 2012.
- South Coast Register – 12, 14, 19 and 28 November and 7 and 10 December 2012.
- Shoalhaven News – 22 and 29 November and 6 December 2012.
- National Indigenous Times – 14 November 2012.
- Koori Mail – 28 November 2012.
- Berry Town Crier – December 2012.

A community update was sent in November 2012 to over 12,000 households from Gerringong in the north, to North Nowra in the south and Shoalhaven Heads in the east. The update provided information about the environmental assessment exhibition locations and timeframes for submissions.

Variable messaging signs were placed at the northern and southern ends of the project and were updated weekly with the latest display information.

The environmental assessment was made available electronically for viewing and download on the Department of Planning and Infrastructure's [website](#) and the [project website](#). Electronic copies (on CD) were also made available to members of the public on request.

The environmental assessment was exhibited at the following locations:

- RMS project office – Shop 3/113 Queen Street, Berry. Open:
 - Mondays, Tuesdays, Wednesdays and Fridays 10am to 5pm.
 - Thursdays 12pm to 7pm.
 - Saturday 24 November 10am to 2pm.
 - Saturday 1 December 10am to 2pm.
- Department of Planning and Infrastructure display – 23-33 Bridge Street Sydney (open Monday to Friday 9am to 5pm).
- Kiama Municipal Council – 11 Manning Street Kiama (open Monday to Friday 8.45am to 4.15pm).
- Kiama Library – 7 Railway Parade Kiama (open Monday, Wednesday, Thursday and Friday 9.30am to 5.30pm, Tuesday 9.30am to 8pm and Saturday 9.30am to 2pm).
- Shoalhaven City Council – 44 Bridge Road Nowra (open Monday to Friday 9am to 5pm).
- Nowra Library – 10 Berry Street Nowra (open Monday to Friday 9.30am to 7pm and Saturday 9.30am to 3pm).
- Office of Gareth Ward MP, Member for Kiama – 125 Terralong Street Kiama (open Monday to Friday 9am to 5pm).
- Gerringong upgrade community display centre – 446 Princes Highway Gerringong (open Monday to Friday 9am to 5pm).
- RMS Wollongong office – Level 4, 90 Crown Street Wollongong (open Monday to Friday 8.30pm to 5pm).
- RMS North Sydney office – Level 9, 101 Miller Street North Sydney (open Monday to Friday 8.30pm to 5pm).
- Nature Conservation Council of NSW – Level 2, 5 Wilson Street Newtown (open Monday to Friday 9am to 5pm).

Over 1000 visits were made by community members to RMS' project office in Berry during the environmental assessment display period. The display at the project office included:

- Copies of the environmental assessment report and technical papers.
- A set of 11 information posters, displaying the concept design, how to make a submission, key environmental issues (flooding, flora and fauna, Aboriginal and non-Aboriginal heritage and traffic and transport) and the three design options for Victoria Street.
- A 3-dimensional animated model of the concept design which was used during one-on-one discussions with community members. The built-in features of the model allowed affected stakeholders to measure distances and heights of particular project features.
- Five 3-dimensional video animations showing:
 - The proposed alignment from Toolijooa Road to Muller Lane (southbound).
 - The proposed alignment from Mullers Lane to Toolijooa Road (northbound).
 - Pedestrian and cycleway routes from Kangaroo Valley Road to Mark Radium Park.
 - Pedestrian and cycleway routes from Kangaroo Valley Road to North Street (sports fields).
 - The three design options for Victoria Street.

- A 3-dimensional physical model showing the route and features of the concept design for all three sections of the Gerringong to Bomaderry Princes Highway upgrade. The model is moulded to reflect the existing surrounding contours and terrain, and assist visitors in visualising the concept design route.
- An interactive mapping tool, showing potential (modelled) noise and flooding impacts.
- Technical concept design drawings.

The project website provided an overview of the project, a full copy of the environmental assessment, guidance on how to make a submission and information on consultation activities undertaken for the project to date. It included links to the interactive noise and flooding mapping tools and the five video animations.

The environmental assessment report and technical papers were also made available in electronic format (CD) during the display period.

A freecall project information line (1800 506 976) and email address were also available during the exhibition period.

1.3.1 Topic specific community information sessions

Four topic specific community information sessions were held during the exhibition period:

- Noise and vibration, Tuesday 20 November 2012, around 25 attendees.
- Flooding, Wednesday 21 November 2012, around 20 attendees.
- Traffic, Thursday 22 November 2012, around 30 attendees.
- Urban design, Tuesday 27 November 2012, around 10 attendees.

All sessions were held between 6pm and 7:30pm at the Berry School of Arts, Alexandra Street, Berry. Technical specialists with relevant expertise were available for one-on-one discussions during the four sessions.

1.3.2 Letters and emails to key stakeholders and community

Letters were sent to key stakeholders and members of the community to inform them of the exhibition period, provide information on consultation activities and offer advice on how to make a submission. Letters were sent to the following recipients:

- 43 letters to potentially directly affected property owners (owners of those properties that would potentially be impacted by land acquisition) which, in addition to providing details on the exhibition, offered a one-on-one meeting with members of the project team.
- Two letters to local councils, Shoalhaven City Council and Kiama Municipal Council.
- Five letters to NSW Government Agencies, Department of Primary Industries (two letters), Environmental Protection Authority, Office of Environment and Heritage (Heritage Branch and Landscape and Aboriginal heritage).
- One letter to the Berry Chamber of Commerce and Tourism.

Over 700 copies of the community update were posted to stakeholders and community members registered on the project mailing list.

Over 650 registered stakeholders and community members were also sent an email notification to advise them of the commencement of the exhibition period. The email provided direction to the project website for more information.

1.3.3 Phone calls to property owners

A total of 110 phone calls were made at the commencement of the public exhibition period. Phone calls were made to both potentially directly affected property owners and potentially indirectly affected property owners (within close proximity to the project, but not affected by property acquisition). Potentially directly affected property owners were offered a one-on-one meeting with the project team. Potentially indirectly affected property owners were provided with information on the public display and encouraged to participate in the consultation process.

1.3.4 Meetings with property owners

Potentially directly affected property owners were offered a one-on-one meeting with RMS project staff and members of the project team. In all, 13 meetings were held with property owners throughout the exhibition period to discuss the environmental assessment, potential property impacts and other issues associated with the concept design.

1.3.5 Meetings with local Councils

Meetings were held with each council affected by the project. A meeting was held with Kiama Municipal Council on Monday 19 November 2012 and a separate meeting held with Shoalhaven City Council on Monday 10 December 2012. The meetings presented a summary of information available in the environmental assessment and discussed potential issues associated with the concept design. The video animations of the project were also presented to both Councils as a reference tool.

1.4 Purpose of the document

During the exhibition of the environmental assessment, 254 submissions were made. The Director-General of the Department of Planning and Infrastructure provided copies of the submissions to RMS. In accordance with section 75H(6) of the EP&A Act, the Director-General required RMS to respond to the issues raised in these submissions in a submissions report. The Director-General also advised that if there are any proposed changes to the project to minimise its environmental impact, a preferred project report may be required, and that the Statement of Commitments in the environmental assessment may need to be revised to reflect any proposed changes to the project.

This report identifies the issues raised during exhibition of the environmental assessment and provides responses to those issues (**Chapter 2**). It includes information regarding a description of changes to the project (**Chapter 3**) and a revised statement of commitments for the project (**Chapter 4**).

2 Response to issues

2.1 Respondents

A total of 254 submissions were received during the exhibition period from 14 November 2012 to 17 December 2012. Late submissions were also received through to 26 January 2013 and have been responded to in this report. Submissions included copies of two form letters and one petition.

Form letters

Two form letters were received. In total, Form Letter 1 was lodged 50 times and raised concerns over the impacts from the Berry bypass on the Berry Equestrian Centre.

Form Letter 2 was lodged seven times and was in support of the implementation of Victoria Street Option 3.

Petitions

A petition bearing 22 signatures in total was received calling for the implementation of Victoria Street Option 3.

Details of each submission and the location where issues raised are addressed in this report are provided in **Appendix A**.

2.2 Overview of the issues raised

The Department of Planning and Infrastructure received a total of 254 submissions in response to the exhibition of the environmental assessment comprising five submissions from government agencies, three submissions from local councils and 246 submissions from the community.

Each submission has been examined individually to understand the issues being raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and RMS' response to these issues forms the basis of this chapter.

Of the 254 submissions received, six per cent made a clear statement of objection to the project and four per cent made a clear statement of support for the project. A further one per cent stated an objection to the project with qualifications on the impacts on the township of Berry due to the proposed location of the Berry bypass. Three per cent of respondents provided conditional support on the basis that their issues of concern would be addressed. Eighty six per cent of submissions did not include a clear statement of objection to or support for the project.

Victoria Street design options

The environmental assessment display presented the following three options for the western end of Victoria Street:

Option 1	Full closure of Victoria Street (created by a cul-de-sac) with a southbound on-ramp from Queen Street, providing access to the new bypass.
Option 2	Victoria Street remains open, providing one-way travel between Queen and Victoria streets, with a southbound on-ramp south of Victoria Street.
Option 3	Victoria Street remains open, maintaining two-way travel adjacent to the highway between Queen and Victoria streets, with a southbound on-ramp south of Victoria Street.

Of the 254 submissions received, 97 respondents expressed an opinion in relation to Victoria Street. Sixteen respondents supported or preferred Victoria Street Option 1, nine supported or preferred Victoria Street Option 2 and 36 supported or preferred Victoria Street Option 3. Twenty nine respondents expressed opposition to Victoria Street Option 1 and two an opposition to Victoria Street Option 2. A further five submissions expressed support for Victoria Street to remain open, but did not specify a preference for a particular option.

Victoria Street design options are discussed further in **Section 2.22** of this report.

Berry Alliance submission

A detailed submission was received on behalf of the Berry Alliance. Of the 254 submissions received, 31 expressed support of the issues raised in the Berry Alliance submission, while nine submissions were opposed to the Berry Alliance submission on the grounds that the Berry Alliance were not the representative voice of the Berry community.

2.2.1 Government agencies

Five government agencies made submissions, raising a range of issues relevant to their areas of responsibility. Some recommendations for Conditions of Approval were also made. A summary of each agency's issues is provided below.

Heritage Council of NSW

The Heritage Council of NSW raised issues relating to the non-Aboriginal heritage component of the environmental assessment, including the following:

- The project would have a direct impact on nine and a partial impact on six heritage items.
- The project would have visual and structural impacts on the Southern Illawarra Coastal Plan and Hinterland Cultural Landscape.
- The need to reassess the heritage significance of the *Glen Devon* property and assess the possibility of its re-location to a new site.

The Heritage Council also provided recommendations for inclusion as part of the Conditions of Approval.

Environment Protection Authority

The Environment Protection Authority (EPA) stated that there would be significant benefits to the local community and motorists as a result of the project, but that these benefits needed to be weighed against potential adverse impacts. Issues raised related to the assessment and management of noise, air quality, surface water and groundwater, and waste management impacts. The EPA also made recommendations for inclusion as part of the Conditions of Approval.

Office of Environment and Heritage

The Office of Environment and Heritage (OEH) raised issues on biodiversity impacts of the project and Aboriginal heritage matters, including the:

- Calculation of the biodiversity impacts and offset requirements for the project.
- Potential placement of some temporary ancillary facilities on areas containing Aboriginal cultural heritage values.
- Amendments to the Statement of Commitments.

Trade and Investment - Crown Lands

Crown Lands detailed the status and tenure of the Crown Land holdings impacted by the project.

Department of Primary Industries

The Department of Primary Industries submissions included responses from Fisheries NSW, NSW Office of Water, Agriculture NSW and Forests NSW. Issues raised include the:

- Safeguards and mitigation measures to minimise the environmental impacts on Broughton Creek, Broughton Mill Creek, Bundewallah Creek, Connollys Creek and Town Creek.
- Diversion of Town Creek, impacts on riparian vegetation and revegetation strategy.
- Location of project works and ancillary infrastructure (including stockpiles).
- Severance of rural properties and maintenance of internal accesses / connectivity of farmland.
- Recommendations for inclusion as part of the Conditions of Approval.

2.2.2 Local councils

Kiama Municipal Council, Shoalhaven City Council and Shoalhaven Water each made a submission which raised a range of issues which are summarised below:

- Access arrangements to properties during the construction phase.
- Severance of rural properties lots and loss of connectivity to parcels of farmland.
- Traffic increase on 'the Sandtrack' during the construction phase of the project resulting in road deterioration and increased maintenance requirements.
- Flooding issues at pipes, bridges, culvert outlets and increased flooding levels on properties.
- Ease of access for residents, emergency vehicles and deliveries to residents on the existing highway between Toolijooa and Austral Park Road. Provision of adequate signage at both the Austral Park Road and Toolijooa exits.
- Re-vegetation and ongoing maintenance of landscaping treatments proposed to mitigate the visual impact of the highway and structures.
- Relocation of the Alexander and David Berry sculptures.
- Noise, visual, socio-economic and land-take impacts on the Berry Equestrian Centre.
- Provision for a future northbound exit and an entry point for traffic heading south onto the highway at the eastern end of Berry.

- Preference for Victoria Street Option 3 which provides traffic to and from the south-west sector of the town with the opportunity to exit or enter the highway without travelling on other local roads.
- Modified Victoria Street Option 3 proposed by Shoalhaven City Council for RMS consideration.
- Minimisation of impacts on Mark Radium Park with support for the park to continue functioning as a rest area park with appropriate highway signage.
- Construction and maintenance issues including noise and vibration impacts, dilapidation of the existing local road network, footpaths and other infrastructure, impacts on utility services and location of sedimentation basins.
- Recommendations for inclusion as part of the Conditions of Approval.

2.2.3 Community

Community submissions have predominantly reflected the issues and concerns of residents living along the Princes Highway alignment and in the Berry township, local groups with social, economic and environmental interests and users of the Princes Highway including motorists and agricultural business owners. The main issues raised in community submissions include:

Strategic alternatives and project options

- Validity and robustness of the route selection process and exclusion of environmental and socio-economic assessment of the southern route option.
- Justification for the exclusion of the 1996 Value Management Workshop results in the environmental assessment and development of the long list of route options.
- Design refinement recommendations for the project.

Traffic and transport

- Varying preferences and issues relating to the three design options presented for Victoria Street.
- Recommendations of alternative access options for the Arbour and Bupa estates.
- Pedestrian and cyclist safety at the Berry southern interchange and on the local road network including George, Edward and Albany streets.
- Accuracy of RMS traffic modelling and forecasting.
- Provision of a second northbound exit ramp for Berry.

Noise and vibration

- Construction noise and vibration impacts on residents associated with blasting of Toolijooa Ridge, high noise activities, out of hours and extended hours of work.
- Increase in operational traffic noise from the new highway.
- Design, appearance and functionality of the noise barriers along North Street and adjacent to Huntingdale Park Road.
- Recommendations for alternative noise mitigation treatments for noise sensitive receivers other than architectural treatments.

Biodiversity

- Fauna mitigation measures including fauna fencing and wildlife crossings.
- Environmental impact on wildlife corridors and waterways due to construction activities and vegetation removal.
- Impact on the Illawarra Gully Wet Forest and its importance as a defining landscape feature for the southern entrance and exit for Berry.

Surface water, groundwater and flooding

- Impacts on drinking water quality during construction and operation of the project.
- Increased flood levels at individual properties.
- Flooding impacts associated with the diversion of Town Creek.

Landscape character and visual amenity

- Loss of rural landscape character due to highway and associated infrastructure.
- Visual impacts of the Toolijooa Ridge cutting on road and rail travellers from Gerringong and Gerroa.
- Loss of views of the escarpment and rural amenity due to close proximity of the highway at North Street and height of the noise barrier.
- Inclusion of community input into the design and appearance of the noise barriers at North Street and Huntingdale Park Road.
- Treatment of the green space buffer zone between the highway and North Street.

Heritage

- Local historic significance of *Glen Devon* property on North Street.
- Construction impacts on historic rural properties along the alignment.
- Construction impacts on potential Aboriginal cultural sites of significance and proposed mitigation measures.

Land use and property

- Access arrangements to the highway and internal property accesses during construction and operation of the project.
- Impacts on property values and agricultural use.
- Property acquisition process and timing.
- Residual land uses and revegetation of fragmented land parcels.

Socio-economic

- Berry bypass northern alignment severs the Berry township into 'east' and 'west' Berry.
- Disproportionate scale of infrastructure (including the Berry northern and southern interchanges) to the existing landscape and amenity of Berry.
- Impacts on Mark Radium Park and its continuation as a rest area for travellers.
- Noise, visual, socio-economic and land-take impacts on the Berry Equestrian Centre.
- Impacts on the lifestyles of residents and visitors of Berry and its historic rural nature.

2.3 Strategic and project justification – need for the project

2.3.1 Need for the project

Stakeholder identification number(s)

25, 130 and 155

Issue description

Submissions relating to the need for the project raised issues regarding the requirement for the project to be built and the acceptability of the current form of the project.

In summary, the respondents raised the following issues:

- RMS should move forward with the project. RMS is capable of designing the most logical, environmentally considerate and cost-effective bypass for Berry. Community discussion could continue for years and never reach consensus. The bypass needs to be built to remove heavy vehicles from the centre of town.
- The project is welcomed as the existing highway is unable to cope with the number of vehicles.
- There is a need for the highway to bypass Berry. However, the project in its current form as set out in the environmental assessment is not acceptable.

Response

Submissions stating the need for the project and desire for the project to be constructed have been noted. The project seeks to provide a safer and more efficient highway and would also remove heavy vehicles from Queen Street in the centre of the Berry township.

The current form of the project was determined through a rigorous and peer reviewed route options development process as well as community review groups to refine the project. All project documents associated with the route options development and community review groups, including the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007) and the *Gerringong to Bomaderry Princes Highway Upgrade, Route Optimisation Peer Review* (Connell Wagner, 2008), are available on the [project website](#). Chapter 3 of the environmental assessment sets out the alternatives and project options that were considered during the route selection process. **Section 2.4.2** of this report provides more detailed responses to specific issues surrounding the selection of the preferred option. The preferred option was considered to best meet the objectives of the project overall.

Extensive community consultation was undertaken to develop the preferred option. This included the exhibition and collation of submissions on the short-listed route options and the preferred option, community involvement in the value management workshops, as well as on-going notifications, meetings and workshops to modify and refine specific areas of the preferred option.

Consultation would continue throughout the detailed design phase of the project, to enable affected land owners and interested community members to participate in the further refinement of parts of the concept design, such as property access, landscaping and residual land. Refer to **Section 2.7** of this report for further details.

2.3.2 Justification

Stakeholder identification number(s)

7, 130, 215 and Environment Protection Agency

Issue description

Submissions relating to the justification of the project raised issues regarding the benefits of the project, consideration of the public interest and future generations, the project objectives and the potential socio-economic impacts of the project.

In summary, the respondents raised the following issues:

- There would be significant benefits to the local community and motorists in NSW from upgrading this section of the Princes Highway.
- Objection to the project as it would impact on the environment and only serves to facilitate easier access to the South Coast. The project and decision making in general needs to be in the public interest and consider future generations.
- Consideration on whether the project has satisfactorily and equally achieved all of the project objectives is required. Assessment of the socio-economic impacts does not demonstrate the ability of the project to meet the following project objectives:
 - Enhance potential beneficial environmental effects and manage potential adverse environmental impacts.
 - Optimise the benefits and minimise adverse impacts on the local social environment.

The project also does not meet the following urban design objective:

- Urban design objective 4 – Respect the communities and towns along the highway. Minimise the impact of the project on the amenity of Berry residents.
- The project does not achieve RMS stated objectives, nor does it preserve cultural patterns or avoid significant features in the landscape (namely Berry township). The project does not respect the amenity of rural and town communities along the highway
- The concluding statement of the Executive Summary, “on balance, it is considered that the overall impact of the project would be positive for the region” ignores the negative impact of the project on Berry and its community.

Response

The project forms part of a broader program of upgrades to the Princes Highway between Gerringong and Bomaderry. The finalisation of all three discreet projects in this area would provide improved access to the south coast. However, this is only one benefit of the upgrading of this entire section of the Princes Highway. The project, as well as the complete upgrade program, would improve road safety and efficiency on the Princes Highway, within Berry and along the 'Sandtrack'. Improved access between the south coast and major centres such as Wollongong and Sydney would also support the local and regional economy of the area. For these reasons the project is in the public interest.

The project would provide legible access to Berry which is a destination town but is also partly reliant on highway-dependent trade. As detailed in Section 7.10.2 of the environmental assessment, around 70 per cent of businesses within Berry serve locals, tourists and motorists passing through the town (SGS Economics and Planning, 2008). It is important for the project to provide easy and clear access to both the south coast and to Berry.

The project is considered to be in the public interest and has considered the requirements of future generations. Section 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that an object of the Act is to encourage ecologically sustainable development (ESD). One of the principles of ESD is inter-generational equity, which states that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. Section 11.1.3 of the environmental assessment details how the four principles of ESD, including inter-generational equity, have been applied to the project. Section 11.1.1 of the environmental assessment details that the project is considered to be in the public interest as it would improve road safety, traffic efficiency and access on the NSW south coast and it would improve safety and amenity within the Berry township.

The route options development process aimed to find a balance between the benefits and impacts of each option to find an alignment that best met the project objectives. This was achieved by scoring each option against each project objective. The options with the highest overall scoring were carried forward as the preferred option. RMS acknowledges that the preferred option did not score equally against each project objective, however, the preferred option provided a balanced solution across all the objectives. An assessment of each option considered against the project objectives is presented in Chapter 3 of the environmental assessment. Specific issues relating to the options development process are addressed in **Section 2.4.2** of this report.

The urban design objectives informed the route options development process and the concept design. The six objectives detailed in Section 4.3.2 of the environmental assessment formed the basis of the landscape character and visual amenity assessment presented in Section 7.6 of the environmental assessment.

The environmental assessment considered the potential environmental and socio-economic impacts of the project. These impacts were also considered during the development of the preferred alignment and the concept design. Section 7.10 and Chapter 10 of the environmental assessment and Appendix M – *Technical Paper: Socio-economic* to the environmental assessment presents commitments and management measures to minimise the socio-economic impacts associated with the project.

The project would be expected to improve amenity within Berry by removing heavy vehicle and through traffic from Queen Street. The environmental assessment also assessed the potential adverse amenity impacts associated with the project. These included noise and visual amenity impacts along North Street, Berry. Section 7.10.4 of the environmental assessment presents management and mitigation measures to address these impacts. Amenity impacts are discussed further in **Section 2.13** of this report.

Issues associated with the economic analysis of the project have been addressed in **Section 2.17** of this report.

2.3.3 Funding cost

Stakeholder identification number(s)

187 and 215

Issue description

Submissions relating to funding raised issues regarding potential changes in government and the Berry to Bomaderry upgrade.

In summary, the respondents raised the following issues:

- The amount of money being spent on the project is unnecessary and could alter with a change of government.
- The NSW Government and RMS are requested to provide assurance that the missing link between Berry and Bomaderry would be given the highest priority in funding.

Response

The NSW Government has committed \$500 million in its first term to build the Gerringong Upgrade (currently under construction) and to commence construction of the Foxground and Berry bypass. Funding to complete the commitment had been identified by the NSW Government and would be confirmed following the successful lease of Port Kembla and Port Botany.

Funding for the upgrade of the Princes Highway between Berry and Bomaderry is outside of the scope of this project. The concept design for the Berry to Bomaderry upgrade is nearing completion and the review of environmental factors is currently in preparation.

2.4 Strategic alternatives and project options

2.4.1 Strategic alternatives

Stakeholder identification number(s)

208 and 209

Issue description

Submissions relating to the route options development process raised issues regarding alternatives to the project. This included an option to divert heavy vehicles from Berry down Beach Road and an option to invest further in public transport.

In summary, the respondents raised the following issues:

- An alternative to the project could be to build low bearing pedestrian bridges at either end of Berry, with height restrictions only allowing car access along Queen Street. Heavy vehicles would be diverted down Beach Road which would act as the bypass. This option would be extremely cost effective and least obstructive to residents, businesses and the town of Berry.
- An alternative to the project could be constructing a smaller scale upgrade to the Princes Highway and further investing in public transport to reduce car travel.

Response

Section 3.3 of the environmental assessment presents an evaluation of the strategic alternatives for the project. These included:

- The base case ('do nothing').
- An upgrade of the Princes Highway.
- An upgrade of the 'Sandtrack' (the route from Gerringong to Nowra via Shoalhaven Heads, including Fern Street, Crooked River Road, Gerroa Road and Bolong Road).
- An upgrade of the South Coast railway.

The assessment concluded that an upgrade of the Princes Highway was the preferred alternative as it best met the project objectives.

The suggested alternative to remove heavy vehicles from Berry by constructing low bearing pedestrian bridges and diverting heavy vehicles down Beach Road (via Tannery Road in Berry) would not meet the following project objectives:

- Improving road safety – this alternative would not improve the safety of the overall road network. The full length of the Princes Highway between Toolijooa Road and Schofields Lane would continue to have road safety issues.
- Improving efficiency of the Princes Highway – this alternative would not improve the efficiency of the entire length of the Princes Highway between Toolijooa Road and Schofields Lane. Removing heavy vehicles only from Berry would not alleviate the congestion problems experienced during peak holiday periods.
- Supporting regional and local economic development – removing heavy vehicles from Berry would not support businesses within Berry that rely upon freight access for delivery and distribution such as milk haulage and deliveries to retail outlets such as service stations, grocery suppliers and rural supplies stores. This would impact on the viability of many businesses within the Berry township.

This alternative would force heavy vehicles to use the 'Sandtrack' in order to gain access to and from Nowra. The 'Sandtrack' currently has a five tonne load limit meaning that it cannot be used by heavy vehicles. Any alternative that would require heavy vehicles to use the 'Sandtrack' would also require an upgrade of the 'Sandtrack'. As discussed in Section 3.3 of the environmental assessment, an upgrade of the 'Sandtrack' would not meet the project objectives.

The suggested alternative to further invest in public transport was assessed in Section 3.3 of the environmental assessment. The evaluation concluded that an upgrade to the South Coast railway would not alleviate the road safety and efficiency issues of the Princes Highway. Given that the South Coast railway terminates at Bomaderry, an upgrade would not be expected to deliver a significant shift from road to rail, especially for freight transport. As a result a smaller scale upgrade to the Princes Highway would not adequately meet the project objectives.

2.4.2 Options development

Route options development process

Stakeholder identification number(s)

118, 135, 138, 143, 161, 209, 215, 233 and 234

Issue description

Submissions relating to the route options development process raised issues regarding the accuracy of the route options development process, design changes made following the value management workshops, community consultation and the omission of options to the south of Berry.

In summary, the respondents raised the following issues:

- Expressions of concern regarding the accuracy and legitimacy of the route options development process.
- The language used to describe the evaluation of route options was subjective and did not adequately explain the basis for the decisions or the relative weighting given various factors. Details should be provided on how the weighting of environmental and social factors used in the evaluation was developed when the baseline information on these factors was not known.
- Page 40 of the environmental assessment states “the preferred option was considered to provide the best outcome for the local environment and the community.” Details on how this decision was reached should be provided.
- The social and environmental benefits of a southern option have not been considered. The value management workshop approach did not sufficiently evaluate the full impact of both environmental and social impacts.
- There is no reference to the access options workshops in the environmental assessment or on the project website. Information on when these workshops were held, who attended, and what factors were used to evaluate access options should be provided.
- The Berry access options, Berry bridge, northern interchange for Berry and alignment along North Street were all changed after the value management workshops. The workshop outcomes were highly subjective.
- Errors in project based figures provided to the community has led to a lack of confidence in RMS and its ability to arrive at a correct decision for the upgrade.
- The preferred option was not chosen by the Berry community.
- Community representatives were not invited to participate in the formal process for developing or evaluating the long list of options. The impacts on the Berry community were not adequately addressed during this period.
- Throughout the process of evaluation and community consultation, RMS has shown little regard for changing their long held view that the bypass should go north of Berry, despite viable alternatives being put forward.
- The initial route options list provided insufficient background information on environmental and social impacts for the community to make an informed comment. Furthermore, RMS did not adequately evaluate community input into these options.
- Was the petition of over 1100 signatures presented to the NSW Parliament in 2010 considered as part of the evaluation of access options?

- The formation of the community review group was initiated by members of the community and the local member. Improvements made to the design throughout this process were entirely due to Berry residents, with no initiation of improvements from RMS.
- The proposed northern Berry bypass was described in the October 2008 RTA Project report as a “slender and unobtrusive design that fits into the landscape”. The bypass design presented by RMS in early 2011 bore no resemblance to the earlier description. Reasonable alternatives put forward by community members have been dismissed.
- RMS presented only two short listed options for the bypass of Berry to the community in 2007, both to the north of the town. No option to bypass Berry to the south was included.
- A peer review of the short listed options found that an option to bypass Berry to the south should have been included. This peer review has not been mentioned in the environmental assessment.
- Ratios for a southern option prepared in May 2008 were inaccurate and biased against a southern option. The ratios were developed from a costing which had a \$50 million error and was over a year old.
- The alignment shown in Figure 3.8 and discussed on page 35 of the environmental assessment was not proposed until December 2011 and should not be included as part of the route options description. The evaluation results shown in Section 3.5.2 refer to southern options included in the 2006 long list of options and are not applicable to the 2011 proposal. It should be noted, the 2011 proposal closely followed the southern route developed in the 1996 Berry bypass value management workshop.

Response

In 2006, RMS was requested by the then State government to investigate potential options for upgrading the Princes Highway between Gerringong and Bomaderry and to determine feasible and appropriate upgrade projects. A number of studies had previously been undertaken in the area, particularly around options for a bypass of Berry. These studies were used in 2006 as background information to provide an appreciation of the likely constraints in determining the long list of options as detailed in Section 3.4 of the environmental assessment.

The route options identified in 2007-2008 were identified and evaluated using all available background information (as summarised in the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007)) and assessed against criteria established for this route selection process. The route selection process in 2007-2008 was not a continuation of previous studies.

Background specialist assessments were prepared to feed into the route options development process and used to determine the short-listed route options as well as the preferred option. These assessments included preliminary assessments of environmental and socio-economic impacts. The assessments undertaken allowed for the evaluation of environmental and social impacts as part of the development of route options to the level required for the value management process. Based on this background information, each of the long-listed route options was scored against each of the project objectives. The options with the highest overall scores were carried forward as short-listed options.

The options were scored in value management workshops which included members of the project team, government agencies, community participants, interest groups and other stakeholders. This approach aimed to provide a balanced assessment of the route options against the project objectives. Workshop participants provided a weighted valuation of options taking into consideration a wide range of opinions from the different participants. The weightings and scorings were determined by the participants as part of the workshops. The process for the evaluation and the information used in determining the scorings was presented in the *Princes Highway Upgrade, Gerringong to Bomaderry, Value Management Workshop Report* (RTA, 2008) which is available on the [project website](#).

The route options development process, including the value management workshops, was consultative and iterative. The process was open and transparent and RMS looked to review and publish all documents that informed the process or resulted from the process both internally and externally. The published documents included the design and costing figures.

The *Gerringong to Bomaderry Princes Highway Upgrade, Gerringong and Berry Preferred Access Arrangements Report* (RTA, 2009) was published on the project website and was discussed in the environmental assessment. Section 3.1.2 of the environmental assessment presented a list of the reports discussed and Section 3.6.1 of the environmental assessment presented a summary of the findings of the access options value management workshop.

The design changes required following the value management workshops were based on a desire by RMS to continue consulting with the community. The design was then modified as a result of this community involvement. As detailed above, the changes were not made as a result of errors in the design, but rather were a result of the consultative and iterative process.

All community involvement in the consultation process as well as all correspondence and submissions received, including petitions, were considered as part of the development of the preferred option. Refer to **Section 2.7** of this report for further details.

As detailed in **Section 2.4.4** of this report, all studies undertaken by RMS as part of the project indicated that a bypass to the south of Berry was not feasible. The option to bypass Berry to the south performed as well against the project objectives as the worst performing short-listed route option and was discounted.

A peer review of the route options development process was undertaken by Connell Wagner in April 2008 following community concern that an option to the south of Berry was not included in the short-listed route options. The peer review concluded that the route options selection process was well founded and consistent with good practice, following all steps required to complete a comprehensive assessment of each route.

The review recommended more detailed cost estimates of the routes to the south of Berry be undertaken to confirm whether or not these routes were feasible when considered as part of an overall option from Gerringong to Bomaderry. The recommended additional cost estimates were prepared and confirmed that a route to the south of Berry would not be cost effective when compared to an overall option from Gerringong to Bomaderry, including a bypass to the north of Berry. There was an error in the media release regarding the cost analysis results, issued on 4 July 2008. This error was acknowledged and revised ratios were published on page 54 of the *Gerringong to Bomaderry Princes Highway Upgrade, Preferred Option Report* (RTA, 2008).

As detailed in **Section 2.4.2** of this report, Chapter 3 of the environmental assessment was structured so that all potential route options were evaluated in the same section. The options were not presented based on the process undertaken. The environmental assessment presented the results of all potential routes to bypass Berry to the south that were evaluated during the 2007-2008 route options development process and subsequent reviews.

1996 Berry bypass value management study

Stakeholder identification number(s)

118, 135, 138 and 215

Issue description

Submissions relating to the 1996 Berry bypass value management study raised issues regarding the results of the study and the reasons why these were not used in the assessment of route options for the project.

In summary, the respondents raised the following issues:

- The 1996 Berry bypass value management workshop recommended a southern route as the preferred option for the bypass of Berry on the basis of the cost and qualitative selection criteria. This recommendation was overturned by the then RTA on the basis of an internal investigation and a northern bypass option selected. The initial recommendation of the 1996 workshop has never been disclosed in background material distributed during future evaluations.
- Justification should be provided on why the results of the 1996 value management workshop were not included in the development the long list of route options or the environmental assessment. Evidence that the specific issue of severance between east and west Berry was considered in this process should be provided.

Response

As discussed above and detailed in the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007), a number of previous studies had been undertaken in relation to providing a bypass of Berry prior to the commencement of the 2007-2008 route options development process. These studies, including the 1996 Berry bypass value management study, were used by RMS for information purposes only. The 1996 Berry bypass value management study report recommended that further investigations be undertaken into both a modified southern route and a northern option and its variations. Neither option was recommended as the preferred option following this study.

Page 16 of the 1996 Berry bypass value management study report noted that an error was made in calculating the scores during the workshop. During the workshop, it appeared that the southern option scored a 20 per cent superior ranking to the northern option. When the scores were recalculated for the report documentation, the error was discovered and it was found that there was no significant difference between the options. The error did not affect the workshop outcomes.

The 1996 value management study was released to participants at the time, circulated to community members and also placed on the RMS website on 4th April 2013 ? and is now available on the [project website](#). The environmental assessment process, for which the value management workshop provided input, was terminated by the then State government in 1998. The 2007-2008 route options development process utilised the findings of previous studies as background information to help identify the long list of options. However, these studies did not direct or control the evaluation of potential options.

Project objectives

Stakeholder identification number(s)

118, 130, 138, 143, 215 and 227

Issue description

Submissions relating to the project objectives raised issues regarding whether certain project objectives were adequately addressed in the options assessment and whether each project objective was equally weighted.

In summary, the respondents raised the following issues:

- The project objectives, used to evaluate the route options, are skewed predominantly towards benefits for the road user, particularly road efficiency and safety.
- A 100 per cent economic weighting has been given to short-term construction costs and a zero weighting to long-term socio-environmental costs of the project. The result is mitigation measures that are likely to be sub-optimal if social costs were subject to a full economic analysis. This is in contrast to the project objectives.
- Not all of the project objectives set out in the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007) have been applied to the project. This includes objective 6 which states that the project should optimise the benefits and minimise adverse impacts on local social environment with the critical criteria being that the project should:
 - Maintain or improve the overall amenity of the community.
 - Minimise adverse impacts on places of community value.
- The route option evaluation process was not directed by objective 6 but was driven by:
 - Objective 4 provide value for money, with critical criteria that the project should optimise financial return.
 - Objective 1 improve road safety, with assessment criteria that the project should bypass the main street of Berry. This criteria dates back to the 1960's when a bypass of Berry was first considered and is no longer relevant to the current situation.

Response

Submissions that raised concerns that the preferred option does not meet the project objectives have been addressed in **Section 2.3.2** of this report. The route options development process aimed to find a balance between the benefits and impacts of each option to find an alignment the best met the project objectives. No option equally met every project objective. Instead, options were rated against each objective and the highest performing options were carried forward. Individual project objectives were not given a higher weighting than any other project objective.

Section 7.10 of the environmental assessment considered the potential socio-economic impacts of the project. This section, as well as the draft statement of commitments provided in Chapter 10 of the environmental assessment, presented commitments and management measures to minimise the socio-economic impacts associated with the project. These impacts were also considered during the development of the preferred alignment and the concept design.

Environmental and socio-economic impacts

Stakeholder identification number(s)

118, 130, 135, 138, 156, 161, 172, 175, 209, 215, 227, 234 and Department of Primary Industries

Issue description

Submissions relating to the environmental and socio-economic impacts raised issues regarding severance and community cohesion, amenity impacts, the implementation of mitigation measures as opposed to the avoidance of impacts, economic impacts in Berry, ecological impacts and impacts on the landscape character of Berry.

In summary, the respondents raised the following issues:

- Objections to selection of the preferred option because it would:
 - Divide the Berry township.
 - Impact on the Berry township by imposing a permanent feature that would change the landscape character and inconvenience residents.
 - Create construction and operational noise impacts within Berry.
 - Prove costly and unnecessary.
- The bypass design clearly demonstrates that the passage of traffic was paramount and the social and environmental impacts on Berry were not considered.
- While some progress has been made in reducing the social impact of the project, RMS has not gone far enough to appropriately address the impacts on Berry and the community. Refinements to the preferred option outlined in the environmental assessment do not adequately address environmental and social impacts and are restricted by unrealistic budget constraints. The route chosen has insufficiently addressed the social, environmental, ecological and economic impacts, specifically the effects on individual farmers and residents of the area. If the project was approved in its current form, more would need to be done to offset the environmental and social impacts on the town.
- The lack of proper modelling has resulted in numerous design decisions that are likely to have a significant negative impact on the community. Given the preferred option is the one that is likely to have the greatest social and environmental impact on Berry, RMS has an obligation to do everything possible to reduce any impact on the entire community to a level comparable with the impact that would have been created had other, less intrusive routes further from town, been adopted.
- The project has an overreliance on the management of adverse impacts, rather than mitigation through road design. Instead of utilising a road design that would minimise impacts on the entire community, RMS has opted to use sub-optimal design aspects in conjunction with narrowly focussed management practices to reduce impacts only on a select number of the most affected residents.
- Page M-42 of the environmental assessment centres on mitigation of problems caused by the adoption of the preferred northern route. No consideration is given to avoidance, rather than management and mitigation, as the best way to meet the needs of the community.
- Other than a brief mention of removing traffic from the town centre of Berry, there is no evidence in either the route selection process or the environmental assessment of any attempts to evaluate the major environmental and social impacts on the Berry community.

- Objection to the justification of the preferred option based on the community expecting the bypass to be located along the North Street corridor as this had been previously gazetted as a road corridor. This proposal was from the 1960's when Berry was a different town. There was no residential development along Kangaroo Valley Road and the town was still an agricultural village rather than a tourist destination. At this time there was an expectation of a simple deviation of traffic along a slightly upgraded North Street as opposed to the major highway upgrade now proposed.
- Over the last fifty years the Berry township has extended far beyond the western end of Queen Street. The only land that is not flood-prone around Berry lies to the north-west and this is where major development has and would continue to occur. This reality has been completely ignored in the route options process. Map presentations showed none of the existing or planned development to the north-west of the old town until mid-2012. Evidence should be provided that the issue of severance between east and west Berry was considered in the route selection process.
- RMS policy has been to define Berry by its main street and to justify all negative impacts through the removal of physical barriers from Queen Street. RMS has failed to recognise that the preferred option imposes an even greater and irredeemable barrier in the town.
- The environmental assessment states Berry would benefit from improved safety and traffic flow through the removal of traffic from the main street. Any bypass would achieve this. The argument that the preferred northern route would be good for Berry is flawed for the following reasons:
 - Berry consists of more than a retail shopping strip; many other businesses operate in or around the Berry township.
 - Currently noise throughout Berry streets is minimal due to low traffic speeds and the shops themselves confine noise to the main street.
 - Most of the business operators in the main street don't live in Berry and have therefore not registered any concerns about noise proliferation throughout other parts of the town.
- The evaluation of the route options would have benefited from a review of impacts on watercourses and riparian corridors from each option, including number of watercourse crossings and the potential to disturb the bed and banks of watercourses, in-stream habitat and riparian vegetation.
- In Section 7.8.3 of the environmental assessment under subheading 'Project aspects which respect or enhance the cultural landscape values' the following statement is made: "The construction of a bypass of Berry avoids the need to widen and transform one of the town grid streets to accommodate the highway traffic. If the latter option was adopted it would irrevocably change the amenity and heritage character of the town, and require the full or partial demolition of many properties with heritage value."

This statement implies that there was no other option than the current proposal or the option given above. This is incorrect and the community was shown many different options, at least one of which (the southern option) was assessed by town workshops as having virtually no community impacts. The southern option was dismissed solely on the basis of being too costly without any comparison of environmental or community impacts being made.

Response

Socio-economic impacts associated with the proposal were identified, assessed and mitigated in Section 7.10 and Appendix M – *Technical Paper: Socio-economic* of the environmental assessment. Many of the submissions that raised issues associated with the assessment of the environmental and socio-economic impacts of the preferred option related to the assessment of a bypass to the south of Berry. Further details on the assessment process for that option are provided in **Section 2.4.4** of this report.

The environmental assessment acknowledged that there would be residual socio-economic impacts during and following the construction of the project and that the project may act as a barrier to pedestrian movements within Berry.

The route options development process initially looked to avoid or minimise potential socio-economic impacts such as the severance of agricultural properties and loss of community cohesion within Berry. Section 5 of the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007) presented an overview of social and economic constraints in the study area. These included agricultural properties, tourist facilities and residential areas. It considered different socio-economic impacts that could occur as a result of the project and how these could be addressed through the selection of an appropriate alignment.

The location of the preferred option near Kangaroo Valley Road, and the surrounding topography, would allow the highway to sit in a cutting under Kangaroo Valley Road. Kangaroo Valley Road would bridge over the highway at a height close to its existing ground level. As well as this, Shared pedestrian and cycle paths would be constructed around the southern interchange for Berry and the North Street corridor with the aim of facilitating pedestrian movement in Berry.

The environmental assessment did recognise that feelings of severance may be experienced by residents of Berry, especially those north west of the alignment. The route options development process looked to score and balance very different issues and impacts associated with each option. It would not be possible to avoid certain impacts without creating new ones that would affect different properties and residents. For example, a route to the south of Berry would sever a number of large agricultural properties and would have potential surface water and flooding impacts.

The concept design has looked to minimise environmental and socio-economic impacts of the preferred option as far as possible. The urban design objectives were used to inform the concept design, integrating the project into the landscape as far as possible. This has aimed to minimise visual amenity impacts across the alignment, especially near Berry.

As detailed in the route options development process section above, the preferred option was not chosen based on previous investigations. The community expectations of the project being located to the north of Berry based on it being a gazetted road corridor could potentially lessen the impact of the project. However, although taken into account, this was not a determining factor in the evaluation of the route options or the selection of the preferred option.

The route options development process took into account the impacts on watercourses and riparian corridors. Section 5 of the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007) presented an overview of the environmental constraints between Gerringong and Bomaderry. This included identification of watercourses, catchments areas, floodplains and terrestrial and aquatic habitats and communities.

As detailed in Figure 7.1 of the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007), the assessment criteria used to determine the short-listed route options included requirements to avoid or minimise impacts to native vegetation, habitat corridors, water quality and flood prone areas. The scoring of the long listed route options against the project objectives considered the number of watercourse crossings required, impacts on endangered ecological communities and barriers to terrestrial and aquatic fauna movement, amongst other things (refer to Appendix A of the *Gerringong to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, 2007) for further details).

The submission regarding Section 7.8.3 of the environmental assessment was noted by RMS. The statement provided in the environmental assessment was made in relation to the potential non-Aboriginal heritage impacts and was not part of the options assessment. The intent of this section was not to make a judgement on the preferred option but rather suggested that a bypass of Berry would be required from a cultural heritage perspective as opposed to an upgrade of Queen Street.

Short listed route options

Stakeholder identification number(s)

205 and Department of Primary Industries

Issue description

Submissions relating to the short-listed route options raised issues regarding the impacts and benefits associated with each option.

In summary, the respondents raised the following issues:

- The orange route minimises land take and impacts on agricultural land by utilising an existing road corridor for much of its length.
- The blue route is largely greenfield and would impact on high value agricultural land. This would result in a greater impact on agricultural productivity and viability of the directly impacted properties, the severance of land, and the viability and connectivity of the rural community.
- The pink route through Toolijooa Ridge is not in the best interests of the registered and unregistered Aboriginal stakeholders. It would impact on flora and fauna, water quality, aquatic ecology and the people of NSW. The project should revisit the green route. Data used to select the pink route was incomplete and was not made available for public submission. An open day should be organised where interested stakeholders are invited to walk the alignments of the pink and green routes to help visualise the potential impacts.
- The green route is the preferred option from an agricultural perspective as it would minimise the severance of properties, reduce the need to acquire properties and minimise the associated impacts on agricultural businesses.
- The yellow route would create a new highway alignment remote from the existing Princes Highway, cross high value agricultural land and result in severance and acquisition of agricultural land. It would also disturb acid sulfate soils, which is undesirable. It would be a significant change to the landscape due to impacts on relatively undisturbed rural land and communities.

Response

The short-listed route options are shown on Figure 3-6 of the environmental assessment (reproduced below as **Figure 2-1**).

Support for the orange route option was noted by RMS. A modified orange option was adopted by RMS as the preferred option following community consultation undertaken as part of the value management workshop process.

Objections to the blue and yellow options were noted by RMS. These options were not carried forward due to the reason presented in the submissions.

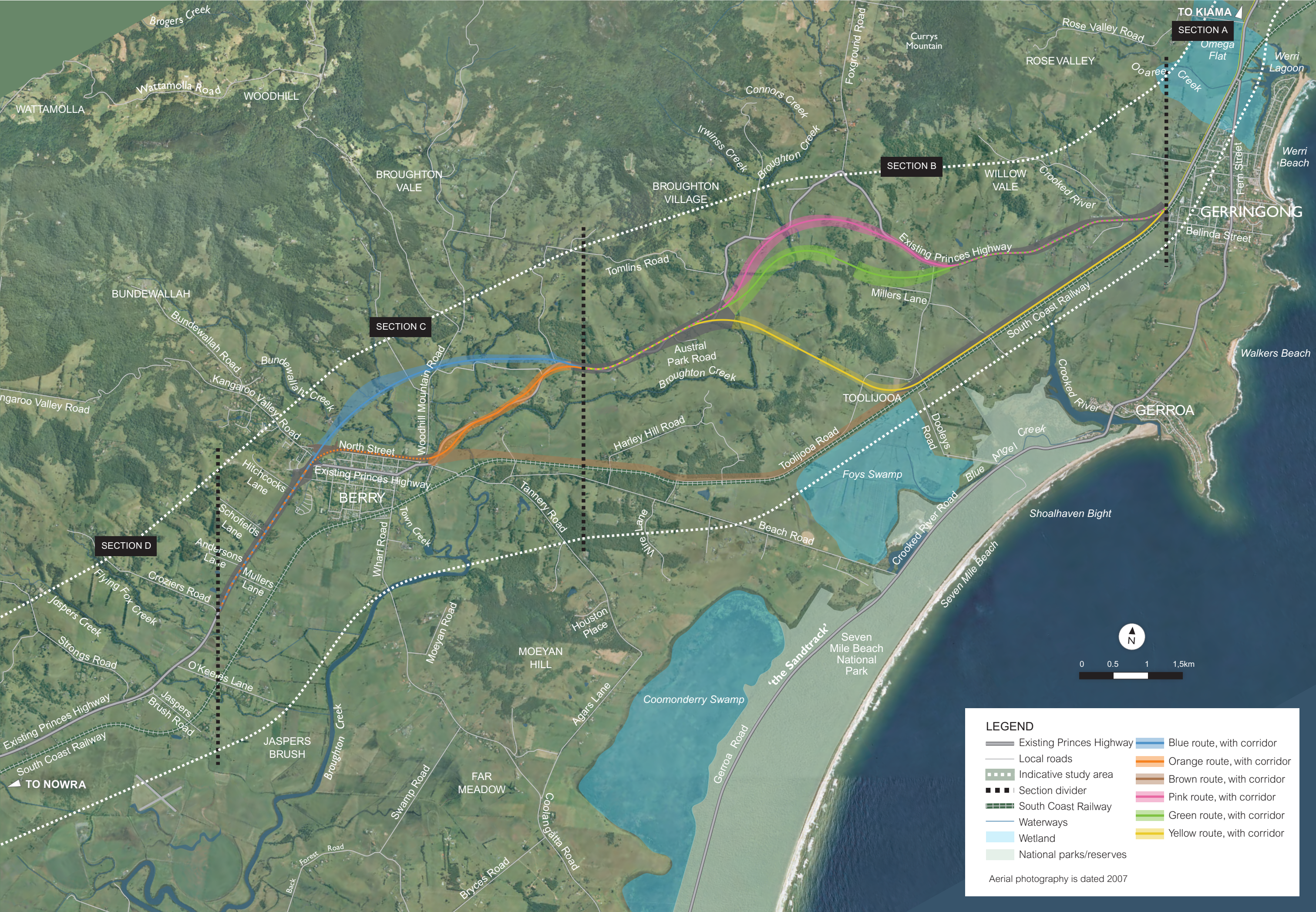


Figure 2-1 Short listed route options

The value management process undertaken to evaluate the short-listed route options and determine the preferred option, concluded that further analysis of the pink and green options was required prior to the selection of either as part of the preferred option. As a result, the *Toolijooa Ridge Preferred Option Report* (RTA, 2009) was produced and made available on the project website. The predominant difference between the two options was that the green option crossed Toolijooa Ridge through a tunnel whereas the pink option crossed the ridge through a large cutting.

This report included an assessment of impacts associated with each option, including land use and property, ecology and Aboriginal heritage among others. It also evaluated the potential constructability and road safety issues of each option and provided cost estimates.

The assessment of Aboriginal heritage compared the likely impacts of each option. This included the acknowledgement of instances where one option imposed a degree of impact or required mitigation substantially greater in scope than the other. The report concluded that the green option represented a lesser impact on Aboriginal heritage items than the pink option.

As detailed in Section 3.5.2 of the environmental assessment, it was initially considered that the green option would lessen the impact on an endangered ecological community (EEC) and a potential wildlife corridor along the ridgeline. However, through the gathering of detailed geotechnical information it was found that the geology would not allow for the construction of the tunnel at the original level. This meant that the portal required at the northern end would have been much larger than originally expected and would require some removal of the EEC.

It was acknowledged that the green option would minimise the acquisition and severance of agricultural properties required. However, a cost estimate undertaken determined that the green option would be around \$90 million more expensive to construct, operate and maintain than the pink option. As a result of the ecological impacts and cost implications, the pink option was carried forward as the preferred option.

2.4.3 Design refinements

Submissions relating to design refinement options raised issues regarding the southern interchange for Berry, the North Street corridor, the Austral Park Road interchange and the bridges over Broughton Creek.

Southern interchange for Berry

Stakeholder identification number(s)

10, 79, 89, 185 and 215

Issue description

Submissions regarding the southern interchange for Berry raised issues relating to relocating or splitting the southern interchange for Berry and the assessment and justification of the interchange in its current location.

In summary, the respondents raised the following issues:

- The southern interchange for Berry should be relocated further south towards Nowra. This would reduce traffic and noise impacts on the residents of Berry, help improve cohesion by reducing the physical impact of the highway on the town and increase pedestrian and cyclist safety.
- Relocating the southern interchange further south would negate the need for a southbound on-ramp past the western end of Victoria Street, which could remain open.

- The southern interchange for Berry should be split with the southbound on-ramp and northbound off-ramp relocated to Schofields Lane. This option would remove the two large roundabouts on Kangaroo Valley Road and the proposed bridge design at Kangaroo Valley Road could be refined to include a pair of Bebo arches (cut and cover) which would detract less from the town's amenity.
- A split southern interchange was previously dismissed by RMS on the basis of cost. Requests from members of the community to see the cost differentials calculated by RMS have been refused.
- The environmental assessment fails to provide an explanation as to how a split southern interchange for Berry fails to meet social and environmental impact objectives and is therefore not being considered further. A comparison between the social and environmental impacts of an interchange located at Kangaroo Valley Road or moved further south is required.
- The argument that the town needs to be visible from the highway to attract visitors, used to justify the current location of the Berry southern interchange is invalid. Research on other successfully bypassed towns such as Berrima proves this.
- Arguments in favour of the relocation of the southern interchange at Berry including the removal of intrusive roundabouts at Kangaroo Valley Road and retaining the Berry gateway with Mark Radium Park have been ignored in the environmental assessment.

Response

An option to split the southern interchange for Berry was assessed in Section 3.6.1 of the environmental assessment. This option included the north-facing on and off-ramps connecting to Kangaroo Valley Road and moving the south-facing on and off-ramps further south of the current design, to an area near Schofields Lane.

This option would reduce the construction footprint of the southern interchange for Berry at Kangaroo Valley Road. However, it would increase the overall construction footprint of the interchange south of Berry. It would also increase the impact on properties south of Berry as a two-way service road around one kilometre in length would need to be constructed to allow traffic movements to and from Berry.

The split southern interchange would also not meet the project objective of providing value for money. A cost estimate of the split southern interchange was included as a provisional item in the *Report on route feasibility comparative cost estimates* (RMS, 2012). The split southern interchange was estimated to cost an additional \$15.8 million over the cost of the southern interchange for Berry.

This cost differential was considered to be too great and as a result the option to split the southern interchange was not considered further and detailed assessments of the potential environmental and social impacts were not undertaken¹.

As discussed in **Section 2.8**, the project now includes additional movements at Schofields Lane. These changes were part of a separate process relating to the development of the design for Victoria Street in response to submissions lodged following exhibition of the environmental assessment and are mutually exclusive to the assessment of the split southern interchange. The additional movements at Schofield's Lane would provide improved access to the project from properties south of Berry. The magnitude of these changes were much lower than for a split southern interchange.

¹ As with all other options considered for the project, the split southern interchange was assessed initially against the project objectives. This included an initial assessment of the social and environmental impacts associated with the option.

The socio-economic impacts associated with the southern interchange for Berry have been addressed in detail in Section 7.10 of the environmental assessment. Section 7.10.3 states that the location of the alignment to the north of Berry would provide easy access to the town centre and to accommodation and other tourist-dependent businesses within Berry. Berry is a destination town but many businesses would still rely on passing trade following the construction of the project. The idea that the Berry township should be visible from the upgraded highway was a community led response discussed during the value management workshops undertaken as part of the development of access options.

The location of the southern interchange for Berry would take advantage of the existing topography around Kangaroo Valley Road. The height of the highway would be lowered through a cutting allowing Kangaroo Valley Road to be maintained at its current level. This would reduce potential connectivity and severance impacts associated with the interchange.

Potential socio-economic impacts would also be mitigated through the inclusion of shared pedestrian and cycle paths on both sides of the Kangaroo Valley Road bridge over the highway. These paths would connect to Mark Radium Park and Victoria Street to the south and North Street and the playing fields to the north. The wide shoulders proposed for the upgraded highway would allow cyclists to safely utilise the upgraded highway.

The concept design presents the Kangaroo Valley Road bridge as a single span bridge. This would reduce the overall land take and footprint of the project as it would remove the need for any structures in the median, which are also a safety hazard. The installation of a single span Bebo arch is not feasible as making provision for future widening to six lane increases the span beyond the limits of this technology. The construction of twin arches would increase the width of the median required and would potentially have major safety implications. The concept design is considered to be the best engineering solution for the Kangaroo Valley Road bridge.

The environmental assessment has looked to assess and mitigate the potential environmental and socio-economic impacts associated with the project. It is acknowledged that there would be some residual impacts following the upgrade, including severance and connectivity impacts around the southern interchange for Berry. The assessment of options against the project objectives aimed to determine the most appropriate solution and provide a balanced judgement of the options. The nature of the route selection process means that not every project objective was equally met by the preferred option.

North Street corridor

Stakeholder identification number(s)

9, 30, 41, 130, 135, 175, 208 and 215

Issue description

Submissions relating to the North Street corridor raised issues regarding the proximity of the alignment to Berry, the decision process for the current alignment of the project and the height of the project in this area.

In summary, the respondents raised the following issues:

- The Berry bypass should be located as far from North Street and Albert Street south as possible to reduce the operational noise and visual impacts on residents. Further modelling and an assessment of the environmental and social impacts should be undertaken to review whether the project can be moved further north.
- Residents of North Street and Berry as a whole do not want the project moved closer to North Street.

- The environmental assessment does not adequately explain the methodology used in the evaluation of route options for the North Street corridor. A full explanation on how a decision was made, in quantitative terms, that a location for the project 50/50 between the farm and North Street rendered the farm nonviable should be provided. Was an independent opinion obtained?
- Between the northern and southern interchanges at Berry the project curves back to align with North Street. The bridge over Woodhill Mountain Road should be adjusted so that the route to Rawlings Lane is straightened. This would move the project further away from North Street and enhance the views to the north.
- Aligning the Berry bypass further north would move the project away from the township and resolve the issue of severance at the western edge of Berry, reducing the impact on community cohesion.
- Further lower the height of the project along the North Street corridor has not been adequately addressed in the environmental assessment. Lowering the project further along the north side of Berry would significantly reduce the visual and noise impacts on the town.
- The environmental assessment does not adequately explain why mechanical pumps cannot be used to drain the road pavement along the Berry bypass, allowing the height of the project to be lowered further along North Street.

Response

During the route options development process a number of long-listed and short-listed route options bypassing Berry to the north were evaluated. Figure 3-5 and Figure 3-6 in the environmental assessment identify these options. The short-listed orange and blue options are shown on Figure 3-6 of the environmental assessment (reproduced above as **Figure 2-1**). The assessment considered that the blue option would have lower noise and visual impacts on the community. However, this option performed poorly against the environmental and social criteria as the area of impact would be largely greenfield and high value agricultural land. The blue option would also result in a loss of visual connectivity to Berry and have a greater impact on terrestrial and aquatic ecology when compared to the orange option.

In response to community concerns, RMS established a community review group in August 2011 to review the layout of the northern interchange for Berry, the location and height of the bridge at Berry and the alignment along the North Street corridor. As discussed in Section 3.6 of the environmental assessment, a number of options to move the alignment further north improving the buffer between the highway and North Street and to lower the height of the alignment were developed and assessed during a series of workshops.

The assessment addressed matters such as agricultural viability, road geometry and alignment constraints, flooding impacts, environmental impacts including impacts on Bundewallah Creek and amenity impacts to residents on North Street. During the assessment consultation was also undertaken with the affected agricultural land owner.

A final decision on the alignment was formed by the community review group following comparison of options against the project objectives and the engineering constraints that were investigated. The group concluded that the alignment could not be moved any further north.

As discussed in Section 3.6.4 of the environmental assessment, the use of permanent pumps to drain the road pavement was not considered to be a viable option given the construction and operational costs, maintenance requirements, the volume of water that would require pumping and the risk of road closures during flood events. Most importantly, there would be potential for major public safety implications associated with the use of mechanical pumps as pumps are not considered to be able to adequately reduce the risk of aquaplaning on high speed rural highways. The community review group considered the extent to which the alignment could be lowered and considered that due to these constraints the road could not be lowered any further.

Austral Park Road interchange

Stakeholder identification number(s)

60 100 and 169

Issue description

Submissions regarding the Austral Park Road interchange related to relocating the interchange further south and the best use of associated cuttings and embankments.

In summary, the respondents raised the following issues:

- The Austral Park Road interchange should be moved further south, onto land already acquired by RMS. Relocating this interchange would reduce negative impacts on land-take and the productive capacity of farms, reduce visual impacts, and minimise the intrusion of light, noise, litter and security. The location of the interchange has more adverse impacts on surrounding properties and lifestyles than the proposed highway upgrade.
- Benching the local access road opposite Austral Park Road into the top of the ramp excavation would provide a more environmentally sympathetic treatment than the proposed additional deep and intrusive cutting adjacent to the northbound exit ramp.

Response

The Austral Park Road interchange was located in the position presented in the concept design as it:

- Reduced the earthwork requirements by making the best use of the existing terrain and therefore minimising the extent of cut and fill required.
- Utilised the existing local road network and where possible minimised impacts to property access by providing a tie-in with the existing highway.
- Minimised the construction footprint by reducing the length of on and off-ramps and property access roads.

If the interchange was moved further south, it would impact different agricultural properties and an impact on productive agricultural land or property would remain. The location of the interchange is also constrained by the surrounding topography which becomes less sympathetic further south.

As discussed in **Section 2.16** of this report, consultation with affected land owners has resulted in changes to the access roads. This has reduced the extent of land take required and as a result has reduced the impacts on properties associated with the interchange.

All residual land generated by the project would be included in the urban design strategy which would be produced during the detailed design phase of the project. Landscaping would be undertaken in consultation with relevant councils and other affected land owners. Residual land retained by RMS would be included in the on-going maintenance plans following construction of the project. Where practicable, all surplus land would be sold at market rates following finalisation of the project (refer to **Section 2.16** of this report for further details).

Broughton Creek bridges

Stakeholder identification number(s)

203

Issue description

The submission relating to the Broughton Creek bridges raised issues regarding the height of Broughton Creek bridge 3.

In summary, the respondent raised the following issue:

- The proposed gradient of Broughton Creek bridge 3 is too steep resulting in greater noise impacts, lower road safety and efficiency. A deeper cut would lower the height of the bridge and provide additional spoil material which could be used to construct a mound to screen the highway.

Response

The road grade of Broughton Creek bridge 3 was designed to take into account the terrain to the north and the south of the bridge. The project would be on embankment across the Broughton Creek floodplain and through part of the Austral Park Road interchange. The height of Broughton Creek bridge 3 has been designed to produce the safest road grade across the entire alignment in this area rather than looking at the bridge in isolation.

A deeper cut would increase the construction footprint as the alignment would need to be wider and would have a greater overall visual impact. The current grade is well within the design guidelines and would not be too steep, allowing most vehicles to operate at or near the posted speed. As a result, increasing the depth of the cut would not be expected to improve safety.

The noise levels at the receivers near Broughton Creek bridge 3 have been assessed against the NSW EPA 'Road Noise Policy'. Noise mitigation in the form of a low noise pavement has been applied to the project. Low noise pavement would reduce noise levels at all receivers and outdoor areas. The noise levels predicted at these receivers comply with the requirements of the NSW EPA 'Road Noise Policy' and RMS' 'Environmental Noise Management Manual'.

Constructing a mound to screen the bridge using the spoil material from the deeper cut would have constructability and cost implications. The mound would require additional construction on the flood plain which would also present potential environmental impacts. The concept design has balanced earthworks as far as possible and this would again be assessed during the detailed design phase of the project.

2.4.4 Southern bypass of Berry

Assessment of a southern bypass of Berry

Stakeholder identification number(s)

4, 41, 49, 50, 118, 124, 138, 156, 161, 175, 209, 215, 242, 245 and Department of Primary Industries

Issue description

Submissions relating to the assessment of a southern bypass of Berry raised issues regarding the positives and negatives of a bypass to the south of Berry, support for a bypass to the south of Berry and independent review of the various assessments.

In summary, the respondents raised the following issues:

- Support for a southern bypass of Berry and requests for a southern bypass of Berry to be reconsidered.
- An option to the south of Berry that follows the rail line should be reconsidered. RMS has stated that it is too difficult and costly to follow this route, however, a rail line was built on the southern side of Berry 100 years ago.
- The southern route represents a win/win solution for all.
- An independent review of the preferred route option for the bypass of Berry was not undertaken.
- The environmental assessment does not provide an alternative route option and states the Berry southern bypass is too costly. RMS is seeking project approval based on the 1966 decision to bypass Berry with a northern route.
- The short list of route options for the Gerringong to Bomaderry upgrade released in 2007 did not include a southern option. The route option shown in Figure 3-8 was not proposed until December 2011 and should not be included in this section. The evaluation results shown in Section 3.5.2 refer to southern options included in the 2006 long list of options and are not applicable to the 2011 proposal.
- The environmental assessment does not contain results of the peer review instigated by the Roads Minister in early 2008. Why were the results of the peer review excluded from the environmental assessment?
- All short listed route options join the existing highway alignment at Kangaroo Valley Road. Environmental and social impacts have not been fully evaluated and a route to the south of the Berry township should have been retained.
- A southern bypass of Berry would remove impacts relating to North Street, including:
 - Visual impacts such as loss of views to the escarpment, the proximity of the project to residents and noise walls.
 - Air quality and noise impacts.
 - Property impacts on commercial areas, playing fields and the pony club.
 - Future impediment to existing flood flows.
- A southern bypass of Berry would remove impacts relating to the Kangaroo Valley Road interchange, including:
 - Socio-economic impacts such as the severance of the township both now and in the future.
 - Limited pedestrian access to Berry.
 - Local road and road safety impacts such as safety issues for school children and complicated traffic roundabouts.

- Land use and property impacts such as loss of agricultural land and changes to the current access to two dairy farms; the acquisition of residential property and the reduction in property values of current and planned new estates. .
- A southern bypass of Berry would remove impacts associated with access to Mark Radium Park, the closure of Victoria Street and access to the Arbour and Bupa Care Services facility as the existing local road network within Berry would remain unchanged.
- A southern bypass of Berry would:
 - Preserve approximately 100 mature growth trees that are over 100 years old.
 - Ensure the Berry township would remain unchanged for the next 100 years.
- The assumption that no other route option avoided the heritage Pulman Street precinct is incorrect. The proposed southern bypass of Berry avoids the Pulman Street precinct.
- The bypass to the south of Berry is not favoured because of:
 - A high probability of encountering acid sulfate soils.
 - Surface water and flooding issues.
 - The severance of a number of large agricultural properties as opposed to the northern options that utilise the existing road corridor.

Response

A bypass to the south of Berry was assessed as part of the options development process undertaken in 2007 and documented in the *Route options development report* (RMS, 2007). Section 3.4 of the environmental assessment demonstrates that a number of route options to the south of Berry were identified and assessed as part of the evaluation of the long list of options. Options that bypassed Berry to the south were assessed in the same manner as all other options across the length of the project.

Through the route options development process, options to the south of Berry were not short-listed and carried through to the value management workshop as they were not evaluated to best meet the project objectives of providing value for money and supporting local and regional economic development.

RMS acknowledges it is not feasible for all project objectives to have been equally met by the preferred option. Each option was scored against each objective and the preferred option represented a balanced solution. While it is considered that this process selected the most appropriate design, RMS acknowledges there are residual environmental and socio-economic impacts with the preferred option, at the same time recognising that no option would be exempt from residual impacts.

As a result of some community members promoting a bypass to the south of Berry, RMS established a technical investigation group to independently assess the costs associated with both a bypass to the north or south of Berry. The investigation was undertaken between February and June 2012 and the results are documented in the *Report on route feasibility comparative cost estimate* (RMS, 2012). The cost differential was in excess of \$100 million above the cost of the bypass to the north of Berry and was considered too great to warrant further environmental and socio-economic investigations. All options assessments undertaken for the project concluded that a bypass to the south of Berry would not be feasible.

The route options development process undertaken in 2007 and documented in the *Route Options Development Report* (RMS, 2007) was separate to previously undertaken assessments. Previous studies were used as background information to help identify routes for the long list but were not used to evaluate the long or short-list of options assessed as part of the project.

Given that the environmental assessment presented an evaluation of the route options as opposed to a description of the route options development process, the 2008 route optimisation peer review by Connell Wagner was not discussed. The findings of this report were inherent in the evaluation as it was considered as part of the preferred option decision. The environmental assessment considered all options assessment studies undertaken as part of the project.

The environmental assessment presents the southern option in the same section as the short-listed option as it was assessed as a route option. Figure 3-1 of the environmental assessment presents the process undertaken. The assessment that follows then evaluates the route options that were developed throughout the different stages of the process.

In accordance with the Director-General's requirements (DGRs) for the project, a detailed environmental assessment was only undertaken for the preferred option. The environmental assessment represents an independent review of the preferred option.

Chapter 7 of the environmental assessment and the technical papers prepared for the environmental assessment detailed the potential social and environmental impacts of the preferred option. As presented in these documents, mitigation measures and refinements were applied to the concept design to minimise potential environmental and social impacts associated with the project.

Vegetation removal required for the project was considered and assessed in Section 7.3 and Section 7.6 of the environmental assessment. Any heritage values associated with mature growth trees in the project area were assessed in Section 7.7 and Section 7.8 of the environmental assessment.

As discussed in Section 3.5 of the environmental assessment, a southern bypass of Berry would impact on heritage items, including the heritage precinct at Pulman Street, David Berry Hospital and an Aboriginal heritage encampment located at the confluence of Broughton Mill Creek and Broughton Creek.

Support for the preferred option was noted by RMS. The impacts associated with a bypass to the south of Berry would include:

- Increased potential for encountering acid sulfate soils.
- Greater amount of earthworks and fill required.
- Requirement for large bridge structures to mitigate flooding.
- Impacts to agricultural properties.

The benefits of a bypass to the north of Berry would include:

- Reduced flood impacts in Berry due to the diversion of Town Creek.
- Enhanced public spaces to the north of Berry for pedestrian and cyclist uses.

The South Coast railway located to the south of Berry does not currently achieve flood immunity during a 1 in 100 year event. Locating the project near the railway would require the construction of engineered structures to ensure that the design criteria are achieved.

As a result of feedback received through the submissions process, Victoria Street would no longer be closed. The design changes associated with Victoria Street are detailed in **Section 2.22** and **Chapter 3** of this report. These changes would alleviate the access issues to Mark Radium Park and nearby private properties that would exist if Victoria Street remained closed.

Socio-economic impacts

Stakeholder identification number(s)

29, 41, 67, 118, 135, 138, 175, 193, 209, 215 and 244

Issue description

Submissions relating to the socio-economic impacts of the bypass of Berry raised issues regarding the impacts associated with the preferred option and agricultural property impacts.

In summary, the respondents raised the following issues:

- Evaluation of the southern bypass of Berry was based on cost only and did not consider likely social and amenity impacts including:
 - Severance of Berry.
 - Visual impacts such as the loss of views to the escarpment.
 - Noise impacts.
- A southern bypass of Berry would provide the same access options to and from Berry as the preferred option. The commercial effects on the town would be the same for either option.
- The importance of visibility of the Berry township should not be used as a reason to discount the southern bypass options, particularly that proposed by the community in December 2011.
- The cost estimate of the southern bypass of Berry indicates that the compensation package offered to agricultural property owners affected by the option would be around \$350,000 per hectare. According to local real estate agents this would be around 10 times greater than the current land value. This would provide these property owners with a large windfall. Given a southern bypass of Berry would provide full access for cattle and farm machinery to both sides of the road alignment via a series of underpasses, farming operations would not be significantly affected. There would only be about 30 hectares of resumed farm land required for a southern bypass of Berry.

Response

Environmental assessments of a number of routes to the south of Berry were included in the initial assessment of the long list of route options. Given that the assessment of the December 2011 southern bypass option was undertaken outside of the route options development process, the feasibility of the option was first determined by evaluating the likely cost and constructability issues. This assessment required investigation into a number of environmental and socio-economic impacts, such as flooding, acid sulfate soils and severance of agricultural properties.

Socio-economic impacts associated with a southern bypass of Berry were discussed in Section 3.5 of the environmental assessment. These included the severance of a number of large agricultural properties, visual amenity impacts due to the dominant structures that would be required in this area and cultural heritage impacts. The visibility of Berry from the highway and the proximity of the interchanges to the town were considered to be benefits of the Orange option shortlisted in the *Route Options Development Report*, (RMS, 2007). However, these were not used as determining factors in ruling out a southern bypass of Berry.

The cost estimate for the southern bypass of Berry was undertaken through the technical investigation group. This process involved RMS property evaluation specialists and was undertaken in consultation with affected property owners. In effect, each property valuation was unique and determined the value of the property both unaffected and effected by the project, the difference being the compensation. The estimated compensation package for farmers who would have been affected by a bypass to the south of Berry included multiple factors in addition to the actual property value, such as the loss of productive agricultural land and the impact to the operation of the farm.

Technical investigations group and cost estimate

Stakeholder identification number(s)

41, 79, 118, 175, 215, 227 and 246

Issue description

Submissions relating to the technical investigations group raised issues regarding whether the aims of the group had been met, the accuracy of the cost estimate, provision items included in the cost estimate, the independent review and community involvement.

In summary, the respondents raised the following issues:

- The technical investigation group was chaired by a Project Director who had previously resisted any deviation from the northern bypass route. The technical investigation group consisted of five consultants from Evans and Peck, six consultants from AECOM (who had previously performed a flawed costing of the southern route) and three RMS staff. AECOM consultants would not support an outcome that discredited their organisation, and therefore the outcome of the costing comparison was effectively pre-determined.
- The technical investigation group set up by RMS did not conform to their stated aims which included using "best engineering endeavours", comparing "like for like", and estimating quantities correctly.
- The independent cost review of a southern bypass of Berry was inaccurate. The cost of the Berry southern bypass should be reviewed again and consider the design refinements provided by a community member. Members of the community were unable to review RMS' engineering drawings until after the Minister's announcement of the preferred option. A community assessment of these drawings found incorrect assumptions resulted in the southern option costing an additional \$100 million for imported fill. A redesigned southern option provided by a community member would produce a saving of around \$15 million compared to the preferred option.
- The relocation and modification of the southern interchange for Berry and a second northbound off-ramp were not considered in the cost analysis between the preferred northern alignment and the southern Berry bypass.
- An independent reviewer was selected and hired by RMS from a consultancy that is dependent on RMS for future business and therefore supported all technical investigation group findings and RMS recommendations.
- The Project Director of the technical investigation group severed communications with a member of the community, was not impartial and ignored questions regarding incorrect RMS project assumptions.

Response

Community review group and technical investigation group

A series of community review group sessions were held from August to December 2011 with respect to refining the alignment of the preferred option north of Berry. During this period a group of independent industry experts joined with community participants willing and able to attend two full day workshops to review and optimise the preferred option.

The workshops were facilitated by an external facilitator and the participants were encouraged to challenge the existing design, brainstorm new options, report back to, and seek feedback from, the wider community. The outputs of the community review group and workshop sessions can be viewed on the project website.

The work of the community review group culminated in changes to the preferred option north of Berry. These changes were presented to the community on 6 December 2011 and included:

- Moving the bridge at Berry around 95 metres to the north where it crosses Woodhill Mountain Road.
- Lowering the bridge at Berry by around 6.4 metres where it crosses Woodhill Mountain Road.

The presentation given to the community is available on the project website.

In response to a resident's submission made in December 2011 (and made available on the project website), RMS undertook a preliminary costing of a bypass to the south of Berry compared with the preferred option to the north of Berry. The preliminary costing was undertaken in January 2012 and involved a high level assessment based on available information at the time. The preliminary costing exercise set out to verify the resident's claim that a bypass to the south of Berry would cost less than the preferred option. The preliminary costing exercise found that a bypass to the south of Berry would cost significantly more than the preferred northern route.

The technical investigation group was formed in February 2012 after the Minister for Roads and Ports and the Local Member for Kiama requested that the option to bypass Berry to the south be reviewed in greater detail than had previously been undertaken in the preliminary costing exercise.

The technical investigation group consisted of professionals and specialists from RMS; AECOM; Evans and Peck; Aurecon and Peter Stewart Consulting. The details and qualifications of the technical investigation group members can be viewed in Appendix A2 of the *Report on route feasibility comparative cost estimates* (June, 2012) which is available on the project website.

Aims and review of the technical investigation group

The brief of the technical investigation group was to:

- Develop an indicative route bypassing Berry to the south with sufficient information to produce a robust strategic cost estimate.
- Use its best endeavours to:
 - Optimise the southern route to minimise property impacts and land severance.
 - Engineer a cost effective solution to bypass Berry to the south.
 - Apply any benefits found on the southern bypass of Berry to the preferred northern bypass of Berry where applicable and vice versa.

- Evaluate the bypass to the south of Berry by comparing it to the current preferred bypass alignment to the north of Berry within the context of the whole alignment between Toolijooa Road and Schofields Lane.

The outcomes of the technical investigation group's investigations were reported in the *Report on route feasibility comparative cost estimates* (June, 2012). The work of the technical investigation group was witnessed, monitored and reviewed in real time by the independent review team and documented in the its report *Foxground and Berry Bypass, Princes Highway Upgrade, Berry Bypass Route Comparison, External Review of the RMS Findings* (SMEC, 2012).

The reports produced by both the technical investigation group and independent review team are available on the project website. Paper copies of both reports were made available at the Berry Project Office. Further details on the independent review are provided below.

The estimating work conducted by the technical investigation group was reviewed by RMS Project Management Office. These findings were documented in the *Project Management Office concurrence report* (RMS, 2012) which is available on the project website. The report documented recommendations made to the technical investigation group and acknowledged that these had been included in the technical investigation group's cost estimate. The Project Management Office concluded that it was generally in agreement with the technical investigation group's cost estimate for the alignments to the north and south of Berry.

Cost estimate

Cost comparisons between the options to bypass Berry to the south and north were undertaken a number of times during the development of the preferred option for the project. The estimate produced by the technical investigation group, reviewed by the independent review team and verified by RMS' Project Management Office was informed by the concept design developed using "12D Model" software concept design information, comprehensive flood modelling, geotechnical fieldwork and constructability, staging and programming analysis. The estimate comparison produced by the technical investigation group was for the whole alignment between Toolijooa Road and Schofields Lane. It was accurate to the level of detail provided by the concept design and followed the accepted protocols used by State government agencies across Australia.

The cost estimate produced by the technical investigation group was documented in the *Report on route feasibility comparative cost estimates* (RMS, 2012) and shows that a bypass to the south of Berry would be significantly more costly than the preferred option.

Submissions stating that cost savings could be made by reducing the amount of imported fill are incorrect. It would not be feasible to eliminate imported fill material for a bypass to the south of Berry. A community member has attempted to do so by adjusting the vertical alignment, reducing the requirement for fill by approximately 50 per cent and increasing on-site generated fill material from cuttings by more than 100 per cent, theoretically achieving balanced earthworks. However, this exercise would compromise the design by narrowing embankments, producing non-conforming curves and non-conforming geometry to the extent that compliance with design and safety standards would not be met.

Attempting to reduce the height of embankments and bridges between the numerous constraint locations along the alignment to the south of Berry would result in a non-compliant design. The vertical grades between constraints would detrimentally increase the roller coaster effect on the vertical alignment, impacting sight lines and safe stopping distances at speed. The impact on road user safety is further exacerbated when combined with the compound horizontal curves which would be required to avoid the Pulman Street heritage precinct, the Mananga historic property, Berry sewage treatment plant, a skewed crossing of the South Coast railway, and then connect to the existing Princes Highway alignment at the southern interchange for Berry.

Cost estimate – provisional items

Relocation and modification of the southern interchange for Berry was examined by the technical investigation group and reported on in the *Report on route feasibility comparative cost estimates* (RMS, 2012). The cost estimates for the changes to the southern interchange for both a bypass to the north and south of Berry were presented in Table 7.12 of the report.

The late introduction of these changes during the investigation process was dealt with by treating them as provisional items from which either an adjustment sum or a provisional sum was generated. Adjustment sums were included in the final cost comparison cost estimate figures whereas provisional sums were not. A full explanation of provisional items is given in Section 7.3.2 of the report.

The modification of the southern interchange for Berry reduced the cost of a bypass to the south of Berry by \$15.1 million. This cost reduction was included in the final cost estimate comparison.

The relocation of the southern interchange for Berry was included as a provisional item in the cost of the preferred option. This equated to a sum of \$15.8 million given the additional infrastructure requirements. While this would increase the cost of the preferred option, it was not added to the overall cost as it was an item being considered at the time in consultation with the community. This item was eventually not incorporated into the design of the preferred option.

Land required for the provision of a second northbound off-ramp located at Woodhill Mountain Road was treated as a provisional item in Table 7.12 of the report. This item was included at the request of Shoalhaven City Council as an option for the future, if traffic volumes justify its requirement. Construction of the off-ramp itself was not included in the estimate or as a provisional item.

The inclusion of the adjustment and provisional sums in the cost estimates is provided in Section 5 and Table 7.8 and Table 7.9 of the *Report on route feasibility comparative cost estimates* (RMS, 2012).

Independent review

The independent review team was composed of professionals from three organisations selected for their independence from the project, experience in the development of other similar projects, expert understanding of critical aspects of the route comparison investigations and independence from the influence of the technical investigation group.

The three organisations of the independent review team were:

- SMEC – an engineering consultancy of international standing and a reputation for technical excellence among a wide range of government agencies across Australia.
- Lyall and Associates – specialist flood modelling consultants.
- RMS Project Management Office, Parramatta – specialists in construction processes and cost estimating and independent of the project team primarily based at RMS Southern Regional Office in Wollongong.

Each organisation was engaged by the project team and paid for from the project budget.

The independent review team did not report to, or take direction from, the technical investigation group or the project team. The independent review team reported to RMS' General Manager Project Development.

The scope and methodology of the independent review team's review of the technical investigation group's investigations comprised of considering whether:

- The technical investigations were conducted in an unbiased and even handed manner for both routes.
- The technical investigation group adequately questioned and challenged the scope of work and outputs.
- The scope of work and outputs were in line with community and RMS expectations.
- All reasonable measures were taken to ensure a "like for like" comparison of the two bypass routes.
- The best possible engineering solutions were applied to both routes.
- Applicable suggestions from the community and others were included in developing the route designs and construction methods.
- The proposed constructability methods were realistic and reasonable.
- Any innovations carried an appropriate risk allowance.
- The appropriate risk factors and contingencies were adopted and properly documented.
- The construction program was realistic and production rates were in line with construction industry norms.
- The cost estimates were thorough and complete.

In its report, the independent review team concluded that:

- The technical investigations undertaken by the technical investigation group were unbiased and even-handed. They allowed for a "like for like" comparison of the concept design for bypasses to both the north and south of Berry.
- Based on non-cost criteria, there were advantages and disadvantages for both options. The option to the south of Berry had a number of technical challenges to overcome to be viable and these added significant costs which made this option uneconomical. All reasonable measures were taken by the technical investigation group within the time available to ensure a "like for like" comparison of both routes.

Community involvement

During the community review group and technical investigation group processes, numerous documented meetings took place with particular community participants concerning aspects of the bypass to the south of Berry. The notes from these meetings are available on the project website. In addition, further meetings and telephone discussions took place with these participants from December 2011 to July 2013.

As the technical investigation group's work developed and became more complex it was important to ensure all members of the community had equal opportunity to contribute their views during the investigations and understand the issues raised and the consequences of particular solutions. To this end RMS and the technical investigation group committed to serving the whole community by responding to queries in an open forum, initially through a critical issues register and subsequently an issues and actions register, both of which are available on the project website.

Points and suggestions raised by any community participants were always examined by the technical investigation group, discussed at technical investigation group meetings in the presence of the independent review team and recorded in the meeting notes.

Notes of meetings and updated registers were published shortly after the event on the project website and all registered community participants were notified via email. Community members who required paper copies of any documentation could obtain them from the Berry project office.

2.5 Project

2.5.1 Construction staging

Stakeholder identification number(s)

60 and Kiama Municipal Council

Issue description

Submissions regarding the staging of construction raised issues relating to consultation regarding the construction methodology selected and the timing of the diversion of Town Creek.

In summary, the respondents raised the following issues:

- Kiama Municipal Council requests details on the construction staging methodology selected, including the duration and method of construction for the Toolijooa Road interchange, the cutting at Toolijooa Ridge, and the bridge crossings over Broughton Creek and their impacts on existing road and drainage infrastructure.
- The diversion of Town Creek should be specified as early works in the construction tender. This would minimise the flood risk to properties and businesses throughout Berry as early as possible in the construction phase.

Response

RMS would consult with Kiama Municipal Council during the detailed design phase of the project to inform them of the staging methodology.

The diversion of Town Creek would likely be undertaken early in the construction phase of the project, so that appropriate stabilisation can take place, and allow for the excavation and construction of the proposed main highway alignment in the North Street area.

2.5.2 Operation design criteria

Stakeholder identification number(s)

60, 114 and 185

Issue description

Submissions regarding the operational design criteria raised issues relating to the operation of the Berry Equestrian Centre, the potential to reduce noise impacts by reducing the speed limit and potential spoil management and safety benefits that could be achieved by constructing a wider median.

In summary, the respondents raised the following issues:

- The concept design may not fully consider the design requirements for the safe operation of the Berry Equestrian Centre.

- A speed limit of 80kph should be placed on the area between David Berry memorial just past the bridge at the north interchange and Mullers Lane to mitigate noise impacts, particularly from air brakes. Signage should be placed strategically to alert motorists of the speed limits, residential areas and noise restrictions to ensure noise is minimised. The
- The outside four lanes of the ultimate six lane configuration between Toolijooa Ridge and the north of Berry should be constructed as part of the project. This would utilise some of the 300,000 cubic metres of excess fill that would be generated by the project. Does RMS have a plan for how this excess fill would be otherwise utilised? Building the outside four lanes would also facilitate a wider median and would have the benefit of improving safety. Current and proposed highway developments between Terragong bridge north of Kiama and the southern side of Toolijooa Ridge generally provide a median of five metres or less. A wide median between Toolijooa Ridge and the north of Berry would improve safety by increasing the runoff area and improving sight distances. It would also allow median planting which can relieve driver stress particularly from headlight glare as traffic in this area travelling from Sydney is in the recognised two hour fatigue zone.

Response

The concept design has been produced in accordance with RMS' 'Road Design Guide' (RTA, 1998) and has considered subsequent amendments to the guide. Due to the development of the Austroads 'Road Guide to Road Design' (Austroads, 2006-2009) and the subsequent RMS supplements, standards adopted for this project may be superseded in the near future. It is anticipated that any design standard changes would be addressed and implemented as required during the detailed design phase of the project.

The route options assessment process identified the surrounding land uses in the evaluation and development of the preferred option. RMS would consult with the Berry Equestrian Centre in order to determine an appropriate arrangement for the centre during and following the construction of the project.

As stated in Table 4-5 of the environmental assessment, the project would be designed to cater for traffic travelling at 100 kilometres per hour. A noise impact assessment was undertaken with the assumption that traffic would travel at 100 kilometres per hour (refer to Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment). Noise attenuation measures such as noise barriers and architectural treatments are proposed. Overall, the noise environment within Berry would improve with the removal of heavy vehicles from Queen Street.

The formation for the outside lanes would only be constructed near interchanges and at major cuttings, such as at Toolijooa Ridge. The outside lanes would only be constructed in the future if required for traffic efficiency and safety reasons. Constructing the outside lanes at this point would increase the overall construction footprint of the project and increase the environmental impact.

Spoil management would be assessed during the detailed design phase of the project. The project would be expected to achieve balanced earthworks without a large surplus of spoil. Strategies for reducing the volume of spoil produced could include flattening embankment batters through the Broughton Creek floodplain and utilising excess spoil as part of the landscaping strategy for the proposal, such as in the formation of noise mounds

The run-off area and drainage of the pavement, site distances and potential headlight glare issues have been considered and the concept design has been developed in accordance with the required design safety parameters set out in RMS 'Road Design Guide' (RTA, 1998) and subsequent updates. A wider median with planting is not considered appropriate given the expected ongoing maintenance requirements. The provision of a sealed median reduces the amount of ongoing maintenance required and the associated potential safety risks for maintenance personnel.

2.6 Planning and statutory requirements

2.6.1 Approval process, including adequacy of the environmental assessment

Stakeholder identification number(s)

41, 86, 100, 118 and 215

Issue description

Submissions relating to the route options development process raised issues regarding the adequacy of the environmental assessment and the draft statement of commitments. Issues regarding the approach taken to the environmental risk analysis, the use of a worst case scenario for key environmental issues and how modifications to the project would be made were also raised.

In summary, the respondents raised the following issues:

- The environmental assessment is inadequate. However, RMS is experienced at getting project approval from the Department of Planning and Infrastructure and the environmental assessment would not undergo a genuine approval process as the Director-General generally accepts recommendations made by RMS.
- The project should be subject to an independent judicial review or public enquiry before approval is given.
- Objection to the project due to impacts on a property in Broughton Village. Environmental impacts have not been adequately addressed in the environmental assessment.
- The environmental assessment does not adequately assess the impact of the project on the Berry Riding Club site.
- The draft statement of commitments is not adequate. The undertakings included in the draft statement of commitments are not measureable, nor are they binding in their terminology of the obligations imposed on the construction contractor responsible for the eventual management of the impacts generated by this project.

The statement of commitments requires reconsideration and a more detailed process to develop satisfactory commitments. Further community input should be obtained through a community review group process.

- The environmental risk analysis section in the environmental assessment is not a sufficient response to the DGRs as it presents broad, overarching statements. The environmental risk assessment should not be a reiteration of the main findings of the environmental assessment, but rather be assessed from the perspective of the stakeholders bearing the most significant environmental and social impacts. Residual risks should be identified and explained as best as possible.

The history of major projects is that retrospective corrective actions, should they prove necessary, are both extremely expensive and rarely fully effective. Mistakes made at the project concept stage are outcomes the affected community would live with in perpetuity. This scenario should be avoided.

- As per the DGRs, the environmental assessment should quantify both the expected worst case and the expected typical case. It is not reasonable to evaluate only the typical case as, in some situations, the impact could be greater than the typical case. The Berry community bears the greatest risk should the worst case ensue, therefore only the Berry community can evaluate the magnitude of that risk.
- RMS moved the highway 45 metres away from North Street to provide relief for North Street residents. This should not revert back again after the environmental assessment has been approved.

Response

Following review of the environmental assessment, the Director-General formed the opinion that the environmental assessment adequately addressed the environmental assessment requirements (DGRs) for the project.

Prior to the Minister making a decision on the project, the Department of Planning and Infrastructure would undertake an independent environmental assessment of the project and the Director-General would give a report on the project to the Minister for their consideration of the application for approval to carry out the project. This report would include any environmental assessment undertaken by the Director-General or other matter the Director-General considers appropriate. If the environmental assessment requirements with respect to the project have been complied with, the Minister may approve or disapprove the carrying out of the project. This process is independent to RMS.

The RMS approach to preparing a statement of commitments is to identify desired project outcomes and the mechanisms for achieving these outcomes. A draft statement of commitments is provided in Chapter 10 of the environmental assessment and the revised statement of commitments is provided in **Chapter 3** of this report. If the project is approved, the statement of commitments would be implemented in conjunction with any conditions of approval.

Detailed and site-specific management and mitigation measures related to environmental protection are identified throughout the environmental assessment. This includes the preparation of environmental management plans which would include site-specific, measurable outcomes for the construction and operation of the project.

RMS' approach to environmental risk analysis is to identify key environmental issues, and in doing so, to guide the scope of work for environmental investigations and assessments. This is consistent with the DGR for the project requiring environmental risk analysis. The environmental risk analysis is aimed at identifying whether additional key environmental issues (over and above those identified in the DGRs) have emerged during preparation of the environmental assessment.

Worst case and representative impact scenarios have been addressed where appropriate in the environmental assessment. A number of assumptions have been made in each specialist area to ensure that a conservative assessment has been undertaken. These assumptions are detailed in the relevant technical papers appended to the environmental assessment. Technical papers have been prepared in accordance with the relevant NSW environmental assessment guidelines and the DGRs.

If the project is approved, and a change is proposed to the project post approval which is inconsistent with the approval, the change would require RMS to submit a modification which would require assessment by the Department of Planning and Infrastructure and approval by the Minister for Planning and Infrastructure or his delegate.

2.6.2 Statutory requirements

Stakeholder identification number(s)

EPA

Issue description

Submissions relating to the route options development process raised issues regarding the need for an Environment Protection Licence before construction of the project can commence.

In summary, the respondents raised the following issues:

- RMS would require an Environment Protection Licence under the Protection of the Environment Operations Act 1997 prior to the commencement of construction.

Response

RMS would apply for an Environment Protection Licence prior to the commencement of construction.

2.7 Consultation

2.7.1 Level / quality of consultation

Community consultation

Stakeholder identification number(s)

10, 24, 41, 138, 194, 215, 226 and 241

Issue description

Submissions relating to community consultation raised issues regarding the effectiveness of the community consultation as a transparent and collaborative process, the inability of RMS to listen to the community's opinions and preferences, and the accuracy of the information provided by RMS.

In summary, the respondent(s) raised the following issues and comments:

- RMS has not genuinely responded to the needs of Berry residents regarding the bypass.
- RMS has not listened to the community's chosen voice, Better Options for Berry, which has expressed concerns regarding the chosen route.
- The review meetings held during the course of the past year have been promoted as transparent and collaborative. This is considered as highly questionable.
- The consultation process was flawed, and information and answers provided by the project team were often inaccurate and have not effectively represented the community's opinions and preferences.
- During consultation and workshops there have been errors, complications, inaccuracies in note taking, misrepresentations and attempts to drive events towards a pre-set goal or agenda.
- RMS staff erroneously sent a project email by "Carbon Copy" instead of "Blind Carbon Copy", thereby disclosing the personal email addresses of all registered stakeholders.

- The process of evaluating community comments on the environmental and social impacts of the highway upgrade has not been transparent. RMS should outline the processes used to rank the importance of these comments.
- The objectives of building an ongoing relationship with the community and encouraging community involvement have not been achieved.
- RMS has conducted a fair, transparent and thorough process in order to decide the best route. Community consultation and input has been undertaken at every step. RMS has endeavoured to accommodate the community, including peer reviews, re-costing of options and even conducting long and extensive studies of a southern route, all of which is detailed on the website.
- Disagreement with negative statements from the Berry Alliance / Better Options for Berry regarding the work that Department of Planning and Infrastructure, RMS and associated specialists have carried out on the project.
- RMS' route selection process was based on extensive detailed studies and community input and was transparent, democratic and fair.

Response

RMS considers that meaningful and engaging community consultation is an essential component of the project. The consultation program implemented for the project is comprehensive and has been prepared in accordance with the Director-General's requirements for the project (issued 27 May 2011), *Community Engagement and Communications: A resource manual for staff, October 2012* (RMS, 2012), *Guidelines for Major Project Community Consultation* (Department of Planning and Infrastructure 2007) and *IAP2 Spectrum of Public Participation* (International Association for Public Participation 2007).

Community involvement has been an integral component during each stage of the project, commencing with the route options development process in 2006. At each stage, consultation activities have been undertaken to inform the community and other stakeholders with the aim of both increasing public understanding of the project, and encouraging participation in the consultation activities and feedback process. The consultation program has aimed to inform and engage the whole community in a constructive, fair and transparent process.

Community and stakeholder engagement has included: the establishment of a project office in Berry (open on Fridays) staffed by members of the project team; a 1800 (toll free) project information line; a dedicated project website; public displays and information sessions at key milestones / stages of the project (route options, preferred option, access options for Berry, refining the preferred route at Berry and the southern Berry bypass review); meetings with interest groups, relevant stakeholders and property owners; participation in value management workshops; a community review group; community working groups; distribution of community updates; letters to householders and regular registered stakeholder email notifications.

The above activities have provided community members with a number of opportunities to gain direct access to the project team to discuss the project. In addition, the project team has been available to meet with groups and individuals by appointment.

Feedback and input from the community, relevant stakeholders and property owners have been sought at all key stages of the project, and every issue / suggestion has been taken into consideration by RMS in its determination of the final concept design submitted to the Department of Planning and Infrastructure for planning approval. Key changes which have been made to the concept design resulting from community input include amendments and modifications to:

- Individual property accesses following discussions with property owners.

- The alignment of the Berry bypass to avoid the Berry sports fields, Camp Quality Park and the Pulman Street heritage area.
- Berry access arrangements to aim for southbound flood free access.
- The Berry bypass alignment, including:
 - Moving the bypass 26 metres further north, providing a 40 metre buffer between the northern edge of North Street (between Albany and Edward streets) and the revised alignment.
 - Diverting Town Creek, decreasing flood risk and allowing the roadway to be lowered. See **Section 2.12.1** of this report for further details.
 - Lowering the bypass between Alexandra and George streets by two metres. This responds to the community's desire to reduce the visual impact of the bypass.
 - The height of the noise mitigation has been reduced from five metres to four metres while maintaining appropriate levels of noise mitigation for Berry.
- The bridge at Berry, including:
 - Moving the bridge around 95 metres further away from the town as it crosses Woodhill Mountain Road.
 - Decreasing the bridge height to 6.4 metres lower than the previous design.
 - Providing a design that aims to maintain larger numbers of existing locally heritage listed Poplar trees.
- The Kangaroo Valley Road interchange to avoid linking directly into Huntingdale Park Road, including:
 - Re-aligning the northbound off-ramp to pass under the Kangaroo Valley Road bridge and avoid Huntingdale Park Road.
 - Retaining the Huntingdale Park Road junction with Kangaroo Valley Road at its current location.
 - Minimising impacts to properties.
- Removal of the proposed heavy vehicle rest area at Austral Park Road.
- Altering the end point of Austral Park Road to allow for better integration with existing property access points.
- Inclusion of above and below ground wildlife crossings.

RMS has held over 20 community information sessions / Q&A forums in addition to 13 topic specific working group meetings to gain community wide feedback and input into the concept design. These events are open to all members of the community and RMS recognises the contribution, input and concerns of all individuals and community groups. Events are advertised through the local media, on the project website, through email notifications to registered stakeholders, in the Berry project office, on two variable message signs located at the north and south entries to Berry and, where practical, through community updates and householder letters sent to all residents with postal addresses in the project area.

A community question and answer session held by RMS on Tuesday 3 July 2012 in Berry attracted about 200 community members. The *Report on Route Feasibility Comparative Cost Estimates* (bypass review report) (RMS 2012) findings were explained and subject matter experts, the independent reviewer (SMEC, working with Lyall and Associates) and the project team answered questions from the community. This session, like many others of this nature, was facilitated by an external stakeholder engagement practitioner to assist with the transparent and collaborative process being sought by RMS during each community discussion.

Meeting statements / minutes of meetings are recorded for community events and published on the project website at www.rms.nsw.gov.au/fbb. The project website also contains project reports, maps, video animations of the concept design, fact sheets, a meeting register, and other project relevant information. Further information can also be obtained from the Berry project office or by calling the 1800 (toll free) project information line.

RMS endeavours to provide the community with up to date and accurate information at the time of publication. The project's concept design however, is continually changing / being amended in line with design developments and community consultation.

There is no formal process for the community to review the performance of RMS, however the community can continually provide feedback on the delivery of the project through its involvement in the community consultation process.

Community review group 2011

Stakeholder identification number(s)

79 and 215

Issue description

Submissions relating to the community review group 2011 raised issues regarding the method for the establishment of the community review group process, commitment of RMS to the process, and the inadequacy of the process in addressing community concerns and community suggested design changes.

In summary, the respondent(s) raised the following issues:

- The environmental assessment does not adequately explain that the community reference group was established at the instigation of the Member for Kiama, after representatives of the community met with the Minister for Roads in mid-2011, to reduce adverse environmental and social impacts of the road. The subsequent relocation of the northern interchange, lowering of Berry bridge, diversion of Town Creek and lowering the road alongside North Street were all suggestions made by the community but ignored until the meeting with the Minister for Roads.
- There are a number of important issues that the design refinements, agreed with the community reference group, have not adequately addressed. This includes the vertical and horizontal alignment along North Street, the impact of the southern interchange on the connectivity between 'east' and 'west' Berry, and the proposed closure of Victoria Street.
- RMS project staff were not supportive of the community review group process which ran from August to December 2011. Throughout the review of the bridge at Berry the project team restricted itself to faulting the community's proposals, and objections were usually cost-based. In meetings and correspondence, RMS did not consider the social cost of the project.

RMS has failed to answer specific questions from the community and has held working group meetings to discuss aspects of the design on which it has already decided, for example the closure of Victoria Street.

In parallel with the community review group process, RMS met with a small unrepresentative group who sought the closure of Victoria Street. Despite assurances that the process was 'inclusive and transparent', reports from these meetings were never tabled with the community review group.

The community review group was ended by RMS on the grounds of project timing before the group could examine issues relating to the southern interchange for Berry.

Response

A community review group was established on 24 August 2011 following a request by the Minister for Roads and Ports; the Member for Kiama, Gareth Ward; and residents in Berry to improve the design of the highway proposed to the north of Berry. The group, comprising approximately 20 local residents and representatives of stakeholder groups, met fortnightly to review and develop options along and in the vicinity of the northern alignment. In agreement with the group, the discussions focussed on two key issues:

- Improving the aesthetics and form of the bridge at Berry in order to keep it as low as possible and minimise the environmental and community impacts.
- Keeping the overall alignment of the Berry bypass as low as feasible and increasing the buffer zone between Berry and the bypass as much as possible in order to minimise environmental and community impacts.

RMS committed to a process to re-examine the concept design in this area and invited interested members of the community to be part of the community review group. Further details on the objectives of the community review process are provided in Section 6.2.3 of the environmental assessment.

The community review group looked at options to reduce the social and environmental impact of the project along the preferred route to the north of Berry and discussed the financial feasibility of each option. The group largely accepted that the bypass needs to be economically viable and understood that the project competes on a state wide level for funding.

In response to the community review group's concern that information should be provided to the whole community as soon as possible, meeting statements were posted on the project website following each meeting. Summary advertisements were also placed in the South Coast Register and the Berry Town Crier. These statements were a summary of discussions and next steps to be taken as agreed by the community review group.

Two separate one-day workshops were also held with several independent industry experts and some members of the community review group to review community suggested design changes for the bridge at Berry and the northern interchange. Meeting statements describing the key outcomes of the meeting as agreed by the workshop attendees and a report evaluating and critiquing options reviewed at the workshops were published on the project website.

Significant design review work was completed following the workshops, taking into account the key considerations identified in the first workshop to optimise the horizontal and vertical alignment of the community suggested (BR2) option and develop an improved community suggested (BR3) option.

The second workshop examined the revised community suggestion (BR3) option (variants A, B and C) and focused on reaching agreement among the attendees on bridge and northern interchange alignment, bridge structural form and aesthetic treatments. From these criteria several design objectives were generated.

The group agreed to adopt the community suggested (BR3) option as the baseline road geometry for ongoing design development. Further information on workshop process, discussion and outcomes is provided in the *Bridge Design Workshops Process Report*, (Evans & Peck, November 2011), including graphical representation of options BR2 (Appendix 7) and BR3 (Appendix 8) which is available on the project website.

The workshop series was successful in reviewing the revised design options, considering the community suggested design options and identifying areas of the design needing further work or revision.

The key outcome from the workshops was to lower the height of the bridge at Berry by 6.4 metres and correspondingly lower the northern interchange layout.

The group generated a number of preferences and agreed a set of objectives to guide the work by RMS and the community in finalising the design for the bridge at Berry and the northern interchange.

In parallel with the community review group, RMS continued to meet with other interest groups and members of the community to discuss their issues and concerns with the project. This included a meeting with Berry Public School Parents and Citizens Association on 19 January 2012 to discuss Victoria Street. All meetings held during this timeframe were recorded in the project's meeting register which was continually updated and posted on the project website.

The seventh and last community review group meeting was held on 30 November 2011 at which a revised preferred alignment was largely accepted by the group. RMS proposed, with the support of the community review group, to publicly display the revised alignment to the wider community from 1 December 2011 at the Berry project office with a two week period for community feedback. During the feedback period a community meeting was held and the Berry project office was staffed to give community members the opportunity to discuss the new alignment.

In January 2012, RMS decided to discontinue the community review group and broaden involvement to all members of the community via community working groups. The community working groups would further develop the work undertaken by the community review group and discuss other community and design issues relating to the project. Invitations to join the working groups were advertised in the South Coast Register and the Berry Town Crier, on the project website, by email to registered stakeholders and in the Berry project office. Four separate working groups were formed:

- North Street precinct working group.
- Austral Park Road interchange and heavy vehicle rest area working group.
- Berry north interchange and the bridge at Berry working group.
- Kangaroo Valley Road interchange and Victoria Street precinct working group.

During these working group meetings, RMS worked with the community to mitigate key issues including:

- The northern bypass alignment along North Street including a commitment from RMS to further review the horizontal alignment along North Street during detailed design, the design of the noise barrier and urban design solutions for the residual land between North Street and the bypass.
- Bridge design improvements, including a commitment from RMS to develop a 'reference design'. A 'reference design' refers to a design developed beyond concept design with specified design improvements locked in as part of the environmental assessment, eg bridge joint types, number of bridge joints, column numbers and thickness.
- Pedestrian / cyclist connectivity between 'east' and 'west' Berry (including a review of moving the Berry southern interchange further south), impacts on Mark Radium Park and the impact of through traffic on Victoria Street residents and pedestrians.

Community agreement on a preferred option for Victoria Street was not achieved during the Kangaroo Valley Road interchange and Victoria Street precinct working group workshops. RMS advised that, for the purpose of the environmental assessment, only one of the Victoria Street options could be presented in the concept design for review by the Department of Planning and Infrastructure. Following an internal review (details of which were made available on the project website), at which RMS reviewed the three proposed options for Victoria Street against the project objects and DGRs, a decision was made to show Victoria Street as closed. RMS advised the community that this could change following ongoing community consultation through the environmental assessment submissions process. Please refer to **Chapter 3** of this report.

RMS provided the community working group with a copy of the internal review findings to answer the group's questions on how one of the options was selected to be included in the concept design for review through the environmental assessment process.

RMS presented the traffic assessment of Victoria Street design options at a Berry Alliance community forum on 14 June 2012. This was in response to an invitation by the Berry Alliance to help provide an understanding of the traffic survey data and forecasts in and around Victoria Street in relation to the three options.

Southern Berry bypass costing review

Stakeholder identification number(s)

118 and 135

Issue description

Submissions relating to the southern Berry bypass costing review raised issues regarding the evaluation of a southern Berry bypass.

In summary, the respondent(s) raised the following issues:

- The short list of options released in 2007 did not include a southern option. The route option shown in Figure 3.8 and discussed on page 35 of the environmental assessment was not proposed until December 2011 and should not be included in this section.
- The Berry community has recommended or requested a bypass to the south of Berry be evaluated by RMS in order to avoid the severance of the Berry township. To date, RMS has not provided the community with a fair evaluation, defending the northern option and insisting that the original (1966) decision was the right one.

Response

A number of options to the south of Berry were assessed as part of the route options development process which commenced in 2006. These were considered in the long list of options and the physical, environmental and social constraints of these options were assessed.

Options south of Berry did not perform as well against the project objectives of providing value for money, supporting regional and local economic development and minimising adverse local social and environmental impacts as did the short-listed options to the north of Berry. As a result a southern bypass of Berry was not carried forward as part of the project.

An evaluation and comparison of all options reviewed as part of the route options development process is provided in the *Gerrington to Bomaderry Princes Highway Upgrade, Route Options Development Report* (RTA, November 2007) which is available on the project website.

In February 2012, RMS was directed by the Minister for Roads and Ports to undertake a cost evaluation of a southern Berry bypass route following a southern route suggestion submitted by a community member. This suggestion claimed a direct cost saving and numerous qualitative benefits to Berry from a southern route over the preferred northern bypass alignment.

RMS brought together a group of professionals and specialists to form a technical investigation group to investigate the southern route suggestion (see Figure 3.8 of the environmental assessment). For further details on the technical investigation group, please refer to **Section 2.7** of this report. Two route feasibility cost estimates for the whole Foxground and Berry bypass project were prepared, one incorporating a bypass to the north of Berry and one incorporating a bypass to the south of Berry. An independent review team was engaged to oversee the technical investigation group investigations. The independent review team was composed of professionals from SMEC Australia Pty Ltd, Lyall and Associates, and RMS Project Management Office Parramatta. For further details on the southern Berry bypass review process please refer to **Section 2.4.4** of this report. The cost estimate of the southern Berry bypass was greater than the cost estimate for the northern bypass by more than \$100 million. The main factors contributing to this difference were the cost of the structures and earthworks required.

The review process is documented in *Foxground and Berry bypass Princes Highway upgrade, Report on route feasibility comparative cost estimates* (RMS, June 2012) and *Foxground and Berry bypass – Route Comparison, external Review of the Technical Investigation Group Findings* (SMEC, June 2012).

The Minister for Roads and Ports reviewed the findings of the southern Berry bypass costing review and on 25 June 2012, announced the northern alignment as the preferred route for the project.

Communication tools

Stakeholder identification number(s)

41 and 78

Issue description

Submissions relating to communication tools raised issues regarding the effectiveness of the video animation of the proposed route presented by RMS as part of the environmental assessment process.

In summary, the respondent(s) raised the following issues:

- The video animation of the project shows a highly picturesque view of driving along the motorway without any reference to the effects upon the historic town of Berry and its residents.
- Access to 'Glenvale' was omitted from the video animation used as part of the environmental assessment display.

Response

The video animation is a graphic representation of the project based on the concept design which was assessed in the environmental assessment. It was developed in response to community requests to provide visualisations of the alignment and proposed key features of the project such as the bridge at Berry, interchange arrangements, most property accesses and the noise wall adjacent to North Street. The animation provides an opportunity to understand how traffic can use the upgraded highway and shows how pedestrians can use the new pathways provided as part of the project. Videos for the three Victoria street options and the potential impacts of each option on Mark Radium Park were also displayed.

The project team worked closely with the animation supplier to provide as accurate a visual representation of the concept design as feasible for the environmental assessment display. The project is only at concept design and therefore RMS was not able to show detail which would be finalised in detailed design. Neither was RMS able to show the final design for areas which were either still to be agreed with the community / stakeholders or discussed further with individual property owners, for example some individual property accesses and the final design for the noise barrier and buffer zone along North Street.

2.7.2 Cost of consultation

Stakeholder identification number(s)

24

Issue description

Submissions relating to the cost of consultation raised issues regarding the constructive use of time and value for money gained from consultation with certain community groups.

In summary, the respondent raised the following issue:

- Consultation undertaken with those in the Berry community who agree with the Berry Alliance / Better Options for Berry has not been a constructive use of time and money.

Response

RMS is committed to openly engaging with the whole community in a constructive, fair and transparent process. As such, RMS does not exclude requests or invitations from any individual or interest group to discuss their issues either on a one-on-one basis or as part of a community forum.

The community review group process and southern Berry bypass costing review process were conducted at the request of the NSW Government.

2.7.3 Future consultation

Future consultation with key stakeholders, interest groups and community members

Stakeholder identification number(s)

67, 99, 122, 215, 218, Shoalhaven City Council and Kiama Municipal Council

Issue description

Submissions relating to future consultation raised issues regarding requests and suggestions from key stakeholders, interest groups and community members as to whom RMS should include as part of its ongoing community consultation for the project.

In summary, the respondent(s) raised the following issues:

- RMS and Shoalhaven City Council should work with the management of the Arbour to ensure the entry to Berry from the south is as attractive as possible.
- Kiama Municipal Council should be consulted during the preparation of the construction environmental management plan.
- The operators of local school bus services should be consulted during the design phase of the project to ensure safe drop off and pick up facilities are provided in the final design. Advanced notification should be provided to bus operators and the community of any changes or relocation of existing bus stops. The operators of local school bus services should also be consulted to ensure safe interim arrangements are implemented during construction.
- Boolarng Nangamai Aboriginal Art & Culture Studio in partnership with Boolarng Nangamai Aboriginal Corporation: Local Aboriginal group requests consideration for employment opportunities on the project.
Request to seek the group's advice throughout the duration of the project and to pass on information relating to Caring for Country and employment opportunities.
- In the past, only the vocal residents have been catered for. RMS should ensure cooperation and fairness for all residents during future phases of the project.
- The buffer zone between North Street and the upgrade would make a valuable community resource and the community should be involved in its design.
- Additional design work is needed to effectively deal with ongoing community concerns with regards to the Berry bypass.
- The repositioning of the Alexander and David Berry Memorial Sculpture should be the subject of consultation with the artist, Shoalhaven City Council and interested parties in the Berry community.
- Shoalhaven City Council should be consulted regarding the retrieval of suitable sandstone from the construction phase that may be used for landscaping and gateway features, or similar projects within the Shoalhaven.
- The relocation of the 'Kiama' stone wall entry feature at the Municipality's southern entry on the existing Princes Highway, which was not identified in the environmental assessment, should be undertaken in consultation with Kiama Municipal Council.

Response

RMS is committed to continued engagement with key stakeholders, interest groups and the community throughout the detailed design, construction and operation phases of the project. This would include consultation with bus operators and the community about relocation of existing services during construction and operation of the project.

RMS would identify and manage issues of interest or concern to the community during the assessment and approval process and, if the project is approved, during the detailed design and construction phases of the project. This includes the location of the Alexander and David Berry Memorial Sculpture, the 'Kiama' stone wall entry feature and the use of the buffer zone between North Street and the project.

A community involvement plan would be developed and implemented for the detailed design phase of the project and updated prior to construction commencement. This plan would set out the methods to be employed and stakeholders to be targeted as part of consultation and communication to address the conditions of approval for the project and community feedback received during the environmental assessment display.

For further information on future consultation for the project, please refer to Section 6.4 of the environmental assessment in which RMS details its commitment to continued consultation through the detailed design and construction phases, involving key stakeholders such as local councils, government agencies, emergency services, the Aboriginal Focus Group and the community.

Community working group

Stakeholder identification number(s)

79, 135, 209 and 215

Issue description

Submissions relating to the community working group raised issues regarding the re-establishment of a community review group forum to discuss and develop design improvements for outstanding community issues including the height of the alignment along North Street, the negative impacts of the severance of North Street, and the social and environmental impacts of the southern interchange.

In summary, the respondent(s) raised the following issues:

- A working group including external experts and community members should be established as the model to resolve remaining issues such as the height of the alignment along North Street, the social and environmental impact of the southern interchange and to review the transparency of the process to date. Ideally this working group would work under the auspices of the community review group and the independent expert workshops as this approach was successful in resolving design concerns relating to the Berry bridge.
- Section 6.4.1 and Section 6.4.4 of the environmental assessment dealing with future consultation are too subjective and open for interpretation by RMS and its contractors. No formal process for future community consultation has been recommended. RMS should meet with members of the community impacted by the project to establish a formal process going forward, including reforming the community review group and appointing an independent community advocate. This process should be approved by the Department of Planning and Infrastructure rather than RMS.

As the concept design for the environmental assessment has been completed and submitted to the Department of Planning and Infrastructure for project approval it is not appropriate to continue with a community review group for the project at this stage of the planning process.

If project approval is received from the Department of Planning and Infrastructure, RMS would consider what community forums may be needed in response to the conditions of approval for the detailed design, construction and operation of the project, and community feedback received during the environmental assessment display. RMS would also consider the appointment of a community advocate if project approval is received.

RMS is committed to continued engagement with key stakeholders, interest groups and the community throughout the detailed design phase of the project and would develop, prior to the commencement of detailed design, a community involvement plan which would set out the consultation methods to be employed throughout the detailed design and further developed for the construction phase of the project.

2.7.4 Level / quality of consultation – Victoria Street

Stakeholder identification number(s)

4, 37, 38, 47, 79, 89, 138, 159 and 213

Issue description

Submissions relating to the level and quality of consultation raised issues regarding the opening or closure of Victoria Street. Specific issues raised included: keeping Victoria Street open as this is consistent with community feedback; lack of community wide, transparent consultation; and inaccurate figures on the impacts on Mark Radium Park.

In summary, the respondent(s) raised the following issues:

- Community preferences (numbers for each option) for Victoria Street should be provided.
- Victoria Street remaining open is consistent with community feedback during RMS community meetings and forums.

A petition was put forward by a select few to close Victoria Street. This petition and RMS' support of the closure was done without consultation with the whole community. A further petition was unsuccessfully put forward to RMS of more than 200 signatures against the closure of Victoria Street. The project document implies RMS' decision on closure is final.

RMS has called a number of community meetings at which strong objection was made to the closure of Victoria Street, however RMS still continues to document Victoria Street as closed.
- The options for Victoria Street should be put to a vote for all residents in the 2535 postcode.
- Every household in the 2535 postcode should have been advised in writing of the three options for Victoria Street as they affect all, not just the residents of the Berry township.
- A spokesperson for RMS originally stated that it was not a major concern to RMS which one of the three options for Victoria Street would be adopted and that it was up to the community and council to make the decision. The Berry Community Consultative Body and the Berry Alliance organised a community consultation meeting to decide what would be best for the town. Two days before the meeting, RMS announced that it would be basing its costings on a closed Victoria Street. The decision and timing of the announcement has been questioned by members of the community.

- RMS has not been transparent in its consultation on the closure of Victoria Street, as a decision must have been made in March 2012 in order for an announcement on 13 June 2012. Subsequent working group meetings to discuss the southern Berry interchange, including the 14 June forum, were a waste of time and money. During the early stages of consultation RMS stated that Victoria Street was shown as closed on project drawings for the purpose of discussion and a final decision had not been made. Victoria Street closure is now shown as the preferred option in the environmental assessment.
- RMS' argument for closing Victoria Street is the preservation of Mark Radium Park. This decision was based on incorrect figures regarding the percentage of Mark Radium Park that would be impacted by each of the three options. RMS has still not publicly corrected the error.
- Consultation with bus service providers is essential when considering the treatment of the western end of Victoria Street.

Response

In January 2012, RMS called for interested community members to join working groups for the project. These working groups were open to all residents who were interested in working with RMS on design aspects of the project. Invitations to join the working groups were advertised in the South Coast Register and the Berry Town Crier, on the project website, by email to registered stakeholders, and in the Berry project office. Four separate working groups were formed, including a Kangaroo Valley Road interchange and Victoria Street precinct working group.

RMS held a total of five working group meetings in 2012 (8 March, 29 March, 17 April, 16 May and 25 July) to discuss the Kangaroo Valley Road interchange and Victoria Street precinct. One of the important topics of discussion was Victoria Street and the future use of Mark Radium Park.

Three options for Victoria Street were developed as potential solutions for consideration in the environmental assessment:

- Option 1 Victoria Street closure (by creating a cul-de-sac) with a southbound on-ramp from Queen Street providing access to the new bypass.
- Option 2 left-in / left-out only access for Victoria Street, with one-way travel to Queen Street and a southbound on-ramp starting south of Victoria Street.
- Option 3 maintaining two-way travel adjacent to the highway between Queen Street and Victoria Street and a southbound on-ramp starting south of Victoria Street.

All three options remove the right turn movement from the existing Princes Highway into Victoria Street.

The workshops included a number of discussions on each of the three options, with community advocates representing both sides of the argument giving presentations to the group.

Community agreement on a preferred option for Victoria Street could not be achieved during the Kangaroo Valley Road interchange and Victoria Street precinct working group discussions. It was clear to RMS from working group discussions, feedback received in the project office, calls from 1800 number and written correspondence, that the community had differing opinions over the preferred option for Victoria Street.

During the working group meeting of 17 April 2012, RMS advised that for the purpose of the environmental assessment, only one of the Victoria Street options could be presented in the concept design for review by the Department of Planning and Infrastructure. Following an internal review held on 23 May 2012 (notes of which were made available on the project website), at which RMS reviewed the three proposed options for Victoria Street against the project objectives and DGRs, a decision was made to show Victoria Street as closed for the purposes of the environmental assessment.

RMS sent an email to the working group on 13 June 2012 to advise its decision to close Victoria Street for the purpose of the environmental assessment. In this email, RMS advised that it had made provision to ensure either outcome could be achieved and would finalise the decision following receipt of community feedback in response to the public display of the environmental assessment.

RMS presented the traffic assessment of Victoria Street design options at a Berry Alliance community forum on 14 June 2012. This was in response to an invitation by the Berry Alliance to help provide understanding of the traffic survey data and forecasts in and around Victoria Street in relation to the three options.

A community working group was held on 25 July 2012 at which RMS outlined the reasons behind the decision and provided the working group with a copy of the internal review findings to answer the group's questions on the selection of one option to be included in the concept design for review through the environmental assessment process.

The rest of the community was informed through a householder letter in August 2012. Again, RMS advised the community that the decision to close Victoria Street could change following ongoing community consultation through the environmental assessment submissions process. The householder letter was sent to all registered stakeholders on the project mailing list and households with a registered postal address in the 2535 postcode area. This notification was also available from the Berry project office and on the project website, with registered stakeholders informed through email.

Many of the submissions received by the Department of Planning and Infrastructure during the environmental assessment expressed a preference for one of the three options for Victoria Street, with some submissions suggesting further design refinements. A breakdown of the Victoria Street preference responses is provided in **Section 2.2** of this report with design refinements discussed in **Chapter 3** of this report.

One of the key factors for RMS' decision to show a closed Victoria Street as the selected option in the environmental assessment was the impact on Mark Radium Park. Section 3.6.6 of the environmental assessment details the percentage area impacted by each of the three options as considered in the internal review. Option 1 which is the closure of Victoria Street, reduced the overall footprint of the southern interchange and had the least impact on Mark Radium Park.

Post review, RMS refined the design options further and the percentage impact differences between the three options on Mark Radium Park reduced. RMS has updated the information in response to the submissions and this is presented in **Section 2.22 and Chapter 3** of this report.

Following the environmental assessment display and the issues raised by the community, it was clear that the continued use of Mark Radium Park as a tourist 'rest' stop was important to both council and the community. As such, RMS has further developed the options to keep Victoria Street open and has presented a modified solution in **Section 2.22 and Chapter 3** of this report.

For further information on the design refinements proposed for Victoria Street please refer to **Chapter 3** of this report.

2.8 Traffic and transport

2.8.1 Construction traffic efficiency

Stakeholder identification number(s)

202, 208 and 215

Issue description

Submissions in relation to construction traffic efficiency raised issues regarding the potential impacts that construction activities and vehicles would have on the operational performance of the existing road network in the locality of Berry and on the alternative 'Sandtrack' route.

In summary, the respondent(s) raised the following issues:

- The construction of a project of this scale would result in significant traffic disruptions and delays for the local community.
- The estimate of three per cent shift of total through traffic between Gerringong and Bomaderry to the 'Sandtrack' during construction seems low, and these traffic volumes should be monitored during construction, particularly during construction periods on the existing Princes Highway. Appendix D Traffic and Transport, Figure 2.1 states that the 'Sandtrack' is favoured by many local vehicles to avoid delays behind slow moving, heavy vehicles and therefore the traffic increase may be greater than three per cent. There would also be a subsequent increase on the roads between the 'Sandtrack' and Berry (Beach Road, Tannery Road, Coolangatta Road and Prince Alfred Street).
- Traffic work on the highway would result in delays due to:
 - The installation of two construction zones with intermittent stopping and speed reductions.
 - Capacity restrictions due to lower speed limits, with greater delays if the existing 100 kilometres per hour and 90 kilometres per hour sections of the Highway are affected.
 - Lower speed limits during weekends and holiday periods even if no work is taking place (as currently occurs on the Gerringong upgrade).
 - General interaction with construction traffic and reduced overtaking opportunities.

For short periods these factors may not be significant. However, the three year construction period for the project would likely result in behavioural change, particularly with regular users of the Princes Highway. While estimating behavioural change would be difficult, it would almost certainly be greater than three per cent. If 50 per cent of regular users were to change their behaviour, 'Sandtrack' traffic would be increased by over 4000 vehicles per day. With an annual 3.2 per cent growth, this would increase to 4800 by 2016, a 50 per cent increase on current volumes.

Response

Traffic disruptions and delays for the local community are addressed in Section 7.1.3, Section 7.1.4, and Section 7.1.5 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment. Management of construction impacts are addressed in Section 8.1 of Appendix D.

Large sections of the project (6.6 kilometres of the total 11.6 kilometre project length) would be constructed offline from the existing Princes Highway road alignment. This would ensure that construction could be carried out at these locations with minimal impacts to traffic efficiency on the current highway and local road network in the project area.

However, some temporary disruptions and delays to local and highway traffic would be experienced during construction of the project due to the narrowing of lanes and temporary speed reductions, particularly during the holiday peak periods. There would also be temporary delays to local traffic during periods when other local or private roads are being bridged or tied in with the project.

Although passing opportunities would be reduced during construction of the project, it is RMS' goal to maintain a travel speed of 80 kilometres per hour through construction zones where feasible. It is noted that a posted speed limit of 60 kilometres per hour has generally been implemented during the construction of the Gerringong upgrade; as a minimum this speed would be maintained during construction of the Foxground and Berry bypass. In addition, the Gerringong upgrade would have been completed, reducing travel times between Mount Pleasant and Toolijooa Road. The compound result of these and other factors means that overall travel times on the Princes Highway between Gerringong and Bomaderry are not expected to significantly increase above current travel times (prior to commencement of works on the Gerringong upgrade) during construction of the project.

Around 50 heavy vehicles associated with construction of the project are anticipated on a typical weekday. A maximum of 10 heavy vehicles have been assumed to travel during the AM peak and PM peak hours; existing heavy vehicle volumes on the Princes Highway exceed 100 vehicles per hour during these periods. As the volume of construction traffic, when compared to existing traffic on the Princes Highway, is relatively low, the effects of additional heavy vehicles generated during construction are not expected to be significant.

RMS does not intend to divert additional traffic to the alternative 'Sandtrack' route, which currently accommodates around 45 per cent of total through traffic between Gerringong and Bomaderry. However, based on the relationship between relative travel times and traffic distribution described above; it is estimated that on average, around three per cent of traffic would transfer to the 'Sandtrack' from the Princes Highway during the three year construction period. This proportion has been estimated based on the effects of 80 kilometres per hour construction zone speed limits and limited overtaking opportunities along the existing highway. Specifically transferred traffic is expected to consist of:

- Through traffic travelling between Gerringong and Bomaderry (and beyond) transferring from the Princes Highway to the Sandtrack.
- Traffic travelling between Berry and Gerringong (and beyond) using a combination of Beach Road/Tannery Road and the 'Sandtrack' rather than using the Princes Highway during construction.

Coolangatta Road / Prince Alfred Street provide a route between Berry and Shoalhaven Heads. Unlike Beach Road / Tannery Road, its alignment and connectivity does not provide a beneficial alternative to the Princes Highway, even when considering construction impacts. Consequently, construction of the project is not expected to result in an increase in traffic along this route.

Notwithstanding the above, and the wider assessment of the anticipated impacts of construction, it is acknowledged that there remains a risk of a perception of construction related delays by travellers. In response to this and in consultation with Shoalhaven City Council, RMS has agreed to install traffic counters at strategic locations. These counters would be used to monitor any changes to existing traffic volumes and patterns, and to develop a strategy to address any road safety and road maintenance issues arising from:

- A greater transfer of traffic than the predicted three per cent.
- Significant and/or other unexpected changes to existing traffic patterns and volumes.

These commitments would be carried forward to the design and construction contractor or retained by RMS as appropriate for both Kiama Municipal Council and Shoalhaven City Council areas.

In a worst-case construction scenario, performance analysis indicates that despite a poor level of service and low travel speeds during peak hours, the Princes Highway would have the capacity to accommodate worst-case traffic volumes during construction. Furthermore, due largely to the offline construction of the Berry bypass, the local road network and intersections in Berry would still perform adequately during a worst-case construction scenario.

A traffic management plan would be prepared as part of the construction environmental management plan in consultation with Shoalhaven City Council and Kiama Municipal Council. The traffic management plan would include guidelines, general requirements and procedures to monitor the operational performance of the Princes Highway, local roads and the 'Sandtrack' (including overtaking opportunities along the route) and when necessary, implement appropriate measures to ensure road safety and traffic efficiency is maintained along the route during construction.

2.8.2 Construction traffic road safety

Sandtrack

Stakeholder identification number(s)

202

Issue description

Submissions relating to construction traffic road safety raised issues regarding the safety of vehicles travelling on the alternative 'Sandtrack' route.

In summary, the respondent(s) raised the following issues:

- Traffic impacts for the 'Sandtrack' during project construction in the environmental assessment have been based on very low traffic switch from the Princes Highway. This does not accord with common traffic behaviour. If incorrect, this could lead to significant safety issues on the 'Sandtrack'. A more definitive strategy is required to address the risk of greatly increased traffic volumes. This is particularly relevant given the high severity rate of accidents on the 'Sandtrack', due in part to the high speeds and lack of formal overtaking lanes.

Response

RMS does not intend to divert additional traffic to the 'Sandtrack'. Two-way traffic would be maintained on the highway throughout construction, with supporting static and variable message signs providing up-to-date information to drivers affected by construction zones.

However, the potential for a temporary shift of traffic from the highway to the 'Sandtrack' during construction is recognised. The 'Sandtrack' currently carries 45 per cent of traffic travelling between Gerringong and Bomaderry and it is likely that mainly local traffic would shift and slightly increase this percentage, particularly during holiday peak periods. **Section 2.8.1** of this report generally describes the expected effects of this traffic transfer which would likely consist of:

- Through traffic travelling between Gerringong and Bomaderry (and beyond) transferring from the Princes Highway to the Sandtrack.

- Traffic travelling between Berry and Gerringong (and beyond) using a combination of Beach Road/Tannery Road and the 'Sandtrack' rather than using the Princes Highway during construction.

Section 2.8.1 also describes the traffic monitoring measures that would be employed to address any road safety, efficiency, or road maintenance issues arising from unexpected changes to traffic volumes and patterns, should they arise.

A specific 'Sandtrack' traffic control plan would be developed in consultation with Shoalhaven City Council and Kiama Municipal Council, as part of the traffic management plan. The plan would include a pre-construction road safety assessment of the route, including a review of speed zones, overtaking opportunities and uncontrolled intersections.

In addition, road safety performance along the 'Sandtrack', including overtaking opportunities along the route, would be monitored during construction. This would include observation surveys of traffic volumes, travel speeds, queues and delays; and when necessary, the implementation of appropriate measures to ensure road safety is maintained along the route during construction.

Maintenance and dilapidation

Stakeholder identification number(s)

202, Kiama Municipal Council and Shoalhaven City Council

Issue description

Submissions relating to maintenance and dilapidation raised issues regarding the monitoring and preservation of the existing road network during construction of the project; to ensure that any damages are reported and repaired.

In summary, the respondent(s) raised the following issues:

- Maintenance impacts due to increased traffic on the 'Sandtrack' should be addressed.
- RMS to discuss with Shoalhaven City Council an assessment of the existing conditions and a commitment for maintenance to be undertaken for any deterioration of the 'Sandtrack' incurred during the construction phase and commissioning of the project. This may occur due to RMS diversions, or voluntary increases in traffic along the 'Sandtrack' to avoid construction work delays and construction speed limits.
- RMS to prepare a dilapidation report, including photographic evidence, prior to construction for the local road network including roads, footpaths, drainage and other infrastructure owned and maintained by Kiama Municipal Council to the satisfaction of Council.
- RMS, on completion of the project, must repair the damage to the local road network including roads, footpaths, drainage and other infrastructure owned and maintained by Kiama Municipal Council to the satisfaction of Council.
- RMS to provide, in consultation with Council, ongoing maintenance during the project construction to ensure safe public access to the Kiama Municipal Council owned local road network and footpaths. Of particular note is Toolijooa Road and surrounds which are proposed to be used as the site office and storage area during construction.

Response

RMS would ensure that pre and post construction dilapidation surveys are conducted and reported; and the potential impact on council road infrastructure (assets) is identified and repaired where required. This would be undertaken in consultation with both Shoalhaven City Council and Kiama Municipal Council.

Specifically, RMS would manage the handover of assets to Councils via working groups set up in accordance with RMS Policy 192 'Transfer of assets and asset management functions between the RTA and other roads authorities'.

Resident safety

Stakeholder identification number(s)

175 and 185

Issue description

Submissions relating to resident safety raised issues regarding the potential impacts and disturbance that construction activities and vehicles would have on the welfare of residents and visitors during construction.

In summary, the respondent(s) raised the following issues:

- Construction traffic would impact amenity and safety for residents and visitors. All routes that construction traffic would take to and from the construction sites should be identified.
- The Berry preschool operates on Edward Street and additional traffic along this street between North Street and the highway would be hazardous. Edward Street should be rezoned to one way traffic north from the highway for the duration of the construction of the bridge.
- With a possible 12 months construction of the proposed bridge over Kangaroo Valley Road, all Kangaroo Valley Road traffic to Berry, Sydney and Nowra would be diverted along North Street and to Edward or Albany streets. As traffic on the road at present travels up to speeds of 100 kilometres per hour in a 50 kilometres per hour zone, either signage or a speed camera should be installed to maintain safety on the road during construction. North Street has a number of older residents and reversing or pulling into their driveways safely would be compromised with an increase in traffic speed and volume.
- Berry is already short of parking spaces and parking for construction workers is of concern.

Response

Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment includes the following sections:

- Section 7.1.2: Construction traffic generation.
- Section 7.1.3: Traffic delays and disruptions.
- Section 7.1.4: Roadway level of service.
- Section 7.1.5: Intersection level of service.
- Section 8.1: Management of Impacts (Construction).

Construction of the project would inevitably generate additional heavy vehicles travelling to, from, and within the project area on the existing Princes Highway and local roads which provide site access. However, it should also be noted that internal haul roads would be progressively developed within the construction footprint between the site compounds and key work areas to provide temporary offline routes for construction vehicles.

It is anticipated that most of the construction-related heavy vehicles would travel to and from the project area from the north, particularly the Wollongong region. Wherever practicable, offline construction of the project would be completed first, with the aim of removing construction-related vehicles from the existing highway. Construction traffic entry and exit points would be minimised and controlled and the use of the existing highway would be restricted at peak hours, especially during holiday periods.

During construction of the bypass at Berry, heavy construction vehicles would be present in the northern end of the town if the construction contractor decided to source and transport material to/from the potential compound sites located adjacent to Woodhill Mountain Road and south of North Street. All other compound sites and construction compound/offices would be accessed directly from the existing highway or vehicles would be required to travel a short distance on a local road after turning off the highway (eg Toolijooa Road).

As with any increase in traffic, the use of the Princes Highway by construction vehicles would be expected to decrease road network performance. As discussed in Section 2.8.1 of this report, performance analysis of a worst-case construction scenario indicates that the Princes Highway would have capacity to accommodate worst-case traffic volumes during construction, and the local road network and intersections in Berry would perform adequately.

It is not anticipated that construction traffic would reduce road safety, provided adequate traffic management measures are employed. A traffic management plan would be prepared to ensure suitable locations are chosen for access and egress points to worksites and the specific controls required at selected locations.

The traffic management plan would be developed in stages to reflect the progress of construction work and would include signage requirements for temporary speed restrictions, changes to the road environment and traffic management controls in place.

At this stage, specific traffic management measures have not been developed for Edward Street and North Street during construction. However, construction activities that may influence the safety of residents living/travelling on these streets and all local roads in Berry would be identified in the traffic management plan and corresponding mitigation measures would be detailed and implemented. The traffic management plan would be developed in consultation with Shoalhaven City Council. During construction, the contractor may detour traffic from Kangaroo Valley Road to North Street, or the contractor could also consider a side track along Kangaroo Valley Road to take traffic around the site of the bridge construction.

The traffic management plan would also include parking provisions for construction workers. It is expected that construction workers would generally park their vehicles at locations designated for this purpose within compound and site office sites.

Construction traffic management

Stakeholder identification number(s)

161 and 215

Issue description

Submissions relating to construction traffic management raised issues regarding plans and procedures that would be developed and implemented to measure and control the performance of vehicles travelling through construction zones.

In summary, the respondent(s) raised the following issues:

- Construction traffic management Draft Statement of Commitments (T1) proposes a management plan. Elsewhere in the environmental assessment it is stated that traffic management, particular truck movements, have not been considered. The plan proposed by T1 is of concern as it would only be prepared after a contract has been negotiated and the contractor engaged.
- The current design for the Gerringong upgrade, Mount Pleasant to Toolijooa Road, provides a protected turning lane to properties by having the overtaking lane 'painted out'. This was included in the design for the Gerringong upgrade in negotiation with RMS because of the difficulties from a shift of the current peak traffic flow tailback at Mount Pleasant to Toolijooa Road. However, the overtaking lane should be removed during construction of the Foxground and Berry bypass project for the safety and amenity of the residents (illustration attached to submission).

Response

Section 7.1.3 of the environmental assessment and Section 7.1.2 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides details of forecast construction traffic movements, which are summarised in Section 2.8.1 and Section 2.8.2 of this report.

The traffic management plan described in Section 8.1 of Appendix D – *Technical Paper: Traffic and Transport* would be prepared as part of the construction environmental management plan. The details of this plan, including traffic management and truck movements cannot be developed until the preferred construction methods and staging are known. This would be undertaken by the nominated construction contractor when these details are better defined, following the development of the detailed design.

Project constructability and staging is discussed in Section 7.1.1 of Appendix D – *Technical Paper: Traffic and Transport* and the final staging strategy would be determined during the detailed design phase of the project, with control measures for construction activities included in the traffic management plan.

RMS recognises the potential safety and amenity implications should the line marking and protected turning lane provided under the Gerringong upgrade be removed during the construction of the Foxground and Berry bypass project. This is a permanent change that would be provided under the Gerringong upgrade and therefore would not be impacted during construction of the Foxground and Berry bypass project.

2.8.3 Operation traffic impacts

Toolijooa interchange

Stakeholder identification number(s)

166 and Kiama Municipal Council

Issue description

Submissions within the subcategory of traffic volumes, routes and travel times raised issues relating to the operational performance of vehicles travelling on the existing and upgraded Princes Highway within the project area.

In summary, the respondent(s) raised the following issues:

- Access to the Toolijooa interchange from the south to improve access to properties along the old highway between Toolijooa Road and Austral Park Road interchanges should be investigated.
- The southbound entry/exit ramps should be reinstated at the Toolijooa Road interchange. Under the current proposal vehicles stopping at Toolijooa Road, including buses, would be unable to re-join the upgraded highway and would be required to travel for half the length of the project to access a southern ramp.
- Given the distance from Foxground and Toolijooa it is very likely that vehicles may miss the Austral Park exit to access the existing Princes Highway, forcing them to travel to Gerringong in order to turn around.

Response

The Toolijooa interchange, currently being constructed as part of the Gerringong upgrade, would provide two north facing ramps that would allow access to the upgraded highway in the northerly direction and from the highway in a southerly direction. A full interchange with four ramps was previously investigated as part of the preferred access options assessment. However, it was concluded that this design option would not provide value for money due to low traffic volumes (less than 500 vehicles per day in 2037) and constructability constraints of the additional two south facing ramps.

Shoal Bus operates a weekday school-specific service that commences in the Foxground area and travels south along the Princes Highway through Berry and on to Nowra. This service has informal pick-up and drop-off locations, stopping at property accesses in rural areas along the Princes Highway where children reside.

At this stage, these informal locations would remain on the old Princes Highway between the Austral Park Road and Toolijooa Road interchanges. However, it is proposed that to improve road safety following the construction of the project, this practice would be discouraged on the upgraded Princes Highway in the project area. Public and school buses would only stop at dedicated facilities built for this purpose at the grade separated interchanges at Tindalls Lane and Toolijooa Road. Therefore, south facing ramps would not be required as school buses and other bus services would continue to travel on the old Princes Highway to collect/drop off children and other passengers.

The project would include appropriate and effective signposting, with warning signs commencing two kilometres prior to the off-ramp, to direct drivers via the off-ramp at the Austral Park grade-separated interchange in order to access the existing Princes Highway. In addition, the majority of motorists using the interchange would generally be residents living in the Broughton Village and Foxground area. These residents have been consulted and informed of their access arrangements throughout the planning of the project and this would continue during the detailed design and construction phases of the project.

Volumes, routes and travel times

Stakeholder identification number(s)

65, 67 and 215

Issue description

Submissions relating to traffic volumes, routes and travel times raised issues regarding the operational performance of vehicles travelling on the existing and upgraded Princes Highway within the project area.

In summary, the respondent(s) raised the following issues:

- The upgrade is needed to resolve current traffic conditions during public holidays including standstill traffic and delays to travel times to Berry and surrounding areas.
- Travel times, both north and south, would be reduced. This would provide better connectivity to the Arbour for relatives, friends and emergency services.
- Southbound motorists would experience significant delays in peak periods as they merge from the bypass to the old two-lane highway. This would impact access from the southbound ramp.
- The proposed new entry and exit points for Gembrook Lane add approximately six kilometres to the return trip to South Nowra and to Berry shops.

Response

The Princes Highway is a major route for tourism and consequently carries significant peak period traffic volumes during the school and public holidays. This commonly results in significant delays and congestion, which is caused by a reduction in capacity (from two to one lane in each direction) and reduced travel speeds through Berry or on sections of the existing highway with poor horizontal and vertical alignments, such as the 'Foxground bends'.

As shown in Section 7.2 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment, the project would provide two lanes in each direction which, when coupled with the improved alignment and bypass sections would increase the safe operating travel speeds on the Princes Highway in the project area. This would significantly reduce travel times, delays and congestion during school and public holidays.

The project would shorten the length of the highway through the major realignment of the existing carriageway, resulting in an estimated travel time reduction of over seven minutes on the Princes Highway between Toolijooa Road and Schofields Lane.

Although the level of service is expected to improve within the project area, the increase in traffic on the Princes Highway following construction of the project could put pressure on unimproved sections of the highway south of the project.

It is currently common for commuters travelling south on the existing highway to experience queues at Mount Pleasant during peak holiday periods. This is the result of a 'bottleneck' where two lanes of traffic merge into one. Once the Gerringong upgrade and this project have been built, this 'bottleneck' would occur south of Schofields Road until the subsequent Berry to Bomaderry upgrade is constructed and open to traffic.

2011 traffic count data shows that the Princes Highway in the vicinity of Mount Pleasant, currently carries around twice the volume of southbound daily and holiday peak period traffic, compared to the highway at Schofields Road. This is outlined below:

- The Princes Highway at Mount Pleasant carries 11,110 southbound vehicles on an average day and 1,290 vehicles per hour during the holiday peak period.
- The Princes Highway south of Berry carries 6,150 southbound vehicles on an average day and 715 vehicles per hour during the holiday peak period.

Following completion of the project in 2017 and prior to the construction of the Berry to Bomaderry upgrade, southbound traffic on the Princes Highway in the vicinity of Schofields Lane is forecast to be around 8220 vehicles. Southbound holiday peak period traffic is expected to be around 1220 vehicles per hour. These estimates include the effects of traffic transferring from the 'Sandtrack' to the upgraded highway.

These forecast volumes suggest that during holiday peak periods queuing similar to existing levels at Mount Pleasant may occur in the vicinity of Schofields Lane; this would inevitably create delays for traffic travelling southbound on the Princes Highway and traffic joining the highway southbound from Berry. Despite this, it is not expected that this queuing would impact the ability of traffic to join the highway from the southbound on-ramp. Slow traffic speeds as a result of queuing would generally improve the safety of merging traffic. In this situation traffic typically behaves in a mannered fashion where traffic joining from an on-ramp is allowed space to merge by traffic travelling at low speeds on the highway.

Although delays created by southbound traffic queuing at Schofields Lane following construction of the project are likely, it is noted that significant delays and queuing within Berry and throughout the project area are already experienced on the Princes Highway during peak traffic periods. Due to this, in the short-term construction of the project is not expected to significantly increase the impact of delays and queuing during peak traffic periods. In the long-term, following construction of the planned Berry to Bomaderry upgrade, these delays and queuing would be removed.

Planning for the Berry to Bomaderry upgrade proposal is in progress with RMS working to finalise the concept design and Review of Environmental Factors for the proposal. The 2012/13 State Budget has allocated \$1 million for ongoing planning for the project and the NSW Government would continue to seek funding for the project as it evolves.

Under the access arrangements presented in the environmental assessment, residents living on Gembrook Lane would be required to travel to the nearest u-turn facilities at the Tindalls Lane and Austral Park Road interchanges, which would add between one and six kilometres to existing journeys from their property.

However, the project design has been refined since the environmental assessment and now includes the provision of an underpass connection from Gembrook Lane to the Tindalls Lane grade-separated interchange; providing full access to the upgraded highway. This refined design would considerably reduce the additional distance that residents would have to travel to less than 500 metres.

Refer to **Chapter 3** of this report for further details about this design change.

Design

Stakeholder identification number(s)

9, 37, 135, 156, 172, 208, 215 and Shoalhaven City Council

Issue description

Submissions relating to road design raised issues regarding the proposed carriageway (at Toolijooa Ridge), local roads and access arrangements (at Kangaroo Valley Road), based on the operational performance of traffic and transport in the project area.

In summary, the respondent(s) raised the following issues:

- The highway design should include planning and land reservation for a future northbound exit at Woodhill Mountain Road to minimise impacts at Huntingdale Park, and an entry point for traffic heading south to enter the highway at the eastern end of Berry. Additional on-ramps and off-ramps at Woodhill Mountain Road are essential to assist effective flow of local traffic.

This proposal was supported by a petition coordinated by the Better Options for Berry community group with over 1100 signatures in November 2010, but has not been adequately addressed in Section 7.1 of the environmental assessment. These proposed design changes would remove or minimise traffic from passing through the township.

It is noted at Gerringong, RMS has provided two points of entry / exit to serve the township.

A further example to support the provision for future design and planning of an additional eastern entry / exit is the Kiama bypass where an additional entry / exit point was required 18 years after commissioning of the bypass.
- The planned two-lane carriage way (one lane in each direction) for the proposed Kangaroo Valley overpass seems inadequate and traffic impacts would be exacerbated by the closure of North Street at the western end.
- There is only one exit to Berry when travelling north from Nowra via a confusing and poorly designed roundabout at Kangaroo Valley Road. This area would become a bottleneck and would create traffic problems. There is no second exit to Woodhill Mountain Road at the north side of town.
- The turning circle at the end of Austral Park Road would become a dumping ground for unwanted goods. The road should be kept as an access route to local farms only. The justification for the proposal in relation to garbage collection is invalid as current garbage disposal arrangements are adequate.
- The size of the cutting required to provide three lanes at Toolijooa Ridge (Foxground Bends) is of concern, as two lanes would be sufficient.

Response

Section 7.2.2 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides details of the operational performance analysis that was completed for the Kangaroo Valley Road interchange and local roads within Berry. Traffic modelling shows that the proposed northbound off-ramp arrangement at this interchange would have sufficient operating capacity to adequately accommodate traffic volumes much higher than those predicted in the future for the 'design year' in 2037. Traffic modelling also indicates that the designed lane configuration for the Kangaroo Valley Road overpass would operate well within its operational limits and traffic would experience little congestion or delay.

In addition, it is anticipated that other environmental impacts (for example noise and air quality impacts created by traffic) would be within relevant thresholds based on the proposed design, without the provision of a second northbound off-ramp.

Due to this, the social and environmental impacts that would be created by the construction of a second northbound off-ramp would not be justifiable when considering the project objectives; this is especially true when considering the proposed site for an additional off-ramp to Woodhill Mountain Road and the close proximity of Bundewallah Creek

Under the design presented in the environmental assessment, Austral Park Road would include a turning circle for garbage collection vehicles. However, the project design has been refined since the environmental assessment and the turnaround facility previously proposed as part of the Austral Park Road extension, has been removed. Refer to **Chapter 3** of this report for further details about this design change.

The road corridor boundaries would be set to make provision for an ultimate third lane in each direction. Where widening would be difficult and/or costly in the future, such as for structures and deep cuttings, provision of a six lane formation would be provided under this project. This would be the case for the large cutting through Toolijooa Ridge. In addition, the vertical grades on the highway through the ridge create a requirement for a climbing lane in each direction, making a six lane formation necessary at project opening.

Property access

Stakeholder identification number(s)

78, 169 and 174

Issue description

Submissions relating to property access raised issues regarding the additional travel distance and time for residents that would be impacted by the revised access arrangements between properties and the upgraded highway.

In summary, the respondent(s) raised the following issues:

- Access to a property (details withheld) would be reduced to one way, meaning the owner would have to drive into Berry before being able to drive south to Nowra.
- The proposed roadworks would remove the direct access from a specific property near Broughton Village to the existing highway. New access would be provided via the Austral Park Road interchange, resulting in approximately 1.5 kilometres of additional travel between the properties and the Berry and Gerringong town centres.
- Access arrangements for many properties located between Tindalls Lane and Austral Park Road would increase mileage and time for each journey. Each trip would add a maximum travel distance of 3.2 kilometres, which equates to on average 992 kilometres per year.
- The extra mileage would have negative impacts on vehicle wear and tear, courier driver travel time, and added stress from pick up/drop off at Tindalls Lane bus stop.

Response

RMS recognises that proposed left-in left-out access arrangements would result in increased travel time for some local residents, however it is considered that this inconvenience would be offset by the overall road safety benefits that the proposed design would deliver to both through and local traffic. The additional travel time for residents impacted by the proposed design would be offset by reduced travel times on the upgraded highway in comparison to existing conditions.

In addition, the project design has been refined since the publication of the environmental assessment, and two vehicular underpasses have been proposed between Tindalls Lane and Austral Park Road to further mitigate the impacts of local access constraints. These design changes are discussed in detail in **Section 3**.

RMS has met with individual property owners to discuss functional and safe access, and consultation with affected property owners would continue during the detailed design process of the project.

2.8.4 Operation traffic growth/forecasting/modelling

Stakeholder identification number(s)

215 and Shoalhaven City Council

Issue description

Submissions relating to growth, forecasting and modelling of operational traffic raised issues regarding the methodology and assumptions used by RMS to develop future year traffic volumes for the Princes Highway and local road within the project area.

In summary, the respondent(s) raised the following issues:

- The assumptions and processes used in the traffic modelling and forecasting are concerning such as:
 - Traffic from the south would exit at Kangaroo Valley Road interchange and enter the local road network at Berry. RMS estimates that of all traffic entering or leaving Berry approximately 60 per cent of the traffic is to / from the south. This includes traffic that would then travel eastwards through the township.
The traffic levels at completion of the project are expected to increase over the projected timeline of the highway. The environmental assessment report considers the traffic levels would reach theoretical capacities by the year 2070 using SIDRA assessment, however RMS environmental capacity thresholds have not been incorporated into the assessments for the environmental assessment, particularly through the Kangaroo Valley Road interchange.
 - The environmental assessment does not address the risk that traffic forecasting may prove to be incorrect either overall or in the proportion of heavy vehicles at night. The latter has proven to be a major problem in previous projects. Traffic forecasting is uncertain and the environmental risk analysis section should consider the error risk.
 - The DGRs state "Consideration should be given to what effect potential major land use changes in the locality may have on the traffic assessment outcomes". There is concern regarding the validity of traffic forecasting on which the prediction of major potential impact issues, such as noise, are critically based. Examination of strategic operational planning issues is required. Issues would include: access to and from the township, and significant town planning constraints caused by the project acting as a barrier between the existing town and the main area for proposed expansion by Shoalhaven City Council.

- The environmental assessment does not address the future impact of increased traffic on Berry once the Nerriga Road upgrade is completed. This would provide a new route for traffic from both Canberra and the Hume Highway to the south coast and beyond.

Response

Chapter 4 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides a summary of the traffic modelling and forecasting process used. Section 4.2.4 provides details of the modelling scenarios that were developed to forecast traffic volumes and the effects of different road network configurations. These scenarios were assessed in subsequent sections of Appendix D – *Technical Paper: Traffic and Transport*.

A comprehensive, industry standard modelling approach has been used to calibrate the base year models, which were then used to forecast traffic volumes within the project area; simultaneously estimating the effects of both the proposed changes to the supply (eg the introduction of the project) and changes to travel demand (eg the impact of major land use developments such as Huntingdale Park).

The traffic and transport assessment and accompanying modelling was underpinned by an extensive set of traffic surveys, including automatic traffic counts ('tubes'), intersection turning counts and origin-destination surveys.

It is acknowledged that other specialist assessments such as noise and air quality are reliant on accurate future year traffic volumes. Consequently, the modelling assumptions, methodology and application were carefully developed in accordance with industry standards and understood before the assessment commenced, to ensure that traffic projections are based on a transparent and comprehensive process.

Future forecast traffic patterns and volumes have been calculated using existing data, augmented with regional traffic growth rates from the regional TRACKS model, and included where appropriate a long-term Berry local road traffic growth rate of two per cent per annum. This rate was selected and agreed in consultation with Shoalhaven City Council.

Major land use changes, specifically the development of Huntingdale Park, are known to create step-changes in traffic generation and distribution, and treated accordingly as 'special generators' of future travel demand. In this case, the highest level of future traffic generation has been estimated based on the proposed development yield and relevant trip generation guidelines; in consultation with Shoalhaven City Council.

Chapter 7 of Appendix D – *Technical Paper: Traffic and Transport* provides details of the variety of scenarios and sensitivity tests which have been undertaken during the course of the assessment. In addition, Chapter 8 includes an overview of the management of impacts of the project, including measures to address the impacts of discrepancies between forecast and actual performance.

Other sensitivity tests have been used throughout the environmental assessment process to gauge the effects of both minor and major discrepancies between expected and actual traffic volumes. One example is the further analysis of the Princes Highway | Kangaroo Valley Road northbound off-ramp, included in Section 7.2.2 of Appendix D – *Technical Paper: Traffic and Transport*. Traffic modelling (Paramics microsimulation) shows that the proposed northbound off-ramp arrangement at this interchange would have sufficient operating capacity to adequately accommodate traffic volumes much higher than those predicted at the time of the design year in 2037.

Generally the findings of sensitivity testing undertaken throughout the course of developing the traffic and transport assessment indicate that the project would have sufficient capacity to safely and efficiently accommodate significantly higher traffic volumes than those expected by the design year (2037) in terms of road network performance.

In summary, the traffic forecasts that have been developed as part of the project and used in subsequent traffic and transport, noise and air quality assessments are underpinned by a series of government land-use predictions; derived from a comprehensive methodology; and based on assumptions that were agreed with Shoalhaven City Council. More specifically, findings from the traffic and transport assessment show that the local and regional road network would have sufficient operational capacity to accommodate a large margin of error in the traffic forecasts; as the service levels are far below the threshold for detailed sensitivity testing.

Notwithstanding this, traffic levels and operational performance would be monitored throughout and following construction, particularly during peak periods, to ensure that the road network performs as expected. Traffic monitoring would be undertaken on the Princes Highway and key local roads to assess actual volumes against predicted volumes. A comparison of actual versus modelled performance of the road network in this way would identify any significant differences at an early stage, to re-assess the future operational performance of the project and plan in advance of any major impacts occurring.

Overall the methodologies outlined above, combined with future-proofing for an ultimate configuration of three lanes per direction on the highway and other design features, have been used during the consideration of the risks and corresponding mitigation measures associated with discrepancies between forecast and actual traffic volumes.

The Princes Highway in the project area is currently a B-double route, which continues south to Nowra. Therefore, unlike other project such as the Yelgun to Chinderah upgrade which opened a new road corridor for larger heavy vehicles², the upgraded highway would not undergo a significant change in heavy vehicle volumes as a result of the project.

The Nowra - Nerriga Road (MR 92) is sealed between Nowra and Nerriga. To the west of Nerriga, a number of local roads - which include unsealed sections - provide linkages to existing arterial routes including the Hume Highway and the Federal Highway. Recent traffic counts on the Nowra-Nerriga Road at Tianjara Creek recorded 550 vehicles per day in 2011 and 588 vehicles per day in 2012.

While no current proposals or strategic corridors exist for any potential upgrade west of Nerriga, the *Nowra to Nerriga Main Road 92 Upgrade Environmental Impact Statement (2002) Technical Paper Number 3 - Traffic and Transport* (SKM, 2002) modelled future traffic predictions on the Nowra to Nerriga Road and considered additional 'future upgrade' scenarios. These included consideration of the potential impact any future upgrade west of Nerriga may have on traffic in areas including the Princes Highway in the vicinity of the project.

These forecasts included the consideration of other potential upgrades, including a bypass of Berry and an upgraded Princes Highway to four lanes between Kiama and Nowra. Allowing for induced traffic and perceived benefit considerations (eg a 'highest traffic' scenario), current traffic volumes closely match the forecast traffic numbers for the Nowra-Nerriga Road.

² Heavy vehicles including semi-trailers already used the Yelgun to Chinderah route prior to upgrade; the upgrade subsequently enabled the use of this route by B-Doubles.

The technical paper modelled two key scenarios relevant to the submission:

- Scenario C3: an MR 92 upgrade from Nowra to Braidwood, plus an upgrade of the Kings Highway from Braidwood to Queanbeyan (Table C.6).
- Scenario D1: an MR 92 upgrade from Nowra to Braidwood, an upgrade of the Kings Highway from Braidwood to Queanbeyan, plus an upgrade from Nerriga to Bungendore via Tarago (Table C.7 – essentially a full double route upgrade).

Scenario C3 includes induced traffic and perceived benefits; Scenario D1 includes no induced traffic and no induced benefits. Additional vehicles per day in the vicinity of the project for these scenarios were forecast to be:

- Scenario C3: 150 vehicles per day.
- Scenario D1: 340 vehicles per day.

These scenarios indicate the highest predicted traffic impacts of the Nerriga Road upgrade options modelled relevant to the project. Consequently RMS considers that any potential future upgrade to MR 92 would have a negligible impact on traffic on the Princes Highway in the vicinity of the project area.

2.8.5 Operation service roads

Stakeholder identification number(s)

161

Issue description

Submissions relating to service roads raised issues regarding the proposed left-in left-out access to private properties located in the project area adjacent to the proposed Princes Highway upgrade. Specifically, the respondent questions the safety of the design and feels that a network of service roads between properties and grade-separated interchanges would be a safer design option.

In summary, the respondent(s) raised the following issues:

- The current design includes left-in / left-out access to private properties. These movements would be unsafe at future traffic volumes. The design should be changed so that vehicles from those properties access the highway at grade-separated interchanges, by the provision of service roads if required. The predicted traffic volumes are questioned in relation to the standard to which these accesses are built.

Response

Section 4.2.8 of the environmental assessment provides an overview of proposed property access arrangements. Where the project follows the existing highway alignment, direct property access would be provided or consolidated via property access roads where feasible. Direct connections to the highway would include a widened deceleration lane within the highway shoulder and signposting, and would be restricted to left-in / left-out movements.

Where the current access point could not be maintained, entrances to properties would be relocated. This could include direct access to the upgraded highway:

- At a new location.
- Via an existing local road.
- Via a new service road.
- Via a right of way across a private property.

Consultation with property owners about their individual property accesses has been undertaken and is summarised in Chapter 6 and assessed in Section 7.9 of the environmental assessment. Section 7.2.8 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment includes an assessment of road safety impacts following construction of the project, including the provision of left-in and left-out turns only at local accesses.

Existing crash data shows that over 20 per cent of crashes in the project area occur either at intersections or between vehicles travelling in opposite directions. Road safety at intersections is estimated to significantly improve as a result of the project due to the following design features:

- At-grade intersections would be upgraded to left-in / left-out only access, enforced by the provision of central median wire rope barrier. This would:
 - Eliminate traffic performing right turns to/from minor roads across fast-moving two-way traffic.
 - Require drivers only to consider and give way to traffic travelling in one direction when entering and exiting the highway.
- A 100 metre long widened deceleration lane within the highway shoulder at the approach to each property access would allow safer deceleration and minimise the potential for rear-end crashes.
- The provision of two lanes as a minimum in both directions along the length of the project would provide additional road space for through traffic to manoeuvre past traffic turning (prior to deceleration lanes) into and out of properties.
- Enhanced highway alignment would result in improved 100 kilometres per hour safe intersection sight distance for vehicles turning left-out of property access roads.
- Installation of appropriate signage to identify the left-in / left-out movements.

2.8.6 Operation local road network

Stakeholder identification number(s)

Kiama Municipal Council

Issue description

Submissions relating to operational impacts on the local road network raised issues regarding performance of the existing Princes Highway in the Foxground area and request for clarification of the transfer of this asset to Council.

In summary, the respondent(s) raised the following issues:

- Post construction, a formalised process should be developed for the handover of the existing Princes Highway in the vicinity of Foxground when it is decommissioned and handed to Kiama Municipal Council as a local road, including the provision of a full road safety audit report and the process for rectification of any identified defects.

Response

A formalised handover process in accordance with RMS Policy 192 and in consultation with both Kiama Municipal Council and Shoalhaven City Council would be initiated for the transfer of assets. This would include a road safety audit and the rectification of defects would also be managed by this process.

2.8.7 Operation incident response

Stakeholder identification number(s)

215 and Kiama Municipal Council

Issue description

Submissions relating to incident response during operation raised issues regarding potential impacts that the proposed design may have on the safety and efficiency of emergency vehicles travelling to/from incidents in the project area.

In summary, the respondent(s) raised the following issues:

- Access for properties in Toolijooa and Foxground is limited to one southbound exit and one northbound entry to the highway. The nearest turning facility for emergency vehicles for these properties is at the Belinda Street interchange or just north of the Austral Park interchange. An additional turning facility for emergency vehicles should be located in the area surrounding the Toolijooa Road interchange.
- The Environmental Risk Analysis section of the DGRs should contain identification of potential uncertainties (additional risks) with an associated proactive mitigation proposal that can be reflected in the project statement of commitments and passed on to the contractual obligations of the project builder. For example, there is no mention of measures that could be taken if the Queen Street roundabout was blocked by a serious accident. However, reference is made to a possible blockage of the Kangaroo Valley overpass. The response that a critical incident plan would be written is inadequate and does not address the bypass restricting all access to one point.

Response

The regular spacing of grade-separated interchanges minimises the need for dedicated at-grade public u-turn facilities. Two would be provided as part of the project; one on a section of the residual highway just north of the Austral Park Road interchange, and the other at Mullers Lane south of Berry.

The Toolijooa interchange, currently being constructed as part of the Gerringong upgrade, would provide two north facing ramps that allow northbound access to the upgraded highway and southbound access from. A full interchange with four ramps was previously investigated as part of the preferred access options assessment. However, it was concluded that this design option would not provide value for money due to low traffic volumes (less than 500 vehicles per day in 2037) and constructability constraints of the additional two south facing ramps.

Emergency vehicles would travel to incidents within the project area from an ambulance station in either Bomaderry or Kiama, which are two of 13 stations within the Illawarra catchment zone. It is likely that emergency vehicles would travel from the Kiama station for an incident east of the Toolijooa Road interchange or within the Foxground area and therefore, would use the north facing ramps at the Toolijooa interchange. If, for example, an ambulance attended an incident on the northbound side of the Princes Highway and had to then travel south, the additional journey time required to travel north to the Belinda Street interchange to perform a u-turn would be negated by increased / safer travel speeds on the upgraded highway when compared to existing conditions.

In the event of an incident occurring on the highway between the Toolijooa Road and Austral Park Road interchanges, an at-grade emergency vehicle U-turn facility would also be provided by the project between Broughton Creek Bridges two and three at chainage 10950. This would supplement the dedicated at-grade public u-turn facilities which could also be used by emergency vehicles, and further mitigate additional travel times incurred as a result of the project.

It is recognised that there would be environmental risks to the efficiency of the local road network in the event of an incident at key intersections or roadways. However, these risks are present on the existing road network and when the Berry bypass is operational, the majority of traffic that may be currently responsible for (eg heavy vehicles) or delayed (eg through vehicles) by an incident would not be travelling on the local road network in Berry. Hence, there would be a large reduction in the number of vehicles impacted by a potential incident in Berry, compared to existing conditions.

However, if the Queen Street roundabout or Kangaroo Valley Bridge was temporarily blocked, traffic management plans would be implemented to direct traffic to alternative detour routes through the town. More specifically and following feedback received through the environmental assessment process, Option 3 for Victoria Street, with the modifications presented in **Chapter 3** of this report has been adopted. This option includes a two-way road between Queen Street and Victoria Street, which would provide a temporary detour if there was an incident at the Queen Street roundabout. Refer to **Section 2.22** of this report for further details about Victoria Street.

2.8.8 Operation pedestrian/cyclist

Access routes

Stakeholder identification number(s)

11, 67, 70, 79 and 215

Issue description

Submissions relating to access route raised issues regarding the suitability and safety of the proposed pedestrian and cyclist facilities, which would be provided as part of the proposed upgrade.

In summary, the respondent(s) raised the following issues:

- Page 142 of the environmental assessment notes the Department of Planning and Infrastructure's request that pedestrian connectivity between Kangaroo Valley Road and Berry be maintained. Section 7.10 of the environmental assessment does not adequately address the shared pathway from Kangaroo Valley Road to Berry on the north side of the road crossing under the road at bridge at Berry, and the issue of pedestrian connectivity and pedestrian and cyclist safety.

- North Street is a popular and peaceful pedestrian and cycling area. The project would sever the street and put a foot/cycle path along the south side of the bypass to Queen Street. Cyclists and pedestrians, when arriving at the Kangaroo Valley Road junction with Queen Street, would have to cross two roundabouts either side of a bridge if they wish to continue along the path from 'west' Berry to 'east' Berry where most social infrastructure is located. There is a lack of alternative pedestrian and cyclist links between Kangaroo Valley Road and the town centre of Berry. The safety of cyclists and pedestrians would be compromised and the proposed mitigation is not acceptable.
- The re-routing of pedestrians and cyclists due to the severance of North Street is of concern. Consideration should be given to a walk / cycleway running along the northern side of the bypass from Rawlings Lane, to cut under / go over the bypass and connect to the cycleway on the southern side. Cyclists and pedestrians could then access town and the sporting fields without having to go through the Kangaroo Valley Road interchange.
- The removal of large trucks from Queen Street would be of great benefit to the residents of the Arbour and future construction of pedestrian crossings on Queen Street. Three crossings along the length of the CBD would give residents and visitors safer pedestrian access to shops.
- There is a safety issue at and near the intersection of Queen Street and Prince Alfred Street which would be accentuated by increased vehicle usage of Prince Alfred Street. Increased traffic volumes on Prince Alfred Street would result in traffic conflict with pedestrians accessing the medical centre.
- Monitoring post construction for "lack of safe access for pedestrians and cyclists at the southern interchange" is not adequate. Proposed roundabouts cannot be retrospectively made safer. Even with pedestrian refuges, pedestrians would still need to cross roads.

Response

Section 7.2.10 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment includes an overview of pedestrian and cycling impacts within Berry. Section 8.2 addresses the management of these impacts following construction of the project.

The project includes the provision of shared pedestrian and cyclist facilities on both sides of the Kangaroo Valley Road overbridge where there is currently no footpath provided along Kangaroo Valley Road. These facilities would be separated from traffic and provide a new safe pedestrian link between Berry town centre and residential development to the north-west along Kangaroo Valley Road and beyond

Shared pedestrian and cyclist facilities along the northern side of North Street would provide connectivity between Kangaroo Valley Road and the sports grounds and mitigate the loss of pedestrian and cyclist connectivity associated with the bypass and the cul-de-sac of North Street. These features are discussed in more detail in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* of the environmental assessment.

A possible design for a pedestrian link to the north of the Berry bypass, was presented and discussed as part of the 2011 community review group consultation process. However, following community input to the proposed alignment in this area, it was decided that the shared pedestrian / cycle path should be located on the southern side of the proposed Berry bypass, to make best use of the enlarged area for community open space and to provide improved connectivity between Kangaroo Valley Road and North Street.

Traffic volumes on Prince Alfred Street are not expected to increase as a result of the project. In addition, the Berry bypass would remove large volumes of through traffic from Queen Street, which would improve the safety of the Queen Street and Prince Alfred Street intersection.

Overall, the project would generally enhance pedestrian mobility within Berry. Less traffic in the town would reduce the delays and enhance safety when crossing roads within the town and increase amenity by improving air quality and reducing noise.

Contemporary guidelines relating to road design, specifically Austroads 'Guide to Road Design Part 4B: Roundabouts' (2009), states that there is no evidence to suggest that roundabouts are less safe for pedestrians than other forms of intersection control. With most roundabouts, the installation of well-designed splitter islands of sufficient size to hold and protect pedestrians allows them to cross only one direction of traffic at a time. This should result in pedestrians being able to move more safely and freely around the intersection than was the case before installation of the roundabout.

Suitable pedestrian and cyclist arrangements would be provided according to relevant guidelines to ensure that safe pedestrian access is maintained following construction of the project.

Provision for pedestrians and cyclists in and around Berry would support and complement any Berry pedestrian access and mobility plans and would be developed further during the detailed design phase of the project in consultation with Shoalhaven City Council.

Design

Stakeholder identification number(s)

67, 215 and Kiama Municipal Council

Issue description

Submissions relating to design raised issues regarding the specific features of pedestrian and cyclist facilities that would be provided in and around Berry and on the upgraded highway.

In summary, the respondent(s) raised the following issues:

- The environmental assessment has proposed cycleway facilities as part of this project in accordance with the provisions of the NSW Bikeplan, even though there would be 2.5 to 3 metre wide shoulders either side of the highway. The provision of cycleways should be included as an extension of the Princes Highway upgrade at Gerringong.
- Space should be dedicated for the future provision of a two metre wide dedicated bike path alongside the highway from Berry to Nowra. It is critical that this is considered when a (future) six lane highway is being designed. Construction of dedicated bike paths along new roads in flat areas is a cost-effective way of ensuring the community can enhance their health through exercise. Other benefits include decreased vehicular traffic and increased tourism cycling. Leaving space on the verge of a four lane highway is only a partial solution until the highway is upgraded to six lanes in future.
- An additional pedestrian / cycleway such as a tunnel or overpass should be constructed or at least designed for future construction. This would allow a range of users including school children, mums with prams, the elderly and cyclists to commute across the highway from the Kangaroo Valley side of the highway to the Berry township without having to negotiate complex intersections.
- The provision of pedestrian refuges at each of the many roads feeding into the roundabouts at the Kangaroo Valley interchange does not satisfy concerns for safety, particularly for unaccompanied school children.

Response

Pedestrian and cyclist arrangements would be provided according to relevant guidelines to ensure that adequate access is maintained. The project includes the following provisions for cyclists and pedestrians:

- A minimum 2.5 metre wide shoulder that would provide adequate space for cyclists access along the main alignment of the project. Although not part of this project, a 2.5 wide shoulder on both sides of the highway would also form part of the Berry to Bomaderry upgrade.
- Provision of shared pedestrian and cyclist facilities on both sides of the Kangaroo Valley Road overbridge. The shared facilities would be separated from traffic and provide a link between Berry town centre and residential development to the north-west along Kangaroo Valley Road and beyond.
- Shared pedestrian and cyclist facilities along the northern side of North Street. This facility would provide connectivity between Kangaroo Valley Road and the sports grounds and mitigate the loss of connectivity associated with the bypass and the cul-de-sac of North Street by maintaining the existing level of recreational connectivity.
- All provisions for cyclists would comply with RMS' 'NSW Bicycle Guidelines' and Austroads 'Traffic Engineering Practice - Part 14'; this includes provision for cyclists at all interchanges and intersections constructed as part of the project.
- Provision for pedestrians and cyclists in and around Berry would support and complement any Berry pedestrian access and mobility plans and would be developed further during the detailed design phase of the project in consultation with Shoalhaven City Council.

Contemporary guidelines relating to road design, specifically Austroads 'Guide to Road Design Part 4B: Roundabouts' (2009), states that there is no evidence to suggest that roundabouts are less safe for pedestrians than other forms of intersection control. With most roundabouts, the installation of well-designed splitter islands of sufficient size to hold and protect pedestrians allows them to cross only one direction of traffic at a time. This should result in pedestrians being able to move more safely and freely around the intersection than was the case before installation of the roundabout.

Suitable pedestrian and cyclist arrangements would be provided according to relevant guidelines to ensure that safe pedestrian access is maintained following construction of the project.

2.8.9 Operation public transport

Stakeholder identification number(s)

166, 215 and Kiama Municipal Council

Issue description

Submissions relating to public transport during operation raised issues regarding proposed facilities in the project area and how they were appraised in the traffic and transport assessment.

In summary, the respondent(s) raised the following issues:

- The environmental assessment has not identified the morning and afternoon school services operated by Gerringong Buses and Kiama Coachlines which transport students.
- By preventing school buses from stopping at informal locations and making limited dedicated bus stops, adequate parking areas need to be made available for parents waiting to pick up their children.
- For northbound traffic, a provision should be made for a bus stop bay opposite the new Toolijooa Road T-intersection at about chainage 7700. Benefits would include:
 - Eliminating the need for the bus to divert to the bus facility on the southern side of the upgrade.
 - Visibility of passengers in advance, thereby avoiding unnecessary delays.
 - Incorporating the bay into the road shoulder at minimal cost.

Response

Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment identified school bus routes and services. These were specifically identified in Section 2.3.1 and have been considered in the concept design for the project in consultation with relevant bus operators. The consultation process with bus operators would continue during the detailed design and construction phases of the project.

It is proposed that informal school bus stop locations would remain on the old Princes Highway between the Austral Park Road and Toolijooa Road interchanges. However, it is proposed that to improve road safety following the construction of the project, this practice would be discouraged on the upgraded Princes Highway. Public and school buses would only stop at dedicated facilities for this purpose at the grade separated interchanges at Tindalls Lane (existing) and Toolijooa Road (new). Parent drop off and parking facilities at the new Toolijooa Road bus stop would be developed during the detailed design stage of the project.

The proposed design considered current provisions for school, local and intrastate buses and a strategy of reconciling and consolidating the existing arrangements was developed. In addition, the project team met with local bus operators and undertook observational surveys to determine the two proposed locations for the formal bus stops.

2.8.10 Operation traffic road safety

Stakeholder identification number(s)

170, 175, 199 and Kiama Municipal Council

Issue description

Submissions relating to traffic road safety during operation raised issues regarding the potential safety implications of the proposed design at specific locations including interchanges, property accesses and on the carriageway of the upgraded highway.

In summary, the respondent(s) raised the following issues:

- Removal of the right turn access to homes and businesses in Schofields Lane requires slow moving thoroughbred trucks, cattle trucks and agricultural machinery to use a u-turn facility.

Approved businesses in Schofields Lane require specialised transport trucks. Crossing a multi-lane highway with 100 kilometres per hour traffic in a large slow moving vehicle is difficult and dangerous.
- Heavy vehicles servicing rural properties would be forced to use the existing highway from the Austral Park Road interchange. This section of the existing highway is notorious for heavy vehicle accidents.
- RMS should upgrade the intersection of Foxground Road and the existing Princes Highway due to the poor sight distance and steep grades at this intersection, prior to the handover of the old Princes Highway to Kiama Municipal Council
- Glare from the sun is dangerous, particularly in winter along North Street.
- Residents exiting from properties in the vicinity of chainage 12250 to chainage 13900 have restricted vision to the south. The narrow shoulders are often used as rest stops or mobile phone stops, blocking access to properties. Signage on the pavement surface or roadside would assist addressing this problem. Wider shoulders and/or a possible underpass with long acceleration and deceleration lanes should be included to improve safety for trucks.

Response

The design changes presented in **Chapter 3** of this report include revised access arrangements between the upgraded highway and Schofields Lane. The revised Schofields Lane interchange would accommodate all northbound and southbound movements to and from the upgraded highway. An underpass would provide a grade-separated connection for both light and heavy vehicles beneath the highway. This arrangement would maintain existing accessibility between the highway and Schofields Lane. It would also remove the requirement for slow-moving trucks to cross multi-lane highway traffic before joining and after exiting the southbound carriageway.

Daily traffic volumes on the existing Princes Highway between Austral Park Road and Toolijooa Road are predicted to considerably reduce to around 1000 vehicles in 2037. The existing highway would operate as a local road and the low volume of traffic would increase safety for heavy vehicles turning into local roads and properties.

A formalised handover process in accordance with RMS Policy 192 and in consultation with Kiama Municipal Council would be initiated for the transfer of assets. This would include a road safety audit and the rectification of defects would also be managed by this process.

RMS would aim to minimise the risk of glare created by noise barriers; it is however difficult to mitigate glare on open roads across the existing and future road network (eg Berry bypass), particularly as the impacts would be both weather and time dependant. A well-designed road such as the proposed upgrade would help motorists deal with the issue of glare; as part of the detailed design stage of the project, a thorough lighting strategy and design would be developed, including a headlight glare assessment.

The project would provide for safe property and local road access in accordance with current road design standards. Property access arrangements have been designed to include a wider shoulder, which would allow safer deceleration and minimise the potential for rear-end crashes.

It is not desirable to use the shoulder as an acceleration lane because of the observation angle required to merge when exiting a property access road. It is desirable to stop at a near right angle to the traffic stream and enter the highway when there is an appropriate gap in the traffic. The current and future traffic density would also allow an appropriate sized gap for acceleration.

The design changes presented in **Chapter 3** include a change to the property access at Chainage 12850 that includes the provision of a new vehicular underpass as a second property access facility. The revised property access would provide both northbound and southbound access and address the issue of blocked property access and limited sight distance for vehicles exiting this property.

Generally there would be an increase in shoulder widths over the length of the project and there would be little need for motorists to stop at existing local accesses. Additionally, the strategy for local accesses would guide third parties to not park in driveways.

The RMS has met with individual property owners to discuss functional and safe access, and consultation with affected property owners would continue during the detailed design phase of the project.

2.8.11 Operation traffic impacts – Victoria Street

Stakeholder identification number(s)

15, 17, 20, 23, 32, 34, 44, 47, 75, 89, 97, 123, 134, 146, 149, 152, 159, 164, 187, 193 and 215

Issue description

Submissions relating to operational traffic impacts - Victoria Street raised issues regarding potential impacts that the project would have on the operation of Victoria Street and other roads which it directly connects with.

In summary, the respondent(s) raised the following issues:

- Option 1 for Victoria Street (closure) is unacceptable as Victoria Street provides a single lane access for all southbound traffic from Berry. Closure would force all traffic to use one southbound exit at the end of Queen Street. An accident on the Queen Street roundabout or the southbound on-ramp would cause congestion, restrict movements of emergency vehicles and require residents to travel on the 'Sandtrack', resulting in significant delays.

Two southbound exits from Berry are required, particularly to reduce congestion and in the case that a serious accident blocks one exit. In an emergency at the western end of Victoria Street, direct access to the highway via Victoria Street is essential to ensure fast access for emergency vehicles, rather than a longer route via George Street / Queen Street.

Options 1 and 2 for Victoria Street would add an additional 90 seconds for emergency services to access the highway. There are two retirement villages and the Bupa Aged Care Facility on Victoria Street with aged care and senior living facilities, along with many private residential properties in the area. Lives could be saved if access to Victoria Street remains open. The project should at least maintain open access or provide emergency vehicle access between Victoria Street and the southbound highway until the proposed Berry bypass and southbound on-ramps are in place. Under periods of intense rainfall (last observed in 2007), the northbound highway access from Berry is completely cut off by flooding in the vicinity of Apex Park and the Berry Bowling Club. At these times, the only road access to emergency health services is to the Shoalhaven Hospital in Nowra.

- Option 3 for Victoria Street (open) would increase access for emergency services to the southern retirement communities and better disperse local traffic movements.
- Victoria Street affords an easier access point to the Princes Highway for the many elderly people living in the area, especially during high tourist traffic periods. Tourist traffic increases the difficulty of accessing the Princes Highway from side streets.
- Table 7.16 of the environmental assessment states that only 45 vehicles per day would travel northbound along a two-way road past Mark Radium Park. This is questionable, as a two-way road would provide access to the Kangaroo Valley Road interchange for all Kangaroo Valley Road bound and northbound residents of the western end of Victoria Street (including Bupa Aged Care Facility, the Grange, the Arbour and Windsor Drive), and others from local streets. It would be the key road for highway travellers entering and exiting the park and would keep this traffic, including towed boats/caravans out of George Street. At present to turn right at this location involves encountering busy highway traffic accelerating after the speed camera. Locals see this as too dangerous.
- Option 2 and Option 3 for Victoria Street would accommodate a small amount of daily traffic ranging from 30 to 110 vehicles per hour, and less if required traffic calming devices are installed on Victoria Street. This makes a one-way or two-way link between Queen Street and Victoria Street unwarranted, particularly when Queen Street is only a block away for access to the highway.

Response

Victoria Street design options, including the varying effects of these options on access and egress, local traffic distribution, and network operation are addressed in Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment.

The traffic and transport assessment and accompanying traffic modelling was underpinned by an extensive set of traffic surveys, including automatic traffic counts ('tubes'), intersection turning counts and origin-destination surveys. The collection and analysis of this data enabled a comprehensive understanding of existing traffic patterns and volumes in Berry, particularly the existing distribution and movement of traffic in Berry south of Queen Street. As an example, Figure 7.11 in Appendix D – *Technical Paper: Traffic and Transport* shows the following existing annual average daily traffic (AADT) volumes:

- 30 vehicles per day turn right from Victoria Street onto the Princes Highway northbound.
- 110 vehicles per day turn left from the Princes Highway southbound into Victoria Street.

Future forecast traffic patterns and volumes have been calculated incorporating existing data, augmented with regional traffic growth rates, and including where appropriate a long-term Berry local road traffic growth rate of two per cent per annum, as agreed with Shoalhaven City Council. Traffic modelling for Victoria Street options subsequently used this information in conjunction with the steps and assumptions indicated in Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to estimate the impacts of the alternative design options.

For Option 3, two-way access would be maintained between Victoria Street and Queen Street / Kangaroo Valley Road. Road safety would be improved through the removal of conflicting northbound through traffic from the Princes Highway and appropriate intersection design would ensure safety and ease of access for all traffic movements.

The traffic modelling of future scenarios is consistent with currently planned and approved land use developments throughout Berry, which indicates that there are no major traffic generating developments which are expected to significantly increase the limited demand for the right-turn from Victoria Street towards Kangaroo Valley Road (see **Section 2.8.12** below). Based on this assumption and applying the agreed long-term local traffic growth rate of two per cent over 25 years to existing demands, the following forecast AADT demands are expected in 2037:

- 45 vehicles per day turn right from Victoria Street onto the Princes Highway northbound.
- 164 vehicles per day turn left from the Princes Highway southbound into Victoria Street.

Paramics microsimulation modelling (described in Section 4.3.1 of Appendix D – *Technical Paper: Traffic and Transport*) was also used to quantify and visualise local and regional traffic flows, including a comparison of pre- and post-upgrade scenarios. The results of this modelling validated the assumption that none of the Victoria Street options are expected to significantly increase demand for the right-turn movement exiting Victoria Street towards Kangaroo Valley Road.

The existing direct access from the Princes Highway northbound into Victoria Street would be removed for all three Victoria Street options. Traffic currently travelling along this route would need to use the Kangaroo Valley Road interchange to access Berry. Therefore, additional travel times would be incurred by all vehicles travelling to The Arbour, The Grange, Bupa Care Services facility, and other locations in Berry from Nowra; these would be roughly equal for all three options. Table 7.16 in Appendix D – *Technical Paper: Traffic and Transport* notes this negative impact for all options.

Option 1 – Victoria Street closure – would redirect traffic from Victoria Street travelling towards Nowra via the Kangaroo Valley Road interchange, hence negative impacts would include additional travel time for southbound traffic.

In terms of accessibility and travel time impacts, the closure of Victoria Street would not result in a significant change from existing conditions. Any additional travel time (less than two minutes when compared to existing conditions), would be offset by the increased speeds on the upgraded highway between Berry and Nowra – particularly after the Berry to Bomaderry upgrade is constructed.

It is important to note that the closure of Victoria Street would result in the re-distribution of the relatively large volume of traffic which currently turns left from Victoria Street onto the Princes Highway southbound – currently around 1100 vehicles per day – onto other local roads.

If Victoria Street is closed it is acknowledged that the occurrence of traffic incidents at the Queen Street / Kangaroo Valley Road / southbound on ramp roundabout or on the southbound on ramp itself would have the potential to restrict traffic movements travelling southbound from Berry; which could result in detours, delays and congestion.

Option 2 and Option 3 would maintain existing accessibility and minimise travel times for traffic travelling southbound from Victoria Street towards Nowra. The provision of a direct connection from Victoria Street to the southbound on ramp would also result in a reduction in traffic volumes on local north-south roads between Victoria Street and Queen Street when compared to Option 1, as shown in Table 7.15 and Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport*. For these options the Victoria Street intersection and adjoining road layouts would be appropriately designed to ensure safety and ease of access for all traffic movements.

RMS is able to deliver any of the Victoria Street design options through the project. All Victoria Street options have received both supporting and opposing submissions, and the proposal has been reassessed accordingly.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected. Refer to **Section 2.22** of this report for further details.

2.8.12 Operation traffic growth / forecasting / modelling – Victoria Street

Stakeholder identification number(s)

11, 33, 75, 133, 146, 149, 201 and 215

Issue description

Submissions within the subcategory of operational traffic growth / forecasting / modelling – Victoria Street raised issues relating to the methods used to develop and present traffic modelling and forecasting results, which have been used to assess the impacts of Victoria Street options.

In summary, the respondent(s) raised the following issues:

- The two per cent per annum increase due to population and employment growth projections seems high, given that the development of Berry township south of Victoria Street is limited due to rail and road boundaries.
- Appendix D Traffic and Transport Victoria Street AADT flow diagrams, F1-4, and all judgements and statements relating to these diagrams to be found in Volume 1, eg pages 198 to 200 of the environmental assessment report and Appendix D of Volume 2 page 99 to 105 should be removed from the environmental assessment report as they are incorrect.

In Appendix D Traffic and Transport, Section 7.2.7 Victoria Street Design Options, under Traffic distribution model development, the wrong assumptions were employed in predicting redistribution of traffic under the different Victoria Street options making any accurate prediction impossible. Residents from the south of Berry who live in Clarence Street, Gwenda Avenue, King Street, Albany Lane, and the southern ends of Albany and Alexandra streets contribute greatly to traffic flow on Victoria Street. They have not been captured in traffic measurements and are not shown on the flow diagrams. The western end of Victoria Street, including Bupa Aged Care Facility, the Arbour, the Grange and Windsor Drive, are located above any device placed opposite Mark Radium Park. It seems that predictions were made relating only to the volume of traffic entering and exiting the highway. There is no sole connection between this traffic and the traffic found on George, Edward, Albany and Alexandra streets. That could also come from the areas not measured.
- The assumption of “Existing volumes and proportions of total AADT across George Street, Edward Street, Albany Street and Alexandra Street” to predict redistribution suggests that with Victoria Street fully or partially closed, traffic would continue to use these north / south roads in the same volumes that they do pre-bypass. Under all options, existing volumes cannot be sustained as permanent closure of the right turn into Victoria Street alone would significantly change traffic volumes.
- RTA Traffic Generating Rates calculate that, with closure of Victoria Street, 1500 vehicles per day from residences at the western end of Victoria Street would use the Victoria / George Street intersection, with an estimated 900 of these turning into George Street. Had this traffic been factored into RMS data, it would have been spread across all north-south streets. This is not a valid calculation, as traffic would primarily use George Street as the fastest route to access destinations north, south or west of Berry. It appears that neither the potential impact at this intersection, nor the correct traffic increases and impacts on George and Edward streets have been calculated by RMS. Due to the nature of the George / Victoria Street intersection, there is a greater potential for traffic conflicts to occur here with an increase in traffic.

The increase in traffic on George Street would exceed RMS' own environmental flow criteria, also the "levels of acceptable diversion" based on AUSTROADS guidelines and NSW Road Traffic Noise guidelines. It does not properly address the DGRs for changes to local road capacity / safety impacts from traffic rerouting and modified access.

- An Origin-Destination survey to determine peak use was carried out on Victoria Street on a market day. This highly popular market is reputed to be the largest craft market in NSW, drawing visitors to Victoria Street from points well outside the Shoalhaven. The market is busy from 8am, crowded by 10am and doesn't begin to clear until after 2 pm. The capture of Victoria Street data only between 10am and 2pm gives no indication of how busy the street can be.
- Option 1 for Victoria Street has the largest impact on the local road network and should be rejected for this reason. There would be more than three times the daily traffic volumes on the local north-south roads in 2037, reduced to two times the volume under Option 2 and 3. Option 1 confers the highest disadvantage to these local streets, with one-sided or no footpaths and narrow bridges. It interrupts connectivity and existing traffic movements to the greatest degree. It should be noted (p199 Volume 1) that only Option 1 would reduce Queen Street to level of service (LoS) C in 2037. This should not be listed as a positive for Option 1.
- RMS' estimate of traffic movements from the Grange and the Arbour used the model for nursing homes (one to two movements per day) rather than for 'over 55 Estates' (four to six per day). This is a serious error. The medium density housing that mostly applies to the western end of George Street ie parts of Windsor Drive and the two 'over 55s living' developments generate more traffic than is usual in the older parts of Berry.
- Closure of Victoria Street would substantially increase traffic along Princess Street, for which traffic volume analysis is not available.
- There is community resistance due to the way RMS and consultants have presented traffic forecasting figures. The key assumption of a two per cent linear increase in traffic volumes due to population and employment growth on roads to the south of Queen Street is poorly conceived as it is not based on fact but rather on generalised assumptions. A proper analysis of the potential growth for Berry to the south of Queen Street would show that it is not possible to increase land release or density based on current planning guidelines to generate the growth that has been assumed. The effect over a 25 year time horizon is to grossly overstate the potential traffic volumes on these roads, which has caused unnecessary concern in the community. Victoria Street should remain a local road only and should not be effectively elevated in status to a primary egress path from the Berry town centre.

Response

Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides an overview of Victoria Street design options from a traffic and transport perspective, including the assumptions used during model development and the varying effects of the three Victoria Street options on local traffic distribution. In addition Chapter 4 of Appendix D – *Technical Paper: Traffic and Transport* provides details of the overall traffic modelling and forecasting approach for the project.

Existing traffic volumes and patterns

The traffic and transport assessment for the project and accompanying modelling was underpinned by an extensive set of traffic surveys, including automatic traffic counts ('tubes'), intersection turning counts and origin-destination surveys within Berry.

The collection and analysis of this data enabled a comprehensive understanding of existing traffic patterns and volumes in the town, in particular the existing distribution of total traffic across the locations listed below. Consequently, estimates of existing traffic levels generated from individual dwellings, other developments or areas were generally not required. The survey data provided sufficient information and is 'actual observed data', in comparison to applying assumptions or calculations to estimate existing traffic patterns and volumes. Specifically, the locations of traffic surveys undertaken during the assessment of Victoria Street options are as follows:

- Victoria Street West: West of access to Mark Radium Park.
- George Street: South of Queen Street.
- Edward Street: South of Queen Street.
- Albany St North: South of Queen Street.
- Alexandra Street: South of Queen Street.
- Prince Alfred Street: South of Queen Street.
- Victoria Street East: West of Prince Alfred Street.

These survey locations formed a cordon which captured all traffic movements between areas south of Queen Street - including Coolangatta Road and beyond - and Queen Street / Princes Highway and beyond. This includes traffic generated by residential and non-residential land uses on Clarence Street, Gwenda Avenue, King Street, Albany Lane, and the southern ends of Albany Street and Alexandra Street. As the traffic count at the western end of Victoria Street was located west of the access point to Mark Radium Park, this included any traffic generated by Bupa Care Services facility, The Arbour, The Grange, and Windsor Drive, travelling to and from the Princes Highway at the western end of Berry.

The roads within and surrounding Berry, including Victoria Street, are subject to significant variations during holiday peaks in addition to local events including markets and fairs. At the time of assessment, the most recent 24-hour traffic survey conducted on the day of a Berry Country Fair was Sunday 6 May 2012. On this day:

- At the western end of Victoria Street:
 - Two-way daily traffic was around 3260 vehicles (AADT is around 2170 vehicles).
 - Two-way hourly traffic peaked at around 510 vehicles, between 10am and 11am.
 - Two-way hourly traffic was:
 - About 270 vehicles between 8am and 9am.
 - About 270 vehicles between 2pm and 3pm.
- At the eastern end of Victoria Street:
 - Two-way daily traffic was around 1630 vehicles (AADT is around 1140 vehicles).
 - Two-way peak hourly traffic was around 255 vehicles, between 10am and 11am.
 - Two-way hourly traffic was:
 - About 90 vehicles between 8am and 9am.
 - About 150 vehicles between 2pm and 3pm.

Regular localised and regional increases in traffic volumes over the course of the year occur in this area. This has been considered during the development of appropriate design solutions, and throughout the concept design development and environmental assessment process.

Traffic forecasting (Methodology)

Future forecast traffic patterns and volumes have been calculated using existing data, augmented with regional traffic growth rates from the TRACKS traffic model, and including where appropriate a long-term Berry local road traffic growth rate of two per cent per annum, as agreed with Shoalhaven City Council.

The two per cent local road growth rate is underpinned by population and employment growth (land use) projections. However other factors, including anticipated increases in car ownership and other demographic changes, also contribute to forecast traffic growth. As a result, traffic typically grows at a faster rate than related land use forecasts. Therefore while land use development in Berry is expected to increase at a rate of less than two per cent per annum in the long-term, a two per cent per annum traffic growth rate has generally been adopted to reflect the increase in trip generation related to other factors.

These growth rates, based on both specific and land use assumptions were used as inputs to a Berry local road distribution model in addition to existing mid-block, intersection and origin-destination survey data.. The distribution model was used to assess the traffic impacts in the town as a result of each Victoria Street design option.

Following construction of the project, the traffic and transport environment in Berry would be vastly different to existing conditions. This in another important factor that was considered during model development. Traffic on Queen Street is expected to be at least 50 per cent lower than it is today, resulting in improved travel times, amenity, and safety. These factors would generally be expected to increase its use by local traffic. In addition all traffic approaching the town from the Princes Highway northbound would do so via Kangaroo Valley Road, changing real and perceived traffic benefits of various local route options, most notably Queen Street.

Traffic volumes and split of total AADT across George Street, Edward Street, Albany Street and Alexandra Street are proportional to traffic generated by local land uses on each of these north-south corridors, in addition to local road operation controls and priorities, driver behaviours and trip patterns, and other factors. Unlike the traffic and transport environment in Berry, in the long-term, local traffic generation and distribution across local roads has been assumed to remain relatively static as overall land use development typically increases at a relatively uniform level.

As a result, for the purposes of undertaking an evidence-based assessment, it has been assumed that the generally demonstrated patterns for local traffic distribution would continue in the long-term future based on:

- A general increase in benefits and corresponding use by local traffic of Queen Street as a collector road connecting to local north-south roads.
- Long-term land use development (and corresponding trip generation and distribution) in Berry increasing at a relatively uniform level throughout the town.

Future year forecasting for the three modelled Victoria Street options subsequently used this information in conjunction with the steps and assumptions indicated in Section 7.2.7 of the traffic and transport assessment, to estimate the impacts of the alternative design options.

Traffic forecasting (Trip generation)

The RMS 'Guide to Traffic Generating Developments' provides the following traffic generation rate guidelines for residential developments:

- Dwelling houses:
 - 9.0 daily vehicle trips (25 per cent internal to subdivision)
- Medium density residential flats (up to two bedrooms):
 - 4-5 daily vehicle trips (25 per cent internal to subdivision)
- Housing for aged persons:
 - 1-2 daily vehicle trips (25 per cent internal to subdivision)

In addition to the above, 'Trip Generation and Parking Generation Surveys – Housing for Seniors' conducted by RMS in 2009 indicates that traffic generation rates for senior housing are in the range 1.22 to 2.85 daily trips per dwelling (with an average generation of 1.95).

As an example using the above generation rates, if it is assumed that there are 50 dwelling houses on Victoria Street west of George Street – roughly accounting for Victoria Street and Windsor Drive – these dwellings would generate around 450 vehicle trips per day. If 1500 vehicles per day were generated by developments on Victoria Street west of George Street, this would leave approximately 1050 vehicles per day generated primarily by Bupa Care Services facility, The Arbour, and The Grange. These developments are most accurately defined as housing for aged persons | seniors; this level of trip generation would require the total development of between around 370 (2.85 trips/dwelling) to around 1050 (1 trip/dwelling) dwellings of this type.

It is not clear what land use assumptions have been used to estimate trip generation of 1500 vehicles per day from residences at the western end of Victoria Street, however this estimate does seem high when considering the above example. Despite this, RMS can confirm that future traffic generation resulting from the planned and approved land developments at the western end of Victoria Street has been factored into the traffic modelling undertaken.

As described above, a long-term Berry local road traffic growth rate of two per cent per annum was agreed with Shoalhaven City Council and applied to existing traffic volumes during traffic modelling. A large proportion of existing residential developments in the vicinity of Victoria Street and throughout Berry are houses, which typically generate nine vehicle trips per day. The residential developments at The Grange and The Arbour would be expected to generate significantly fewer vehicles. The maximum surveyed generation rate for housing for seniors is 2.85 vehicle trips per day, as indicated above.

As a result, applying a two per cent per annum long-term growth rate to existing traffic volumes, with much of the traffic on Victoria Street and throughout Berry generated by existing dwellings with significantly higher trip generation rates than The Grange and The Arbour, is believed to adequately cover long-term future traffic generation for Victoria Street and its surrounds.

Forecast traffic volumes and patterns (Results)

Section 2.8.11 of this report describes the expected effects of the various Victoria Street options on traffic re-distribution within Berry. All Princes Highway northbound traffic would utilise the Kangaroo Valley Road interchange to access Berry in the future; the closure of Victoria Street (Option 1) would also result in the re-distribution of traffic which currently turns from Victoria Street onto the Princes Highway southbound onto other local roads. Conversely, the provision of a direct connection from Victoria Street to the southbound on ramp (Option 2 and Option 3) would result in relative benefits including a reduction in traffic volumes on local north-south roads between Victoria Street and Queen Street when compared to Option 1, as indicated in Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport*.

The construction of the Berry bypass would result in a significant decrease in traffic on Queen Street – around 50 per cent to 60 per cent, as indicated in Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport*. Queen Street is expected to operate at Level of Service (LoS) C in 2037 for Option 1 and LoS B is expected for Option 2 and Option 3. Under all options the LoS of Queen Street is listed as a positive as this illustrates a higher LoS than existing conditions (LoS D). Performance would be expected to continue to deteriorate as a result of traffic growth in a ‘Do Nothing’ scenario.

The re-distribution of traffic would add to natural traffic growth on local roads. Although overall growth is predicted to be large when compared to existing levels, the resulting daily volumes are relatively low with local roads accommodating between 700 and 2000 vehicles per day in 2037. The resulting level of service (LoS) for all local roads is predicted to be LoS A or LoS B in 2037, which represents optimum operating conditions (free flow).

Princess Street provides an east-west connection between George Street and Prince Alfred Street, roughly equidistant from Queen Street and Victoria Street. Although Princess Street provides an alternative to these roads between the eastern and western ends of Berry, it is not an attractive route for through traffic as it gives way at all intersections with local north-south roads (including stop controls at many intersections). The project does not include any impacts which would increase the attractiveness of Princess Street to traffic and it is therefore not anticipated that any redistribution of traffic to Princess Street would occur following construction of the project for any Victoria Street option.

RMS is able to deliver any of the Victoria Street design options through the project. All Victoria Street options have received both supporting and opposing submissions, and the proposal has been reassessed accordingly.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

The impacts of this option, summarised in Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* are generally compliant with relevant guidelines and recommendations and do not exceed any prescribed limits or criteria. In addition it is believed that the DGRs relevant to traffic and transport, provided in Chapter 1 of Appendix D – *Technical Paper: Traffic and Transport*, have been comprehensively addressed in the traffic and transport assessment, in addition to a significant amount of associated material developed and other activities undertaken throughout the environmental assessment process.

In summary, it is expected that for all options, predicted traffic volumes 25 years from now would not significantly change the residential nature of the local road network in Berry, especially when considering that AADT on Queen Street in 2037 is expected to be at least 50 per cent less than existing daily traffic volumes.

Presentation of traffic volumes and patterns

While it is acknowledged that forecasts extending 25 years into the future can be difficult to comprehend, it is a requirement of RMS to undertake an assessment which considers the performance of the project for a ‘design year’ 20 years after construction is completed. For the project, the planned design year is 2037, following completion of construction activities in 2017.

This design year is ultimately used to inform and validate the design process through the assessment of the performance of key aspects of the project, including the impacts to local roads, at a defined point in the future. The traffic and transport assessment has generally assessed the project for the design year, which requires the forecasting and presentation of traffic figures for 2037 for this purpose.

In summary traffic forecasts for 2037 have been used to best estimate the impacts and operation of the project for the design year. They have not been used to overstate or otherwise create concern within the community.

2.8.13 Operation local road network – Victoria Street

Victoria Street Option 1

Stakeholder identification number(s)

4, 5, 10, 12, 17-20, 22, 27, 28, 31-33, 37-39, 44, 45, 47, 51, 54, 60, 64, 66, 70, 75, 85, 89, 98, 123, 129, 133, 146, 149, 151, 152, 156, 159, 163, 168, 171, 178-184, 188, 189, 196, 213, 215, 234, 237 and Shoalhaven City Council

Issue description

Submissions relating to operational local road network – Victoria Street (Option 1) raised issues regarding the positive and negative impacts of the potential closure of Victoria Street. Throughout this section the relative benefits and disadvantages of the varying Victoria Street options are discussed.

In summary, the respondent(s) raised the following issues:

- The process has not involved proper consideration of environmental and social impact upon local streets, as well as introducing potential traffic conflicts and safety issues.
- Objection to the closure of Victoria Street due to the following issues:
 - Residents living in the south-west corner of Berry, including residents of the Grange, the Arbour and Bupa Aged Care Facility, would have to backtrack and divert to Queen Street through Huntingdale Park to access the southbound lanes of the highway, or be forced to travel via George, Edward, Albany, Albert, Alexandra, Prince Alfred and other locals streets, placing extra traffic on these quiet residential areas. The local streets are not designed to carry heavy trucks and heavy volumes of traffic. Where would local traffic go if Victoria Street is closed?
 - Traffic travelling south from the most densely populated area of Berry would be forced back towards town, adversely affecting traffic flow through the town.
 - Edward Street has a wooden bridge which can accommodate local traffic but would struggle with the projected increase.
 - It still forces local traffic to converge on the southern Berry interchange to travel north, south and west. This is not in line with project objectives as it would compromise the safety of residents and the western end of Queen Street would become dangerously congested.
 - Victoria Street currently serves as the only collector road for over a third of Berry. Its closure would result in a noise increase and significant inconvenience for residents and their quality of life.
 - There would be a significant increase in traffic at the junction of the Princes Highway and George Street. Is another roundabout warranted?
 - Residents and visitors to the bottom end of Victoria Street would have to drive down George Street to access the Kangaroo Valley Road interchange. Shoalhaven City Council has estimated this could be 1500 vehicles a day. Negative traffic impacts on the town should be avoided. This increase in traffic is not acceptable and of amenity, safety, noise and social connectivity impacts should be considered.

- Closure of Victoria Street would cause more traffic disturbance around the Berry Primary School area. Residents of Windsor Drive, lower Victoria Street and school commuters would add to the traffic congestion on George Street. This increased traffic would cause further congestion and may also result in safety concerns for children attending the school.
- There is no justification to further reduce traffic on Victoria Street by closing it and increasing traffic on side streets.
Victoria Street should remain open and unchanged. It is important that access to the remaining east-west streets isn't severed and that houses and large residential developments on the north side of Queen Street are able to enter and exit from Victoria Street. Victoria Street is a convenient and safe route for residents and employees of the retirement and aged care facilities in the area.
An open Victoria Street would provide an alternative exit route if the Queen Street roundabout and on-ramp is blocked. It would also relieve the daily pressures on the Queen Street roundabout, thereby reducing the likelihood of accidents or traffic back-up. Keeping Victoria Street open is a better option and would provide the greatest benefit to Berry and the surrounding areas by maintaining the existing traffic patterns, including access to Mark Radium Park for travellers 'rest and revive'. Additionally, Option 2 would only remove southbound traffic, not northbound. It is noted Shoalhaven City Council has prepared a report detailing its concerns for unacceptable traffic impacts on local roads from the closure of Victoria Street.
- The closure of Victoria Street would result in the minimisation of traffic conflicts at the western end of Victoria Street through the removal of 2000 vehicle movements per day. There is increased chance of compliance with traffic control signs (eg Stop, School Zone and 50 kilometres per hour zone) on Victoria Street, as the traffic profile becomes more localised and 'through' traffic is eliminated. Furthermore, the diversion of all traffic exiting town onto an existing purpose built and (to be) underutilised Queen Street for safer and well defined access north and south.
- With the number of alternative opportunities to access the Princes Highway once the bypass is built, the closure of Victoria Street would result in minor impacts on local residents and no adverse impacts on the larger community. Victoria Street closure maintains and improves the connection to town for private properties located near Bupa Care Services facility and would discourage speeding. There is currently a high volume of traffic using this street as it is a less congested route to get back on the highway.
- Option 1 for Victoria Street (closure) is preferred for the following reasons:
 - Northbound traffic originating from south of Victoria Street already uses local north-south roads.
 - At least half the traffic volume increase would result from the development of the bypass, regardless of the western end of Victoria Street being closed.
 - The Huntingdale Park Estate development has 243 lots and is approved by Council to have sole access via Huntingdale Park Road (one lane in and one lane out). The Berry community south of Victoria Street is of the same magnitude and is serviced by five access roads (five lanes in and five lanes out), excluding the western end of Victoria Street.
 - "... the resulting level of service (LoS) for all local roads is predicted to be LoS A or LoS B in 2037, which represents optimum operating conditions (free flow)".
 - "... predicted traffic volumes 25 years from now would not significantly change the residential nature of the local road network in Berry ...".
 - "Additional travel times would be minimal and the affected local roads would continue to function within capacity and with minimal impact to the amenity".
 - "Traffic wishing to access the highway would divert to Queen Street via local roads but the diversion is not expected to increase travel times for vehicular traffic and pedestrian accessibility would not be affected".

Response

Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides an overview of Victoria Street design options from a traffic and transport perspective, including the effects of the three Victoria Street options on local roads (traffic volumes), travel times, and accessibility. The relative positive and negative impacts of Victoria Street options in relation to these considerations, and the traffic modelling developed for this assessment are also generally discussed throughout this section.

The impacts of the varying Victoria Street options on local road safety, amenity, and general performance are known to be a key concern of the community. These impacts are also discussed in **Section 2.8.12**, **Section 2.8.16**, and **Section 2.8.11** of this report respectively.

Section 2.8.11 of this report describes the expected effects of Victoria Street options on traffic re-distribution within Berry. Following construction all Princes Highway northbound traffic would utilise the Kangaroo Valley Road interchange to access Berry. As a result all options are expected to increase traffic volumes on local north-south roads, and decrease traffic on Victoria Street. These impacts are directly linked.

Responses to issues raised relating to the traffic forecasting undertaken for Victoria Street are provided in **Section 2.8.12** of this report. RMS can confirm that future trip generation and distribution throughout Berry has been appropriately incorporated as part of the traffic modelling process.

Table 7.15 and Table 7.16 in Appendix D – *Technical Paper: Traffic and Transport* outline the forecast traffic volumes and level of service for local roads, and summary of traffic and transport impacts respectively for the varying Victoria Street options. In 2037, daily traffic volumes on local north-south roads are predicted to be three times greater when compared to existing levels for Option 1 and traffic volumes would be around twice existing levels for Option 2 and Option 3.

The re-distribution of traffic would add to natural traffic growth on Edward Street, however the existing wooden bridge would continue to provide adequate capacity to accommodate future traffic for all forecast scenarios. RMS has been advised by Shoalhaven City Council that the Edward Street bridge is nearing the end of its operational life and is due for replacement; Council has advised that funds are available for its upgrade, which would involve the construction of a large box culvert which would be designed to be wide enough to accommodate two-way traffic. This work is planned for completion by June 2013, which would provide further capacity on Edward Street should Council choose to continue with this upgrade.

Unlike local north-south roads, traffic volumes on Queen Street for all design options are forecast to reduce in the future (in 2037) by at least 50 per cent when compared to existing volumes as a result of the construction of the Berry bypass. Following this significant decrease in traffic, total traffic passing through the intersections between Queen Street and local north-south roads (the main conflict points in the existing road network) would be significantly lower than current volumes. In addition, the project would upgrade existing intersection arrangements in the vicinity of Kangaroo Valley Road as part of the southern interchange.

As a result, the combination of a reduction in total traffic on Queen Street combined with appropriate upgrades to the road network and intersections as proposed by the project, would be expected to improve traffic safety and efficiency, reduce conflicts and congestion, and generally improve traffic flow on Queen Street throughout the town. This would be expected despite the forecast growth and re-distribution of locally generated traffic increasing demand on local north-south roads. Specifically in relation to the George Street / Queen Street intersection, a roundabout is not deemed to be required to maintain intersection safety or operational performance.

Further analysis can be found in Chapter 7 of Appendix D – *Technical Paper: Traffic and Transport*, specifically: Section 7.2.2 (Intersection level of service) and Section 7.2.8 (Traffic crashes). This analysis indicates that with Victoria Street closed, the most heavily trafficked existing intersections within Berry including the southern interchange for Berry would operate at LoS A with minimal delay, based on proposed layouts and control methods.

As stated above, following construction of the project, all Princes Highway northbound traffic would use the Kangaroo Valley Road interchange to access Berry. For access to properties in the south-west corner of Berry (ie Victoria Street west of George Street), Option 1 - the closure of Victoria Street - would result in all traffic travelling to this area via George Street. For Option 2 and Option 3, traffic travelling to this area would also be provided with a route between Kangaroo Valley Road and the western end of Victoria Street. Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport* notes that for all Victoria Street options, negative impacts would include additional travel time to areas along and adjacent to Victoria Street from the south. These additional travel times would be offset by the increased speeds on the upgraded highway between Berry and Nowra.

The closure of Victoria Street (Option 1) would also result in the re-distribution of traffic which currently turns from Victoria Street onto the Princes Highway to other local roads. Hence with Victoria Street closed negative impacts would also include additional travel time for this traffic. Conversely the provision of a direct connection from Victoria Street to the southbound on ramp (Option 2 and Option 3) would result in relative benefits including a reduction in traffic volumes on local north-south roads between Victoria Street and Queen Street and improved travel times when compared to Option 1, as indicated in Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport*.

When considering traffic patterns and driver behaviour in the future, it is important to note that following construction of the project, the traffic and transport environment in Berry would be vastly different to existing conditions. Traffic on Queen Street is expected to be at least 50 per cent lower than it is today, resulting in improved safety, amenity, and travel times. These factors would generally increase its use by local traffic. In addition, all traffic approaching the town from the Princes Highway northbound would do so via Kangaroo Valley Road, changing real and perceived traffic benefits when considering various local route options.

For all options the expected removal of a large proportion of through traffic which currently uses Victoria Street between the Princes Highway and Prince Alfred Street is expected to result in lower vehicle speeds along this route and a corresponding improvement in road safety. For any option the Victoria Street intersection and adjoining road layouts would be appropriately designed to ensure safety and ease of access for all traffic movements.

It is acknowledged that for Option 1 – Victoria Street closure - the occurrence of traffic incidents at the Queen Street / Kangaroo Valley Road / southbound on-ramp roundabout or on the southbound on ramp itself would have the potential to restrict traffic movements travelling southbound from Berry, which could result in detours, delays and congestion.

RMS is able to deliver any of the Victoria Street design options through the project. All Victoria Street options have received both supporting and opposing submissions, and the proposal has been reassessed accordingly.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

Victoria Street – Options 2 and 3

Stakeholder identification number(s)

17, 23, 26, 32, 33, 35-38, 40, 44, 45, 47, 49, 50, 85, 89, 107, 112, 121, 129, 134, 152, 168, 178-184, 201, 215, 247 and Shoalhaven City Council

Issue description

Submissions relating to the operational local road network - Victoria Street (Option 2 and Option 3) raised issues regarding the positive and negative impacts of the non-closure of Victoria Street. Throughout this section the relative benefits and disadvantages of the varying Victoria Street options are discussed.

In summary, the respondent(s) raised the following issues:

- Option 2 for Victoria Street with left-in / left-out access would enable easier access onto the highway to Nowra, would provide faster egress for emergency vehicles and an alternative route in case of a problem on the Kangaroo Valley Road interchange on-ramp. It would ease traffic congestion impacts on and around Queen Street (eg George Street, Edward Street, Albany Street and Alexandra Street) and would benefit the Grange, the Arbour and the Masonic Village. More consideration should be given to people living south of Queen Street. Although Option 2 is more flexible, it only caters for southbound travel.
- A one-way or two-way link between Queen Street and Victoria Street is unwarranted as Options 2 and 3 would accommodate only a small level of daily traffic ranging from 30-110 vehicles per hour (even less if required traffic calming devices are installed on Victoria Street), and Queen Street is only a block away for access to the highway.
- Preference is for Victoria Street Option 3 with two way local road past Mark Radium Park to keep traffic in local streets. A local two way road adjacent to Mark Radium Park would provide ready access to the Queen Street roundabout.

Option 3 also provides the opportunity for traffic to and from the south-west sector of the town to exit or enter the highway without travelling through other local roads, thus minimising impacts such as noise, and wear and tear on local roads. Traffic on Victoria Street would be almost halved with right-turn access from the highway removed, traffic on the smaller streets would not be increased and travellers would still use Mark Radium Park. It best maintains current traffic patterns and traffic flow; allows much easier access heading south to Nowra (the main shopping option for the community); provides convenient access to the northbound on-ramp at Kangaroo Valley Road interchange and to Kangaroo Valley Road; decreases the potential for bottlenecks on the Queen Street roundabout, particularly during peak periods; provides the best connectivity by keeping a key collector road open; and is the most effective and least disruptive option, providing easy access to and from Berry. An open Victoria Street would not cause an increase in traffic, would ensure continued access for vehicles to and from the densely populated western end of Victoria Street (including the Grange, Arbour and Bupa Care Services facility), would ensure traffic isn't pushed onto small residential streets such as George, Edward and Albany streets, and would maintain present traffic patterns for locals and travellers.

Response

Section 2.8.11 of this report describes the expected effects of Victoria Street options on traffic re-distribution within Berry. Following construction all Princes Highway northbound traffic would utilise the Kangaroo Valley Road interchange to access Berry in place of the current right turn into Victoria Street. As a result all options are expected to increase traffic volumes on local north-south roads, and decrease traffic on Victoria Street; these impacts are directly linked.

Table 7.15 and Table 7.16 in Appendix D – Technical Paper: Traffic and Transport outline the forecast traffic volumes and level of service for local roads, and summary of traffic and transport impacts respectively for the varying Victoria Street options. Option 2 and Option 3 would minimise the transfer of traffic to local north-south roads. In 2037, daily traffic volumes on local north-south roads are predicted to be around two times greater when compared to existing levels for these options, but around three times greater if Victoria Street were closed.

All options would result in a significant decrease in traffic on Queen Street; combined with appropriate upgrades to the road network and intersections as proposed by the project, this would be expected to improve traffic safety and efficiency, reduce conflicts and congestion, and generally improve traffic flow on Queen Street throughout the town. To quantify this, Section 7.2.2 of Appendix D – *Technical Paper: Traffic and Transport* provides an overview of intersection level of service following construction of the project. This analysis indicates that with Victoria Street closed (effectively a worst-case scenario) all intersections at the southern interchange for Berry would operate at LoS A with minimal delay, based on the proposed layouts and control methods. Similar results are shown for local roads throughout Berry in Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport* for all Victoria Street options.

The relatively low volumes of traffic expected to use a link between Kangaroo Valley Road and the western end of Victoria Street are discussed in **Section 2.8.11** of this report. At present 30 vehicles per day turn right from Victoria Street onto the Princes Highway northbound, while 110 vehicles per day turn left from the Princes Highway southbound into Victoria Street. There are no major developments which are expected to significantly increase the demand for these movements in the future.

Despite this, it is important to recognise that the closure of Victoria Street (Option 1) would also result in the re-distribution of the relatively large volume of traffic which currently turns left from Victoria Street onto the Princes Highway southbound, currently around 1100 vehicles per day, onto other local roads. Conversely, the provision of a direct connection from Victoria Street to the southbound on ramp (Option 2 and Option 3) would result in relative benefits including a reduction in traffic volumes on local north-south roads between Victoria Street and Queen Street. A reduction of around 35 per cent in 2037 is forecast when compared to Option 1, as indicated in Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport*.

The provision of a direct connection from Victoria Street to the southbound on ramp (Option 2 and Option 3) would closely maintain existing accessibility, resulting in benefits including improved travel times when compared to Option 1. These options would also provide an alternative access point to the Princes Highway southbound in the event of an incident in the vicinity of the Kangaroo Valley Road interchange. During such an event the closure of Victoria Street (Option 1) would have the potential to restrict traffic movements travelling southbound from Berry.

It is acknowledged that Option 3 best maintains existing accessibility and connectivity of the local road network of the three Victoria Street options, providing a link for traffic to the Princes Highway southbound, and a two-way link between Kangaroo Valley Road and the western end of Victoria Street. This link would provide easy access to Mark Radium Park from the Kangaroo Valley Road interchange, which would encourage its continued use as a stopping area for vehicles.

RMS is able to deliver any of the Victoria Street design options through the project. All Victoria Street options have received both supporting and opposing submissions, and the proposal has been reassessed accordingly.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected. Refer to **Section 2.22** of this report for further details about Victoria Street.

Victoria Street – Option 3 with modifications

Stakeholder identification number(s)

45, 186 and 215

Issue description

Submissions relating to the Operational local road network - Victoria Street (Option 3 with modifications) raised issues regarding the positive and negative impacts of a modified Option 3 (2-way link to Kangaroo Valley Road) for Victoria Street. Throughout this section the relative benefits and disadvantages of the varying Victoria Street options are discussed. In summary, the respondent(s) raised the following issues:

- From a public interest viewpoint, it appears that the level of disadvantage that would be imposed upon the four north-south streets (Alexandra, Albany, Edward and George streets) under Option 1 is greater than the level of advantage provided to Victoria Street, which would have reduced traffic regardless of any option, therefore Option 3 (with modifications) provides the least traffic increase/impact on the north/south streets. It best maintains current traffic patterns and provides the best connectivity by keeping a key collector road open.
- With Queen Street becoming the only link to the west and the more logical link to the highway to the north for the rest of town and with Bupa Aged Care Facility traffic largely removed (modified Option 3 with external access for Bupa Aged Care Facility) traffic on Victoria Street should markedly decrease.

A modified Option 3 for Victoria Street would maintain access and provide two roads (Victoria and Queen Street) as feeder to the highway from Berry.

Response

It is acknowledged that Option 3 best maintains existing accessibility and connectivity of the local road network of the three Victoria Street options, providing a link for traffic to the Princes Highway southbound, and a two-way link between Kangaroo Valley Road and the western end of Victoria Street. Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport* indicates that this arrangement would be expected to result in the lowest traffic volumes and overall least impact on local north-south roads, although these volumes are comparable to Option 2.

Although Option 3 would result in a relative increase in traffic on Victoria Street when compared to Option 1, shown in Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport*, this would still represent a reduction when compared to a 'Do Nothing' scenario. Conversely, the closure of Victoria Street (Option 1) would result in the re-distribution of the relatively large volume of traffic which currently turns left from Victoria Street onto the Princes Highway southbound onto local north-south roads.

RMS is able to deliver any of the Victoria Street design options through the project. All Victoria Street options have received both supporting and opposing submissions, and the proposal has been reassessed accordingly.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street. The design change includes revised access arrangements for some private properties in the vicinity of the western end of Victoria Street. These properties would be connected to a revised Schofields Lane interchange, which would allow for all north and south movements to and from the upgraded highway. As this revision affects only a small number of private properties it would have a negligible impact on traffic redistribution.

Bupa Care Services facility has an existing formal agreement for a right of way between its site - via the internal road network of The Arbour - and Victoria Street. The proposed design change would accommodate a possible future link connecting Bupa Care Services facility to the Schofields Lane interchange, but it would not be constructed by RMS as part of the project. As a result the project would not change current access arrangements for the Bupa Care Services facility - which would continue to be provided via Victoria Street - unless the operators of this facility decide to alter this arrangement. Any changes to access would be subject to a separate application and approval process.

General Victoria Street access

Stakeholder identification number(s)

17, 51, 159 and 160

Issue description

Submissions relating to General Victoria Street access raised issues regarding the general impacts to access and operation of Victoria Street options.

In summary, the respondent(s) raised the following issues:

- There are at least two opportunities to access the Princes Highway from Berry via the proposed highway upgrade. A second access at Victoria Street is unnecessary due to the short distance from Queen Street to Victoria Street and would unnecessarily complicate the merging of southbound traffic and reduce safety margins.
- Shoalhaven City Council has conducted traffic studies which show the potential impact on other small residential streets within Berry if Victoria Street is closed. Increased traffic in these streets would be a safety issue as they have no footpaths and are not capable of taking high volume traffic. This is evident from the traffic study conducted by Council.
- If Victoria Street is closed, the volume of traffic using the Queen Street roundabout should be considered.

Response

Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment provides an overview of Victoria Street design options from a traffic and transport perspective, including the effects of the three Victoria Street options on local roads (traffic volumes), travel times, and accessibility. The relative positive and negative impacts of Victoria Street options in relation to these considerations, and the traffic modelling developed for this assessment are also generally discussed throughout this section.

Shoalhaven City Council has provided traffic survey data, advice, and other inputs and information, which have been appropriately considered and incorporated throughout the traffic and transport assessment.

The project would provide a single southbound on-ramp to the Princes Highway at the southern end of Berry. Under Option 1, this on-ramp would only be accessed via Queen Street / southern interchange and under Option 2 and Option 3 an additional access would be provided at the western end of Victoria Street..

Option 1 - Victoria Street closure, would redirect traffic from southern Berry travelling towards Nowra via the Kangaroo Valley Road interchange. Hence with Victoria Street closed negative impacts would include additional travel time for southbound traffic, although this would be offset by the increased speeds on the upgraded highway between Berry and Nowra.

Conversely Option 2 and Option 3 would maintain accessibility and minimise travel times for traffic travelling southbound from the western end of Victoria Street towards Nowra. These options would also minimise the redistribution of traffic from Victoria Street to other local roads. For all options all intersections and adjoining road layouts would be appropriately designed to ensure safety and ease of access for all traffic movements.

Table 7.15 and Table 7.16 in Appendix D – *Technical Paper: Traffic and Transport* outline the forecast traffic volumes and level of service for local roads, and provide a summary of traffic and transport impacts respectively for the varying Victoria Street options. Traffic volumes on Queen Street are forecast to be around 50 to 60 per cent less than today. As a result of this decrease, total traffic within Berry would be significantly lower than current volumes. The transfer of a large volume of traffic to the Berry bypass and resulting change in traffic conditions would generally improve traffic flow throughout the town.

To quantify this, Section 7.2.2 of Appendix D – *Technical Paper: Traffic and Transport* provides an overview of intersection LoS following construction of the project. This analysis indicates that with Victoria Street closed, all intersections associated with the southern interchange for Berry, including the Queen Street / Kangaroo Valley Road roundabout would operate at LoS A with minimal delay, based on the proposed layouts and control methods.

Although traffic growth on local north-south roads is predicted to be significant when compared to existing levels, the resulting daily volumes are relatively low; between 700 and 2000 vehicles per day in 2037, with a resulting LoS A for all roads in 2037, representing optimum operating conditions. In addition, the closure of Victoria Street would be expected to redistribute a large proportion of through traffic which currently uses this route between the Princes Highway and Prince Alfred Street. This would typically result in lower vehicle speeds in the area and a corresponding improvement in road safety and amenity.

In summary, while it is acknowledged that increased traffic on local roads would result in negative impacts to amenity, for all options predicted traffic volumes 25 years from now are not expected to significantly change the residential nature of the local road network in Berry.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

Victoria Street assessments

Stakeholder identification number(s)

215 and Shoalhaven City Council

Issue description

Submissions relating to Victoria Street assessments raised issues regarding the general development and findings of the assessment of Victoria Street options.

In summary, the respondent(s) raised the following issues:

- The environmental assessment has not adequately addressed the impacts to other local roads from Options 1 and 2 for Victoria Street and the concentration of traffic generators (the Arbour, the Grange and Bupa Aged Care Facility).
- The proposed closure of Victoria Street is based on incorrect calculations for traffic and noise increases in George, Edward, Albany and Alexandra streets. Traffic and noise increases are described in the environmental assessment as “acceptable”, however the loss of amenity due to traffic and noise impacts for residents of George, Edward, Albany and Alexandra streets is considered unacceptable.

Response

The impacts of the varying Victoria Street options on local road safety, amenity, and general performance are known to be a key concern of the community. These impacts are also discussed in **Section 2.8.12**, **Section 2.8.16**, and **Section 2.8.11** of this report respectively. **Section 2.8.11** describes the expected effects of Victoria Street options on traffic re-distribution within Berry. Following construction all Princes Highway northbound traffic would utilise the Kangaroo Valley Road interchange to access Berry. As a result all options are expected to increase traffic volumes on local north-south roads – as noted in Table 7.16 of Appendix D – *Technical Paper: Traffic and Transport*, and decrease traffic on Victoria Street. These impacts are directly linked.

Responses to issues raised relating to the accuracy of traffic forecasting undertaken for Victoria Street are provided in **Section 2.8.12** of this report. RMS can confirm that future trip generation and distribution throughout Berry – including the substantial land developments at the western end of Victoria Street - has been appropriately considered and incorporated as part of the traffic modelling process.

Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport* summarises the forecast traffic volumes and level of service for local roads. An increase in traffic of between two and three times existing levels on north-south local roads is a negative impact associated with all Victoria Street options.. Although this growth is significant when compared to existing levels, the resulting daily volumes are relatively low; between 700 and 2000 vehicles per day in 2037. In addition, the closure of Victoria Street would be expected to redistribute a large proportion of through traffic which currently uses this route between the Princes Highway and Prince Alfred Street. This would typically result in lower vehicle speeds in the area and a corresponding improvement in road safety and amenity.

In summary, while it is acknowledged that increased traffic on local roads would result in negative impacts to amenity, for all options predicted traffic volumes 25 years from now are not expected to significantly change the residential nature of the local road network in Berry.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

2.8.14 Operation pedestrian and bicycle use – Victoria Street

Stakeholder identification number(s)

32, 201 and 215

Issue description

Submissions relating to pedestrian and bicycle use raised issues regarding the facilities that are proposed as part of the project within the vicinity of Victoria Street and Mark Radium Park.

In summary, the respondent(s) raised the following issues:

- The following statement from the environmental assessment regarding Victoria Street Option1 (closure) is supported: “Improve pedestrian and cyclist access and amenity and provide a safe pedestrian and cyclist environment for parks and walkways through adoption CPTED principles”.
- Cycleway linkage to Mark Radium Park is requested, as it may encourage use by locals.
- Option 3 for Victoria Street allows for adequate pedestrian and cycleways.

Response

Section 7.2.9 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment includes an overview of general pedestrian and cycling benefits as a result of the project, namely improved walking and cycling travel times and amenity in Berry and improved safety for cyclists. Specifically, the project includes the following provisions for cyclists and pedestrians:

- A minimum 2.5 metre wide shoulder along the main alignment of the project.
- Shared pedestrian and cyclist facilities on both sides of the Kangaroo Valley Road overbridge and shared link to Mark Radium Park from the interchange.
- Shared pedestrian and cyclist facilities along the northern side of North Street. This is discussed in more detail in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment.

Pedestrian and cyclist arrangements would be provided and maintained according to relevant guidelines to ensure adequate access arrangements, amenity and safety. All provisions for cyclists would comply with RMS NSW Bicycle Guidelines and Austroads Traffic Engineering Practice - Part 14. Provision for pedestrians and cyclists in and around Berry would support and complement any Berry pedestrian access and mobility plans and would be developed further during detailed design in consultation with Shoalhaven City Council. In addition, Crime Prevention Through Environmental Design (CPTED) would be considered and is referenced in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment.

It is acknowledged that Option 3 for Victoria Street would provide two-way vehicle access between Queen Street and Victoria Street, adjacent to Mark Radium Park. However, all of the Victoria Street options would provide the same facilities for shared pedestrian and cycleways in and around Berry.

2.8.15 Operation public transport – Victoria Street

Stakeholder identification number(s)

15, 21, 47, 54 and 187

Issue description

Submissions relating to the operation of public transport - Victoria Street raised issues regarding the potential impacts of the project on public transport services in this area.

In summary, the respondent(s) raised the following issues:

- The western end of Victoria Street is a bus route providing an essential service from Gerringong through Berry to Nowra for school children and other commuters. To have this conveniently located bus service discontinued due to the closure of Victoria Street would impact on the amenity of residents.

- Closing Victoria Street would impact children in the area. Traffic accessing the Grange, the Arbour or Berry Public School would be a danger to children walking or riding to school in peak hours. Families walk between the Berry pre-school and Berry Public School and forcing traffic onto Queen Street would make it dangerous to cross.
- How would buses access the Grange, the Arbour or Berry Public School if Victoria Street is closed?
- Buses currently travel along Victoria Street for high school students travelling to and from Nowra.
- Bus service access to the highway from Victoria Street is essential. Victoria Street closure would prevent bus access from Victoria Street to the highway.
- Currently a Shoal bus service collects residents from the Masonic Retirement Village and then proceeds down Victoria Street to pick-up passengers from the Grange and the Arbour. Closure of Victoria Street may impact this service.

Response

A bus service / bus stop at the frontage of The Grange and at other locations along Victoria Street would not be removed or prevented by the construction of the project. Bus services would still be able to collect and drop-off passengers at this location, although it is acknowledged that buses travelling to a stop at this location would incur additional travel times and distances.

The existing direct access from the Princes Highway northbound into Victoria Street would be removed for all three Victoria Street options. Traffic currently travelling along this route would need to utilise the Kangaroo Valley Road interchange to access Berry. Therefore for all Victoria Street options, negative impacts include additional travel time to areas along and adjacent to Victoria Street from the south.

In the opposite direction, the project would provide access to the southbound Princes Highway on-load ramp via Victoria Street and/or Queen Street. Option 1, Victoria Street closure, would redirect traffic from the western end of Victoria Street travelling towards Nowra via George Street and the Kangaroo Valley Road interchange. Hence with Victoria Street closed, negative impacts would also include additional travel time for southbound buses. Conversely Option 2 and Option 3 would maintain accessibility and minimise travel times for traffic travelling southbound from the western end of Victoria Street towards Nowra.

Section 8.2 of Appendix D – *Technical Paper: Traffic and Transport* includes an overview of mitigation measures for negative project impacts, including the provision of turning facilities for large vehicles such as buses and garbage trucks. If Victoria Street were closed, the project would provide safe turning facilities in the newly created cul-de-sac, and buses and trucks would be redirected via an alternative route as described above. This would ensure that current routes and services can be maintained.

As a result the negative impacts would be limited to a small increase in travel time in the area, which would be offset by the increased speeds on the upgraded highway between Berry and Nowra – particularly after the Berry to Bomaderry upgrade is constructed.

Benefits resulting from the project are expected to include generally improved pedestrian safety and amenity within Berry. Lower volumes of traffic within the town, including a significant transfer of traffic from Queen Street to the Berry bypass, would enhance pedestrian safety, reduce noise and improve air quality.

The closure of Victoria Street would also be expected to redistribute a large proportion of through traffic which currently uses this route between the Princes Highway and Prince Alfred Street to Queen Street or the Berry bypass. This is expected to result in generally lower travel speeds in the town and a corresponding improvement in road safety and pedestrian accessibility and amenity.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

2.8.16 Operation traffic/road safety – Victoria Street

Resident safety

Stakeholder identification number(s)

5, 6, 11, 20, 22, 26, 44, 45, 49-51, 60, 64, 67, 89, 146, 154, 159, 160, 171, 189, 200, 201, 206 and 215

Issue description

Submissions relating to operational traffic/road safety - Victoria Street raised issues regarding the potential safety impacts of the project for all road users.

In summary, the respondent(s) raised the following issues:

- Option 3 for Victoria Street with two way access from Victoria Street to and from Queen Street provides the safest access for the Arbour and local residents.
Victoria Street should remain open as there is no recollection of any serious accident on Victoria Street. The road is wide and well regulated with stop signs and speed limits near the school.
Victoria Street should be kept open to avoid pushing traffic onto George or Edward streets to access Queen Street. These are small, quiet residential streets with few footpaths, where local residents and school children regularly walk and cycle.
- Closure of Victoria Street based on increased safety for school students is not endorsed by Berry Primary School leadership. At a public meeting held in June 2012, concerning the closure of Victoria Street, a member of the School P&C announced that the P&C association did not endorse the closure. A petition of 200 signatures requested that Victoria Street remains open.
Closure would push local residential traffic, along with traffic from the Arbour, Bupa Care Services facility and the Grange, onto narrow side streets and past the school on Victoria Street. How would closing Victoria Street be safer for school children? The closure of Victoria Street is from residents and the developers who own the Arbour to make their street quieter.
- Support for closure of Victoria Street for safety reasons.
Victoria Street is the home to many residents, including the Berry Public School and three retirement communities, all requiring protection from traffic.
The Grange and the Arbour retirement villages and the Bupa Care Services facility have created a concentration of older residents at the western end of Victoria Street. Planned expansion of these facilities would only increase the number of older residents in this area.
The Princes Highway end of Victoria Street is the most densely populated part of town. Daily, a large number of vehicles disregard the posted speed limits on Victoria Street and it is used extensively as a 'rat run' to avoid Queen Street by heavy vehicles, including trucks, buses, commercial and waste management vehicles. Residents of Windsor Drive and lower Victoria Street would add to the traffic congestion on George Street. Traffic flow has considerably increased above what would normally be expected for a 'community' street. Traffic would pose a safety risk for children attending Berry Public School and residents from the surrounding aged care and retirement facilities.

Closing Victoria Street is an opportunity to protect residents, including the most vulnerable in the Berry community such as children and the elderly. It would prevent through traffic, making it significantly safer for these residents, and preserve and enhance the residential nature of the street. RMS and other authorities have a duty of care to ensure the road system and traffic through this area is safe.

- There is currently a problem with vehicles speeding down the lower end of Victoria Street. Any configuration of Victoria Street should have a 50 kilometre per hour speed limit and calming devices prior to the bypass being completed. Speeding cars represent a risk to pedestrians and cars going in and out of the three residential aged care facilities (the Grange, the Arbour and Bupa Care Services facility) and also the local primary school. Closure of Victoria Street as an option greatly impacts on the safety of the north-south streets.
- Option 1 for Victoria Street would:
 - Minimise traffic conflicts, particularly at the western end through the removal of 2000 vehicle movements per day.
 - Improve safety with increased compliance on Victoria Street with traffic control signs (eg stop sign, school zone, speed limits) as traffic would become more localised and through-traffic would be eliminated.
 - Address the risk of traffic conflicts and collisions along Victoria Street or at the intersection with Queen Street which occur due to slow moving traffic turning left from Victoria Street and merging with vehicles accelerating on the southbound on-ramp. Options 2 and 3 do not address this risk.
 - Divert all traffic exiting town onto Queen Street which would be underutilised in the future and is purpose built for safer north and south access.
 - Provide safe turning for larger vehicles such as buses and trucks at the western end of Victoria Street, adjacent to Mark Radium Park.
 - Ensure headlights from cars travelling towards the western end would not distract drivers travelling on the highway.
 - Create safer pedestrian access for the school community, safer pedestrian connectivity to Mark Radium Park, and green space for the elderly and other residents.
- The Arbour management publicly states it does not take a position on the closure of Victoria Street.
- Option 1 for Victoria Street disadvantages local streets, with one-sided or no footpaths and narrow bridges. It interrupts connectivity and existing traffic movements to the greatest degree and introduces potential safety issues to pedestrians and cyclists.

Response

The high concentration of vulnerable pedestrians and cyclists, including children and older residents – on Victoria Street is acknowledged. It is also acknowledged that the consideration of safety impacts and, where necessary, development of mitigation measures are fundamental requirements for any Victoria Street option.

None of the proposed Victoria Street options are expected to reduce road safety on Victoria Street or surrounding local roads; all options would remove the existing direct access from the Princes Highway northbound into Victoria Street. This would be expected to reduce traffic on Victoria Street, redistributing a large proportion of through traffic which currently uses this route between the Princes Highway and Prince Alfred Street to Queen Street or the Berry bypass.

When considering traffic patterns and vehicle behaviour in the future, it is important to note that following construction of the project, the traffic and transport environment in Berry would be vastly different to existing conditions. For example traffic on Queen Street is expected to be at least 50 per cent lower than it is today, resulting in a general change in driver perceptions and behaviour. It is expected that this would result in generally lower travel speeds in the town and a corresponding improvement in road safety and pedestrian accessibility and amenity.

Table 7.15 and Table 7.16 of Appendix D – Technical Paper: Traffic and Transport note that the negative impacts of all design options include an increase in traffic volumes on local north-south roads between Victoria Street and Queen Street, including George Street and Edward Street. Although traffic growth is large when compared to existing levels, the resulting daily volumes are relatively low, as an example with George Street accommodating between 850 and 1165 vehicles per day in 2037. While it is acknowledged that this increase in traffic would result in some negative impact to amenity, for all options predicted traffic volumes 25 years from now are not expected to significantly change the safety or residential nature of local roads.

Conversely, all options would be expected to result in a decrease in traffic, and hence traffic conflicts, on Victoria Street, primarily as a result of the removal of the existing direct access from the Princes Highway northbound into Victoria Street. This is particularly true at the western-most end of Victoria Street, where traffic volumes would be vastly reduced. This would substantially reduce pedestrian / vehicle interaction and generally improve road safety on Victoria Street in the vicinity of Mark Radium Park. The closure of Victoria Street would also eliminate the possibility of crashes between traffic from the southbound on-load ramp and Victoria Street.

Regardless of the Victoria Street option selected, modifications to intersections and adjoining or adjacent local/highway road layouts would be appropriately designed to ensure safety and ease of access for all traffic movements. As noted in **Section 2.8.15** of this report, if Victoria Street were closed, the project would provide safe turning facilities in the newly created cul-de-sac for large vehicles such as buses and garbage trucks, which would be redirected via an alternative route.

RMS acknowledges the perception that there is a problem with speeding cars on Victoria Street. RMS would continue to work with Council to ensure that road safety is maintained or improved following construction of the project until handover of the asset to Council. Ultimately Victoria Street is a local road for which Shoalhaven City Council would be responsible for implementing controls including posted speed limits and other traffic calming devices.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

Traffic conflicts (including traffic safety)

Stakeholder identification number(s)

79, 152, 187 and 215

Issue description

Submissions relating to traffic conflicts (including traffic safety) raised issues regarding the potential of the treatment of Victoria Street to generally increase conflicts and decrease safety for all road users.

In summary, the respondent(s) raised the following issues:

- There is a greater potential for traffic conflicts to occur with an increase in traffic at the George / Victoria Street intersection. George and Victoria streets have one-sided or no footpaths and there is cycle and pedestrian activity on a daily basis.
- Victoria Street Option 1 would triple traffic on cross streets of Berry, reducing road safety.
- The caravan park and Berry Primary School should be instructed in road safety should there be changes to Victoria Street.
- Victoria Street provides a second exit from Berry, in addition to Queen Street. In the event of an accident on Queen Street or at the Kangaroo Valley interchange, southbound access to the highway would be impossible. This would have safety implications in the case of an emergency.

Response

An overview of Victoria Street design options from a traffic and transport perspective is provided in Section 7.2.7 of Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment. The consideration of safety impacts and, where necessary, development of mitigation measures are fundamental requirements for any Victoria Street option.

Table 7.15 of Appendix D – *Technical Paper: Traffic and Transport* summarises the forecast traffic volumes and level of service for local roads. An increase in traffic of between two and three times existing levels on north-south local roads is a negative impact associated with all Victoria Street options. Although this growth is significant when compared to existing levels, the resulting daily volumes are relatively low; between 700 and 2000 vehicles per day in 2037.

Conversely traffic volumes on Victoria Street in 2037 are forecast to be at least 15 per cent less than they are today for all options following construction of the project. As a result, total traffic passing through the George Street intersection would be expected to be similar to current volumes, resulting in traffic interaction/conflict at this intersection of a similar level to existing conditions.

None of the proposed Victoria Street options are expected to reduce road safety on Victoria Street or surrounding local roads. All options would remove the existing direct access from the Princes Highway northbound into Victoria Street. This would be expected to reduce traffic on Victoria Street, redistributing a large proportion of eastbound through traffic which currently uses this route between the Princes Highway and Prince Alfred Street to Queen Street or the Berry bypass.

The closure of Victoria Street would be expected to also redistribute westbound through traffic which currently uses this route between Prince Alfred Street and the Princes Highway to Queen Street or the Berry bypass. Any reduction in through traffic would typically result in generally lower vehicle speeds in the town and a corresponding improvement in road safety and pedestrian accessibility and amenity.

In summary, while it is acknowledged that increased traffic on local roads would result some negative impacts to amenity, for all options predicted traffic volumes 25 years from now are not expected to significantly detract from the safety or residential nature of the local road network in Berry.

Prior to, during, and following construction of the project RMS would communicate any proposed and actual changes to traffic conditions, including road safety, with the local and wider community through appropriate channels.

Following feedback received through the environmental assessment display period and submissions process, Option 3 with the modifications presented in **Chapter 3** of this report has been selected; refer to **Section 2.22** of this report for further details about Victoria Street.

2.9 Noise and vibration

2.9.1 Construction noise and vibration

Environmental assessment and statement of commitments

Stakeholder identification number(s)

41, 215 and EPA

Issue description

Submissions relating to construction noise and vibration issues raised regarding the contents of the draft Statement of Commitments and the environmental assessment report.

In summary, the respondent(s) raised the following issues:

- The construction noise and vibration management plan described in the Draft Statement of Commitments would have no value to the affected community if mitigation measures are dependent on 'reasonable' cost decisions made by a contractor engaged by RMS.
- The draft Statement of Commitments is inadequate. For example, it is not sufficient to make a commitment to prepare a future noise and vibration management plan, as numerous noise and vibration impacts associated with the project have not been quantified in the environmental assessment. A commitment that the Proponent would ensure the DGRs are imposed on the construction contractor through the implementation of a noise and management plan prepared as part of the contract negotiation may prove a meaningful commitment.
- The interpretation of the environmental assessment is complicated by regular use of the term 'recommended' which should state 'anticipated'.
The environmental assessment states the detail of noise and vibration mitigation measures would be determined in a subsequent noise and vibration management plan. Using the term 'recommended' appears to negate the responsibility of the noise and vibration management plan to rigorously investigate treatment options. The community is being asked to be reassured that the noise and vibration management plan would resolve all problems, but in the context that it can only trust the treatments that are 'recommended' in the environmental assessment.
It is not sufficient to state that the concept design may or may not meet the design criteria and a noise and vibration management plan would be prepared.
- The term 'impacted' in Appendix E Noise and Vibration, Section 4.2.3 Standard Work Hours is used inconsistently. Use of the term "impact" in the conclusions of Section 4.2.3 ranges from reference to the expected measurable level of noise due to a source through to situations where impact refers only to those areas predicted to exceed the reference assessment criteria. Impact is a non-technical term and it would perhaps be prudent to use the terms 'conformance' and 'exceedance' more commonly.
- The term 'worst case' in Appendix E Noise and Vibration, Section 4.2 is used inconsistently, with Section 4.2.4 being an example. This appendix has presented summary scenarios for the 'most noise intensive' activities but not during adverse weather conditions. Adverse weather conditions could be reasonably expected for around 50 per cent of the time. The worst case examples considered in Section 4.2.4 could well therefore be typical cases. These scenarios do not reassure that valid conclusions regarding potential noise impacts have been presented.

- The noise levels which would be generated by the project both during and after construction are obscured by technical talk of decibels.
- The use of computer modelling is accepted as an essential means of evaluating construction noise on large scale projects. A statement that a computer model has been used does not allow the affected resident to verify the reasonableness of the inputs. A sample point calculation would be of considerable assistance. A critical aspect, for example, is whether any consideration has been given to the adverse effects of tonal or impact noise sources, such as piling, and to the penalty weightings normally applied to their assessment. The quality of this assessment procedure remains uncertain.
- The information provided in Appendix E Noise and Vibration, Section 4.3 could be misunderstood. A range of scenarios have been modelled using an aggregate sound power level of 120dB(A) re 1pW during 'loudest' work activities. These generalisations are not unreasonable, however it needs to be made clear that the worst case noise impacts are additional to these source noise effects. It is also unclear how the reader is expected to make use of the work duration activity schedules with respect to the predicted noise emission levels given in the preceding tables. No conclusions can be drawn from Section 4.3.
There has been no indication that penalty loadings have been included for the situations where impact noise is likely. This is a significant omission and is detrimental to a fair assessment for the adversely affected community areas.
- Appendix E Noise and Vibration, Table 3-3 footnotes should refer to Table 2-2 and Table 3-1 respectively
- In relation to implementing 'reasonable' mitigation treatments, as referenced in the environmental assessment report Appendix E, Section 5.1 (construction noise management), how can the proponent or the contractor if this responsibility is contractually delegated 'reasonably make a judgement to determine whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure' (reference to DECCW, Road Noise Policy 2011, page 20 and DECCW Interim Construction Noise Guide 2009, page 4)? The interest of the impacted community is not adequately protected by this methodology. There is potential misuse of the term 'reasonable' in determining what mitigation treatments would be provided.

Response

The construction noise assessment undertaken at the environment assessment stage is typically indicative of the likely scenarios. The environmental assessment stage also provides indicative mitigation measures as provided in Section 5.1 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment. The actual noise levels from the project could vary dependant on a range of factors including concurrent construction works, chosen equipment and construction methodology. At this stage in the assessment process it is not possible to provide a highly detailed assessment without restricting the contractor to use specific equipment and construction methodology, which is not considered a reasonable outcome for major NSW transportation projects. This is why the detailed construction noise assessment is undertaken by the contractor.

RMS would require the contractor to prepare a construction noise and vibration management plan. The construction noise and vibration management plan would provide a revised assessment with the actual equipment to be used for the construction. The construction noise and vibration management plan would also identify all reasonable and feasible mitigation measures for specific construction tasks. The construction noise and vibration management plan would be prepared at a closer date to construction where equipment sizes, types and quantities would be known to produce a more accurate and effective management strategy. The proposed noise mitigation measures would be reviewed and approved by the EPA, in accordance with existing best practice currently in use on NSW infrastructure projects.

RMS has assessed construction noise in accordance with the EPA's 'Interim Construction Noise Guideline' (EPA, 2009). The term 'impacted' is used throughout the environmental assessment with specific reference to the EPA's 'Interim Construction Noise Guideline' (EPA, 2009). Under the EPA's 'Interim Construction Noise Guideline' (EPA, 2009) there is no requirement to assess construction noise under adverse weather conditions. However, RMS recognises that the worst affected receivers located close to the works are least likely to receive any significant increase in noise levels as a result of worst case meteorological conditions. As worst case meteorological conditions are temporary in nature and construction noise is highly variable, there is a low potential for the worst case meteorological condition and worst case construction noise to occur simultaneously. RMS has applied a five dB penalty where applicable to construction equipment, including to impulsive and tonal equipment in accordance with the EPA's 'Interim Construction Noise Guideline' (EPA, 2009).

RMS has used computer modelling for increased construction noise prediction accuracy. Computer modelling has been undertaken using the ISO9613 noise modelling standard and includes, air absorption, ground absorption, local terrain features, reflective surfaces and appropriate heights of all equipment and buildings. This algorithm is well documented and much more detailed than hand calculations. Hand calculations would result in far too conservative noise levels as well as the opportunity for misinformation.

All noise emissions for any project are assessed in decibels as this is the standard unit of measurement. The decibel scale (a weighting), and the noise criteria is based on the human response to noise levels. A noise thermometer, showing the typical noise levels from different activities is provided by RMS at this address (http://www.rta.nsw.gov.au/environment/downloads/noise_fact_sheet_updated_sept2011.pdf)

Construction environmental management plan

Stakeholder identification number(s)

Environment Protection Agency

Issue description

Submissions relating to construction environmental management plans raised issues regarding the preparation and contents of a construction noise and vibration environment management plan.

In summary, the respondent(s) raised the following issues:

- RMS to acknowledge that the implementation of the construction noise and vibration management plan referred to in Appendix E Noise and Vibration, Section 5.1 would not, in many cases, be able to reduce the impacts of works to a suitable level relevant to construction noise and vibration goals.
- The construction noise management levels adopted in Appendix E Noise and Vibration are appropriate in regard to recommended licence conditions for construction noise associated with the project. Any exceedances of the noise management levels indicate the potential for construction noise impacts and should be addressed by RMS in the construction noise and vibration management plan.
- RMS' construction noise management measurements should include effective communication with, and the management of responses to the concerns of the affected community.

Response

RMS would require the construction contractor to prepare a construction noise and vibration management plan prior to the commencement of construction as described in commitment NV1 in Chapter 10 of the environmental assessment. RMS recognises that predicted noise levels for some noise intensive work are unlikely to reach levels that comply with the noise management levels. However, RMS is committed to reducing the impact as much as practical on the community. Any predicted exceedances of the noise management level would be identified in the construction noise and vibration management plan. The construction noise and vibration management plan would be approved by the Director General in consultation with the NSW EPA to ensure that the contractor has applied reasonable and feasible mitigation strategies that is consistent with other major transportation projects within NSW.

RMS recognises the importance of community engagement throughout the construction phase of the project. A community involvement plan as described in Section 5.1.3 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment would be developed and would include a 24 hour hotline and complaints management process. Other forms of mitigation that would be adopted are outlined in Section 7.2 of the environmental assessment and Section 5.1.3 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment.

Construction noise impacts on individual properties

Stakeholder identification number(s)

9, 10, 185, 191, 208, 215, and EPA

Issue description

Submissions relating to construction noise impacts on individual properties raised issues regarding construction noise impacts at individual properties and locations in the project area such as specific dwellings, the Berry community, North Street and other sensitive land uses such as the cemetery.

In summary, the respondent(s) raised the following issues:

- The Executive Summary of Appendix E Noise and Vibration confirms that construction noise impacts at affected dwellings are predicted to exceed the preferred guideline levels but not to exceed 'highly affected' levels. Highly affected levels would result in substantial adverse impact on residents.
- Appendix E Noise and Vibration, Section 3.2 describes other sensitive land uses. The cemetery described in Section 2.2.5 should also be considered as passive use open space.
- Appendix E Noise and Vibration, Table 4-5 and Table 4-7 contain instances where noise levels above 75 dB(A) are predicted in some noise catchment areas (NCAs), yet no receivers are considered 'highly noise affected' (for example Table 4-7 NCA5). This should be reviewed and amended by RMS or explained in the accompanying text.
- The construction of a project of this size would have significant noise and vibration impacts on the small community of Berry, particularly along North Street.
- The bypass alignment along North Street should be moved as far away as possible from residents to reduce construction noise impacts.
- The Berry southern interchange should be relocated further south, away from the town, to reduce construction noise impacts on the residents of Berry.
- Construction activity for the Gerringong upgrade has been extremely intense. Is a similar level of construction activity to be expected for the Foxground and Berry bypass?

- What construction noise mitigation measures are proposed for Broughton Village properties?

Response

RMS acknowledges that construction noise levels would impact the community. However, RMS proposes to implement appropriate management and mitigation measures to ensure construction noise levels are minimised and impacts are reduced as far as practical. Specific noise mitigation is presented in Section 7.2 of the environmental assessment and Section 5.1.3 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment. Proposed management and mitigation measures are reproduced below for easy reference.

The specific noise mitigation strategies in Section 5.1.3 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment include:

- High noise generating construction works would be carried out during standard construction hours wherever practicable.
- Schedule noisy activities that cannot be undertaken during standard construction hours to as early as possible during the evening and/or night-time periods.
- Appropriate plant would be selected for each task, to minimise the noise impact.
- Deliveries would be carried out during standard construction hours where practical and safe to do so.
- Non-tonal reversing alarms would be fitted on all construction equipment where possible.
- If it is safe, plan for and conduct night-time activities in such a manner as to eliminate or minimise the need for audible warning alarms.
- Maximise the offset distance between noisy plant items and nearby residential receivers.
- Orientate noisy equipment away from residential receivers.
- Position site access points and roads as far as practicable away from residential receivers.
- Use structures or enclosures to shield residential receivers from noise sources where practicable.
- Trucks should travel via internal haul routes and major roads and routes where practicable and not be allowed to queue near residential dwellings.
- Consider respite periods during times of noise intensive works where sensitive receivers would be adversely impacted for extended periods. These could include late start and/or early finishes.
- Wherever practicable, noise intensive works should be planned in the following order of priority to minimise the potential impacts on sensitive receivers:
 - Standard working hours.
 - Extended working hours.
 - Evening working hours.
 - Night time working hours.
- To reduce the total number of blasts it is proposed that multiple simultaneous blasts be undertaken for this project. Simultaneous blasts would not increase the perceived number of blasts in one day, hence would be unlikely to increase the annoyance of potentially impacted receivers.
- Bored piling should be used in place of impact piling wherever possible. Additionally, impact piling should only be undertaken during standard work hours.

Alignment changes for the project have been thoroughly explored during the route analysis stage of the project. RMS does not intend to revise road alignments further to reduce construction noise impacts. Rather, construction noise impacts would be managed through the implementation of noise management and mitigation measures. Construction noise levels and mitigation strategies are likely to be similar to those adopted for the Gerringong upgrade project.

Construction noise impacts for the Gerringong upgrade are typical for major road projects, and blasting was avoided. This project would require blasting along Toolijooa Ridge. Unlike the Gerringong upgrade, this blasting cannot be avoided due to the large size of the cut required.

The cemetery along Kangaroo Valley Road is located approximately 300 metres from the proposed alignment. RMS has not assessed the cemetery for either construction or operational noise within Appendix E of the environmental assessment. Although impacts would be minimal given the distance from the project, RMS would include an assessment of the cemetery in the noise assessment undertaken during the detailed design phase of the project. Given that the cemetery is located 300 metres from the proposed alignment with shielding from four rows of housing and the four metre high noise barrier at Huntingdale Park Road, the criteria for passive recreation would unlikely be breached. As the cemetery has been provided with mitigation in the form of a low noise pavement and a four metre noise barrier, it would be unreasonable to provide further mitigation to this receiver. Construction noise mitigation for the cemetery would be managed as described in Section 5.1 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment. A typographical error is also noted for that assessment in Table 4.5 and Table 4.7 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment. RMS can confirm that where receivers in Table 4.5 and Table 4.7 experience noise level at or greater than 75 dB(A), they are considered 'highly noise affected'. Mitigation outlined in Section 5.1 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment would remain unchanged as a result.

Cumulative noise impacts

Stakeholder identification number(s)

175, 215 and EPA

Issue description

Submissions relating to cumulative noise impacts raised issues regarding cumulative construction noise impacts and measures required to mitigate these.

In summary, the respondent(s) raised the following issues:

- Appendix E Noise and Vibration, Section 4.5 explains that cumulative noise could result in higher levels in areas close to site compounds than those already predicted to exceed the management levels. It is misleading to state that a change of +3dB(A) would not be significant, as it is difficult to calculate the probability of cumulative noise. Compound noise increases are likely to cause disproportionately higher inconvenience for residents. The assessment in Section 4.5.1 suggests the magnitude of the problem is minor. This is incorrect. A construction noise management plan is the only reasonable means of control. The risk of cumulative noise effects should only influence approval conditions, not the approval itself.
- RMS' construction noise management measurements should include the early erection of temporary noise barriers and, where possible, operational noise barriers and/or other mitigation measures as proposed in Appendix E Noise and Vibration.

- Construction noise would be very intrusive and frustrating for residents and visitors. No additional noise should be added from construction workers listening to radios / music at sites etc. RMS needs to reassure the public on the project plan for construction.

Response

RMS would require cumulative noise impacts to be managed through the construction noise and vibration management plan. This plan would be prepared prior to the commencement of construction and when exact construction timetabling is known. While RMS acknowledges that cumulative noise impacts would result in a maximum of an additional 3 dB in construction noise, an increase of 2 - 3 dB is generally considered indiscernible. The construction noise and vibration management plan would include mitigation measures such as, early erection of temporary and permanent noise barriers where practicable³, worksite induction training including educating staff on noise sensitive issues and the need to make as little noise as possible.

Noise and vibration from construction activities

Stakeholder identification number(s)

169, 172 and EPA

Issue description

Submissions relating to noise and vibration from construction activities raised issues regarding vibration impacts on dwellings questioned the use of certain plant and equipment and highlighted discrepancies in the text of the environmental assessment.

In summary, the respondent(s) raised the following issues:

- Vibration (from heavy machinery movements, blasting and rock piling) during construction and traffic impacts during operation would impact on properties in Broughton Village, including a heritage dwelling and out-buildings.
- Appendix E Noise and Vibration, Table 4-1 refers to a number of construction activity scenarios with typical equipment used in each scenario. The first activity, site establishment and landscaping, describes a sound power level (SWL) of 105-110 dB(A). This appears somewhat low, when considered in the context of the SWLs of individual equipment items, and should be reviewed and amended as necessary for all assessment scenarios.
- Appendix E Noise and Vibration, Table 4-1 contains an asphalt paver in the earthworks scenario. This appears to be out of place.
- Appendix E Noise and Vibration, Section 4.2.3 and Section 4.2.4 mentions the use of rock breaking, yet a rock breaker is not listed in Table 4-1.
- Appendix E Noise and Vibration, Table 4-19 lists a receiver (number 36) as being 0 metres from the works. This should be reviewed and corrected by RMS as necessary.
- Appendix E Noise and Vibration, Table 4-1 includes both an impact piling rig and a bored piling rig. It is not clear which one would be used for each scenario, or whether both would be used concurrently. In view of their relative sound power levels (SWL) the use of a bored piling rig is preferred and strong justification should be provided by RMS for the use of an impact piling rig with its associated high noise emissions.
- Pile driving should be included in the descriptive text at the bottom of page E-29 and E-32 in Appendix E Noise and Vibration

³ Erection of barriers would be constrained by earthworks requirements and the staging of the construction works.

Response

All construction noise and vibration modelling undertaken for the environmental assessment stage was based on preliminary construction scenarios and undertaken to assess the possible impact of construction.

RMS acknowledges that construction scenarios are likely to change as equipment sizing and timetabling become available during the detailed design phase of the project. It is also the case that all equipment would not be operating at the same time, therefore the typical sound power levels provided in Table 4-1 of Appendix E: *Technical Paper: Noise and Vibration* of the environmental assessment have considered that some equipment would not operate at the same time. Table 4-1 is an indicative list only. The community could expect the equipment selection in the construction noise and vibration management plan, which would be prepared by the contractor prior to the commencement of construction in consultation with the EPA and approved by the Director-General of the Department of Planning and Infrastructure, to provide greater accuracy.

As an example, RMS has undertaken a noise and vibration impact assessment for both a bored piling rig and an impact piling rig in Section 4.2.3 and Section 4.2.4 of Appendix E – *Technical Paper: Noise and Vibration* to the environmental assessment. Despite this, the preference is to use a bored piling rig, which has a lesser impact, in all locations, except where ground conditions necessitate the use of an impact piling rig.

RMS would require a detailed assessment to be provided in the construction noise and vibration management plan. This would include the identification of specific management and mitigation measures recommended for specific tasks including safe working distances for vibration activities. Until then all sound power levels and equipment used for the assessment are not locked in and would be reassessed more accurately at a later date. The construction noise and vibration management plan would provide accurate sound power levels for the specific equipment used during each construction task.

With regards to heritage buildings and other buildings at risk of construction vibration affects, the contractor would complete a property condition report prior to the commencement of construction to enable potential impacts to be monitored. Where receivers have been listed as 0 metres from construction works, buildings are owned by RMS and are within the footprint of the project. These buildings would either remain unoccupied, be demolished or be used as an ancillary facility, removing the noise and vibration impact on these particular receivers.

Construction traffic noise

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to construction traffic noise raised issues regarding increased construction traffic being offset by decreases to local traffic and management of noise from reversing trucks.

In summary, the respondent(s) raised the following issues:

- Appendix E Noise and Vibration, Section 4.8 states that the additional construction traffic would be partially offset by a three per cent reduction in local traffic volume. This three per cent reduction would correspond to an insignificant reduction in noise level of less than one decibel.

- Nose-in / nose-out construction traffic movements should be maximised in the construction traffic plan. Noise mitigation measures in Appendix E Noise and Vibration, Section 5.1.2-4 proposing construction traffic reverse away from noise sensitive receivers appears inadequate.

Response

Section 4.8 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment provides an assessment of the total noise impact generated by construction traffic required for the project.

The increase in noise levels as a result of construction traffic would be less than 0.5 dB. This would be offset by a three per cent reduction in local traffic volume as detailed in Appendix D – *Technical Paper: Traffic and Transport* to the environmental assessment. Both figures have been included in the environmental assessment for completeness of the assessment.

RMS recognises that a three per cent reduction in local traffic volume would result in a negligible reduction in noise levels. However, an increase in noise of less than 1 dB is generally considered beyond perception by humans.

RMS proposes to implement appropriate management and mitigation measures, as outlined in Section 5.1 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment to minimise noise impacts as far as practicable.

When operating trucks, there are certain workplace safety requirements which must be complied with, including the use of reversing alarms. The successful contractor would minimise reversing through use of nose in / nose out truck movements as far as possible. In some circumstances however, reversing would be required. To minimise noise impacts, broadband reversing alarms would be utilised. These alarms are directional and therefore if the reverse alarm faces away from receivers, noise levels are reduced.

Safe working distances

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to safe working distances raised issues regarding monitoring to determine safe working distances and safe working distances for vibration intensive plant.

In summary, the respondent(s) raised the following issues:

- Appendix E Noise and Vibration describes the management principle of establishing 'safe working distances' and utilising a suitable measurement monitoring program to progressively confirm the site specific distance limits.
The summary of mitigation measures suggests that this monitoring occurs inside the safe working distances, suggesting the only objective is to establish if the distances can be lessened. It needs to be recognised that distances could equally expand and monitoring should consider larger as well as shorter distances.
- Appendix E Noise and Vibration, Table 4-21 lists recommended safe working distances for vibration intensive plant. An impact piling rig and its associated safe working distance should be added to this table.

Response

Safe working distances provided in the environmental assessment have been sourced from the Transport for NSW Construction Noise Strategy (TfNSW, 2011). Safe working distances are provided as a guide for distances, outside of which, vibration intensive equipment can be operated safely. These distances are designed to be conservative and would only increase if the size of the equipment increased.

As discussed in Section 4.9 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment, the primary form of vibration mitigation would be appropriate selection of equipment to avoid the breach of safe working distances. The safe working distance for an impact piling rig would be included in the list of recommended safe working distances for vibration intensive plant that would be provided to the successful contractor.

There is no proposal to shorten the safe working distances. Monitoring would occur when the safe working distances need to be breached. If vibration levels are found to exceed the criteria, work would stop and an alternative construction method would be utilised, for example, using smaller equipment. RMS would also prepare condition reports for residences that have potential to be affected by vibration prior to the commencement of construction.

2.9.2 Construction noise extended hours

Environmental assessment and statement of commitments

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to construction noise extended hours raised issues regarding the content of the draft Statement of Commitments and the environmental assessment report.

In summary, the respondent(s) raised the following issues:

- Use of the term 'generally' in NV2 of the Draft Statement of Commitments releases RMS from any responsibility regarding potential adverse impacts on the community from work outside approved construction hours. This is aggravated by RMS' intention to seek extended 'normal' hours.
- The inconsistent use of the terms 'extended' and 'out of hours' in NV3 of the Draft Statement of Commitments is an inadequate commitment. Providing a hotline for complaints is necessary, but is not a solution.
- It is unclear in the environmental assessment who is recommending working extended hours. The only meaningful basis for recommending extended hours is to lessen the duration of impact, however the environmental assessment does not appear to justify or quantify this objective.
- The interviews carried out with residents potentially affected by extended construction hours do not provide sufficient evidence of community support for extended hours and out of hours work. The statement, 'potential impacts on sleep disturbance would need to be included in any future planning for out of hours work' should be amended to state, 'control of impacts on sleep disturbance is an obligatory inclusion for advance planning of any out of hours work as part of the Statement of Commitments'.

- Extended hours would be expected to shorten the construction impact duration, this is not guaranteed. If one or two property owners have expressed objection or concern to extended hours, this does not justify the 35 residents that have (those who have indicated agreement may not understand the impact until it is too late). Two critical issues affect this aspect:
 - The contractor would be the organisation controlling any approved activities and there has been no discussion in the environmental assessment of potential impacts from haulage.
 - An owner consent based on little or no information cannot be considered an informed consent.
- It is not clear whether the restriction to areas for which extended hours are proposed (between northern Berry interchange and Toolijooa Road) is clearly stated in the environmental assessment or whether it is just a reassurance. This restriction is relatively meaningless if haulage is ignored in the review of potential impacts.
- RMS would require prior approval and provide clear justification for any project construction works outside the standard hours in the Interim Construction Noise Guideline. This includes the proposal to extend standard construction hours between the northern Berry interchange and Toolijooa Road detailed in Appendix E Noise and Vibration, Section 1.2.2.
- The work described in Appendix E Noise and Vibration, Section 1.2.3 is inconsistent with the statement made in Section 4.1 where concrete placement is expected to occur during evening and night periods. Section 1.2.3 appears misleading and is aggravated by the issue that haulage (for example concrete) is ignored in the environmental assessment.
- RMS' construction noise management measures should include clear justification, community support and prior approval to carry out any construction work outside the recommended standard hours defined in Section 2.2 of the Interim Construction Noise Guideline, including the adoption of the proposed extended construction hours.

Response

RMS is seeking approval for extended working hours as part of this environmental assessment for a number of reasons which are seen as a benefit to the community. Extended construction hours at the start and finish of each working day are considered to be in the public interest as it would:

- Shorten the overall construction period by approximately three months or 10 per cent. This would minimise the disruption to the Princes Highway and improve access to the NSW south coast. It would also minimise impacts to local businesses that may be experienced during the construction period.
- Reduce exposure of the public to a substandard and inefficient road, reducing the potential for crashes.
- Reduce the overall cost to the State of construction.

Should extended hours works would be approved by the Director-General of the Department of Planning and Infrastructure, this would be done in consultation with the NSW EPA. RMS would limit the extended working hours to between noise catchments 1 – 4 inclusive (approximately Toolijooa Road to the northern interchange for Berry). RMS has provided clear justification in Section 1.2.2 and 4.6 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment for any construction works on the project outside the standard hours.

The draft Statement of Commitments NV2 provided in Chapter 10 of the environmental assessment states the following:

“Construction would generally be confined to approved construction hours, including any extended working hours, which will be specified in the approved Construction Environmental Management Plan for the project. Specific exceptions identified within this Environmental Assessment would also be included for out of hours work for emergency situations, traffic safety and efficiency or safe transport of plant or materials. Specific out-of-hours work activities would be assessed on a case-by-case basis by the EPA.”

This commitment would apply to all works outside of standard working hours, as would an Environmental Protection Licence from the EPA. Impacts of work outside of standard working hours have been quantified in Section 4.2.4 and Section 4.2.5 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

In accordance with the Interim Construction Noise Guidelines (EPA, 2009), RMS undertook consultation with the community regarding extended working hours for the project. RMS sought to inform the community of the impacts and the benefits of extended working hours and also to inform the environmental assessment. Mitigation strategies to reduce the potential impacts from extended working hours were discussed in detail and the community was given the opportunity to ask questions and present their concerns.

RMS is aware that noise from construction traffic could be an issue to sensitive receivers. Noise from construction road traffic has been assessed in Section 4.8 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. Some out-of-hours works would be required as described in Section 1.2.3 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. The impact from additional construction traffic resulting from out of hours work would be minimal given the infrequency of the works, however RMS would require construction traffic noise impacts to be assessed in the construction noise and vibration management plan which would be prepared during the detailed design phase of the project. This assessment would be based on exact vehicle types and quantities.

Construction traffic noise, including road haulage has been assessed in Section 4.8 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment and as a standard, construction work activity would be limited to approved construction work hours. Any exceptions to this have been discussed in Section 4.7 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment and consist of activities including bridge works and tie in works where completion of a specific task or the safety of workers and traffic would be an issue.

Activities undertaken during extended work hours

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to activities undertaken during extended working hours raised issues in relation to impact piling, road haulage, construction traffic and the justification for extended working hours.

In summary, the respondent(s) raised the following issues:

- Appendix E Noise and Vibration, Table 4-11 which discusses impact piling is inconsistent with the reassurances given in Section 1.2.2 that work in morning periods would be restricted to benign tasks. Impact piling during extended hours should be prohibited.

- Particularly noisy works such as impact piling should not occur during morning periods or extended hours without strong justification by RMS and prior approval.
- The noise management levels in Appendix E Noise and Vibration, Table 3-4 should also apply during the evening period.
- Attachment 1 - DECCW environmental assessment Requirements states, 'the noise impact assessment should identify the transport route(s) to be used, anticipated traffic movements and expected increase in noise levels. The method, data and assumptions used to assess the impact of road haulage on residential properties must be fully documented and justified'.

The environmental assessment report gives little mention to road haulage and seeks extended normal working hours and work outside these extended normal hours to undertake work that includes major concrete pours. Heavy vehicle haulage, resulting in major potential adverse impacts are not adequately addressed in the environmental assessment.

- The assurances given in the environmental assessment regarding potential impacts from increased traffic noise due to construction traffic are inconsistent and are not justified. The statement that 'increase in construction traffic during the night-time period is not predicted for this project as the extent of haulage activities is not currently known' is illogical and misleading. The potential for adverse noise impact from haulage requires acknowledgement and a commitment to undertake assessment for standard, extended and out of hours work.
- Appendix E Noise and Vibration, Section 4.4 states there are no batching plants included in the project. The absence of any review of noise due to haulage in the environmental assessment is a serious omission and approval of extended hours cannot be given without further justification. Section 4.4 does conclude that the predicted noise levels due to activities within site compounds are likely to exceed appropriate criteria.

Response

Section 5.1.3 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment states that noise intensive activities such as impact piling would be undertaken during standard working hours wherever practicable.

RMS commits to undertaking impact piling (driven piles), if required due to ground conditions, during standard working hours only. An assessment of the impact would be undertaken in the construction noise and vibration management plan.

Table 4-11 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment presents the impacts if this were to occur.

Bored piling, which has a lesser impact, would be used in all locations, except where ground conditions necessitate the use of an impact piling rig.

Construction traffic noise, including road haulage, from all construction working periods has been assessed in Section 4.8 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. The extended hours construction works were assessed against the evening noise management levels in accordance with the Interim Construction Noise Guidelines. RMS has not assessed concrete batching plants. Should the construction contractor wish to utilise batch plants on or adjacent to the site appropriate approvals would be sought.

2.9.3 Construction noise out of hours

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to out of hours constructions noise raised issues regarding the provision of clear justification for out of hours work, the approval process for out of hours work and the type of activities to be undertaken during out of hours work.

In summary, the respondent(s) raised the following issues:

- Work hours outside of standard construction hours are proposed, justification must be provided including alternatives considered.
Justification must be a robust argument rather than a simple assertion that work outside standard hours would save time or reduce costs.
The World Health Organisation provides valuable Guidelines for Community Noise with a set of principles in respect to effective noise management. These principles do not support the approval of work outside normal working hours without strict and rigorous control conditions.
- A similar comparison of LA(max) and the LA90(15 minute) occurring at the time would be preferred for the construction phase and any out of hours work.
- RMS' construction noise management measures should minimise any construction traffic movements outside standard hours, particularly at night time (10pm to 7am) to reduce the potential for sleep disturbance.
- Appendix E Noise and Vibration, Section 1.2.3 Out of Works Hours does not consider the potential impact of concrete batching on truck movement and sleep disturbance issues that may be associated with night time noise events.
- Appendix E Noise and Vibration, Section 4.2.5 (this should be re-numbered to Section 4.2.6 in the environmental assessment) makes the following statement relating to sleep disturbance, 'construction works would generally not be under taken during night time and hence the likelihood for sleep disturbance is low' contradicts the predicted noise levels and assessment in Section 4.2.5 Out of Hours Work.
- Appendix E Noise and Vibration, Section 4.2.5 presents tables relating to out of hours work which contain the same predicted levels for different activities (earthworks and bridge works). This should be reviewed and amended as necessary.
- Appendix E Noise and Vibration, Section 4.7 Out of Hours Work:
 - In preference to non-binding assurances that work of certain types would be restricted to certain areas, commitment to compliance with DECCW criteria for 'standard hours' should be included in the statement of commitments.
 - Impact piling during outside standard hours should be prohibited.
 - The cooperative willingness of potentially affected residents to facilitate the construction progress should not be taken as an opportunity to reduce consideration of the adverse effects on these individual residents.
 - The suggestion in Section 4.7.5 that works not exceeding the noise management levels would be inaudible is rejected. Noise that exceeds the background would be audible. Two of the stated situations (emergencies) are acceptable in any circumstance and are unnecessary statements, while the condition that noise for non-approved work would not exceed the management level does not appear sufficient justification for non-approved work to be permitted.

- The community should be given the opportunity to review any proposal of work outside of standard hours.

Response

Out of hours work would occur only when justified by the requirement for safety, traffic efficiency or emergency reasons. This has been outlined in Section 4.7 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. Specific out of hours works included in the environmental assessment are detailed below:

- Bridge works – lifting and setting of girders over existing roads. Work would typically be undertaken at night when required to reduce the inconvenience to traffic on the Princes Highway, which would need to be closed to allow works to be undertaken safely for both workers and traffic.
- Existing and new road tie-in works – this work would need to be undertaken at night to reduce the inconvenience to road traffic and the highway would need to be closed to allow this work to be undertaken safely for both traffic and workers. Tie-in road works would be required at the beginning and end of the new road alignment.
- Utility adjustments – utility adjustments typically need to be undertaken during out of hours work periods to minimise the impact on utility operations, road traffic and to improve the safety of workers involved.
- Refuelling and maintenance operations to plant and machinery.

As detailed in Section 4.2.5 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment, extended work hours are not proposed south of NCA 4 as these areas are more densely populated.

Some indiscernible work would also take place during the night (out of hours), such as a site inspections. All out of hours work would require a strong justification in accordance with Section 2.3 of the EPA's 'Interim Construction Noise Guidelines' (EPA, 2009). It would also need to be assessed in the construction noise and vibration management plan. All assessments would be in accordance with the requirements of the EPA's 'Interim Construction Noise Guidelines' (EPA, 2009) and would include assessment of construction traffic noise.

All potentially affected receivers would be consulted with and mitigation measures applied to reduce noise level as much as practicable. RMS would provide noise mitigation as outlined in Section 5.1 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment and more specifically in the construction noise and vibration management plan. RMS would encourage community involvement and consultation throughout the construction phase.

Construction traffic noise, including road haulage, from all construction working periods has been assessed in Section 4.8 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. As there are no planned night works, there is also no additional construction traffic predicted for the night time period. RMS has not assessed concrete batching plants as they are not proposed as part of the project construction.

Predicted sound power levels for bridge works and earth works are identical in value. However the bridge works would only occur in the close vicinity of proposed bridges. Section 4.2 of Appendix E – *Technical Paper: Noise and Vibration* of the environmental assessment presents the predicted impacts. Although the worst affected receiver in each catchment area would experience a similar impact, the number of receivers affected varies between the two sets of works as earthworks span the full alignment and bridge works are in a specific location.

2.9.4 Construction noise and vibration property condition surveys and property damage

Stakeholder identification number(s)

172, 175 and 185

Issue description

Submissions relating to noise impacts of construction noise and vibration condition surveys and property damage raised issues regarding concern about property damage due to vibration and how this would be managed.

In summary, the respondent(s) raised the following issues:

- Properties in close proximity to the proposed highway, for example North Street, may be subject to impacts from construction vibration. Would property condition surveys and dilapidation reports be carried out prior to commencement and on completion of the project at no cost to the residents?
- Potential construction noise and vibration impacts (heavy machinery movements, blasting and rock picking) on the farm dwellings in Broughton Village.

Response

All vibration intensive equipment would be operated outside of safe working distances in order to minimise the risk of vibration impacts on property. If for some reason construction works must be conducted within the safe working distance, RMS would undertake vibration monitoring at the worst affected building structure to ensure allowable vibration limits are not breached.

RMS commits to undertake property condition reports on any potentially affected houses before carrying out vibration intensive works. Copies of the condition reports would be provided to the property owner for their records.

2.9.5 Construction blasting

Stakeholder identification number(s)

191, 215, 250 and EPA

Issue description

Submissions relating to blasting during construction raised issues regarding potential impacts on properties from blasting and guidelines to be adopted during blasting.

In summary, the respondent(s) raised the following issues:

- What are the impacts and mitigation measures proposed for blasting on rural farm land, adjacent residences and livestock in the areas surrounding proposed cuttings?
As a mitigation measure an assessment of the potential noise and vibration impacts from blasting should be carried out, along with a strategy to minimise and manage these impacts.
- Any blasting requirements should be assessed in detail against the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines.

- Monitoring of blasting and compliance with DECCW guidelines should be a mandatory requirement of the project. A failure to meet noise criteria is likely to in failure to conform to blast overpressure limits. The impact of blast overpressure on lightweight buildings and on weaker elements such as windows should not be ignored. A strategy to move residents in anticipation of excessive noise is not a sufficient control.
- Increased values provided in Appendix E Noise and Vibration, Table 4-24 are not justified by the statement that they comply with DIN4150. Higher limits may prove satisfactory where transmission paths are through rock, however where softer transmission materials or high water tables are concerned, low frequency levels may be substantially higher.
- Appendix E Noise and Vibration, Section 5.12-4: An emphasis on good blast design should be included in controls on blasting, not simply a condition that blasts be as coincident as possible.

Response

All blasting would be undertaken in accordance with the EPA's 'Interim Construction Noise Guidelines' (EPA, 2009), which refer to the ANZECC guidelines. These guidelines would be used throughout the blasting process to ensure blasting impacts are managed.

The contractor would conduct test blasting with noise and vibration monitoring to determine transmission paths and adjust blast size where required based on the monitoring.

RMS commits to undertake property condition reports on any potentially affected houses before carrying out blasting. Copies of the condition reports would be provided to the property owner for their records.

RMS would consult closely with owners of livestock to ensure owners can manage livestock when blasts occur. Livestock owners would be given the opportunity to move livestock to paddocks at a maximum distance from the blast location.

2.9.6 Operation noise

Impacts on the township of Berry and individual properties

Stakeholder identification number(s)

10, 81, 161, 169, 172, 185, 208 and 209

Issue description

Submissions relating to impacts on the township of Berry and individual properties raised issues regarding noise shift within berry, noise impacts of the berry bypass component of the project, inadequate design of the berry bypass, noise and vibration impacts to properties in Broughton village and opportunities for mitigation of noise impacts.

In summary, the respondent(s) raised the following issues:

- The Berry bypass is located too close to town, resulting in increased noise intrusions and impacting on the tranquillity of the area. Acknowledge that RMS has worked with the community to mitigate these impacts, but noise impacts on the town are still unacceptable.
- The southbound off-ramp for the Berry southern interchange starts immediately opposite several properties on North Street. This, and a bend in the alignment of the Berry bypass at this location would result in increased noise, as traffic brakes to access the off ramp and negotiate the bend (truck air brakes are particularly noisy).

- Properties in Broughton Village would be subject to potential operation noise and vibration impacts from the highway, in particular vibration impacts resulting from vehicles travelling over the road surface and expansion joints, truck compression air brakes and other sounds from passing vehicles such as extreme stereo systems.
- A 3.4 metre embankment situated just after the start of the project, south of Toolijooa Road, would significantly protect nearby properties from construction and operation traffic noise. The cut depth of this embankment should be maintained in the final design.
- The proposed access to a property near Schofield's Lane is unacceptable. The excavation would cause a 'funnel effect' channelling noise from the highway directly towards the property. Bedrooms are located adjacent to the end of the proposed cutting.
- The Berry bypass and the proposed bridge at Berry would increase noise levels and impacts on the town.
- The Berry southern interchange should be relocated further south, away from the town, to reduce operation traffic noise impacts on the residents of Berry.
- The proposed Berry bypass is a 'through pass' which would transfer traffic noise from the main street to other parts of the township.
- The project would carry over 20,000 vehicles per day. The bypass would be highly audible as it sweeps into Berry off the ridge from the east and noise pollution would increase dramatically due to an increase in speed limit from 50 kilometres per hour (present speed limit through Berry) to 100 kilometres per hour.

Response

Operational noise impacts would largely be generated by traffic on the upgraded highway.

Low noise pavement would be used over the whole alignment. Low noise pavement would reduce noise levels by around 3 dB at receivers and all outdoor areas. Low noise bridge expansion joints (such as finger joints) would be used for all bridges to be constructed as part of the project.

The environmental assessment has identified areas where noise barriers would be required in accordance with RMS' Environmental Noise Management Manual' (RMS, 2001).

Where noise levels are still deemed too high post mitigation, architectural treatments for individual dwellings have been specified. Architectural treatment has been considered where noise barriers are considered not to be reasonable or feasible, or where houses behind a noise barrier are still eligible for further treatment. All noise levels have been assessed in accordance with, and comply with, the EPA's 'Road Noise Policy' (EPA, 2011).

Although RMS is unable to eliminate the occurrence of engine braking, the project has been designed to reduce the need for and the likelihood of engine braking. The gradient of the alignment and the alignment bends have been minimised as far as practicable in the design process. This would reduce the likelihood of engine braking events significantly from the existing design. In particular, the receivers on North Street, Berry would have a low exposure to heavy vehicle noise once the project is operational. The traffic analysis in the environmental assessment (Section 7.1) has shown that most southbound heavy vehicles accessing the Berry Township would use the northern interchange rather than the southern interchange, and that northbound heavy vehicle traffic accessing Berry would use the southern interchange and not pass the North Street area.

Any variation from the current concept design that occurs during the detailed design phase of the project would be reassessed for noise and evaluated appropriately for changes in noise emissions at that stage. Large design changes such as moving the southern interchange have been ruled out based on the extra land acquisition and additional service roads that would be required to facilitate this. Smaller amendments including berm or embankment heights could be made during the detailed design phase of the project, however noise would be a large consideration in this decision making process.

The access to a property near Schofield's Lane, Berry that was considered unacceptable has undergone design refinement in consultation with the property owner and a revised access would be implemented.

Relocating the southern interchange for Berry further south could be considered to improve the noise environment in the south-western areas of Berry. However it is likely to have a greater impact on the noise environment. The design would require service roads either side of the existing highway to direct traffic back into Berry resulting in traffic passing twice in front of some receivers. The Kangaroo Valley Road bridge would still be required over the project alignment.

While RMS acknowledges that the project would carry a greater number of vehicles than the existing Princes Highway, near Berry the majority of receivers would be on one side of the alignment. The existing highway in the vicinity of Queen Street has receivers on both sides and as a consequence more receivers would be currently affected.

The impacts of noise and vibration on the Berry township and individual properties have been assessed in Section 7.2 of the environmental assessment and Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. All changes to the area have been considered in this assessment.

Sleep disturbance and adverse weather conditions

Stakeholder identification number(s)

185, 215, 218 and 222

Issue description

Submissions relating to sleep disturbance and adverse weather conditions raised issues regarding night time noise from traffic and other users of the project, inadequacies of the environmental assessment and the lack of night time criteria relating to adverse weather conditions.

In summary, the respondent(s) raised the following issues:

- Transport for Quality of Life 'Traffic Noise in Rural Areas', 2008 and WHO 'Burden of Disease from Environmental Noise, 2011 contains important findings which are relevant to the project. In particular, these publications provide high level guidance on aspects of rural amenity and sleep arousal.
- Additional design work is needed to effectively address ongoing community concerns about noise.
- The proposed footpath from Kangaroo Valley Road along North Street to the Berry skate park could become an extension of the skate park, with day and night use by skate boarders resulting in an unacceptable level of noise and disturbance to the residential amenity.

- Appendix E Noise and Vibration, Section 2.6 Operational Noise Monitoring Results states 'traffic noise is the dominant noise source in the area'. This is not a valid statement for the overall potentially affected area particularly from the perspective of future sleep arousal. The values in Table 2-3 do not correlate with those in Table 4-26 for what appears to be the same source.
- Appendix E Noise and Vibration, Section 3.2.1 Sleep Disturbance vaguely explains the extent of the potential problem and should state that noise events in the order of 48-55dB(A) have the potential to exceed the DGRs. A more rigorous review of this potentially serious aspect should be conducted.
- Appendix E Noise and Vibration, Section 4.11.11 states that 'there is no requirement to meet noise criteria under adverse weather conditions'. However, information given in Section 4.11.11 suggests values in the order of 5dB higher than those provided should be expected. This is a significant increase.

Response

The noise and vibration impacts of the project have been assessed on accordance with the DGRs for the environmental assessment. The assessment is compliant with all legislation, standards and guidelines specified by the DGRs as requiring consideration. There is no requirement to assess the project against additional standards or guidelines.

Assessment of noise from the local skate park was not included as a requirement in the DGRs, and is not regulated by legislation. Notwithstanding, the concern about night time noise from skateboarders using the shared pedestrian / cycle path to get to and from the skate park is acknowledged and has been considered by RMS. It is anticipated that given the low population of Berry, only low level use of the pathway is expected and noise from the skateboarders is unlikely to be a significant noise issue.

Further assessment would be undertaken at the detailed design stage to encapsulate and assess noise impacts of any design changes.

RMS undertook attended noise measurements to confirm the dominant noise source at each logging location. At locations at significant distances from the road, the noise levels were lower, however the dominant source was still traffic noise. The difference in numbers between Table 2-3 and Table 4-26 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment is due to the façade correction of the measured noise levels which is a requirement of the NSW EPA's 'Road Noise Policy' (EPA, 2011).

RMS acknowledges that the DGRs require the consideration of local meteorological considerations (as relevant). However, the EPA's 'Road Noise Policy' (EPA, 2011) does not require assessment of noise under adverse weather conditions. Notwithstanding, as required by the DGRs, Section 4.11.11 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment considers the local conditions and identifies that the local conditions may include a temperature inversion or wind. The numbers presented in Table 4-28 and Table 4-29 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment show the adjustment to noise levels during worst case weather conditions. They do not necessarily occur at any particular receiver.

Berry Equestrian Centre

Stakeholder identification number(s)

56-59, 61-63, 71, 72, 74, 76, 80, 84, 86-88, 90-96, 101-106, 108-111, 113, 115, 117, 119, 120, 126-128, 137, 139, 144, 148, 157, 162, 165, 167, 173, 198

Issue description

Submissions relating to the equestrian centre raised issues regarding noise impact of the project on horses and the implications of this for competitions and safety.

In summary, the respondent(s) raised the following issues:

- The environmental assessment report does not consider the impact of or the mitigation measures for noise on horses in competition or training.
- Increase in noise due to the close proximity of the highway, the skateway, the shared path and North Street would cause safety concerns for horses, riders and the general public.

Response

The Berry Equestrian Centre has been assessed in the noise and vibration assessment for the project as an area of active recreation. The noise criteria for active recreational areas are designed to allow active activities to take place safely without intrusion from the road traffic noise.

Noise levels at the Berry Equestrian centre are likely to increase as a result of the project. However, the Berry Equestrian Centre would still comply with the "open spaces (active use)" criteria as discussed in Section 4.11.10 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. While the "open spaces (active use)" noise criteria would not be exceeded at the Berry Equestrian Centre, RMS would provide mitigation measures to reduce noise levels at the Berry Equestrian Centre in the form of a low noise pavement and a noise barrier in the area adjacent to the centre as described in the environmental assessment. These mitigation measures would reduce noise levels further below the required noise levels. The Berry Equestrian Centre is discussed further in **Section 2.17** of this report.

2.9.7 Operation noise attenuation

Architectural treatments and noise mitigation measures for rural / individual properties

Stakeholder identification number(s)

215 and EPA

Issue description

Submissions relating to architectural treatments and noise mitigation measures for rural / individual properties raised issues regarding the inability of architectural treatment to mitigate noise impacts on outdoor areas, eligibility of some properties for architectural treatment but not others, and noise impacts on Mark Radium Park.

In summary, the respondent(s) raised the following issues:

- The NSW Road Noise Policy, page 5, Environmental Criteria for Road Traffic Noise states its intention to 'preserve amenity appropriate to land use', however none of the stated criteria relate to noise affecting outdoor amenity. The rural amenity and environment of Berry would not be preserved through the implementation of architectural treatments and double glazing. Increased traffic noise from the bypass would impact on Berry's attractive 'outdoor' culture.
- Draft Statement of Commitments: It is not possible for a 'clear trend' to be properly agreed under draft Statement of Commitment NV5 (operational noise monitoring), nor can the adoption of 'feasible and reasonable' measures be considered any form of warranty to the community. Should a failure occur, the application of 'feasible and reasonable' treatment would have already been applied, meaning this mitigation measure is inadequate.
- Draft Statement of Commitments, NV6 (mitigation for noise sensitive receivers) does not appear to be a logical statement when the environmental assessment report has elsewhere stated that various properties are ineligible for treatment under the same circumstance. This statement should be removed, or alternatively the mitigation treatments discussed in the environmental assessment amended to include properties identified in NV6.
- Predicted changes in noise levels in areas of non-residential land usage given in Appendix E Noise and Vibration, Section 4.11.10 state an exceedance is predicted for Mark Radium Park, as well as other areas, however no mitigation measures are proposed for Mark Radium Park.
- Appendix E Noise and Vibration, Section 4.11.12 states a cost benefit analysis was carried out on a proposed noise barrier to address maximum noise levels from the project and the associated potential for sleep disturbance. Although not required by RMS' 'Environmental Noise Management Manual' (RMS, 2001) it would be beneficial to include the results of this analysis in Appendix E.

Response

Low noise pavement would be used over the whole alignment. Low noise pavement would reduce noise levels by around 3 dB at receivers and all outdoor areas. Low noise expansion joints (eg finger joints) would be on all bridges that would be constructed as part of the project to further reduce potential noise impacts.

The noise impacts of the project have been assessed and mitigation measures recommended in accordance with the EPA's 'Road Noise Policy' (EPA, 2011) and RMS' 'Environmental Noise Management Manual' (RMS, 2001). In accordance with these policies, receivers that are not grouped together are not entitled to a noise barrier assessment as noise barriers are not a cost effective solution in such circumstances. Mark Radium Park is not a residential receiver, it is an open space (passive use) so similarly, it is not considered reasonable to provide further mitigation in the form of a noise barrier. Alternate forms of mitigation need to be considered in these circumstances. For example, RMS would investigate the option of including a noise berm on the western side of Mark Radium Park during the detailed design stage of the project. Considerations for the berm would include the noise and visual screening benefits.

The terms 'reasonable' and 'feasible' are defined in RMS' 'Environmental Noise Management Manual' (RMS, 2001). The original concept design for the project was designed with consideration of 'reasonable' and 'feasible' solutions. The same assessment of 'reasonable' and 'feasible' mitigation would be performed if the post-construction noise monitoring survey showed receivers were consistently eligible for treatment.

The eligibility of a receiver for treatment and whether the receiver exceeds the criteria are related but do not mean the same thing. Receivers that exceed the criteria are only eligible for treatment in particular circumstances under the EPA's 'Road Noise Policy' (EPA, 2011) and RMS' 'Environmental Noise Management Manual' (RMS, 2001). For example, where a receiver exceeds the redeveloped road criteria during the 'no build' scenario, and exceeds the criteria during the 'build' scenario but with an increase in noise levels of 2.0 dB or less, the receiver is not eligible for treatment. If the increase were greater than 2.0 dB, the receiver would be eligible for treatment. The redeveloped road criteria takes into account the current road noise exposure from existing road infrastructure.

RMS' 'Environmental Noise Management Manual' (RMS, 2001) requires the consideration of uncharacteristic variations in traffic flows over short periods of time. Noise mitigation may be applied in the form of additional noise barriers or architectural treatments after the construction of the project if required.

A cost-benefit analysis for all recommended noise barriers has been undertaken in accordance with RMS' 'Environmental Noise Management Manual' (RMS, 2001) and is provided in Section 5.2 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

As a result of issues raised in submissions to the environmental assessment, a design change has been made at Victoria Street (refer to **Chapter 3** of this report). This design change has required a consequent revision to the design of the alignment around the Schofields Lane interchange and the road level would be raised by up to two metres. Noise levels in this area could increase or decrease as a result of the changed road level. The full noise and vibration impacts associated with the change would be assessed at the detailed design stage of the project.

Noise attenuation along the bypass of Berry

Stakeholder identification number(s)

2, 8, 47, 78, 100, 156, 169, 170, 172, 174, 175, 177, 185, 191, 193, 203, 215 and 244

Issue description

Submissions relating to attenuation of operational noise raised issues regarding noise attenuation along the bypass of Berry, including the adoption of low noise road treatments and expansion joints.

In summary, the respondent(s) raised the following issues:

- The four metre high noise wall proposed for the Berry bypass would have little impact on noise reduction because:
 - It equates to about the height of an exhaust stack of a diesel truck.
 - Motorbikes can be heard kilometres away and a noise wall would have little impact on bikes travelling at 100 kilometres per hour.
 - Engine retarder brakes from diesel trucks on the bridge approaching Berry would be a major problem.

Several different types of noise walls were presented by RMS for consideration. The most effective is a high, near vertical wall which would direct noise upwards, however RMS is proposing a wall of low height which tapers away at a low angle and is much less effective.

- Noise barriers and low noise treatment expansion joints / road drainage points should be included on the bridge at Berry and the bridge at Kangaroo Valley Road to eliminate traffic noise pollution. Toughened glass similar to the Minnamurra bridge should be used for the noise barriers. Support for the use of a low noise surface for the Berry bypass as it passes through the outskirts of Berry. North Street sports ground would be impacted by traffic noise. To protect passive recreational users, noise mitigation measures would need to be applied given the proximity of the bridge at Berry and the northern interchange at Berry.
- The proposed architectural treatment mitigation measures for rural dwellings are unacceptable. Many houses and buildings are early 1900, retaining original fittings (stain-glass windows and doors) and proposed double glazing mitigation measures are unsuitable. Woodwork fenestrations and wall surfaces are also unsuitable for the proposed insulation treatments.

It would be more appropriate for noise mitigation measures to be erected at the source, eg acoustic walls, low noise road surfacing and low noise treatment expansion joints at bridges.

The onus should be on the project to mitigate the problem, not individual property owners who are strongly disadvantaged because they are considered as single entities. If all rural properties were considered collectively a more suitable mitigation strategy may be adopted enabling residents to continue living outside and opening windows (to allow homes to be aired and negating the need to buy expensive air conditioning).

- Noise barriers, similar to those for the Kiama bypass, should be installed on the southern side of properties in Broughton Village near the cutting through Toolijooa Ridge to reduce the noise from trucks using the climbing lane. Some properties are only 50 to 60 metres from the proposed highway and south, south-west winds would expose these properties to excessive highway noise.
- Properties close to Broughton Creek bridges 2 and 3 would be affected by noise generated from expansion joints. Noise from bridge 3 would potentially have a greater impact as it would start from an elevated position and reverberate in the 'bowl' formed by the mountains. Both bridges should be constructed with two expansion joints and noise mitigation.
- The road profile of the embankment between Broughton Creek bridges 2 and 3 should feature earth mounding along the eastern shoulder for the purpose of noise, privacy and visual screening. The visible length and height of the highway at Glenvale is increased, with increased traffic volumes. This would potentially result in increased noise levels. What noise mitigation measures are proposed other than a concrete wall which would encroach on views and reduce overall amenity?

What noise mitigation measures are also planned for the rented property at Glenvale to ensure noise levels are within acceptable levels? Failure to achieve acceptable noise levels may lead to difficulties renting the property.

- The environmental assessment does not include any noise attenuation on the east side of the Berry bypass from Queen Street to Victoria Street (alongside Mark Radium Park) or south of the Victoria Street intersection. Noise attenuation would mitigate increased noise levels from traffic travelling at 100 kilometres per hour along a four-lane highway.
- The Arbour reserves the right to review noise impacts following project completion. The environmental assessment suggests daytime noise levels of 55 to 60 dBA which could justify the requirements for noise attenuation measures.
- Where the existing highway passes close to the Arbour and Bupa aged care facility, road noise, especially at night, is a problem, making it difficult to sleep with doors or windows facing the highway open. The two facilities have extended the residential town limits and an interim measure is required to extend the 50 kilometres per hour zone and move the speed camera further south. A roundabout should also be installed at Victoria Street to slow vehicles in an extended 50 kilometres per hour zone.

- A property near the proposed turning bay at Mullers Lane is elevated above the upgraded highway and would be impacted by traffic noise. Noise attenuation barriers should be included to protect the property from increased noise.

Response

Road traffic noise levels associated with the project have been assessed in accordance with the EPA's 'Road Noise Policy' (EPA, 2011) and RMS' 'Environmental Noise Management Manual' (RMS, 2001). All reasonable and feasible noise mitigation has been recommended in accordance with the applicable legislation and is outlined in Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

Although RMS is unable to eliminate the occurrence of engine braking, the project has been designed to reduce the need for and the likelihood of engine braking. The gradient of the alignment and the alignment bends have been minimised as far as practicable in the design process. This would reduce the likelihood of engine braking events significantly from the existing design. In particular, the receivers on North Street Berry would have a low exposure to heavy vehicle noise once the project is operational. The traffic analysis in the environmental assessment (Section 7.1) has shown that most southbound heavy vehicles accessing the Berry township would use the northern interchange rather than the southern interchange, and that northbound heavy vehicle traffic would use the southern interchange to access Berry and not pass the North Street area.

Where receivers are eligible for noise mitigation treatment they have been considered for reasonable and feasible noise mitigation. Although some residents may prefer one form of mitigation over another, the appropriate form of mitigation has been assessed in accordance with RMS' 'Environmental Noise Management Manual (RMS, 2001)'. The results of this assessment are outlined in Section 5.2 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment and include:

- Low noise pavement would be used over the whole alignment. Low noise pavement would reduce noise levels by around 3 dB at receivers and all outdoor areas.
- Two noise protection barriers would be built, both 4 metres in height, one near North Street and the other in front of Huntingdale Park Road. The construction materials selected would be subject to urban design review.
- Where receivers are not grouped together, or where less than four receivers in a group require additional treatment, architectural treatment would be considered.
- Other mitigation in the form of low noise bridge joints (eg finger joints) would be built on all bridges constructed as part of this project.

RMS acknowledges that some architectural treatments would not suit all buildings. Receivers offered architectural treatment would be consulted to ensure the requirements of RMS and the building owner are met.

RMS does not intend to extend a 50 kilometre zone to reduce noise levels near The Arbour and Bupa centre. RMS would undertake post construction compliance monitoring to evaluate operational noise levels.

2.9.8 Operation noise monitoring and modelling

Operational noise modelling

Stakeholder identification number(s)

175 and 215

Issue description

Submissions relating to operational noise modelling raised issues regarding post construction operation noise monitoring.

In summary, the respondent(s) raised the following issue:

- Draft Statement of Commitment NV4 to monitor increases to operational noise for up to ten years after opening is a potentially inadequate commitment. Base levels for existing traffic noise have not been provided, against which future changes may need to be measured. This commitment is inadequate as residents are required to wait ten years to determine if the control measures are effective.

Response

RMS would conduct a post-construction noise monitoring survey within twelve months of completion of the project (ie 2017-2018). If the results of the monitoring show consistent exceedances of relevant noise criteria at properties, RMS would consider additional mitigation measures. Post construction, further mitigation could be provided in the form of additional noise barriers or architectural treatments if they are considered feasible and reasonable.

The measured noise levels can be compared against the predicted "build" modelling results for the year of opening that are documented in Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. The criteria could be applied using the "no build" predicted noise levels.

Adverse weather conditions

Stakeholder identification number(s)

215

Issue description

Submissions relating to adverse weather conditions during operation of the project raised issues regarding the consideration of adverse weather conditions in conjunction with reflective noise impacts and inadequacy of the assessment of adverse weather conditions generally in the noise assessment for the project.

In summary, the respondent raised the following issues:

- The DGRs require 'An operational road traffic noise assessment including consideration of local meteorological conditions (as relevant) and any additional reflective noise impact'. There are numerous microclimatic areas in the Berry region, where both temperature inversions and prevailing winds are almost constantly present. Both these factors affect noise propagation in the surrounding valleys. A sincere and robust evaluation taking into account 'worst case' conditions would include consideration of properties up to at least one kilometre from the road. The assessment should present a statement of the mitigation requirements necessary under adverse meteorological conditions. It is not sufficient to simply state that conditions would be worse under adverse conditions as the probability of occurrence for worse case conditions is likely to be high.
- DECCW environmental assessment requirements, Attachment 1, state that 'the noise impact assessment should take into account adverse weather conditions including temperature inversions'. In line with these requirements, the noise impact assessment should make provision for the adverse effects of weather, not simply acknowledge that these adverse conditions aggravate the predicted level of impact and leave the impacted recipients to bear whatever further adverse effects are imposed.
- High frequency of occurrence of temperature inversions and wind effects is noted on page 236 of the environmental assessment. The statement in the environmental assessment that, 'there is no requirement to meet the noise criteria under adverse weather conditions' is rejected. It is unreasonable for the environmental assessment to note that adverse weather conditions occur effectively half of the time and take no further consideration of the effect on reasonable noise mitigation treatments. The frequency of occurrence of adverse weather conditions is likely to be higher for Berry than the more coastal records of Gerroa.

Response

The DGRs for the project require the consideration of local meteorological considerations (as relevant). Section 4.11.11 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment considers the local conditions and identifies that the local conditions may include a temperature inversion or wind. The information presented in Table 4-28 and Table 4-29 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment show the adjustment to noise levels during worst case conditions. They do not necessarily occur at any particular receiver.

The DGRs for the project also require road noise to be assessed under the EPA's 'Road Noise Policy' (EPA, 2011), which does not require any additional assessment under adverse weather conditions. Under adverse weather conditions, the worst affected receivers, which are located close to the works, are least likely to receive any significant increase in noise levels. The receivers located at greater distances from the alignment could experience higher noise levels for short periods of time. This is because the occurrence of worst case meteorological conditions is temporary in nature.

RMS has modelled barriers as fully reflective surfaces but would design and construct barriers with a focus on diffusing reflections such as using vegetation and non-smooth surfaces. This is a conservative assessment designed to minimise the risk of reflective noise impacts.

Sleep disturbance

Stakeholder identification number(s)

215

Issue description

Submissions relating to sleep disturbance raised issues regarding inadequacy of the noise assessment for operational sleep disturbance.

In summary, the respondent(s) raised the following issues:

- Appendix E Noise and Vibration, Section 4.11.12 discussion and findings on maximum noise levels and sleep arousal is unreliable. The data has been obtained by an unmanned logger for which the sources affecting maximum noise levels are unknown. The logger numbers do not correlate with the locations given in Table 2-1 and data therefore may not be representative. Future maximum noise event levels would increase, contrary to the statements made in the environmental assessment as heavy trucks would be moving faster.
- The criteria for assessing sleep disturbance is consistent with NSW Road Noise Policy. The proposed assessment criteria is that the LA1 (1 minute) rise is no higher than 15dB above the background LA90 (15 minute). From a practical viewpoint these values are retrospective measurements and raise complex problems of compliance review.
The LA1 (1 minute) is numerically close to the LA(max) and the LA(max) traffic measurement should be used for the operational stage assessment.
The LA90 (15 minute) is a value that can only be evaluated after the event, and applies to a different time period from that of the intrusive noise event. For monitoring of compliance the threshold value used for evaluating the magnitude of emergence of the LA(max) traffic should be deemed to be the LA90(15 minute) occurring at the time.
- The audit measurement necessary to evaluate sleep disturbance requires a manual measurement survey procedure. As the objective of the audit is to evaluate specific loud events, these cannot be easily determined from unmanned statistical data recorded using a logger. If a pair of unmanned loggers is utilised, one obtaining one minute period LA1 samples and the second 15 minute LA90 samples, the quantity of potentially irrelevant data may render the procedure useless and the delay in being able to issue any compliance report impractical.

Response

Heavy trucks would be able to travel faster on the upgraded highway, however maximum noise levels are likely to decrease as a result of the project due to fewer tight corners and reductions in gradients reducing acceleration and deceleration requirements and generally enabling freer flowing traffic. The acceleration and deceleration of heavy vehicles generally cause maximum noise events rather than increases in overall speeds.

RMS' 'Environmental Noise Management Manual' (RMS, 2001) provides guidance on dealing with maximum noise events. Maximum noise events are not assessed against a criteria that triggers mitigation. They are generally used at the route analysis stage to determine routes with the least impact on the community. The DGRs do not specifically refer to a maximum noise requirement. RMS would undertake compliance monitoring and maximum noise assessments in accordance with RMS' 'Environmental Noise Management Manual' (RMS, 2001). Further information on maximum noise events is provided in Section 4.11.12 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

A post construction noise assessment would be undertaken during the first year of operation of the project as required by RMS' 'Environmental Noise Management Manual' (RMS, 2001). The aim of this assessment would be to assess the accuracy of the modelling documented in the environmental assessment and ensure that mitigation measures recommended in the environmental assessment are appropriate and effective. If this is not the case, reasonable and feasible mitigation would be assessed and implemented at that time. The post construction noise assessment would be undertaken in accordance with RMS' 'Environmental Noise Management Manual' (RMS, 2001).

Reflective noise

Stakeholder identification number(s)

203 and 215

Issue description

Submissions relating to reflective noise raised issues regarding the use of sound absorptive barrier fencing and impacts of reverberation from nearby mountains and noise barriers.

In summary, the respondent(s) raised the following issues:

- The post operational review should impose clear responsibility to evaluate the actual effects of reflection, or alternatively require that the risk be designed out of the project through the implementation of sound absorptive barrier fencing.
- Properties located in the 'bowl' to the east of Broughton Creek bridges 2 and 3 experience a reverberation effect formed by the nearby mountains. Noise levels associated with the current highway from the 'opposite direction' to the highway (from the east) are often louder than noise levels emanated from the actual direction of the highway (from the west). This reverberation effect has not been taken into account in the noise modelling for the environmental assessment.
- Appendix E Noise and Vibration, Section 4.11.6 Reflections of barriers. Land to the north of the bypass and north of the North Street barrier rises in elevation and is frequently affected by temperature inversion conditions. Trucks currently entering the town from the south can be audible at distances up to three kilometres. This area should be considered with respect to potential sleep arousal and loud noise events, both of which would be aggravated by any reflection from barriers.

Response

RMS is aware that surfaces that reflect noise can be distressing for residents. As such reflective surfaces have been included in the road noise model in order to provide a worst case assessment. This model caters for the reflection of acoustically hard surfaces like concrete barriers and soft ground cover. Reflections of mountains and intervening ground have all been included in the noise modelling so the impacts of these have been taken into consideration in the final noise predictions. To provide a conservative assessment, a correction factor of +2 dB(A) has been included for receivers that may be exposed to an increase in noise as a result of reflection. Further discussion on noise reflection is provided in Section 4.11.6 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

Post construction site measurements would involve measuring the actual noise level from the project, which would include any reflection experienced at the measurement point. RMS would construct noise barriers with a focus on diffusing reflections such as using vegetation and non-smooth surfaces. This is a conservative approach designed to minimise the risk of reflective noise impacts.

Background noise monitoring and modelling

Stakeholder identification number(s)

9, 41, 100, 130, 169, 172, 185, 215 and EPA

Issue description

Submissions relating to background noise modelling raised issues regarding the inadequacy of the noise monitoring undertaken for the noise assessment, the need to avoid retrospective monitoring, and seek clarification of some of the technical aspects of the noise assessment. In summary, the respondent(s) raised the following issues:

- The background noise study was taken at a location not consistent with the quiet amenity of properties in Broughton Village. The location point of the study is currently affected more by existing highway noise than that experienced by the properties, therefore the actual impact would far exceed the environmental assessment predictions. Further studies at individual properties should be undertaken to reflect more accurate predictions.
- Appendix E Noise and Vibration, Section 2.5 states that the attended noise measurements confirmed that at each location the road was the dominant noise source. This section refers to rating background levels, which are provided in Table 2-2. Section 2-6 states that the average noise levels in Table 2-3 are, in each case, controlled by road noise. Table 2-3 describes daytime $LA_{eq(15\text{ hour})}$ and night time $LA_{eq(9\text{ hour})}$ traffic noise levels. It is unclear which descriptor (RBL or LA_{eq}) is being used to describe the existing level of road traffic noise, and attended noise monitoring results are not provided in the environmental assessment. This has important bearing on the derivation of operational noise criteria (the relative increase criteria) for the project. The existing levels of traffic noise at each receiver / catchment area should be made clear in the environmental assessment and results of the operator attended monitoring provided. It should also be made clear if any of the receivers in Appendix E - *Technical Paper: Noise and Vibration* (internal Appendix I) of the environmental assessment are controlled by the relative increase criterion.
- . No consideration has been given to the long-term effects of motorway noise day and night on local residents and users of the North Street precinct. A thorough modelling reassessment should be carried out to include:
 - Review of noise levels in relation to the height of the roadway (bypass lowered) along North Street and Albert Street south.
 - Further improvements to noise attenuation (higher wall in conjunction with a lower alignment) to minimise noise impacts.
 - Review of noise differences from traffic travelling on the Berry bypass at 80 kilometres per hour and 100 kilometres per hour.
 - Comparison of present noise levels on North Street (levels in the environmental assessment were taken 12-18 months ago) with anticipated bypass traffic.
- The noise and vibration assessment presented in the environmental assessment lacks detail. The environmental assessment is inadequate in review of many critical aspects and dismisses many significant concerns with little or no technical justification.
- Draft Statement of Commitment T3 -The traffic level monitoring proposed by commitment T3 is focussed only on traffic flow at peak periods and does not include impact of traffic flows (particularly noise) during night time periods. Traffic monitoring during peak periods would disclose only serious flaws and is unlikely to disclose any serious impact outcomes on the community.

- DECCW environmental assessment requirements, Attachment 1, states 'the environmental assessment should specify and assess all monitoring programs for measuring noise, air quality and water quality'. The environmental assessment should specify and assess all monitoring programs for measuring noise, air quality and water quality. The use of monitoring programs is a commendable proposal, providing the monitoring program has a focus on outcomes.. Retrospective monitoring should be avoided.
- A draft or guideline construction program would enhance the ability of a potentially affected reader to interpret and understand the potential impacts of the project. Appendix E Noise and Vibration, Section 1.1 states that computer modelling has been conducted for both existing road build and no-build scenarios for the project. It would significantly assist the non-technical reader if the report presented noise mapping contour results for the existing road to enable a visual comparison between existing and new situations.

This would allow a far better validation of the modelling process than a number of spot outcomes based on input conditions about which the reader knows very little.

- Section 7.2.2, Table 7-25 values of the environmental assessment are stated to be road traffic noise levels, however values measured as LAeq cannot be categorically stated as being due to traffic noise. In urban areas, traffic flow almost always dominates the background noise levels and the LAeq, however a multitude of sources affect the ambient noise in rural areas.
- Adjustment factors are mentioned in Appendix E Noise and Vibration, Section 4.11.1 without explaining what they mean. It is not clear how the sensitivity factor of 1dB(A) and the verifications factors of minus 1.7dB(A) and plus 0.5dB(A) are applied or what their aggregate significance is.

The traffic source strings described in Section 4.11.4 seem logical, but it is unclear whether trucks are modelled as three sources (tyres, engine, exhaust) or only two. If modelled as three sources then it is unclear what sound power division is applied.

Section 4.11.5 confirms that the modelling has used a correction of minus 4.3dB(A) for truck tyre noise. This is not inconsistent with Table 3.1 of the RTA's noise management manual, but is inconsistent with RMS' recommendation that the correction be no greater than minus 3dB(A).

- Appendix E Noise and Vibration, Section 4.11.7 noise model calibration. Table 4-26 provides different values from the same subject reported in Table 2-3. What do these mean?
- Appendix E Noise and Vibration, Section 4.11.7 describes predicted noise levels at BG7 around 4dB lower than measured due to local acceleration around curves not accounted for in the noise model. It is unclear how this discrepancy was handled in the subsequent modelling.
- The examination of the criterion in Appendix E Noise and Vibration, Section 3.5 operational noise criteria is poorly implemented. The community has no option but to trust the validity of large and complex computer noise modelling to predict overall expected levels. Comparable modelling of the existing conditions is not provided.. Instead, relatively discrete single-point locations are inspected and the existing conditions deemed to be representative of the overall existing impact. The limit level change identified in the NSW Road Noise Policy 6 applies to the specific source of road traffic noise and not simply to the LAeq level. A rigorous examination would involve subtraction of the existing traffic modelling results from those predicted for the new traffic models, and identification of all areas where the value exceeds 12dB(A). This calculation strategy would capture many more areas than the methods applied in the environmental report.

Response

Background noise logging undertaken for the project is detailed in Section 2.4 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. Background noise monitoring took place at 10 locations over a period of two weeks. Logging locations were chosen to gain an understanding of the existing noise environment. These locations ranged from a few metres to 600 metres from existing roads along the entire length of the project. The locations were chosen following consideration of aerial photography and site inspections. More information on noise logging locations and the existing noise environment is provided in Section 2.2 and Section 2.4 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

A noise logger measures the noise level over the sample period and then determines L_{A1} , L_{A10} , L_{A90} , L_{Amax} and L_{Aeq} levels of the noise environment. The L_{A1} , L_{A10} and L_{A90} levels are the levels exceeded for one per cent, 10 per cent and 90 per cent of the sample period respectively. The L_{Amax} is indicative of maximum noise levels due to individual noise events. The L_{A90} is taken as the background noise level. The L_{Aeq} is the energy averaged noise level over a defined period.

Noise logging has been undertaken primarily for two purposes, construction noise and operational noise. Construction noise logging involves the establishment of Noise Management Levels as required under the EPA's 'Interim Construction Noise Guidelines' (EPA, 2009). To establish the Noise Management Levels, the background noise level, or L_{A90} is logged. The L_{A90} is the level exceeded for 90 per cent of the time. The recorded noise levels are separated into daytime, evening and night time periods to cater for more sensitive time periods.

Operational noise modelling involves the logging of L_{Aeq} noise levels at locations where traffic noise is the dominant source. Attended noise monitoring is used to confirm that the traffic noise is the dominant source at the logging location, during day and night times. While noise logging is taking place, traffic counts also take place to record traffic volumes and traffic type (heavy and light vehicle) every hour. The recorded L_{Aeq} noise levels and the recorded traffic volumes are used to calibrate the noise model used for all traffic noise predictions. The results of the calibration have been provided in section 4.11.7 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment.

As the EPA's 'Road Noise Policy' (EPA, 2011) requires the assessment of façade reflected noise levels, all calibration levels have had a façade reflection of 2.5 dB added to the free field noise level. Other adjustments made to predicted noise levels include a calibration factor of -1.7 dB during the daytime and +0.5 dB during the night time. The adjustments are made to account for Australian conditions and are based on the results of the Australian Road Research Board Report – Research Report ARR No. 122, April 1983. A 1 dB sensitivity factor has been applied to the design year which results in a more conservative assessment. All factors have been added to the reported results, meaning the presented results have had all relevant adjustments applied to them.

Traffic source strings have been discussed in Section 4.11.4 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. Light vehicles have been modelled at 0.5 metres, heavy vehicle engines have been modelled at 1.5 metres with a source correction of -0.6 dB and heavy vehicle exhausts have been modelled at 3.6 metres with a source correction of -8.6 dB.

RMS have conducted the impact assessment in accordance with the EPA's 'Road Noise Policy' (EPA, 2011) and RMS' 'Environmental Noise Management Manual' (RMS, 2001).

RMS can confirm that the relative increase criterion has been applied in accordance with the EPA's 'Road Noise Policy' (EPA, 2011). The relative increase criterion has not been exceeded at any of the identified receivers.

Contour graphs for the calibration model are not provided as the EPA's 'Road Noise Policy' (EPA, 2011) does not require the existing condition to be assessed. The year of opening is the year for assessment.

RMS notes the difference in numbers between Table 2-3 and Table 4-26 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment is due to the façade correction of the measured noise levels which is a requirement of the EPA's 'Road Noise Policy' (EPA, 2011).

2.9.9 Operation noise policy and guidelines

Stakeholder identification number

215

Issue description

Submissions relating operational noise policy and guidelines raised issues regarding the correct use of guidelines relevant to the project and appropriate interpretation of these.

In summary, the respondent raised the following issues:

- International noise guidelines cover factors relevant to the Berry community, such as: wakeup effects,; loud noise at night; and loss of rural amenity which are not regulated by the current NSW guidelines.
- The relative increase criterion set out in Table 3-16 of Appendix E Noise and Vibration permits an increase of 12 dB(A) to the existing road traffic noise level. The UK Design Manual for Roads and Bridges indicates that the portion of people who would be "bothered very much or quite a lot" by the magnitude of change that this "acceptable" criterion represents would be almost 50 per cent.
- The number of receivers qualifying for architectural treatment under the project funding has been minimised based on the classification of "acute" existing exposure levels. Architectural treatments and double glazing etc may reduce noise impacts on eligible receivers, but this would not preserve the outdoor rural amenity of Berry which is valued by residents and tourists alike. Berry's attractive 'outdoor' culture may be lost due to increased traffic noise from the planned bypass.

Response

RMS has undertaken the noise and vibration assessment for the project in accordance with the DGRs as described in section1 of Appendix E - *Technical Paper: Noise and Vibration* of the environmental assessment. RMS acknowledges that there are international criteria and guidelines which may also be relevant to the project. Appendix A1 and A2 of the EPA's 'Road Noise Policy' (EPA, 2011) provides a summary of the criteria of many countries and other Australian states. The EPA's 'Road Noise Policy' (EPA, 2011) has been developed with the consideration of other policies nationally and internationally.

The EPA's 'Road Noise Policy' (EPA, 2011) and RMS' 'Environmental Noise Management Manual' (RMS, 2001) take into consideration rural amenity. The 'Road Noise Policy' (EPA, 2011) includes an increase in 12dB criterion which has been applied to the project. This accounts for properties which currently have a low road noise exposure level and would trigger treatment where road noise would increase by 12dB. RMS' 'Environmental Noise Management Manual' (RMS, 2001) provides a methodology for the application of treatment where it is required. In particular, for a rural setting, treatment is usually most effective in the form of a low noise pavement and architectural treatments as noise barrier performance is generally poor in rural areas. This can be attributed to the typically large distance offset between residences and the road. For the rural areas affected by the project, architectural treatments would occur. Low noise pavement would be used over the whole alignment. Low noise pavement would reduce noise levels by around 3 dB at receivers and all outdoor areas including Berry township.

2.9.10 Operation noise Victoria Street

Stakeholder identification number(s)

146, 171 and, 201

Issue description

Submissions relating to operation noise impacts on Victoria Street raised issues regarding the three options for Victoria Street presented in the environmental assessment.

In summary, the respondent(s) raised the following issues:

- Traffic noise impacts on residents from cars and heavy vehicles on Victoria Street is already too high. Victoria Street Option 1 closure would minimise noise impacts. Option 1 would allow merging traffic on the southbound on-ramp to accelerate without obstruction as it passes the end of Victoria Street, while Options 2 and 3 would increase noise pollution by leaving the western end of Victoria Street fully exposed to the highway and additional infrastructure.

Response

Following review of the submissions lodged in response to exhibition of the environmental assessment for the project, RMS has committed to Option 3 for Victoria Street with some additional modifications. A full description of the Option 3 with modifications can be found in **Section 2.22 and Chapter 3** of this report.

Given that currently all road traffic noise is generated by vehicles accelerating from 50 kilometres per hour to 100 kilometres per hour, the project would likely reduce road traffic noise as it would, through good design, reduce the degree of acceleration and deceleration required by vehicles at residences near the northbound off ramp and southbound on ramp of the southern interchange for Berry. Through traffic would no longer need to accelerate and decelerate as they currently do and heavy vehicle engine brake noise would be reduced.

2.10 Biodiversity

2.10.1 Terrestrial flora and fauna

Environmental assessment and statement of commitments

Stakeholder identification number(s)

215 and OEH

Issue description

Submissions relating to terrestrial flora and fauna assessment and Statements of commitment raised issues regarding the thoroughness of the terrestrial flora and fauna assessments.

In summary, the respondent(s) raised the following issues:

- Further assessments are required to address biodiversity issues. While the undertakings in the draft statement of commitment F1-12 (mitigation for flora and fauna impacts) may be appropriate, it is mandatory to update and improve numerous items prior to considering these commitments to be appropriate.
- Changes in hydrology have the potential to impact both directly and indirectly on a variety of vegetation types and this does not appear to have been considered as an impact on the terrestrial ecosystems occurring along the route.

Response

The general and threatened flora and fauna and habitats of the study area have been investigated by field and desktop surveys and assessed according to the 'Draft Guidelines for Threatened Species Assessments' (DEC and DPI, 2005) for projects determined according to the former Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The field survey and desktop assessment methods are described in Section 2 Methods (pages F11 to F26) of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment. The results are described in Section 3 of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment including discussion of the plant communities occurring in the study area. In summary, it was identified that cleared land and paddocks dominate the foothills, slopes and floodplains throughout the study area. The majority of the cleared land and paddock areas are considered an unnatural landscape, with limited or no capacity for regeneration of a native plant community and these areas support low biodiversity values. Changes to surface hydrology and ground water are not considered likely to significantly reduce the low biodiversity values of highly disturbed and modified vegetation in the study area.

Appendix H - *Technical paper: Surface Water, Groundwater and Flooding* to the environmental assessment identified that there would be an increase in surface water runoff. This would result from an increase in impervious surfaces and concentration of road runoff through drainage infrastructure. This would potentially increase the pollutants associated with road runoff, including sediments, oil and grease, heavy metals, chemicals and nutrients. Stands of retained remnant native plant communities on the foothills above the floodplain and elevated above the project would not be subject to these impacts. Potential impacts to native plant communities situated on the foothills, but below the project or on the floodplain, would be mitigated by surface runoff control measures. These measures include using water quality basins designed to reduce nutrients and sediment loading and potentially the installation of bio retention systems near sensitive receivers such as Broughton Creek, Broughton Mill Creek and Bundewallah Creek (Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment, page ii).

Section 3.8.6 (pages F51 to F52) of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment discusses groundwater dependant ecosystems in the context of terrestrial ecology. Riverbank forest occurring in the study area has been identified as the threatened ecological community River-flat eucalypt forest, which is a groundwater dependant ecosystem. In the study area, riparian plant communities are generally located on floodplain supported by a shallow alluvial groundwater system. These systems are likely to support base flows emerging as springs from sediments and rock strata underlying a stream's bed and banks.

Impacts to groundwater dependent ecosystems, such as River-flat eucalypt forest, would not be expected given that the impact of the project on groundwater systems would be minimal. This is due to:

- The maintenance of base flow to and from the main waterways on which River-flat eucalypt forest occurs, including Broughton Creek, Broughton Mill Creek and Bundewallah Creeks, at levels that continue to support this vegetation.
- The soil on which this vegetation occurs is currently in a highly modified state. The project would be unlikely to further alter the frequency and duration of waterlogging, the texture, nutrient content and moisture content of the soil in the study area.

A vegetation management plan would be prepared and implemented post construction. It would cover the operation and maintenance of the project and would provide an opportunity to apply adaptive management practices should impacts occur to terrestrial plant communities as a result of changes to the surface and subsurface hydrology.

The terrestrial flora and fauna assessment undertaken for the project is consistent with the *Draft Guidelines for Threatened Species Assessments* (DEC and DPI, 2005). In addition, the assessment addresses the DGRs by providing:

- Details of the survey methodology employed including survey effort.
- Description of the existing terrestrial biodiversity features of the study area.
- Assessment of the likelihood of disturbance, including quantifying the worst case extent of impact on the basis of vegetation type and total native vegetation disturbed.
- Consideration potential impacts such as weed infestation, edge effects, habitat fragmentation including to wildlife and riparian corridors.
- Specific consideration of impacts to threatened species, populations, ecological communities that have been recorded on the site and surrounding land.
- Details of how flora and fauna impacts would be managed during construction and operation for all project components, including adaptive management and maintenance protocols and monitoring programs.
- Discussion of actions to be undertaken to avoid, mitigate or offset impacts associated with the project consistent with the principles of improve or maintain biodiversity outcomes.

The terrestrial flora and fauna assessment has considered all the relevant information available throughout its preparation over approximately three years. This includes consideration of multiple design options, amendments to reflect changes to key legislation relating to terrestrial threatened biodiversity, updated assessment guidelines and methodologies and responding to community and other stakeholder input during the consultation process.

The statement of commitments (Chapter 10 of the environmental assessment) provides commitments to avoid, mitigate, manage and offset terrestrial and aquatic ecology impacts. These commitments are based on detailed assessments of terrestrial and aquatic flora and fauna that assess the likely impacts and provide management and offset measures based on maintaining or improving biodiversity values. Further studies, assessments and plans have been committed to in the environmental assessment to address maintaining or improving biodiversity values and long-term biodiversity management including the preparation of a biodiversity offset package (pages F81 of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment and page Appendix E 19 of Appendix E – *Technical Paper: Aquatic Ecology and Water Quality Management* to the environmental assessment) and vegetation management plan (page F65 of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment).

Loss of vegetation and impacts to flora and fauna and habitats

Stakeholder identification number(s)

7, 116, 145, 147, 232 and OEH

Issue description

Submissions relating to loss of vegetation and impacts to flora, fauna and habitats raised issues regarding the magnitude of direct and indirect impacts. In summary, the respondent(s) raised the following issues:

- The environmental assessment indicates 26.7 hectares of vegetation would be indirectly impacted by the project, however it is unclear where these indirect impacts occur and what type of indirect impacts are being considered. Some of the indirect impacts identified could be considered direct impacts, whereas other impacts, such as increased run off from the highway have not been considered.
- Objection to the loss of existing trees and bushland along the highway (particularly the large mature forest area from Austral Park to Tindalls Lane) and damage to the remaining vegetation during construction.
- Loss of mature trees (gum trees etc.) on the western side of the current highway immediately before Schofield's Lane, and between Schofield's Lane and Hitchcocks Lane (a mature line of Poplars and other trees) from the project.
- Objection to the project due to biodiversity impacts. Mature trees, gullies and local wildlife habitat in the area would be destroyed in favour of quicker access to the south coast. The amount of space required for the Gerringong upgrade by construction workers and their equipment is enormous. The environmental assessment undervalues the need to consider fauna mitigation methods in agricultural land. Native vegetation at Site 20 is also the habitat of many individuals from native fauna species. Those individuals and their communities should not be discarded from the project simply because of the state of the vegetation in which they feed and reside.

Response

Field and desktop surveys of the study area were carried out to identify and assess terrestrial flora, fauna and habitats that could be impacted by the project. This assessment was undertaken in accordance with the 'Draft Guidelines for Threatened Species Assessments' (DEC and DPI, 2005) which apply to projects determined according to the repealed Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As detailed in Section 1.2 of this report, the project is a transitional Part 3A project and as such the requirements of Part 3A of the EP&A Act apply.

Section 1 (page F8) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment provides the terms of reference adopted for the survey and assessment of terrestrial ecology, including the definitions of direct and indirect impacts, subject site and study area. The field survey and desktop assessment methods are described in Section 2 (pages F11 to F26). The results are described in Section 3 (pages F27 to F53) and the assessment of impacts to terrestrial flora, fauna and habitats are assessed in Section 4 (pages F54 to F63).

Section 4 provides a detailed assessment of the potential impacts of the construction and operation of the project. It presents the likely or representative scenarios based on the concept design, terrestrial flora and fauna field survey and desktop analysis. Section 4 specifically addresses potential direct and indirect impacts, including vegetation clearance, habitat loss, habitat fragmentation, edge effects, mortality of individuals and weed invasion. Indirect impacts could occur in the study area should project-related activities affect species, populations or ecological communities in a manner other than direct loss. Other indirect impacts that could occur could occur in the study area are also discussed in Section 4, including loss of individuals through starvation, exposure, predation, competition for reduced resources, erosion, weed invasion, or increased human activity within or adjacent to sensitive habitat areas.

Section 7.3 of the environmental assessment and Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment, acknowledge that direct impacts would occur during the construction and operation of the project, including construction of the roadway, temporary creek crossings, Town Creek diversion and temporary and permanent ancillary facilities. The indirect impacts are also stated and were calculated using 50 metres as the average extent of edge effects. As a result, the indirect impacts were quantified by including a 50 metre buffer around the area that would be directly impacted by construction of the project. The estimated potential direct and indirect impacts on vegetation and potential habitat are presented in Table 4.1 (of Appendix F - *Technical paper: Terrestrial Flora and Fauna* page 54).

Sections 2, 3 and 4 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* are supported by relevant figures in each section or refer to relevant appendices and additional maps provided in Appendix F. These figures provide a visual representation of the project and study area. They show potential areas of direct and indirect impacts, the focus of the field survey effort and the location of significant terrestrial biodiversity such as wildlife corridors and vegetation communities.

Mitigation measures are detailed in Section 5 (pages F64 to F81) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment. The recommended measures to avoid, manage, mitigate and offset were developed to maintain and/or improve biodiversity, as required by the DGRs.

Section 6 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment follows the required assessment guidelines for the project as specified in the DGRs. Section 6.1.5 (page F85) identifies that some biodiversity values of the study area would be lost, however this would be minimised by implementing the mitigation measures detailed in Section 7.3.4 of the environmental assessment and Chapter 5 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment. In particular, measures to avoid significant habitat features, the provision of fauna under and over passes, rehabilitation of intact native vegetation that would be disturbed by the project and revegetation of disturbed areas to improve habitat connectivity would minimise impacts to biodiversity values. Following the implementation of these mitigation measures combined with the preparation and implementation of a biodiversity offset package to compensate for the unavoidable loss of and residual impact on River-flat eucalypt forest, it is considered that a maintain or improve biodiversity outcome would be achievable.

Revegetation and restoration of native vegetation

Stakeholder identification number(s)

116, 145, 147, 161, 192, 197, 215 and Department of Primary Industries

Issue description

Submissions relating to revegetation and restoration of native vegetation raised issues regarding the use of locally occurring native plant species consistent with retained vegetation.

In summary, the respondent(s) raised the following issues:

- Appendix F Terrestrial Flora and Fauna, page 68 notes bridges would be of sufficient height to allow light to filter underneath for vegetation growth but it is not clear if the bridge design would allow moisture to penetrate beneath the structures for vegetation to grow in a continuous fashion.
- Table 7-50 of the environmental assessment notes a vegetation management plan would be prepared which details the restoration, regeneration and rehabilitation of areas of native vegetation in the vicinity of the project. The vegetation management plan should include specific details for the rehabilitation of the riparian corridors disturbed by the project.

Locally indigenous species should be used to rehabilitate and revegetate habitat areas. Riparian corridors should be fully structured (trees, shrubs and groundcover species) and rehabilitated to mimic the relevant local native vegetation community.
- Appendix F Terrestrial Flora and Fauna, Figure 3.1.3, vegetation mapping shows an area of Illawarra Gully Wet Forest opposite to Graham Park at Schofields Lane (chainage 18950). The grove on the Graham Park side is partially located in an ancillary area. The existing trees should be enhanced by planting new eucalyptus trees within the alignment above the cutting at the ridge.
- Detailed mitigation measures should be prepared for the:
 - Warm Temperate Layered Forest at Toolijooa Ridge (chainage 8450 – chainage 8700) and Austral Park (chainage 11650 – chainage 11800).
 - River Bank Forest at all major creek crossings.
 - Illawarra Gully Wet Forest at: Mark Radium Park; Hitchcocks Lane and Schofields Lane.
- Existing trees and bushland lost as a result of construction (particularly the large mature forest area from Austral Park to Tindalls Lane) where possible should be replaced with local native trees and vegetation.
- The environmental assessment identifies 15.4 hectares of Illawarra Gully Wet Forest as highly impacted within the roadway and ancillary spaces and 10.05 hectares as impacted due to edge effects. The environmental assessment does not however provide details of mitigation measures to be taken concerning the disturbance of Illawarra Gully Wet Forest communities. Extensive replanting of Illawarra Gully Wet Forest should occur, including large forest trees as well as under story species to match local native plants within the alignment and areas impacted due to edge effects.
- Similar trees should be planted to mitigate visual amenity impacts on surrounding areas and the loss and impact on existing trees on the western side of the current highway immediately before Schofield's Lane, and between Schofield's Lane and Hitchcocks Lane.
- Any trees removed from a property entrance due to access re-alignment should be replanted or replaced. These trees are a habitat for birds and small mammals.

- The area marked at HF69 should be planted with local trees and vegetation for the purpose of environmental mitigation, remediation and goodwill.
- A separation of approximately 50 metres between the new highway and the existing road is shown in the current design, just after the start of the project south of Toolijooa Road. This separation should be maintained in the final design and revegetated with species existing in the forested area to the north-east of the proposed Toolijooa Ridge cut.

Response

The mitigation and managements measures presented in Section 5 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment includes revegetation using local provenance species and offsetting of residual direct impacts to River-flat eucalypt forest. A vegetation management plan would be prepared and would detail restoration methods (refer to page F65 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment). The vegetation management plan would be integrated with the landscape plan for the project and prepared in consultation with local stakeholders, such as Landcare groups, Southern Rivers Catchment Management Authority (CMA) and affected land owners. It would be guided by best practice methods for collection and establishment of planting stock of local provenance, planting programs, planting maintenance and monitoring. The vegetation management plan would be prepared with reference to 'Guide 3: Re-establishment of native vegetation' from RMS' *Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects* (RTA, 2011), including the following objectives:

- Ensure revegetation is representative of the natural ecological community of the area.
- Focus on vegetation that provides habitat and fauna connectivity.

The vegetation management plan and landscape plan would include detailed planting schedules, inventories of appropriate locally occurring native species (to match specific vegetation communities) and design layouts. The planting schedules and design layouts would initially be designed according to the expected site specific road operation requirements and environmental conditions. However, these may be adjusted following completion of the major engineering and construction works into account factors such as ambient shade and moisture (such as under or adjacent to bridges) as well as RMS specifications for landscaping and long-term management and maintenance of road safety.

Management of vegetation during construction and in perpetuity

Stakeholder identification number(s)

70, 145, 147, 192, 197 and 215

Issue description

Submissions relating to the management of vegetation during construction and in perpetuity raised issues regarding protection of retained trees and stands of vegetation and ownership of certain areas.

In summary, the respondent(s) raised the following issues:

- Two non-locally occurring native tree species adjoining the exiting highway boundary should be disturbed as little as possible.
- Objection to the loss of existing trees and bushland along the existing road (particularly the large mature forest area from Austral Park to Tindalls Lane). What mitigation measures would be applied for potential damage, during construction, to the retained vegetation of the large mature forest area from Austral Park to Tindalls Lane?

- The features of the Illawarra Gully Wet Forest at Schofields Lane have not been acknowledged as significant in the environmental assessment. The Illawarra Gully Wet Forest from Crosiers Road and the large eucalyptus trees on Schofields Lane ridge are a recognisable aspect of Berry and have local significance. These trees should be protected as they are located next to an ancillary facility.
- Appendix F Terrestrial Flora and Fauna, Figure 3.1.3, vegetation mapping shows an area of Illawarra Gully Wet Forest opposite to Graham Park at Schofields Lane (chainage 18950). The grove on the Graham Park side has not been mapped. Correction of this discrepancy in the environmental assessment requires a redefinition of the boundary of the Schofields Lane ancillary area to protect these trees. The grove to the south side of the highway could be affected if a cutting is required for a driveway to the residence adjacent to chainage 19000.
- Ownership and custodianship of the remnant forest land at a property is preferred over acquisition. The remnant forest is part of a plan to return some of the degraded farming land back to its original state and to assist in providing a wildlife corridor from Broughton Creek to the escarpment.

Response

Retention and protection of retained vegetation is addressed in Section 5 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment. Section 5.1 (page F64 to 65) states that vegetation clearing would be restricted to those areas where it is necessary and opportunities to minimise clearing would be considered during detailed design with a particular focus on retention of habitat trees. During construction, retained vegetation such as individual trees, stands of trees or patches of native vegetation would be fenced with highly visible temporary fencing. This would be undertaken in accordance with 'Guide 2 Exclusion zones' of RMS' *Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects* (RTA 2011).

The ancillary areas assessment methodology is detailed in Section 2.7 (pages F22 to F23) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment. The assessment criteria for terrestrial biodiversity aim to identify ancillary areas where there would be:

- No substantial vegetation clearing (unless required for project alignment).
- Low conservation significance for flora and fauna.
- No removal of endangered ecological communities (EECs), threatened flora species or threatened fauna habitat (unless required for project alignment).

In addition no physical disturbance would occur outside the boundaries of the proposed ancillary sites. In accordance with 'Guide 2 – Exclusion Zones' (RTA 2011), buffers and temporary fencing would be installed to mark 'no-go' areas if ancillary sites are located directly adjacent to EECs or areas of medium-high conservation significance. According to the ancillary facility assessment criteria, the definition of medium-high conservation significance includes:

- An area with native vegetation which may be EEC or not.
- Threatened (or migratory) flora or fauna records/occurrences.
- Moderate to good potential habitat for threatened (or migratory) species including intact soil profile, intact structural layers, mature fruiting trees, hollow-bearing trees and fallen woody debris.
- Water source.

Further to the safeguards highlighted above, refinements may be made to the design features and construction methods to further minimise vegetation clearing during the detailed design phase of the project.

As detailed above, a vegetation management plan would be prepared to guide revegetation and restoration works. The vegetation management plan would be prepared in consultation with local Landcare groups, the Southern Rivers CMA and affected land owners and would consider the opportunities and constraints surrounding ownership and continuing management of specific parcels of land.

Additionally, Action 1 of the biodiversity offset strategy (Appendix E to Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment) provides a framework for the delivery of a biodiversity offsets package. The recommended decision making pathway for the delivery of Action 1 focuses on the use of RMS owned land to enhance connectivity and corridors for terrestrial and aquatic habitats. Restoration and rehabilitation in areas other than land owned and managed by RMS may be considered, however the key criteria of connectivity would be a guiding factor. In pursuing Action 1 a legally binding arrangement for ongoing management for conservation would be implemented and may include a trust agreement, conservation agreement, property vegetation plan, wildlife refuge or a BioBanking agreement.

Fauna fencing

Stakeholder identification number(s)

210 and 216

Issue description

Submissions relating to fauna fencing raised issues regarding the design, location and type of fauna fencing.

In summary, the respondent(s) raised the following issues:

- Design specification details for fauna fencing have not been provided in the environmental assessment for community comment. For adequate fauna fencing to be provided, specific design specifications should be given to tenderers with consideration given to the:
 - Type, location and extent of the fauna fencing.
 - Details of fauna fencing along the boundaries of the project area and farm land.
 - Design of fauna fencing. More thought should be given to designing rural fences which maintain rural character, provide fauna safety and prevent livestock entering the road corridor. Basic barbed wire farm fences have become the standard for boundary fences on the project since the Gerringong upgrade. Previous requests for the top barbed wire to be changed to plain have not yet been confirmed. The impact of barbed wire on fauna should be taken into account in the design stage. The lack of certainty of the design of fauna fencing and agricultural boundary fencing should be rectified so that both 'types' of fencing are described in detail and their ability to perform their respective tasks with no risk to wildlife is proven with effort made to reduce the use of barbed wire on agricultural boundary fences.
- There is a lack of provision of fauna fencing on agricultural land. Over time, as plantings occur and the movement of fauna increases it would be difficult to retrofit fencing to prevent road kill and to direct fauna to specialised crossing points in the area. The environmental assessment restricts its interest to the 'most vulnerable areas' but support should be extended to the areas currently "degraded" but which in the future would be vegetated and support fauna movements. Consideration should be given to providing fauna mitigation fencing and other structures within the agricultural component of the Southern Rivers CMA identified corridor.

- Fauna which seeks to move across the road corridor from within agricultural land could use the proposed crossing options if the length of farm land was relatively small and there was a proper crossing point within a reasonable distance. This however would require fauna fencing to be extended far enough into the farm land to guide fauna to a crossing point. Greater consideration should be given to the provision of fauna fencing adjacent to bridges and other fauna mitigation structures indicated in Figures 5.1 to 5.4 in Appendix F Terrestrial Flora and Fauna. For greater freedom of movement for any animals that do gain access to the bridge, request that Type F precast median barriers be used. Consideration should be given to excluding fauna from the sections of the road corridor confined by the sound barriers. Where appropriate, gaps with one way gates should be included to facilitate the exit of fauna from the road corridor.
- The environmental assessment implies that cleared land and degraded bush alongside the highway are not inhabited by native fauna. This is incorrect and for safety reasons it is important that appropriate fauna fencing is erected to try to prevent large fauna such as wombats from venturing onto the highway.
- Fauna fencing should be placed either side of the three Broughton Creek bridges to effectively funnel wildlife underneath.
- The fauna fence shown on Figure 5.2 of the environmental assessment should be extended an additional 200 metres to the west, recognising that there would need to be a gap for property access.
- It is unclear in the environmental assessment if the noise wall along North Street extends to cut off south side fauna transit fully at the bridge at Berry. If not, fauna fencing on the south side of the bridge at Berry should be provided. There is good vegetation on the north-east corner of the bridge at Berry and fauna fencing should also be considered to the north and south of the eastern end of the bridge.
- Farmland and its native fauna were not given serious consideration in the environmental assessment. The 'unnatural landscape' is very much the home of 'natural' native fauna. Further acknowledgement should be given to the need for and design of fauna mitigation structures related to the interface between the agricultural land and the project corridor. More efforts are required to:
 - Ensure that appropriate exclusion fencing is used to prevent access by animals to the road corridor from agricultural land. Agricultural boundary fencing along the project corridor needs to be designed not only with cattle and other livestock in mind but with exclusion of native fauna from the road area as a shared primary concern. Investigations must be made into the design of agricultural fencing which has a greater exclusion capability for smaller native fauna species.
 - Provide fauna-friendly fencing to prevent the killing or injuring of fauna associated with boundary fencing.
- Appendix F Terrestrial Flora and Fauna, Section 5.6 should state who is responsible for remedial development and what level of road kill would trigger such activity. Residents be invited to report road kill incidents (preferably on an interactive website) as this would be more effective than periodic monitoring.

Response

Fauna fencing for the project would consist of a 1.8 metre high chainlink fence. The fence would be dug into the ground to a depth of 200 millimetres. In areas along Broughton Mill Creek identified as potential dispersal habitat for the Green and Golden Bell Frog *Litoria aurea*, a frog-proof fence would also be provided to encourage movement of this species beneath the bridge. As per Section 5.3.4 (page F-69) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment, the use of barbed wire in the vicinity of rope bridges and associated structures is not recommended due to the potential for gliders to become caught and killed in barbed wire fences. Mitigation measures such as fauna fencing, fauna underpasses and rope bridges have been located in areas with the greatest potential for impact based on existing constraints, movement patterns and fauna habitat utilisation.

Fauna fencing would not be provided near Broughton Creek due to the height of the three bridges above the existing riparian vegetation and given that the bridges would be located in predominantly cleared areas. The length of each bridge would allow for a width of at least ten metres between the edge of the embankment and the edge of the creek. In addition, rope bridges would be provided to facilitate movement of arboreal mammals. At Broughton Creek bridges 1 and 2, rope bridges would be provided both over and under the bridge, while at Broughton Creek bridge 3 rope bridges would be provided spanning under the bridge.

Fauna fencing would be provided to avoid or minimise impacts to and improve the safety of native fauna. Fauna fencing would be provided in areas where there is greatest potential for fauna to access the road corridor. Farm boundary fencing would also be provided in some locations and would be around 1.2 metres in height. As detailed Section 5.3.1 (page F-67) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment, fauna fences would be used to guide fauna to crossing points. It is not considered appropriate or necessary to utilise farm boundary fences to guide fauna species to fauna crossing points. Large mobile species, such as macropods, would readily move both through and over fences of these heights, and species such as wombats would readily move through or under most farm boundary fences. The current concept design generally includes wire rope safety barriers, except in locations where space is constrained (such as bridges) where concrete barriers would be required. In these locations, RMS would use Type F concrete barriers to allow for movement of small mammals, amphibians and reptiles across these areas.

RMS would encourage the use of fauna-friendly fencing design when fencing farm boundaries along the road corridor. The type of fencing used would be subject to agreements with landholders. In open agricultural land between areas of remnant vegetation the potential for small native mammals, such as *Antechinus spp.* or *Rattus spp.*, to occur is limited. Many small native mammal species actively avoid open areas due to predation risk, and would be unlikely to cross small breaks in vegetation. Therefore, installing fauna fencing in these areas is not considered to be warranted.

Agricultural land is likely to support a limited range of common and opportunistic species. When compared to areas of remnant vegetation the diversity and abundance of native animals is likely to be limited. The potential for impacts to native fauna would be greater in areas of remnant vegetation and as a result mitigation measures have focused on these areas. As discussed page F-67 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment, Veage and Jones (2007) recommend that fauna crossing structures are located in areas where regular crossing and / or migration pathways are identified. This approach is supported by research such as Roger and Ramp (2008) which supports the use of habitat variables in the prediction of animal – vehicle collisions, and thus the mitigation of such impacts.

The Southern Rivers CMA *Draft Catchment Action Plan 2013 – 2023* (Southern Rivers CMA, 2013) identifies priority areas for restoration of connectivity. It does not identify areas that are currently operating as wildlife corridors. The purpose of the flora and fauna assessment for the project was to identify potential impacts to fauna movement based on current conditions and provide measures to avoid, minimise and mitigate these impacts. It would not be viable to provide mitigation measures for future potential works, particularly those identified at a broad scale. Section 5.3 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment and the offset strategy both provide for the maintenance and improvement of connectivity for fauna through the development of a vegetation management plan which would be prepared in conjunction with the Southern Rivers CMA and local Landcare groups (page F-66 Appendix F - *Technical paper: Terrestrial Flora and Fauna*).

The area proposed for the construction of noise barriers, on the south side of the highway alignment adjacent to North Street, does not support significant fauna habitat. Access to the road corridor from identified fauna movement corridors located along Bundewallah Creek to the north would be limited by the construction of a dedicated fauna fence to the west of the bridge crossing Bundewallah and Broughton Mill Creeks (see Figure 5.1, page F74 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment). Monitoring of animal – vehicle collisions during the operational phase of the project would be undertaken, and if this becomes a problem additional fencing at appropriate locations would be considered. The use of one-way gates on the south side of the highway alignment is not considered appropriate. One-way gates, allowing animal to exit to the south of the highway towards North Street, would force animals into a residential area without ready egress. This would put both animals and people at risk and would not be appropriate for this location.

Fauna mitigation measures would be located in areas of greatest potential impacts and along identified regular crossing and / or migration pathways (Veage and Jones 2007). Monitoring of animal – vehicle collisions would be undertaken during the operational phase of the project, as outlined in Section 5.6 of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment. It has been recommended that monitoring is undertaken by Council road cleansing team or by RMS Southern Region. If roadkill becomes an issue during the operational phase of the project additional fencing of these locations would be considered.

Weed management

Stakeholder identification number(s)

69, 70, 147, 215, 216

Issue description

Submissions relating to weed management raised issues regarding the ongoing the management of terrestrial and aquatic weeds post construction.

In summary, the respondent(s) raised the following issues:

- Some parcels of land would become isolated and not viable as useable land. These areas may become a source of weeds to the surrounding area. Residual parcels of land around the Berry urban area may also become a source of weeds to the local rural area. These parcels of land should be clearly identified and strategies put in place for ongoing maintenance of lots that are not able to be sold or assigned.
- All exotic weeds, both in streambeds and stream banks should be controlled.

Response

Section 5.5 (pages F78 to F79) of Appendix F - *Technical paper: Terrestrial Flora and Fauna* to the environmental assessment provides discussion on the topic of weeds. The discussion references 'Guide 6 Weed management' of RMS' *Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects* (RTA, 2011) and highlights the objective of preventing or minimising the spread of noxious and environmental weed species on all RMS project sites and during maintenance works.

In summary 'Guide 6 Weed management' outlines the requirements for management of terrestrial and aquatic environmental and noxious weeds during construction and suggests best practice methods for weed management during maintenance works. In addition to implementing the management practices recommended in RMS' *Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects* (RTA, 2011), the following mitigation measure would be implemented:

- Control drainage that may contain weed seeds or high levels of nutrients.
- Use weed-free topsoil in landscaping and re-vegetate disturbed sites with locally indigenous species (local provenance).
- Monitor and control weed populations that establish in disturbed areas, with particular attention to eradication of noxious weeds. Weed invasions would be monitored and controlled by a person experienced in weed management.
- Incorporate weed management strategies into the vegetation management plan, detailing necessary weed control works, particularly in areas where the weeds may impact on threatened species and/or their habitats.

2.10.2 Aquatic environment

Stakeholder identification number(s)

100, 170, 197, 215 and Department of Primary Industries

Issue description

Submissions relating to the aquatic environment raised issues regarding the potential impact on the aquatic environment from permanent and temporary waterway crossings and construction activities.

In summary, the respondent(s) raised the following issues:

- Table 10-1 of the environmental assessment identifies a key action as 'permanent and temporary waterway crossings should be designed and constructed in accordance with the fish habitat classification of each waterway and minimise alterations to natural flow regime and impacts on fish passage'. This key action is essential and supported.
- Broughton Creek is rich in all sorts of fresh water marine life, for example platypus, conga eels, water dragons and bass. The increase in creek crossings would adversely affect the quality of water within the creek and its surrounding habitat which supports native animals such as sugar gliders, flying foxes, wombats, kangaroos, possums, spotted quolls, snakes, lizards, echidnas and all manner of bird life and insects.
- Section 7.3.3 of the environmental assessment states that 'other than the bridge at Berry no permanent bridge abutments or piers would be placed within these waterways'. Clarification is required as to whether this mitigation measure is only in relation to the temporary crossing or if it applies to the permanent crossings. If it also applies to permanent crossings it is recommended the mitigation measure in Table 7-50 to 'not position bridge piers or abutments within the section of waterway channels (wetted width) that carry median flows where practicable' is amended to be consistent with Section 7.3.3.

- Section 7.3.3 of the environmental assessment report indicates the construction pads may involve the temporary placement of rocks or other construction materials within waterways. Where possible, construction pads should be located outside the waterways and riparian corridors to minimise impacts on natural flow regimes, bed and bank stability, stream geomorphology, in-stream habitat, riparian vegetation etc. Where this is not possible, the construction method should avoid completely blocking the stream and any placement of rock and material in the waterways needs to be fully removed at the completion of construction. Construction works need to minimise impeding bankful flow.

Where works are proposed within the bed and banks of waterways the bed and bank stability of the waterways should be monitored pre-construction and post construction.
- Reduced water input to the duck pond would result in the destruction of flora and fauna. The introduction of a water feature such as a water spout to top up the pond is essential to keep it filled and aerated.

Response

As discussed in Section 7.3.4 of the environmental assessment, permanent and temporary creek crossings have been designed to minimise impacts on natural flow regimes and fish passage in accordance with the *Guidelines and Policies for Aquatic Habitat Management and Fish Conservation* (Smith and Pollard, 1999) and *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull and Witheridge, 2003).

The placement of permanent footings and piers outside of the wetted width of waterways is preferred, however the concept design for the bridge at Berry incorporates one pier within the wetted width of a low flow channel of Bundewallah Creek. RMS undertook a detailed investigation of design options for the bridge, the results of which indicated that the current concept design provides the safest outcome for maintaining the structural integrity of the bridge. As a result, the placement of a pier within the wetted width of a waterway could not be avoided. Design considerations, mitigation measures and construction features of the project are such that the effects on flow regimes and pollutants are expected to be minor. Mitigation processes would minimise the effects of pollutants and other contaminants on creek health, through the diversion of potential contaminants into sediment ponds and grass swales for treatment. The location of the piers in the low flow section of the waterway represent the least possible impact on natural flow regime and fish passage and overall impacts on aquatic ecology are assessed to be minor. Proposed mitigation is outlined in Section 4.1.1 (page G67) of Appendix G – *Technical paper: Aquatic Ecology and Water Quality Management* to the environmental assessment. With the exception of the bridge at Berry, no permanent bridge abutments or piers would be placed within waterways.

For temporary crossings, construction pads would be used in accordance with the guidelines above, where practicable, in order to minimise potential impacts on natural flow regimes, stream geomorphology, in-stream habitat and bed and bank stability. To date, no geomorphological assessments have been undertaken as part of the assessment for temporary creek crossing locations, however geomorphological investigations would be undertaken during the detailed design and construction phases of the project. Preventative measures such as bank stabilisation / soil retention techniques would be investigated where works are proposed within the bed and banks of waterways. Any preventative measures employed would be undertaken in accordance with the soil and erosion control plan prepared for the project and would be consistent with standards outlined in the NSW government's *Managing Urban Stormwater – Soils and Construction Volume 2D – Main Road Construction* (DECCW, 2008).

The duck pond at Mark Radium Park currently has a low level of water quality. A number of options would be considered in order to maintain current conditions, including passive design of surface water supply and operational maintenance features.

2.10.3 Offset strategy

Stakeholder identification number(s)

169, 170, 208, OEH and Department of Primary Industries

Issue description

Submissions relating to the biodiversity offset strategy raised issues regarding the clarification of biodiversity impacts from the project and appropriate offsets for the loss of biodiversity values.

In summary, the respondent(s) raised the following issues:

- Appendix F Terrestrial Flora and Fauna contains a commitment to develop a biodiversity offset package within 12 months of project approval in accordance with the biodiversity offset strategy. This commitment should be undertaken in consultation with the OEH (OEH) and Fisheries NSW and made a condition of approval for the project.
- Appendix F Terrestrial Flora and Fauna outlines the entire biodiversity impacts of the project. Are these impacts being taken into consideration for the calculation of the offset required for this project? Is the proposed approach consistent with RMS' 'Guideline for Biodiversity Offsets', November 2011 ('RMS Guideline') which states (Step 1, Table 1) that offsets for clearing would be considered where works involving more than five hectares of native vegetation clearing, containing potential habitat for threatened species but not involving native vegetation of 'high conservation value'.
- The indirect impacts on the 26.7 hectares of native vegetation should be quantified, included in the offset requirement and be appropriately mitigated.
- The project is resulting in the substantial loss and disturbance of native vegetation, with the environmental assessment stating that 57.1 hectares of native vegetation would be potentially directly or indirectly impacted by the project. The loss of riparian vegetation is of particular note.
- The environmental assessment indicates only impacts on the EEC River Flat Forest would be offset, as these are the only impacts considered as residual. There are, however other areas of native vegetation (27.5 hectares) which provide habitat for threatened species that are not being offset. No justification for this approach is provided in the environmental assessment.

With reference to RMS' 'Biodiversity Offsets Guideline' (November 2011) and in particular Table 1 titled "When should offsets be considered?" the 27.5 hectares conforms to Row 4 of Table 1 and should be offset to be consistent with RMS guidelines. The calculation of the offset required (as set out in Step 2 of RMS guideline) should therefore include all 30.4 hectares of directly impacted vegetation.

- More detail should be provided regarding offsetting residual impacts and confirmation these are specifically linked to the steps set out in RMS' 'Biodiversity Offsets Guideline'. The environmental assessment should include a clear commitment to follow these steps as part of an agreed biodiversity offset package, to be negotiated and agreed with OEH. In particular, the section "offsetting residual impacts" should include:
 - A concise statement that clearly sets out that the direct "residual impacts" (ie unavoidable clearing that cannot be avoided or minimised) include 30.4 hectares of native vegetation (including one endangered ecological communities and five other vegetation types); and, that indirect impacts be quantified and also included in Step 1.

- A commitment to calculating an offset requirement based on this loss of vegetation and habitat, consistent with Step 2. This would necessitate use of the BioBanking assessment methodology (BBAM).
 - A commitment to meeting this offset requirement through the identification of appropriate offset sites, consistent with Step 3. This should include a commitment to ensure that all offset areas are protected in perpetuity.
 - The management actions required, consistent with Step 4 agreed with OEH as part of the biodiversity offset package.
 - The steps required to implement the agreed offset actions, consistent with Step 5.
 - A commitment to a post construction review that confirms the extent of clearing was not greater than predicted. If clearing is greater, then the package should demonstrate how the offset was modified and increased to the value of the actual habitat lost.
- Of the 30.4 hectares to be directly impacted, 27.5 hectares comprises other vegetation types that provide either foraging, roosting or breeding habitat for nine threatened species, of which seven species are considered to be hollow dependent. Some species (eg Green and Golden Bell Frog) would also rely on grassland and wetland habitats within the project footprint. A stag watching and a detailed hollow bearing tree survey has not been undertaken, however, vegetation including large trees with hollows would be cleared during construction and hollow dependent fauna were identified during the assessment. Threatened species' habitat in the form of hollow bearing trees would be removed from the project and these areas should be offset. The placement of nest boxes is not considered to be an adequate offset for the loss of hollow bearing trees.
 - Table 10-1 of the environmental assessment identifies a key action that 'a simulated BioBanking assessment undertaken for the project determined that native vegetation removed would be offset at an average ratio of 5.3:1 in order to achieve the 'improve or maintain standard'. This is essential in order to provide aeration and maintain water quality.
 - The project impacts on trees that span from the edge of Broughton Creek and continue over the existing highway to the escarpment. These trees provide a good balance in terms of carbon sequestration and offset. The removal of part of this resource increases the negative environmental effects of this proposal and appropriate compensation should be made.
 - Further attention should be given to the preservation of the native vegetation and consideration to vegetation offsets being preferentially located in the Berry corridor.

Response

Field and desktop surveys and assessments have followed the 'Draft Guidelines for Threatened Species Assessments' (DEC and DPI, 2005) for projects determined according to the former Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). 'Step 3 Evaluation of impacts' from the DEC and DPI (2005) guidelines involves identifying the magnitude and extent of impacts and assessing the significance of the impacts as related to the conservation importance of threatened biodiversity and habitats likely to be affected. Appendix 3 of the DEC and DPI (2005) guidelines provides assessment criteria to determine potential effects of the proposal on threatened species, populations or ecological communities, or their habitats to guide the evaluation of impacts. The subject threatened species and ecological communities have been assessed by these criteria in Appendix G to Appendix F - *Technical Paper: Terrestrial Flora and Fauna* of the environmental assessment. In summary, the assessments using these criteria concluded that the project would be likely to have minor impacts on threatened flora and fauna species as listed on the *Threatened Species Conservation Act 1995* (TSC Act), provided recommended mitigation measures are implemented (page F 84).

'Step 4 Avoid, mitigate and then offset' of the DEC and DPI (2005) requires the description and justification of measures to mitigate any adverse effects including consideration of measures to avoid or minimise the impacts. Where measures to avoid and mitigate impacts to threatened species are not possible, then offset strategies need to be considered. These may include offsite or local area proposals that contribute to the long-term conservation of the threatened species. The extent to which measures avoid, mitigate or offset impacts upon threatened species must reflect the conservation value of the feature including its formal status as a critically endangered, endangered or vulnerable species, population or ecological community.

'Step 5 Key thresholds' of the DEC and DPI (2005) guidelines sets out a number of assessment thresholds which need to be addressed to justify the impacts of the project on threatened species, populations and ecological communities. The key thresholds are:

- Whether or not the project, including actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts, would maintain or improve biodiversity values.
- Whether or not the project is likely to reduce the long-term viability of a local population of the species, population or ecological community.
- Whether or not the project is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction.
- Whether or not the project would adversely affect critical habitat.

Section 6 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment follows the required assessment guidelines for the project as specified in the DGRs. The RMS Guidelines for Biodiversity Offsets (2011) were not available when the development of the Offset Strategy was commenced. Section 6.1.5 (page F85) identifies that some biodiversity values of the locality would be lost. It is expected that 2.7 hectares of the EEC River-flat eucalypt forest and 27.5 hectares of non-threatened plant communities would be subject to direct impacts. These impacts would be minimised through the following mitigation measures:

- Avoidance of significant habitat features, where possible.
- Provision of fauna under and over passes.
- Rehabilitation of intact native vegetation that would be disturbed by the project.
- Revegetation of disturbed areas to improve habitat connectivity.

A biodiversity offset package would be prepared and implemented to compensate for the unavoidable loss and residual impacts to the EEC, River-flat eucalypt forest. Following the implementation of the offset package and the mitigation measures detailed in the environmental, it is considered there would likely be a maintained or improved biodiversity outcome in the context of the DEC and DPI (2005) guidelines.

Compensation for the unavoidable loss of riparian habitat, changes to the natural flow regime and lateral connectivity caused by the project would be addressed by the offsets outlined below and detailed in the biodiversity offset strategy for the project (refer to Appendix E to Appendix F - *Technical Paper: Terrestrial Flora and Fauna* of the environmental assessment). Section 5.2 of the biodiversity offset strategy presents two possible offset actions to achieve an improved or maintained biodiversity outcome for the region as a result of the project. Action 1 would involve revegetation and rehabilitation of riparian vegetation in strategic locations. Action 2 would use an appropriate legal instrument to acquire and/or secure native vegetation to ensure that the land is managed for conservation.

It is considered that Action 1 would best achieve the objectives of the biodiversity offset strategy. Section 5.2.1 of the strategy provides a strategic level description of the methodology for the implementation of Action 1. The main aim in the delivery of Action 1 would be to enhance native riparian vegetation connectivity at a locality scale with an emphasis on restoration or enhancement of riparian and aquatic habitats. It would focus on River flat eucalypt forest, other coastal floodplain EECs or closely associated non threatened plant communities. Action 1 would consider the following:

- Restoration of riparian habitat to Category 1 level creeks on RMS owned land to enhance connectivity for terrestrial and aquatic habitats.
- Ongoing financial support for existing riparian restoration works within the region, such as programs run by Southern Rivers CMA, Shoalhaven City Council or the NSW Trade and Investment (DTIRIS).
- The area of restoration would be guided by a simulated assessment of the project impacts and potential offsets using the BBAM with a minimum offset ratio of 2:1 for riparian vegetation to meet DTIRIS policy requirements for the compensation for direct loss of aquatic or riparian habitat (Smith and Pollard 1999).

Section 4 of the 'Guideline for Biodiversity Offsets' (RMS, 2011) provides a decision pathway to determine if *'offsets should be considered for a project assessed under Part 5 of the EP&A Act.'* While the project would be assessed under Part 3A of the EP&A Act, the biodiversity offset strategy for the project generally mirrors the intent of RMS biodiversity offset guidelines. The guidelines provide a number of steps for implementation, including calculating the required biodiversity offset. As recommended by the guidelines, a simulated BioBanking assessment was undertaken for the project using the Biobanking calculator. The assessment determined that residual impacts to River-flat eucalypt forest would need to be offset at an average ratio of 5.3:1 in order to achieve the improve or maintain standard. The use of the BioBanking calculator has accounted for the estimated area of direct impacts to each native plant community, including non-threatened native plant communities and one EEC and was aligned to vegetation types for the Southern Rivers CMA from *The Vegetation Types Database* (OEH, 2012). The report presented in Appendix F - *Technical paper: Terrestrial Flora and Fauna*, generally mirrors the intent of the RMS biodiversity guidelines including consideration of and reference to the content of the five main steps.

As part of the Biodiversity Offset Package RMS would adhere to the RMS Guideline for Biodiversity Offset (2011), RMS would provide biodiversity offsets, where there is a loss of biodiversity above the thresholds identified in the guideline. As stated in the biodiversity offset strategy, the biodiversity offset package would be prepared in consultation with the NSW OEH and DTIRIS and would include details of the final suite of measures to be implemented addressing both terrestrial and aquatic biodiversity. RMS would review the current simulated BioBanking assessment prior to further discussions with OEH regarding offsets requirements.

2.10.4 Riparian corridors / wildlife crossings / temporary crossings

Riparian and wildlife corridors

Stakeholder identification number(s)

69, 145, 147, 197, 215, 216 and Department of Primary Industries

Issue description

Submissions relating to riparian and wildlife corridors raised issues regarding broad scale wildlife corridors and restoration and long-term management of riparian vegetation.

In summary, the respondent(s) raised the following issues:

- The Department of the Environment and Planning's "South Coast Regional Strategy" Map 9 "Biodiversity and Coastal Assets" shows the Berry wildlife corridor crossing the highway alignment between chainage 12200 and chainage 13300.
The Southern Rivers CMA identifies the corridor as crossing the alignment from chainage 11100 to chainage 13300. These agencies' validation of the wildlife corridor should be included in Section 7.3 of the environmental assessment, Figure 7-9.
- Figure 7-9 of the environmental assessment shows an unofficial area linking Broughton Creek to Tindalls Lane at chainage 13950 to chainage 14250. This however does not coincide with existing forest, (see Appendix F Terrestrial Flora and Fauna, Figure 3.1). This is a serious omission of a significant environmental classification of the landscape in the area of the alignment. The environmental assessment does not acknowledge the existence of the Berry corridor (from escarpment to sea). The project would impact on this significant flora and fauna corridor and the corridor's connectivity to Barren Grounds is threatened by the project. The project would impact on the trees that span from the edge of Broughton Creek and continue over the existing highway to the escarpment. This significant natural resource should be preserved for future generations and for the health and habitat of local wildlife.
- Riparian areas at the temporary crossings should be rehabilitated with fully structured local native vegetation (trees, shrubs and groundcover). Removal of the temporary crossings needs to ensure the bed and banks of the watercourses would be stable in the long-term. It is recommended these watercourses are monitored pre-construction and post-construction to ensure removal of the crossings does not create bed and bank stability issues. The monitoring should continue until the rehabilitated crossing sites are identified as stable by an independent certifier.
- Section 4.4.7 of the environmental assessment notes the sedimentation detention basins would be located close to natural watercourses. It is recommended the basins avoid remnant native riparian vegetation and that dry basins be fully vegetated with locally indigenous plant species (trees, shrubs and groundcover species).

Response

The wildlife corridor shown in Map 9 of the *South Coast Regional Strategy* (Department of Planning, 2007) does appear to cross the highway alignment between chainage 12200 and chainage 13300. However, as per page 14 of this strategy (Department of Planning, 2007) these corridors need to be verified with the *South Coast Regional Conservation Plan* (DECCW, 2010). GIS data obtained from the OEH indicates that the majority of wildlife corridors identified in Figure 7-9 of the environmental assessment and Figure 3.4 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment align with or are greater in extent than corridors identified in Map 15 of the *South Coast Regional Conservation Plan* (DECCW, 2010). It is acknowledged that the *South Coast Regional Conservation Plan* also includes a large corridor between chainage 12200 and chainage 13300. This corridor, which appears to provide a link between remnant vegetation north of Tomlins Road with Broughton Creek and south to Harley Hill, passes largely through cleared land and does not align with areas of remnant vegetation. In RMS' opinion this area is unlikely to be currently operating as a wildlife movement corridor, other than as a direct link for bird species between the areas identified above. As stated on page F48 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment, corridors are retained and/or restored systems of habitat which enhance connectivity of wildlife populations.

It is RMS' opinion that Figure 7-9 of the environmental assessment and Figure 3.4 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment reflect the wildlife corridors within the study area that currently support potential for regular wildlife movement and enhance the connectivity of wildlife populations in the local area. Conversely the corridors identified in the draft *Southern Rivers Catchment Action Plan 2013 - 2023* (Southern Rivers CMA, 2012) mapping are stated as representing areas of interest within which efforts towards landscape restoration and improved connectivity become increasingly more worthwhile as protected vegetation remnants are accumulated in the identified areas.

These corridors, including the corridor mapped between chainage 11100 and chainage 13300, therefore reflect priority areas for revegetation rather than currently operating wildlife corridors. As stated on page F-50 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment, the focus of the impact assessment was on connectivity impacts associated with the project, particularly areas of remnant vegetation.

The unofficial corridor linking Broughton Creek with Tindalls Lane at chainage 13950 (identified as Local – Unofficial in Figure 7-9 of the environmental assessment and Figure 3.4 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna*) provides a link between vegetated areas along Broughton Creek to the south and forested areas adjacent to Tindalls Lane in the north. Scattered remnant vegetation is present and provides some level of connectivity between these areas. It is RMS' opinion that the identification of this area as a wildlife corridor is appropriate as it provides functional connectivity between two areas of existing forest. Potential impacts to this wildlife corridor have been mitigated through the installation of three rope bridges underneath the bridge spanning Broughton Mill Creek and Bundewallah Creek.

The environmental assessment commits to further studies, assessments and plans to address the maintained or improved standard. Long-term biodiversity management has also been committed to through the development of a biodiversity offset package and vegetation management plan. The biodiversity offset strategy acknowledges the priority areas defined by the Southern Rivers CMA mapping and the value of this in further development of a biodiversity offset package (Appendix E to Appendix F - *Technical Paper: Terrestrial Flora and Fauna* of the environmental assessment). Further, the biodiversity offset strategy concludes that regardless of the final preferred offset action, the overall decision making framework should be guided by:

- Location of the offset should be within a 30 kilometre radius of the project.
- Enhancement of native riparian vegetation connectivity at a locality scale.

The preparation of the vegetation management plan would be guided by best practice methods for collection and establishment of local provenance planting stock, a planting program, planting maintenance and monitoring. The vegetation management plan would be prepared with reference to Guide 3: Re-establishment of native vegetation of RMS' 'Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects' (RTA, 2011). Guide 3 (RTA, 2011) includes the following objectives:

- Ensure revegetation is representative of the natural ecological community of the area.
- Focus on vegetation that provides habitat and fauna connectivity.

Detailed planting schedules would accompany these documents including inventories of appropriate locally occurring native species and layouts. Planting schemes would be designed in accordance with the final site specific road operation and environmental conditions following completion of the major engineering and construction works including factors such as shade and moisture.

Wildlife crossings

Stakeholder identification number(s)

3, 78, 161, 192, 210, Kiama Municipal Council and Department of Primary Industries

Issue description

Submissions relating to wildlife crossings raised issues regarding the impacts to existing corridors, the location and design of temporary creek crossings, the location of wildlife crossings and the removal of the proposed land bridge at Toolijooa Ridge.

In summary, the respondent(s) raised the following issues:

- Fauna crossings and all supporting structures should be incorporated into the highway reserve and maintained by RMS.
- Support for the use of bridges to cross Broughton Creek, Broughton Mill Creek, Bundewallah Creek and Connolly Creek. In particular, the use of bridges at Broughton Creek, given the riparian corridor provides biodiversity linkages.
- The design requires further development to:
 - Ensure that boundary fencing acts as a guide for fauna to access the nearest wildlife crossing.
 - Provide extra crossing options in the middle of very long sections of agricultural land.
- The fauna crossings proposed for the project have been well placed and thought out. Crossings along the creeks are more likely to be effective than those on the ridge line. 'Glenvale' is perhaps the largest privately owned area of bushland affected by the upgrade and the ongoing maintenance of wildlife corridors through the property and remnant bush on adjacent properties to the forested plateaus above Foxground is important.
- For the last 20 years a property owner has been restoring some of the natural connection between wildlife corridors on this property and neighbouring property. The vision is to provide a lateral connection of vegetation to the existing highway from the escarpment to Broughton Creek.
Key to this corridor are the trees on the north end of the property adjacent to the road. Due consideration should be given to the 'escarpment to creek corridor' of which the property is a part.
- Temporary creek crossings should be located immediately downstream of the proposed bridge alignments and within the existing footprint to minimise the impacts on riparian vegetation. It is unclear if a geomorphological assessment was undertaken to identify the suitability of the crossing locations to minimise impacts on stream geomorphology and bed and bank stability. The temporary crossings should minimise:
 - Potential impacts on stream geomorphology, bed and bank stability, and remnant riparian vegetation.
 - Impeding the bankful flow.
 - Sedimentation impacts during construction and decommissioning of the crossings.The geomorphology of the watercourses should be assessed to minimise impacts on bed and bank stability, and consideration should be given to the potential risk of the crossings failing during their time of use, resulting in sedimentation and water quality impacts in the downstream receiving environment.
- Is a fauna crossing for wildlife, including echidnas, kangaroos and wallabies to be provided under the highway near the second Broughton Creek bridge crossing during and after construction?

- The previous proposal for a wildlife 'land bridge' across the Toolijooa Ridge cutting has been deleted in favour of 'rope crossings' and 'wildlife underpasses'. The adequacy of these proposals in maintaining wildlife corridors is questioned.

Response

Agricultural land is likely to support a limited range of common and opportunistic species. When compared to areas of remnant vegetation the diversity and abundance of native animals is likely to be limited. The potential impacts to native fauna are greater in areas of remnant vegetation and for this reason mitigation measures have been focused in areas with the greatest potential impact. Veage and Jones (2007) recommend that fauna crossing structures be located in areas where regular crossing and / or migration pathways are identified. This approach is supported by research such as Roger and Ramp (2008) which supports the use of habitat variables in the prediction of animal – vehicle collisions, and thus the mitigation of such impacts.

A rope bridge over and under the bridge at the second crossing of Broughton Creek is proposed (see Figure 3.5 page F76 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment).

The inclusion of a land bridge across Toolijooa Ridge was considered during the development of the preferred option. The current mitigation measures were developed in consultation with the OEH and it was deemed that the combination of proposed mitigation measures (underpasses and ropes bridges) in conjunction with strategic revegetation would achieve a better long-term outcome for biodiversity in the locality. See Sections 5.3 of Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment for further details.

The selection of locations for temporary creek crossing included locations that would minimise impacts on riparian vegetation, minimise bank scour or erosion and potential for blockage of fish passage (refer to page 53 of Appendix G – *Technical Paper: Aquatic Ecology and Water Quality Management* to the environmental assessment). For temporary crossings, construction pads would be placed in accordance with the soil and erosion control plan for the project in order to minimise potential impacts on natural flow regimes, stream geomorphology, in-stream habitat and bed and bank stability. To date, no geomorphological assessments have been undertaken as part of the assessment for temporary creek crossing locations, however geomorphological investigations would be undertaken during the detailed design and construction phase to inform appropriate preventative measures. Appropriate measures that consider possible failing of crossing structures would be investigated including bank stabilisation and soil retention techniques where works are proposed within the bed and banks of waterways. Any preventative measures employed would be undertaken in accordance with the soil and erosion control plan prepared for the works and would be consistent with standards outlined in *Managing Urban Stormwater – Soils and Construction Volume 2D – Main Road Construction* (DECCW, 2008).

The environmental assessment recommends mitigation measures and the preparation of a vegetation management plan to minimise and manage impacts to terrestrial biodiversity. Offsetting residual impacts to native vegetation and flora and fauna habitats have also been recommended. The details of the vegetation management plan would be guided by best practice restoration including reference to Guide 3: Re-establishment of native vegetation 'Biodiversity Guidelines: Protecting and managing biodiversity on RMS projects' (RTA, 2011). Guide 3 includes the following objectives:

- Ensure revegetation is representative of the natural ecological community of the area.
- Focus on vegetation that provides habitat and fauna connectivity.

Guidelines and policy

Stakeholder identification number(s)

216 and Department of Primary Industries

Issue description

Submissions relating to guidelines and policy raised issues regarding the inclusion of recent regional and local scale strategic studies.

In summary, the respondent(s) raised the following issues:

- High level guidance on aspects of corridors and the protection of biodiversity assets provided in the:
 - South Coast Regional Strategy;
 - South Coast Regional Conservation Plan Dec 2010; and
 - Berry Town Creek flood study, commissioned by Shoalhaven City Council should be considered in the review of the project.
- Any project approval should require the design and construction of all new or upgraded temporary and permanent road crossings to be undertaken in accordance with NSW Fisheries Policy and 'Guidelines for Fish Friendly Waterway Crossings' (2004) and 'Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings' (2004).

Response

Appendix F - *Technical Paper: Terrestrial Flora and Fauna* to the environmental assessment has reviewed regional and local strategic documents relevant to scope of the environmental assessment including the content and spatial data of the *South Coast Regional Conservation Plan* (DECCW, 2010) as referenced throughout Appendix F.

The *Broughton Creek Floodplain Risk Management Plan* (Cardno, 2012) was reviewed for any relevant content to the terrestrial biodiversity assessments. None of the content including discussion of Town Creek was considered relevant to the current terrestrial biodiversity assessment.

The recommended crossing requirements that conform to relevant NSW Fisheries policies and guidelines were assessed at each site and summarised in Table 3.4 (Appendix G – *Technical Paper Aquatic Ecology and Water Quality Management*, page 37). These assessments have been considered in the overall design and would be considered in the detailed design and construction phases.

2.10.5 Town Creek diversion (flora / fauna)

Stakeholder identification number(s)

200 and 254

Issue description

Submissions relating to the Town Creek diversion and consequent impacts to flora and fauna raised issues regarding the aquatic and terrestrial biodiversity values of Town Creek.

In summary, the respondent(s) raised the following issues:

- The diversion of Town Creek would have detrimental ecological consequences. The creek has the potential to be an attractive part of the Berry township, however, if it is diverted, the flow volumes would drastically reduce, turning Town Creek into a storm water drain.
- The NSW Fisheries should be consulted during the detailed design of the Town Creek diversion including design of the revegetation strategy. This should be made a condition of approval for the project.
- Appendix F Terrestrial Flora and Fauna, Section 5.1 recommends maintaining the flow along the current Town Creek to mitigate impacts on riparian vegetation. It is unclear if flow would be maintained. The environmental assessment notes 'the overall flow speed and volume would be reduced' along the existing Town Creek channel and the diversion would potentially remove wildlife connectivity along the existing creek. The environmental assessment indicates an alternative corridor would be provided along the Town Creek diversion channel and Bundewallah Creek with the planting and rehabilitation of appropriate riparian vegetation. Consideration should be given to maintaining flow along the current Town Creek alignment to mitigate impacts on riparian vegetation. The riparian corridor along either side of the diversion channel should be vegetated with local native plant species to improve biodiversity and stabilise and reduce the risk of erosion.
- Section 4.2.11 of the environmental assessment notes the Town Creek diversion channel would include a meander as part of the design which would be grassed and planted with native vegetation. The diversion channel should aim to have:
 - A changed form and an alignment that replicates natural form and geomorphic features (eg pools, riffles, bed controls, vegetated riparian zone). It should have a stream shape, not a straight channel.
 - A cross-section with appropriate channel definition (ie defined bed and banks incorporating a low-flow channel).
 - The channel fenced to permanently exclude stock.
 - Riparian zone rehabilitation that incorporates vegetation establishment/enhancement.
 - A management proposal for, for example, the next ten years.
 - Crossing and access points for landholders and ongoing management.

Section 4.2.11 of the environmental assessment indicates the gradients of the Town Creek channel would be between 2:1 and 10:1. A 2:1 gradient is likely to require rock. Rock should not be used as a design feature along the full length of the diversion channel unless there is inadequate space. The diversion channel should be consistent with the mitigation measure included in Appendix G Aquatic Ecology and Water Quality Treatment and should aim to mimic a natural creek in alignment, depth, creek bed formation and bank configuration.

Response

As detailed in Section 4.2.1 (page G71) of Appendix G – *Technical Paper Aquatic Ecology and Water Quality Management* to the environmental assessment, Town Creek is a Class 4 waterway and is not considered important fish habitat. The creek is extremely degraded by agricultural development in the upper catchment and residential development downstream of the upgrade. Section 7.4.3 of the environmental assessment states that residual flows would be reduced by approximately one third at the confluence where Town Creek joins Broughton Mill Creek. South of the diversion, Town Creek would continue to receive inputs from surface water as well as minor contributions from groundwater. It is anticipated that the residual water levels would be sufficient to support the wetland species planted in the riparian zone in this reach of the creek. Town Creek is a naturally ephemeral creek and as such the alterations in connectivity as well as a reduction in overall flows are expected to have minimal impact on aquatic ecology and water quality compared to its current condition. Notwithstanding this, RMS would investigate the potential for diversion of water at appropriate water quality levels into Town Creek during the final design stages of the project.

The final design of the Town Creek diversion channel, including configuration of channels and bank gradients would consider both guidelines for waterways, potential to impact on downstream waterways, safety and land use requirements. Following consultation with the landowner (who would retain ownership of the land surrounding the realigned waterway and would ultimately be responsible for the ongoing maintenance of Town Creek where it is diverted), RMS propose to construct the realignment in a way that would allow for appropriate safe ongoing maintenance in line with standard agricultural practices, while maintaining or improving the existing water quality in this part of Town Creek. The creek would be designed so that the landowner can continue using the surrounding land in its existing capacity. This would involve the construction of a straight channel through the property to reduce the amount of land that is impacted and the gradients for the broader channel bank/batter slopes would be determined to suit grazing and access requirements with due consideration of hydraulic flow requirements to minimise the potential for erosion to occur and to ensure safety. RMS would consult with the landowner prior to finalising the design for the realigned length of Town Creek.

With mitigation processes in place, the slight increase (rather than decrease) in flow regimes at Broughton Mill, Bundewallah and Connollys creeks as a result of the diversion of Town Creek, is expected to have minor effects on aquatic ecology and water quality in those creeks (refer to Appendix H – *Technical Paper: Surface Water, Groundwater and Flooding* [pg. 18] of the environmental assessment).

Town Creek would be included as part of the vegetation management plan. Restoration works in Town Creek would be primarily guided by the overall aim of the Town Creek diversion to alleviate flooding and integrate with the final design features including measures to maintain the current ecological function of the creek. Further details are available in **Section 2.12.1** of this report

2.11 Surface water and groundwater

2.11.1 Construction water quality treatment / waterways

Stakeholder identification number(s)

100, 169, 170, 172, NSW Department of Primary Industries and NSW Environmental Protection Authority

Issue description

Submissions relating to construction water quality treatment/ waterways raised issues regarding compliance with legislation, commitments to monitor and manage waterway stability, documentation of plans and management of runoff.

In summary, the respondent(s) raised the following issues:

- The stability of waterways should be monitored where works are proposed within the bed and banks of waterways. Watercourse stability monitoring should continue until the relevant watercourses are identified as stable by an independent certifier.
- The draft statement of commitments includes commitments to minimise impacts on water quality and aquatic ecology and alterations to natural flow regimes. The statement of commitments should also include a commitment to minimise impacts on stream geomorphology and bed and bank stability.
- As a condition of approval of the project, RMS must comply with Section 120 of the *Protection of the Environment Operations Act 1997* which includes the application for an Environment Protection Licence. This licence would include a condition disallowing the discharge of any pollutants from the construction of the project to surface waters and/or groundwater.
- As a condition of approval of the project, RMS should prepare a detailed surface water and groundwater monitoring plan. This plan is to be prepared by an appropriately qualified and experienced person(s) in consultation with the Environmental Protection Authority (EPA). The plan would guide EPA in determining and placing surface water and groundwater monitoring requirements as conditions of any Environment Protection Licence that may be applied to the project.
- Broughton Village properties rely on water pumped directly from Broughton Creek. Earthworks associated with the project would potentially impact the water quality. Query regarding how water quality be maintained during construction of the project.
- Water harvested by properties in Broughton Village by way of spring / rain fed dam and tanks may be affected during construction.

Response

Environmental management measures to reduce the generation of pollutants and minimise the impacts on receiving waters are described in detail in Section 2.3.1 of Appendix H – *Technical Paper, Surface water, Groundwater and Flooding* to the environmental assessment.

The project would be carried out in accordance with the NSW Office of Water publications, 'Guidelines for Instream Works on Waterfront Land', 'Controlled Activities – Guidelines for Outlet Structures' and 'Guidelines for Watercourse Crossings on Waterfront Land'. These guidelines would be particularly relevant for the Broughton Creek bridge crossings, the bridge at Berry and any water quality treatment basins. Monitoring and maintenance periods for works within the bed and banks of waterways would be determined in accordance with these guidelines during the construction phase of the project.

RMS acknowledges that some properties in Broughton Village use water from Broughton Creek together with rainwater harvested from rooftops as their sole source of water supply.

The potential for airborne particle pollution to impact residences is assessed in Appendix N – *Technical Paper, Air Quality* to the environmental assessment. The assessment did not identify risks to rainwater quality either due to the construction or operation of the highway. However, RMS would ensure an appropriate source of potable water would be available to residents in the event that current water supply was interrupted by the project. These measures would be implemented in consultation with the affected parties.

Water quality in Broughton Creek would be monitored in accordance with Appendix G – *Technical Paper, Aquatic Ecology and Water Quality Management*, specifically in internal Appendix F – *Outline of surface water quality monitoring program*. The final monitoring program would be developed in consultation with potentially affected parties. Should the monitoring program identify water quality issues that may affect water supply, RMS would ensure an appropriate source of potable water would be available to residents in the event that current water supply was interrupted by the project. These measures would be implemented in consultation with the affected parties.

As detailed in Section 4.3.3 of Appendix H – *Technical Paper; Surface Water, Groundwater and Flooding*, best practice management measures would be implemented during construction and rehabilitation, in accordance with applicable RMS specifications, and Landcom (2004), *Managing Urban Stormwater – Volume 1 (Soils and Construction)*, and DECC (2008) *Volume 2D – Main Road Construction*.

RMS does not agree that the proposed licencing provision (dot point 3, sentence 2 above) is appropriate. The discharge of any stormwater pollution from the construction of the project would be managed in accordance with the 'Managing Urban Stormwater Guidelines' (Landcom 2004), with specific reference to 'Volume 2D, Main Road Construction' (DECC 2008). This is an industry best practice approach adopted on all RMS road projects in NSW; however it cannot achieve zero discharge of any pollutants in all circumstances.

Prior to the commencement of construction, the following plans would be prepared as part of the project construction environmental management plan:

- Soil and water management plan (including an erosion and sediment control plan), detailed in Section 7.4.4, page 298 of the environmental assessment.
- Water quality monitoring and management plan detailed in Section 7.3.4, page 277 of the environmental assessment.
- Groundwater monitoring and management plan detailed in Section 7.4.4, page 299 of the environmental assessment.

These plans would take into account the detailed design of the project, the proposed construction staging and work methodology and the content of the environmental assessment and approval conditions. During the preparation and ongoing monitoring of these plans, RMS and the selected constructor would consult with stakeholders to address any issues that may require temporary local mitigation of a minor nature.

2.11.2 Construction Town Creek diversion (water quality)

Stakeholder identification number(s)

NSW Department of Primary Industries

Issue description

Submissions relating to water quality during construction of the Town Creek diversion raised issues regarding compliance with agency guidelines and commitments to monitor and manage waterway stability.

In summary, the respondent(s) raised the following issues:

- A monitoring / maintenance period should continue until the Town Creek diversion channel is identified as stable by an independent, suitably qualified certifier.
- Bundewallah Creek (downstream of where the diversion channel enters the creek) should be monitored pre-construction and post-construction. Watercourse stability monitoring should continue until the relevant watercourses are identified as stable by an independent suitably qualified certifier.

Response

In accordance with the NSW Office of Water publication, 'Guidelines for Instream Works on Waterfront Land', RMS would monitor and maintain the Town Creek diversion until considered to be stable by a suitably qualified independent person/authority.

RMS would engage an independent, suitably qualified soil conservationist to conduct rain-event based inspections, at average frequency of three-monthly inspections, for a period of two years following completion of the diversion construction or until agreed completion standards have been met.

The detail of the monitoring plan would be confirmed based on an evaluation, during construction, of the risks and potential failure mechanisms. This would be carried out during construction so as to take into account all relevant site-specific factors. The outcome of this evaluation may alter the proposed frequency or manner in which monitoring is carried out.

2.11.3 Construction water supply

Stakeholder identification number(s)

NSW Department of Primary Industries

Issue description

Submissions relating to water supply for construction raised issues regarding the source of water to be used and the order in which different water sources would be prioritised.

In summary, the respondent(s) raised the following issues:

- Section 4.4.6 of the environmental assessment notes that water sources would include surface water sourced from watercourses and groundwater sourced from dewatering, but later notes the extraction of water (from watercourses or groundwater sources) is not currently proposed. Section 7.4.3 of the environmental assessment report implies that surface water extraction from watercourses may be required. Further clarification should be provided in relation to whether surface water and groundwater sources are required for construction.

Response

Determination of the supply source for construction water purposes is dependent on a number of climatic, seasonal and weather conditions, as well as construction methodologies, staging and timing. To provide guidance whilst acknowledging this uncertainty, the following hierarchy of preference for water supply options is proposed (page 105 of the environmental assessment):

- Recycled effluent from the tertiary [sewage] treatment plant at Gerringong Gerroa and/or Berry.
- Surface water, sourced from on-site detention [sedimentation] basins.
- Surface water, sourced from water courses where it would not be detrimental to the aquatic environment of the waterway [or existing usage rights].
- Potable water, supplied by Shoalhaven Water.
- Groundwater, [for example] sourced from de-watering that may be required at the Toolijooa Ridge cutting.

It is not anticipated at this stage, but should surface water from watercourses or groundwater be required under adverse conditions, a site specific impact assessment would be carried out as part of the construction environmental management plan. This assessment would include consultation with potentially affected stakeholders and the NSW Office of Water.

2.11.4 Construction groundwater (bores/ quality/ drawdown/ dewatering)

Stakeholder identification number(s)

NSW Department of Primary Industries

Issue description

Submissions relating to groundwater impacts during construction raised issues regarding regulation and licencing, requests for involvement in the groundwater management and monitoring program, and a request for a commitment to mitigate groundwater impacts, including any changes due to acid sulfate soils.

In summary, the respondent(s) raised the following issues:

- The project falls within the mapped extent of the Sydney Basin South Groundwater Source as identified within the 'Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011'. However, RMS is exempt from requiring an access licence to take groundwater from that source under Part 1 (access licence exemptions) of Schedule 5 of the Water Management (General) Regulation 2011, which identifies the authority as follows, 'A roads authority (within the meaning of the *Roads Act 1993*) in relation to water required for road construction and road maintenance'.

The project is also exempt from consideration under the NSW 'Aquifer Interference Policy'.

- A groundwater management plan and a detailed groundwater monitoring program should be developed for the project to the satisfaction of the NSW Office of Water.

- Conditions of approval for the project should include a commitment to mitigate any impacts on high priority groundwater dependent ecosystems, water supply bores or groundwater quality changes from acid sulfate soils during the project. The groundwater management plan should include the identification of, appropriate response management procedures and mitigation measures for the protection of:
 - High priority groundwater dependent ecosystem listed in Schedule 4 of the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011.
 - Water supply bores.
 - Groundwater quality impacts from the disturbance of actual or potential acid sulfate soils.

Response

A groundwater management plan would be developed to the satisfaction of NSW Office of Water, detailing the mitigation measures to be implemented to minimise potential adverse impacts to groundwater quality and the receiving environments during construction. The groundwater management plan would be developed by the construction contractor in consultation with a hydrogeological consultant to the satisfaction of NSW Office of Water. Temporary dewatering would be managed through a work method statement prepared in accordance with RMS technical guidelines for the 'Environmental Management of Construction Site Dewatering' (RTA, 2011).

The groundwater dependent ecosystem listed in Schedule 4 of the 'Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources' 2011 near the project area is Coomonderry Swamp. As outlined in Appendix G – *Technical Paper: Aquatic Ecology and Water Quality Management* of the environmental assessment, Coomonderry Swamp is a 670 hectare swamp that is fed by surface and groundwater from eastern slopes of Harley Hill, Mueyan Hill and Coolangatta Mountain, outside the project catchment. As groundwater and surface water inflows originate from outside the project catchment area, the swamp would not be impacted by works associated with the project. Management measures during construction to minimise impacts on receiving waters would be managed by a soil and water management plan as outlined in Section 2.3.1 of the environmental assessment.

Mapping undertaken by the NSW Department of Land and Water Conservation indicates that the risk of encountering potential acid sulfate soils is unlikely within the project. Earthworks/dewatering would be designed to minimise the risk of mobilising acid sulfate soils/groundwater and in the event of acid sulfate soils being intersected, earthworks would be redesigned where possible to avoid/minimise impacts. Management of potential acid sulfate soils and groundwater would be included in the groundwater management plan (and associated acid sulfate soil management plan if required). This would include mitigation measures such as storage and neutralisation of soil and groundwater and/or strategic reburial of acid sulfate soil impacted material below the watertable. Mitigation measures in response to these impacts during design and construction are summarised in Sections 5.1.1 and 5.1.2 of Appendix G – *Technical Paper: Aquatic Ecology and Water Quality Management* of the environmental assessment.

It is recognised that water supply bores are present in the immediate vicinity of the project area and some of these bores are likely to provide stock or domestic supplies for land holders. Works associated with the project may impact the yield of water bores by locally lowering the watertable. A review of the NSW Office of Water groundwater database conducted in February 2010 (Section 7.3 of the environmental assessment) identified 16 registered bores within 500 metres of the project. Since February 2010, additional water supply bores may have been registered with the NSW Office of Water. The watertable may be impacted by temporary dewatering during construction or drainage associated with road cuts.

In developing the groundwater management plan, the NSW groundwater database review would need to be updated to identify any new boreholes within 500 metres of the project. Groundwater monitoring wells may need to be located between large road cuts and registered water supply bores to monitor any groundwater draw-down due to the implementation of seepage control measures. Dependent on the detailed design of the project and the groundwater management plan, numerical groundwater modelling may have to be used to develop trigger points to instigate mitigation measures. Mitigation measures may include a reduction in drainage seepage or relocation of water supply bores.

2.11.5 Operation water quality treatment / waterways

Stakeholder identification number(s)

60, 100, 169, 172, 192, 197, 215, Kiama Municipal Council and NSW Department of Primary Industries

Issue description

Submissions relating to operation water quality treatment/ waterways raised issues regarding water quality monitoring, the location and impacts of water quality treatment devices and changes to catchment areas for existing surface water features.

In summary, the respondent(s) raised the following issues:

- The environmental assessment should specify and assess all monitoring programs for measuring water quality.
- Stormwater from the road pavement and rock cutting benches of the south eastern section of the Toolijooa Ridge cutting, station (chainage) 8400 southern side, would be piped to a water quality basin at station (chainage) 7950. In dry periods, this would reduce environmental flows in the watercourse at station (chainage) 8400 with impacts to pasture downstream.
- - A large elevated water quality basin at station (chainage) 7950 southern side t is a high risk for property structures at the toe of the embankment. The slope shows evidence of existing instability, so construction of a large basin would increase the risk of failure and possibly result in a mud slide. The problem could be alleviated by relocating closer to the bottom of the gully or constructing a number of smaller basins along the catchment path.
- The configuration and location of the sediment basin at a property should be constructed to be as natural as possible in terms of its function and appearance to become part of the natural landscape. Drainage from the sediment basin should be directed towards the small creek in the remnant area rather than into the paddock during flood events.
- The proposed sediment basins form an integral part of the highway asset and should be retained by RMS. Very limited details are provided in the environmental assessment regarding the location, size and configuration and on-going maintenance of the proposed sediment basins.
- The environmental assessment states 'There are no drinking water catchments in the project area. Groundwater has low use within the region because the area receives a relatively high rainfall and Shoalhaven Water provides a reticulated water supply to Berry. North of Berry water users are more reliant on tank water and groundwater'. This statement is incorrect as some properties pump water directly from Broughton Creek. This water is used for drinking (both human and stock), bathing, washing and other domestic and rural activities. RMS should maintain the quality of water in Broughton Creek during operation of the project.

- The *Water Management Act 2000* identifies Basic Landholder Rights (BLRs) for access to water, whereby landholders with frontage to a watercourse can access water for domestic (household) purposes or to water stock without the need for a water access licence.

The environmental assessment indicates that Town Creek is to be diverted. There are no surface water licences on Town Creek below the proposed diversion point and it is unlikely there are BLRs along this section of creek. However, the project needs to demonstrate there are no BLR users that could be affected by the proposed diversion.

Clarification should be provided as to whether landholders who have frontage to Town Creek below the proposed diversion point have been consulted to determine any BLR users. If this has not occurred, it is suggested the landholders are consulted.

- The open space of Town Creek park incorporates the remnant area of Town Creek which has been diverted on the northern side of the alignment. The creek bed would consequently become dry. The planting in the existing bed in the area of the park is mainly weed species. The planting proposed in the environmental assessment for the park include Swamp Mahogany, Sandpaper fig and Broadleaf Paperbark trees. All of these are suitable for wet area planting. The flora and fauna from Town Creek park down the full length of the creek to its junction with Broughton Mill Creek would be gravely affected. There would be high impact consequences.
- The new alignment leaves a small catchment area for the duck pond in Mark Radium Park. This results from the closure of the small feeder creek by the construction of the new alignment. The rain water that falls in the catchment area would now require treatment via the sediment basins for removal of the pollutants collected from the road. Water from these sediment basins would not be channelled to the duck pond as presently occurs and would, instead, be directed to the Arbour Creek.

Response

Conceptual details of the possible size, location and configuration of permanent water quality basins and swales are provided in the concept design drawings for the project. These configurations would be refined during the detailed design phase of the project.

The pavement drainage catchments, water quality basins and pipe networks have been designed to minimise the transfer of water from one catchment to another where possible. There are some locations where this is not possible, generally where road cuttings would change the overall topography. Where this would impact farm dam catchments, the change in catchment area has been calculated and reported in Table 2-3 (page 25) of *Appendix H – Technical Paper: Surface Water, Groundwater and Flooding*. Where impacts are not individually documented, impacts would generally be limited to a small area immediately downstream from the top of the road cutting.

Between chainage 7950 and 8400 the road alignment would follow the Toolijooa Ridge. The alignment orientation along the ridgeline would minimise changes to catchment areas. The watercourse east of the project at chainage 8400 would experience a very minor change in catchment area. The most significant change in this region of the project would affect the catchment area between the existing highway pavement and the top of the proposed cutting from chainage 8400 to 8700. This area is significantly disturbed by the existing highway and is not considered sensitive to the expected change.

The location of all water quality treatment structures would be determined during the detailed design phase of the project. This would include a geotechnical analysis for stability and assessment of risks due to potential basin embankment failure. The proposed basin at chainage 7950 would be assessed and alternate design configurations considered if necessary. The current location has been selected to minimise the distance along which stormwater pollutants are conveyed through the environment and to minimise the construction and operational footprint near the property at the base of the hill.

Water quality basins would generally outlet to natural and existing waterways in order to minimise scour and geomorphologic impacts, in accordance with the NSW Office of Water publication, 'Controlled Activities – Guidelines for outlet structures'. In situations where this would not be possible appropriate scour and waterway bank protection measures would be implemented. Details of these would be determined in consultation as appropriate with affected stakeholders during the detailed design phase of the project.

Management of potential impacts to receiving water quality would be carried out in accordance with the Surface Water Quality Monitoring Program and the Aquatic Ecology Monitoring Program (outlined in Appendix H - *Technical Paper: Aquatic Ecology and Water Quality Management* (internal Appendix F and G respectively)). These programs would be developed in detail and implemented as part of the construction environmental management plan. These plans would be prepared during the detailed design and construction phases of the project in consultation with potentially affected stakeholders, taking into consideration the proposed construction methods and scheduling.

The surrounding land use within the catchment has potential to impact the surface water quality. As such, this potential source of pollution would be recognised in the development of project performance standards. As such the assessment would be based on the impacts directly associated with the project, not on the health of the greater catchment. For many road upgrades, monitoring during construction involves sampling water quality upstream and downstream of the construction activity. This approach would be utilised for the project as it allows for an assessment of impacts that can be attributed to the construction /operation activities rather than the impacts related to the catchment. The monitoring would be focussed on the identified sensitive receiving environments of Broughton Creek and Broughton Mill Creek. As described on Page 3 of Appendix H - *Technical Paper: Aquatic Ecology and Water Quality Management* (internal Appendix G), operational water quality monitoring would take place following minor wet weather events, for one year or 12 sampling events, whichever is greater.

The plan also details how an exceedence is triggered, and states “where a statistically significant difference is observed, the trigger criteria is deemed to be exceeded and further mitigation and management actions would be implemented”. In practice this would typically involve actions such as investigations to locate point source pollutants within the upstream road catchment, removing accumulated sediment from water quality basins, cleaning or unblocking pipes or swales, checking bioretention systems and remove surface sediment or fix and replace bioretention filter media as appropriate.

Land use and landscaping for the Town Creek area south of the proposal would be undertaken in consultation with Shoalhaven City Council. Refer to **Section 2.10** of this report for a detailed discussion of the potential impacts to flora and fauna from Town Creek Park to the confluence of Broughton Mill Creek.

Where the alignment passes through the catchment of the duck pond in Mark Radium Park, the overall size of the duck pond catchment would be reduced by the area of road pavement. This is to allow stormwater that falls on the road alignment to be treated prior to discharge. It is not practically feasible to treat this stormwater if it were to discharge to the duck pond. The total change to the duck pond catchment area would be in the order of -10 per cent, from 10 hectares to 9 hectares. This is not expected to have a significant impact on the water levels within the pond.

During the detailed design and construction of the two way access at the western end of Victoria Street, RMS would seek to minimise any resulting impact on the duck pond.

To provide appropriate treatment to runoff from the road alignment, stormwater would be conveyed to a proposed water quality pond west of the alignment. Currently the existing highway drains to the duck pond untreated and it is expected there would be a nominal increase in the water quality within the duck pond due to removal of this part of the catchment. It is proposed to maintain the duck pond catchment area to the west of the alignment by installing a new culvert at ch17900 to replace the existing culvert at 17860 (refer drawing 60021933-DRG-10-02-DR1022).

Prior to commencement of construction, RMS would consult with landholders along the existing Town Creek alignment, below the proposed diversion, to confirm that there are no Basic Landholder Rights (under the *Water Management Act 2000*) to access water for domestic or stock purposes.

The potential for airborne particle pollution to impact residences is assessed in Appendix N – *Technical Paper: Air Quality* to the environmental assessment. The assessment did not identify risks to water quality either due to the construction or operation of the highway. RMS would ensure an appropriate source of potable water would be available to residents in the event that current water supply was interrupted by the project. These measures would be implemented in consultation with the affected parties.

2.11.6 Operation farm dam capacity

Stakeholder identification number(s)

212 and 214

Issue description

Submissions relating to farm dam capacity raised issues regarding the reduction in size of important farm dams due to property acquisition.

In summary, the respondent(s) raised the following issues:

- Proposed acquisition of part of a property includes a dam which would remove the property's main water supply. Relocating the dam is not feasible as there is no other suitable catchment replacement area and the cost would be prohibitive.

Response

The proposed concept design has been modified to provide an alternate dam design for the property, in consultation with the property owner. Existing capacity would be maintained.

2.11.7 Operational groundwater

Stakeholder identification number(s)

NSW Department of Primary Industries

Issue description

Submissions relating to groundwater during operation of the highway raised issues requesting further information on potential impacts, including drawdown, acid sulfate soils and interruption of groundwater flows, together with clarification of the role groundwater modelling would play in future stages of the project.

In summary, the respondent(s) raised the following issues:

- The environmental assessment outlines several aspects of the project that could potentially impact on groundwater in the shallow alluvial systems and in the underlying hard rock. A comprehensive assessment of potential impacts on groundwater users and groundwater dependent ecosystems has not been included in the environmental assessment. The environmental assessment includes a heavy reliance on further work after project approval, as well as the outcomes of consultation with the NSW Office of Water.

As a result of the short-term construction, the following groundwater impacts are likely to occur:

- Compaction of alluvial sediments beneath embankments having undergone pre-loading for stabilisation purposes, leading to obstruction of groundwater flows.
- Dewatering from excavations for road cuttings and bridge footings, leading to draw-down in surrounding areas.
- Groundwater quality impacts from the disturbance of actual or potential acid sulfate soils, with such impacts needing to be managed in accordance with the acid sulfate soil guidelines.

Further information should be provided of the potential impacts on groundwater users and groundwater dependent ecosystems.

- The operational impacts of the project are indicated as being essentially the same as those likely to occur during construction; that is, groundwater draw-down, changes to flow-paths and potential contamination. The environmental assessment acknowledges the impact of draw-down during operation and indicates 'the results of the groundwater modelling would be used to develop trigger points within groundwater management plans' as well as 'the groundwater modelling program, if required, would be undertaken in consultation with NSW Office of Water '. Further clarification of this issue is required.

Response

The groundwater related operational impacts of the project are recognised as essentially being the same as those likely to occur during construction; that is, groundwater draw-down, changes to flow-paths and potential contamination. These impacts would be managed through an extension of the groundwater management plan. Further technical detail would be provided during the development of the groundwater management plan.

Typically the alluvial aquifer would be impacted during construction by temporary dewatering, however at the completion of dewatering the groundwater levels should rebound to pre-construction levels. After construction, groundwater flow within the alluvium may be impacted locally by the construction of bridge footings or compaction of the strata by embankments, roads or heavy machinery. The volume of water moving within the alluvial aquifer is expected to be unchanged; however the flow path may vary slightly due to the construction of road infrastructure extending beneath the water table. Hence groundwater impacts within the alluvium are expected to be minor and would not impact down gradient groundwater flow significantly to farm dams or groundwater dependent ecosystems (refer Section 3.1.2 of Appendix H – *Technical Paper, Surface Water, Groundwater and Flooding assessment*). Some farm dams are however expected to lose some capacity through a reduction in farm dam catchment for surface water, as outlined in Section 2.3.1 of the environmental assessment.

Potential impacts to groundwater flow within the bedrock aquifer would be monitored and managed as outlined in the groundwater management plan. Operational impacts to groundwater dependent ecosystems are likely to be due to the changes in the flow and quality of groundwater and surface water caused by the project. Groundwater quality would be managed in accordance with the groundwater management plan. Net changes in groundwater flow are only expected in the bedrock aquifers where the flow path may be intersected by road cut excavations. In these instances seepage would be redirected along the surface flow path to maintain preconstruction flow conditions.

The groundwater yield of boreholes could be impacted by the project by temporary dewatering during construction within the alluvium near Berry and adjacent to road cuts that intersect the water table. An assessment of the potential impacts on existing boreholes registered with NSW Office of Water was undertaken (Coffey, 2010) based on the depth of the road cuts, geology intersected and landscape position.

The assessment found that four boreholes located near the deepest road cutting at Toolijooa Ridge are unlikely to be impacted as the boreholes are located on opposite ends of the cutting where the water table is not expected to be intersected. Three registered boreholes could however be potentially impacted by the project as summarised in **Table 2-1**. Drainage of the road cutting within low permeability sandstone and shale near bore GW016425 (Chainage 12500) could potentially lower the available groundwater at this location. Similarly in Berry the available drawdown of boreholes GW015286 and GW54770 may be impacted by road cut drainage. No registered boreholes were identified that could potentially be impacted by temporary dewatering of the alluvium during construction near Berry.

Table 2-1: Registered boreholes that may be impacted by the project

Road cut location	Borehole	Depth	Geology	Landowner
Chainage 12500	GW016425	25.2	Sandstone-shale	Bragg and Ridge
Chainage 17600	GW015286	25.9	Shale	Berry Retirement Village
Chainage 17650	GW54770	12.2	N/A	"Vinedale" *

Note: N/A Geology not available, * ownership details not available

Mitigation measures would consist of monitoring groundwater levels prior to, and during construction and calculating the potential groundwater drawdown in registered boreholes to assess if further mitigation measures are required. Groundwater monitoring wells would be constructed between the registered boreholes in Table 1 and the road cutting as part of the groundwater management plan. Falling head tests are to be conducted in each of these monitoring wells to assess the local hydraulic conductivity of the water bearing strata. The hydraulic conductivity and hydraulic gradients would be used to calculate the potential drawdown and develop trigger points to be included in the groundwater management plan. It is not anticipated that groundwater modelling would be required as part of, or to inform, the groundwater management plan.

The likelihood of significant groundwater drawdown in registered boreholes constructed in sandstone and shale is unlikely due to the low permeability of the strata.

2.11.8 Operation spill management

Stakeholder identification number(s)

175

Issue description

Submissions relating to spill management during operation raised issues regarding how RMS would manage water quality in the event of a crash on the highway.

In summary, the respondent(s) raised the following issues:

- What emergency measures would RMS put in place in the event of a major fuel spill on the bypass?

Response

The operational water quality treatment measures described in Section 2.3.2 of Appendix H – *Technical Paper: Surface Water, Groundwater and Flooding* (in particular page 40) would include provision for the capture and management of fuel spills.

The project would likely provide for safer transportation of vehicles compared with the existing alignment. This would reduce the total number of crashes along the upgraded section and therefore the potential for a spill of hazardous substances would also reduce.

Any spills that do occur would be directed to the permanent water quality basins and swales, all of which would have the capacity to receive a spill with a volume corresponding to that of a typical transport truck. Water quality spill capture basins would have a baffle system incorporated to capture floating spills in the event of a spill during a rainfall event.

Basins capturing runoff from pavements that drain to sensitive receiving environments would be designed with special outlet configurations to reduce the likelihood of overflow into the sensitive environment, such as Broughton Creek. Water quality basins would contain a permanent volume of water which a volume of spill would have to displace before passing through the entire basin. Bioretention systems would have extended detention depths that would have to be breached before overflowing into the downstream environment.

2.12 Flooding

2.12.1 Town Creek diversion (flooding)

Stakeholder identification number(s)

68, 122 and 206

Issue description

Submissions relating to Town Creek and associated flooding impacts raised issues regarding flooding impacts on farmland, preferences for the final structure and condition of Town Creek and impacts on the section of Town Creek that lies within the Berry township.

In summary, the respondent(s) raised the following issues:

- Increased flooding on a nearby private farming property is a major concern, should Town Creek be diverted into Bundewallah Creek. Further information should be provided about the effects of a major flood and what compensation would be provided to property owners.
- The proposal to divert Town Creek through dairy lands would result in an unwanted drain, dumping more unwanted floodwater onto an already flood prone property.
- RMS should discuss a fair and due process for remuneration with impacted property owners before any permission is granted to dump unwanted water onto properties from the Town Creek diversion.
- The Town Creek diversion should be fully piped to allow for nearby farming practices to carry on with little disturbance. If this is not possible, a straight wide dish drain with a concrete base and capacity to accommodate a 1 in 100 year flood should be provided. This would need to be maintained by the appropriate authorities.
- Town Creek is integral to Berry's sense of place. The diversion of water would leave the town with a dry drain instead of the viable and attractive stream that currently exists. Town Creek should not be a casualty of the project, further compromising the amenity of the town.
- The 'normal' non-flood flow should be piped under the bypass into Town Creek in order to maintain flow. The new channel designed to divert Town Creek water to Bundewallah Creek should be used for excess and flood flow only.

Response

As described in Section 7.5 of the environmental assessment, Town Creek would be diverted from upstream of North Street, along Rawlings Lane, to discharge into Bundewallah Creek. The diversion would reduce flooding during the 100 year ARI flood event for 113 properties in Berry. Nine houses would no longer experience above floor inundation and three more would experience a reduction in above floor inundation during the 100 year flood event.

The Town Creek diversion would change the behaviour of flooding in Town Creek. In general, the flood waters would be diverted from developed urban areas of Berry onto the open grassland of the existing floodplain. The decision to divert Town Creek has been proposed based on an assessment of its merits in accordance with the principles of the NSW Floodplain Development Manual.

Some structures and property would be subject to a reduction in freeboard and these are detailed in Figure 7-19 of the environmental assessment and Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* (internal Appendix A) (AECOM 2012) to the environmental assessment. Generally increases to flood levels are estimated to be less than 0.05 metres during the 100 year flood event, and the change in spatial extent of flooding would be negligible. Mitigation measures in response to these impacts are summarised in Table 7-57 of the environmental assessment. These measures may include construction of [local] diversion swales, local bunding, flood proofing of buildings or other agreed solutions. It is not proposed to financially compensate landowners following a significant flood event.

The existing Town Creek channel in the Berry township is an ephemeral stream that only receives intermittent flows during rainfall events (Section 7.4.3 page 293 of the environmental assessment). It would still continue to receive flows from the local adjoining catchment during rainfall runoff events. It should be noted that this channel mostly runs through private residential properties and is in a degraded condition with scattered/disturbed riparian vegetation of varying substance and low conservation value (Section 2.7 of Appendix F – *Technical Paper: Terrestrial Flora and Fauna* (Biosis 2012) to the environmental assessment). It is likely that this existing vegetation would still be maintained by the local property owners.

It is noted that throughout 2012, the Berry Landcare Group and Shoalhaven City Council have been working to enhance the social and ecologic value of Town Creek, and this work is expected to continue. RMS would consult with these groups regarding this work as the diversion is put in place.

As part of the concept design process for the project, consideration was given to the maintenance of low flows in Town Creek by using a culvert to convey low flows under the proposed highway. This design required the raising of the highway road surface by 1.5 metres (indicative) along a 600 metre length parallel to North Street and into the Queen Street area. This would allow noise to propagate further from the highway into the township of Berry. Visual impact from the raised alignment would be significantly higher. On balance, it is proposed that the overall impact of the project on the township is reduced by lowering the highway and diverting all the Town Creek flows west of George Street.

RMS would divert Town Creek across a landowner's property for some 380 metres. The landowner would ultimately be responsible for the ongoing maintenance of Town Creek where it is diverted. RMS therefore proposes to design the creek in a way that would allow for appropriate safe ongoing maintenance in line with standard agricultural practices, while maintaining or improving the existing water quality in this part of Town Creek.

The creek would be designed so that the landowner can continue using the surrounding land in its existing capacity. This would involve the construction of a straight channel through the property to reduce the amount of land that is impacted and the gradients for the broader channel bank/batter slopes would be determined to suit grazing and access requirements with due consideration of hydraulic flow requirements to minimise the potential for erosion to occur and to ensure safety.

Appropriate batter/bank treatments will be selected to provide protection in accordance with the velocity and scour risks. Vegetation would be the preferred treatment with rock only used if/where necessary. Sizing and detailing of the channel to minimise velocity and scour concerns (which are not expected to be high) will be a primary objective of the detailed design process. It is likely that the diversion will incorporate different components and treatments to address both low flow and high flow conditions. A low flow channel would endeavour to provide some semblance of a small defined creek alignment while the adjacent overbank area for higher flows would be more subtle in appearance with gentle slopes and curves.

RMS notes submissions which request that the diversion be rehabilitated to provide for an alignment that replicates a natural stream shape and geomorphic features such as pools and riffles, and is rehabilitated with native vegetation. RMS notes that in order to ensure that safe and reliable maintenance is able to be undertaken by the landowner construction of a natural stream approach to restoration would not be undertaken. RMS does not propose to acquire the lands required for the diversion and as such is required to manage landowner access, ongoing farm viability and maintenance issues to a level appropriate for private ownership.

A proposed monitoring and maintenance period would be adopted and implemented as a matter of good practice. Such an approach was recently successfully employed by RMS for a small deviation of the environmentally sensitive Dellateroy Creek (in southern NSW near Tarcutta) as part of the Hume Highway upgrade (Northern Hume Alliance). As the proposed diversion would remain within private ownership, ongoing maintenance would be required by the landowner.

As detailed in Section 4.3.3 of Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* to the environmental assessment, best practice management measures would be implemented during construction and rehabilitation, in accordance with applicable RMS specifications, *Managing Urban Stormwater – Volume 1 (Soils and Construction)* (Landcom (2004), and *Managing Urban Stormwater – Soils and Construction, Volume 2D – Main Road Construction* (known as the Blue Book) (DECCW 2008).

2.12.2 Increase in flood levels at properties

Stakeholder identification number(s)

77, 78, 170, 203 and 250

Issue description

Submissions relating to increased flood levels at properties raised issues regarding local experience with flooding, changes to flood behaviour from placing an embankment on an existing floodplain, the potential for blockage of culverts and bridges and emergency access and evacuation.

In summary, the respondent(s) raised the following issues:

- Flooding impacts on properties located within the Broughton Creek catchment for the probable maximum flood (PMF) flooding event have not been detailed.
- A risk management report should be provided for both the 1 in 100 year and the PMF events, including the impacts of the increased flooding levels and potential emergency evacuation routes for all dwellings affected by the project including agricultural sheds.
- RMS should update Appendix H – *Technical Paper: Surface Water, Groundwater and Flooding* to include the effects on the properties and infrastructure upstream as the raised road embankment could increase flood levels up to two metres above existing levels during the PMF upstream of Broughton Creek Bridge 1. This should include the potential height above the road levels at all crossing points and the proposed height of water in relation to floor levels of dwellings and other structures such as agriculture sheds.
- RMS should update Appendix H – *Technical Paper: Surface Water, Groundwater and Flooding* to reflect the increased flood levels upstream and the potential for and extent of scour due to the blockage of pipes, bridges and culverts that are highly likely to occur during a flooding event, given the heavily vegetated catchment areas upstream.
- Flooding impacts would result from changes to the overland flow stream by the proposed embankment structure on the Broughton Creek floodplain between Broughton Creek bridge 1 and Broughton Creek bridge 3. No embankment should be built upon the Broughton Creek floodplain.
- Personal and family experience suggests more regular flooding than what is stated in the 1 in 100 year flooding model.
- The road should be constructed on piles (similar to the Minnamurra River flood plain) to minimise interference with the natural creek flow and floodplain.
- No flooding studies have been undertaken for the tributaries that flow into Broughton Creek. Query that without this data, how can RMS be certain of the adequacy of culverts planned at N, O, P, Q, R and S as detailed in the environmental assessment report.
- At present, any maintenance required of the box culverts for the creek and verge for clear southern visibility to traffic is carried out by property owners and residents. Calls for this to be addressed in future by regular scheduling of RMS maintenance crews.
- The new highway would impact flooding at the causeway near Broughton Village. Flood events may be exacerbated by a damming effect created by the new proposed embankment between Broughton Creek bridges #2 and #3 at Broughton Creek and potential funnelling effects where water flow rates may be increased.
- RMS commitment to return causeway access if the computer modelling figures are wrong and flooding events are increased or worsened in the future.

Issues specifically relating to the "Glenvale" property, are summarised below:

- There are a number of deficiencies in the available data relating to flood levels and rainfall at 'Glenvale' in the environmental assessment. There has not been adequate data collection or scrutiny of matters regarding flood levels and rainfall, and further investigation is needed.
- Over the last 60 years the present highway has been overtopped by flooding from the creek at 'Glenvale' on many occasions (at chainage 12800). There is no mention of the overtopping in the environmental assessment. Photographs were supplied with the submission to demonstrate the issue.
- Table 4.3 of the environmental assessment states estimated flow capacity for proposed culvert Q. Clarification that data specific to the catchment at 'Glenvale' was used in determining a 7 x 1.8 metre round pipe would be sufficient to cope with the 1 in 100 year flood event should be provided. Present drainage is unable to cope with the flood event in March 2011, which was counted by Shoalhaven City Council as a 1 in 5 year flood event.
- In Table 4.4 of the environmental assessment report there is a reference to Q, the culvert mostly affecting 'Glenvale', which states the need for 'a minimal water level impact due to upstream property'. No definition of the term 'minimal water level impact' is provided. Expectation that the water level impact would have a much higher importance, eg imperative.
- Previous meetings with RMS have suggested projected computer flood modelling for 'Glenvale' using either the Bureau of Meteorology's rainfall figures for Foxground or rainfall figures (1995 - 2012) provided by property owner would be undertaken.
- The results of a floor and ground level survey conducted by RMS illustrate concerns of a possible increase in flood levels from the proposed highway at 'Glenvale' property (flood modelling results attached to submission). This information should be used to assess the flood level impacts at the property's building in a similar fashion to that shown for other properties in Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* Table 4-7. Or, as shown for other properties in Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* (internal Appendix A) an assessment of creek property flood impacts should be undertaken.

Flood levels over 21.87 metres AHD (ground level) as predicted by RMS survey results, would cause irrevocable damage to the property's shale foundations and two brick fire places.
- Site specific flooding information was requested but has not been provided to owners of the 'Glenvale' property.
- The proposed increase in the amount of fill to build the embankment at chainage 12800, as documented in the environmental assessment, may have a catastrophic impact on life and property at 'Glenvale' should the culverts be inadequately sized to cope with water volume or become blocked.
- Potential for blockages to occur as a result of logs and debris being eroded from creek beds during high velocity events (East Coast Lows). Given the implications of global warming it is likely that such extreme weather events would become more frequent. The steepness of the catchment may further exacerbate this situation.
- Storage capacity of the existing floodplain west of the highway (at chainage 12800) would be reduced significantly due to the extent of the proposed earthworks. This would increase the level of flooding by raising flood heights. Should the culverts become blocked or unable to manage the volume of water, risks to the 'Glenvale' property would include inundation of the heritage residence, deterioration of its shale foundations and/or would prevent access/egress to the property in the event of an emergency.

- RMS has not addressed flooding in this area in the environmental assessment report which could possibly lead to an underestimation of the flooding impact of the embankment proposed at culvert chainage 12800.
- Clarification requested on source of rainfall data used in the environmental assessment report. Rainfall figures from Berry records are significantly different to rainfall figures recorded by the owner at the 'Glenvale' property. Suggestion that Bureau of Meteorology rainfall records for Foxground are much closer to rainfall levels at 'Glenvale'.
- Poor maintenance of the culvert at chainage 12800 could result in potentially catastrophic flooding at 'Glenvale'. Essential a high frequency maintenance schedule for the culvert is implemented.
- The environmental assessment does not include a flood study specific to 'Glenvale'. The owner may need to engage an independent flood mitigation consultant. Query regarding RMS' willingness to reimburse this cost.
- A miscalculation based on incorrect flooding data could result in the flooding of the two properties upstream from culvert Q at chainage 12800. This could have insurance implications with increased premiums or insurance denied as a result of increased flooding risk. .
- Glenvale dairy farm complex is a heritage item under the Shoalhaven Local Environment Plan (1985). It is significant as a Berry tenant cottage with the residence and out buildings and, with the working farm, contribute to maintaining the Berry pastoral landscape. This has been identified as having State significance in NSW in the Shoalhaven Heritage Study. The Illawarra Regional Strategy requires planning authorities to protect these landscapes given the importance to agricultural sustainability. Appendix 7.8 of the environmental assessment report notes this significance, however no mention of impact to the residence in the event of flooding is included in the environmental assessment.
- The cost or repairs to 'Glenvale' (a 160 year old early colonial building with shale foundations) may be considerable given the difficulty of sourcing compatible materials of the period.
 - Water has flooded the present highway and areas close to A371 Princes Highway three times in the past ten years. To build a bank of the proposed length and height near the existing farm at Glenvale chainage 12250-chainage 13900, it must be ensured that adequate flow capacity is provided and a safety overflow must be considered. Suggestion for a vehicle-sized underpass at approximately present highway floor height, which would address, amongst other things, safety flood overflow.

Response

Flood flow rates for the design and impact assessment of the project were estimated in accordance with the guideline 'Australian Rainfall and Runoff' (Engineers Australia, 2001). The procedures outlined in this guideline are accepted as the best available for Australian hydrology applications. As such it is considered that the hydrologic analysis used in the design and assessment is appropriate for informing flood risk management decisions.

Whilst the concept design and environmental assessment for the project considered a significant amount of available historic flood data (particularly in the southern region of the project), a number of submissions contained specific detail on historic flood events that was not available at the time of the assessment. This information is considered invaluable and would be used to refine the design where appropriate during the detailed design phase of the project.

The historic data provided has been reviewed and comments relevant to the environmental assessment process are provided here. The flood assessment showed that flow in Broughton Creek overtops the channel banks with a frequency in the order of at least once in every five years, on average (Figure 4-7 of Appendix H -*Technical Paper: Surface Water, Groundwater and Flooding* to the environmental assessment). For the consideration of impacts of large flood events, a 100 year flood flow has also been assessed as this is the magnitude of flood adopted by RMS as the design criterion, and typically adopted by NSW Councils (including Shoalhaven and Kiama) as a Flood Planning Level in accordance with the NSW Floodplain Development Manual. Flood impacts for flows less than the 100 year flood event would typically be contained within the impacted area shown, and be of a lower magnitude than those impacts reported.

The rainfall data received in the submissions is recorded at a daily time interval. The catchments draining to the highway typically produce the highest flow response during storms of two to six hours duration (dependent on the size of the catchment and rainfall intensity). The use of daily rainfall data to estimate peak flood flows in this situation would underestimate the worst case design situation. As such it is considered appropriate to utilise the hydrology developed in the 'Australian Rainfall and Runoff' (Engineers Australia, 2001) guideline for design and impact assessment.

It is noted and accepted that the spatial distribution of rainfall for any storm would vary over the 12 kilometre length of the project. This is proven from historic storm data and is also reflected in the design data. Design rainfall intensities were calculated in accordance with the data and procedures recommended in 'Australian Rainfall and Runoff' (Engineers Australia, 2001) guideline at several locations along the project. The calculated intensities were generally found to be of a similar magnitude and accordingly, the highest values were adopted for consistency. It is considered that this single set of Intensity-Frequency-Duration (IFD) data is representative and appropriate over the length of the project. There is no evidence that any location along the project has a higher probability of future high rainfall rates than any other location. However for design purposes, this IFD data has been increased by six per cent (in accordance with the adopted project design criteria, derived from the "NSW Climate Impact Profile", DECCW, 2010) to account for possible increases in rainfall intensities due to climate change.

In accordance with the NSW Floodplain Development Manual (Appendix A, page A-1) the design has been assessed for flood impacts to property and structures during the 100 year flood event. Consideration has been given to flood evacuation for properties adversely affected by the proposal during events larger than this. In particular, the paddock to the east of the embankment between Broughton Creek bridge 1 and 2 where a vehicle underpass has been provided and, west of the embankment between Broughton Creek bridge 2 and 3, where an access track has been provided from the floodplain up to the embankment.

A more detailed hydraulic model of the Broughton Creek floodplain would be developed during the detailed design phase of the project. This model would inform the final location and form of the embankment, including scour protection measures, and would be used to inform flood risk planning for events larger than the 100 year flood design event.

No change to flood evacuation routes in flood events up to the PMF are identified upstream of Broughton Creek bridge 1. The final bridge form would be assessed during detail design. RMS would consult with Kiama Council during the detailed design and construction phases of the project to advise on the outcomes of flood studies so as to assist in the management of flood risk.

It is acknowledged that blockage of culverts and the accumulation of debris against bridge piers has the potential to increase flood levels during a flood event. There are a number of design measures that could be incorporated to reduce both the likelihood and consequence of blockage. These include increasing the size of the culverts based around a design blockage factor (often a value of 50 per cent is applied, but this can vary based on land usage in the upstream catchment), using screens or upstream bollards to deflect/capture debris, or having designated overflow paths. The preferred solution for each culvert situation would be identified and designed during the detailed design phase of the project.

In the case of “culvert Q” at chainage 12800 (downstream of the “Glenvale” heritage property), it is acknowledged that the significant height of the proposed roadway embankment presents a considerable risk and consequence in the situation were the culverts to block. In response to this particular situation, in addition to improved accessibility and fauna passage, an underpass has been incorporated in the proposed design at chainage 12850 (A371 Princes Highway). The vehicle-sized underpass would serve as an overland flow path in the event of blockage at culvert Q, allowing relief of floodwater prior to inundation occurring at the Glenvale property. The underpass would have additional benefits as discussed in this report in **Section 2.10** of this report.

The proposed embankment would have only a slight impact on the flood storage capacity of the region, with little natural flood storage available in catchment Q relative to the Broughton Creek floodplain immediately downstream.

RMS would retain responsibility for the culvert and bridge maintenance.

Duration or frequency of inundation at the Broughton Creek causeway (eastern end of the Austral Park Road extension) would not be altered to any significant degree by the project.

2.12.3 Construction impacts - flooding

Stakeholder identification number(s)

3 and 250

Issue description

Submissions relating to construction impacts on flooding raised issues regarding maintaining flood evacuation routes during construction and providing assessment of potential flood water levels during construction.

In summary, the respondent(s) raised the following issues:

- A property would be severed at the second Broughton Creek bridge crossing. Access to all areas of the property is required during flooding to allow the movement of stock to higher / safer ground during and after construction of the highway.
- The construction section of the environmental assessment should also include corresponding proposed flood levels during construction.

Response

Flood free access to the property following construction is discussed in **Section 1.1.2** of this report and in Section 4.2.8 of Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* to the environmental assessment.

RMS currently owns the property. The property has been identified in the environmental assessment (Figure 4-20) as a potential ancillary facility for use during construction. Prior to construction, RMS and the selected constructor, would liaise with the property lessee and determine how the property would be used and managed during construction, should the lessee's tenancy continue through the construction period. Flood risk for ancillary facilities would be managed in accordance with Table 7-57 of the environmental assessment and the construction environmental management plan.

Potential flood water level impacts during construction would depend on the construction staging requirements but typically could be controlled as appropriate to be less than those described in the operational case. As part of the detailed design and construction phases of the project, a construction environmental management plan would be prepared, and any additional temporary flood impacts (such as those caused by haul roads, stockpiling or bunding) would be assessed at this stage and appropriate mitigation measures implemented as necessary.

2.12.4 Operation impacts - flooding

Stakeholder identification number(s)

9, 78, 172

Issue description

Submissions relating to operational impacts on flooding raised issues regarding maintenance and blockage of flow paths.

In summary, the respondent(s) raised the following issues:

- RMS should update Appendix H - *Technical Paper: Surface Water, Groundwater and Flooding* to reflect the proposed mitigation measures to prevent scouring around bridges and culvert outlets. Maintenance of boundary and fauna fencing is required to reduce risk of culvert blockages in the event of flooding. The boundary fence needs to be separated from the wildlife chain wire fencing, which needs to be installed above the flood level. This applies to the three wildlife crossings at 'Glenvale'.
- The potential flooding impacts on North Street and Albert Street.
- Proposed earthworks, including removal of mature trees from creek banks, and re-sculpturing of the natural landform would have direct consequences on creek bank stability, local habitats and remaining pastures and their ability to recover from local flood and drought. The current flood plains have natural groundwater springs beneath and their natural soakage provides pasture growth in dry times. The current landform and slope of the land towards the main creek allows for quick recovery of pastures after local flooding events.

Response

Detail of scour protection around bridges, embankments and culverts would be developed as part of the detailed design phase of the project and in accordance with the NSW Office of Water publication – 'Controlled Activities – Guidelines for outlet structures' and 'Guidelines for instream works on waterfront land'. This would include stabilisation measures at locations where trees are to be removed from the creek bank.

For details regarding mitigation of the removal of mature trees, refer to the biodiversity offset strategy (Appendix F – *Technical Paper: Terrestrial Flora and Fauna* (internal Appendix E) of the environmental assessment) and the associated submission responses provided in **Section 2.10.3** of this report.

Flood risk due to blockage of boundary and fauna fencing by debris would be addressed during the detailed design phase of the project. Typically fauna fencing is connected to either side of the main waterway structures to help funnel fauna through the culvert crossings, and as such would also be located away from high velocity flood flows, reducing blockage risk. Boundary and stock fencing at large creek crossings would typically follow a particular creek crossing design similar to RMS model drawing MD.R201.A05.A (available at http://www.rta.nsw.gov.au/cgi-bin/doingbusinesswithus/designdocuments/index.cgi?md_r201_a05_a.pdf)

In general, flooding on North and Albert Streets would be reduced as shown in Figure 7-19 of the environmental assessment.

2.13 Landscape character and visual amenity

2.13.1 Construction light spill

Stakeholder identification number(s)

175

Issue description

Submissions relating to construction light spill raised issues regarding proposed mitigation measures to minimise the impacts to North Street properties during construction.

In summary, the respondent(s) raised the following issues:

- What mitigation is proposed to address construction lighting on North Street properties?

Response

Construction light spill was not specifically addressed in the environmental assessment. However, consistent with the construction strategy and approach on similar projects, lighting for construction would only be required for specific night works. Night works may include tie-ins and overbridge construction and placement, and other tasks that cannot safely or logistically be completed during the daytime. The details and extent of these night works would be confirmed during the detailed design phase of the project, however the two areas most likely to require some night works are:

- The Kangaroo Valley Road bridge.
- The bridge at Berry as it crosses Woodhill Mountain Road.

The mitigation measures to address construction lighting / light spill include:

- If night work is required local residents would be advised as early as possible prior to the commencement of those works.
- Light sources would be directed away from residential areas.
- Appropriate lighting and lighting strategies would be utilised to minimise light spill impacts. Where light spill from night works may still have a potential impact on residents, consultation with the directly affected residents would be undertaken to determine if further mitigation measures would be required.

2.13.2 Operational visual impact

Berry Equestrian Centre

Stakeholder identification number(s)

56-59, 61-63, 71, 72, 74, 76, 80, 84, 86-88, 90-96, 101-106, 108-111, 113, 115, 117, 119, 120, 126-128, 137, 139, 144, 148, 157, 162, 165, 167, 173, 198

Issue description

Submissions relating to the Berry Equestrian Centre raised issues regarding negative impacts of the proposed highway on rider and horse safety and the viability and function of the riding site.

In summary, the respondent(s) raised the following issues:

- The proposed reduction of area and realignment of the Berry Equestrian Centre site in North Street, along with the proximity to a high speed highway would have a detrimental impact on the ability of the Berry Equestrian Centre to service the community.
The visibility of cars and trucks on the highway would cause safety concerns for horses and riders competing at the site.

Response

The Berry Equestrian Centre is currently the subject of a master plan, the development of which is being coordinated by Shoalhaven City Council in consultation with the Equestrian Centre. This master plan would provide recommendations to minimise impacts of the project on the site of the Equestrian Centre. The recommendations would be carried forward into the detailed design phase of the project to ensure that an integrated and satisfactory outcome is achieved for the Berry Equestrian Centre. It is expected that the recommendations of the master plan would include strategies to ensure safety for horses and riders competing at the Berry Equestrian Centre site by minimising and/or removing the visibility of vehicles on the highway.

Additional responses related to the Berry Equestrian Centre can be found in **Section 2.17** of this report.

Toolijooa Ridge

Stakeholder identification number(s)

70, 145, 147, 197, 208, 215 and Kiama Municipal Council

Issue description

Submissions relating to Toolijooa Ridge raised issues regarding the visual impact, scale and width of the project and revegetation strategy.

In summary, the respondent(s) raised the following issues:

- The 25 metre deep cutting at Toolijooa Ridge would have substantial visual impacts for train commuters travelling to Berry and road users on the coast road from Gerringong to Gerroa. The cutting should be screened with native trees to restore the visual amenity of Toolijooa Ridge. The sensitivity of the Toolijooa Ridge impact assessment should be increased from moderate to high within the environmental assessment.

- The size of the cutting required to provide three lanes at Toolijooa Ridge would be a major visual impact. Two lanes would be sufficient.
- All disturbed land should be appropriately revegetated with the planting of endemic species, including the Toolijooa Ridge cutting which should be vegetated to the same standard as the North Kiama bypass cuttings.

Response

The environmental assessment acknowledges that there would be a visual impact on views from the east back toward Toolijooa Ridge. Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* of the environmental assessment rates the sensitivity to change as having a high to moderate impact, which in the context of the overall project is accurate.

Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [p46] recommends a number of strategies to minimise the visual impacts of the cutting at Toolijooa Ridge including:

- Close to vertical cuttings⁴ in the suitable rock.
- Keep the cutting benches at a consistent profile that matches the elevation of the roadway.
- Enclose the view at the end of the cutting to frame views.
- Establish vegetation to the top of the cutting to ensure integration with the adjacent landscape.

These strategies have been illustrated in the Artist's impression of the cutting in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 63] of the environmental assessment. Any additional / supplementary planting along Toolijooa Ridge outside of the project extent would need to be agreed with the relevant land owners.

Where material is easily rippable, it is proposed to roll out the top of the cutting at a maximum of 3:1 and establish pasture grasses.

The lane arrangement within the cutting is determined by the vertical grade (or steepness) of the highway. The vertical grade in the cutting would be steep enough that it would require a passing lane to be provided for heavy vehicles. This means the uphill sections in the cutting would be three lanes wide. If the vertical grade was reduced, the highway in the cutting would be less steep and a passing lane would no longer be required. However, this means that the cutting would be much deeper, and probably wider at the top than the current proposal, and would have a greater visual impact.

As a general whole of project requirement, any areas that would be disturbed as part of the works would require appropriate revegetation. The integrated landscape solution recommended for Toolijooa Ridge is illustrated in the artist's impression in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 65]. This is a combination of re-established pasture grasses and scattered Eucalyptus tree plantings which is consistent with the existing character of Toolijooa Ridge.

⁴ The vertical cuttings would be made as vertical as possible subject to engineering constraints.

Property impacts

Stakeholder identification number(s)

100, 141, 169, 170, 172, 174 and 203

Issue description

Submissions relating to property impacts raised issues regarding impacts on specific properties and possible mitigation measures. The submissions identify concerns with impacts to views, local landscape character and zone designations in the *Shoalhaven Local Environmental Plan*.

In summary, the respondent(s) raised the following issues:

- Rural views (from a specific property) of surrounding paddocks, roads, the railway line, and vegetation surrounding Seven Mile Beach, Gerringong, Gerroa and sea views to Point Perpendicular would be impacted by the project. Rebuilding in the area would not be the same.
- The proposed embankment of the highway would impact views of natural bush and Broughton Creek to the east of a specific property. Replacement vegetation should be considered to reduce the visual impact of the six metre high embankment.
- Properties within Broughton Village are located in an area that is designated under the *Shoalhaven Local Environmental Plan* as Zone 1(b) Scenic Protection Zone. Development on these sensitive scenic lands should be sympathetic to the surrounding environment. The alignment would visually impact this area.
- A specific private property located near the proposed highway has scenic outlook value which would be impacted by the project. The property would be visually exposed to the traffic and the Mullers Lane u-turn facility. If the land is not purchased by RMS, the provision of a visual barrier between the project and the property should be considered.

Response

The environmental assessment acknowledges that the project would have visual impacts in a number of locations. The urban and landscape design strategy, as illustrated in the environmental assessment and concept design, applies the key strategies and principles to mitigate these impacts to property. The recommended mitigation strategies are identified in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 45] and include:

- Minimise the apparent width of the corridor through reinforcement of the existing landscape patterns and integration of the project with the existing landscape context.
- Integrate new vegetation with the existing landscape character and vegetation communities.
- Ensure that the appropriate footprint is developed as part of the project, including consideration of the construction footprint versus the final footprint.
- Integrate large fill embankments and cut slopes through re-establishing pasture grasses and culturally relevant planting.
- Define minimum design standards for the bridge structures.
- Engage adjacent land owners and community groups in assessing whether mitigation prior to construction (such as landscape planting) can be achieved to help soften or decrease likely impacts of the project in specific locations.

In relation to the specific impacts identified in the submissions above, the identified strategies would be applied and on-going consultation would be undertaken with the specifically affected landowners to determine site specific responses to minimise impacts. This would be undertaken during the detailed design phase of the project.

Highway and interchange visual impacts

Stakeholder identification number(s)

41, 70, 116, 135, 145, 147, 197, 208, 209, 215 and 234

Issue description

Submissions relating to highway and interchange visual impacts raised issues regarding the importance and value of the coastal landscape and the impacts on the character and visual connection with this unique landscape. Specific issues relate to potential loss of views, impact on views, the environmental landscape value and scale of highway related infrastructure.

In summary, the respondent(s) raised the following issues:

- The importance of the coastal landscape in the culture of Berry and its surrounds is confirmed by Government Agency classifications:
 - Berry-Bolong - Pastoral Landscape: Shoalhaven City Council Heritage Study.
 - Berry District Landscape Conservation Area: National Trust of NSW.
 - Berry Township Urban Conservation Area (BTUCA): Shoalhaven City Council Heritage Study and National Trust Register 2011.This increases the sensitivity of impact on all landscape issues.
- The location of the alignment would result in the loss of visual connection between Berry and the escarpment.

The environmental assessment identifies key vistas to and from Berry township and focuses on mitigation strategies to reduce visual impacts from the town to the north and north-west. These strategies ignore impacts of the amenity of Berry from other perspectives. RMS focus is on the impacts to Queen Street, North Street and Huntingdale Park, a consideration of the visual impact on the whole of town is lacking.
- The interchanges, junctions and bridge at Berry would have an additional visual impact. The bypass would be highly visible as it sweeps into Berry off the ridge from the east. The proposed junction at the western side of Berry is inconsistent with the scale and character of the town.
- The height of the road would diminish the attractive look of the landscape. This has not been adequately addressed in the environmental assessment.
- The Illawarra Gully Wet Forest at Schofields Lane forms an important part of the visual landscape of the western entry to Berry. This area has not been acknowledged as significant in the environmental assessment. These trees are next to an ancillary facility and must be protected. Similar trees should be planted as part of urban design and landscaping if this area is impacted by construction.
- The permanent ancillary site near Tindalls Lane interchange should be considered as a project component. There is a lack of screening from the new highway/surrounding area. The site would result in significant visual amenity impacts.

Response

The environmental assessment considered all listed government agency classifications attributed to the landscape within the project area. The cultural landscape context is discussed in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 36] of the environmental assessment. This cultural landscape framework has also guided the assessment rating impacts and assisted in informing the recommended mitigation measures outlined in the environmental assessment.

One of the DGRs for the project was to undertake 'an assessment of visual significance of the area, including the escarpment and ridges and the township of Berry, and impact of the proposed alignment.' As part of the assessment undertaken and documented in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*, a contextual and landscape character analysis was undertaken, refer to Section 5 [page 36]. The visual connection to the escarpment and ridges and impact on this connection was illustrated in detail in Section 6.7 [page 54].

The concept design for the project supports the retention of the visual connection between Berry and the escarpment. As discussed in Chapter 3 of the environmental assessment, the adjustment of the alignment further north, away from North Street assisted in reducing the potential impacts on the views to the ridges and escarpment. Three representative locations were assessed in regard to impacts on views to the escarpment and ridges. The view from just west of the corner of North Street and Edward Street represented the 'high impact' scenario. In this location there would be impacts on the foreground and middle ground views but the views of the ridges and escarpment would be maintained.

In the development of the concept design for the project, the potential impacts for the whole of the town have been considered. This is not just from a visual impact perspective. In addition to analysing potential visual impacts, the study has considered the town function, urban form, unique character and its broader landscape context. This is described in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 38 and 39] and includes a series of diagrams that outline the opportunities and constraints presented by the project for the whole town. As part of this process, a series of community workshops were convened in 2012 to inform the development of design responses that were appropriate and considerate of the whole of Berry.

The bridges and junctions, including the northern interchange and southern (referred to as western in the submissions) interchange for Berry, would all have some degree of visual impact. The placement, scale and potential visibility of all of these elements are a product of:

- An alignment that provides a safe vertical and horizontal geometry that meets RMS required design speeds.
- A design that responds to the local topography.
- A design that limits impacts to property.
- A design that provides 1 in 100 year flood immunity.
- A design that connects into the existing local road network.
- A design that fits with the existing function and circulation network of the town.

Throughout the development of the concept design for the project, all of these elements have been considered to achieve a safe and integrated concept design.

The bridge at Berry, while being a long and elevated structure, has been aligned to sit within the landscape utilising the existing vegetation of Bundewallah and Connolloys Creeks to reduce its scale. The artist's illustrations in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [pages 75 and 77], illustrate the influence of the existing creek line vegetation. It would be expected that this vegetation, and that along Broughton Mill Creek, would screen much of the bridge structure as it sweeps off the ridge north of the town. Notwithstanding, the bridge would still be highly visible for those travelling south into Berry on Woodhill Mountain Road.

Minimum detailed design requirements would ensure that the bridge structure would be a refined, well resolved structure, suitable to its landscape setting. The detailed design of the bridge would be developed in accordance with RMS' 'Bridge Aesthetics Design Guidelines' and the recommendations in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*.

The interchange (referred to as a junction in the submissions) at the southern (referred to as western in the submissions) side of Berry has been developed as a landscape response rather than an urban response. It is recognised that the large scale of highway infrastructure makes it challenging to integrate into the landscape and there is a defined set of strategies to facilitate this. A key part of this is defining the transition between the highway infrastructure and local roads. These strategies include:

- Consider the broader context of the project including the roundabouts and the connections into Queen Street and Kangaroo Valley Road.
- Allow for a 2.5 metre wide shared path on both sides of the bridge that connects with the broader pedestrian and movement plan for Berry.
- Include a landscaped verge between the shared path and carriageway across the bridge.
- Include landscaping at the roundabouts that is consistent with the landscape character of Berry
- Use street lighting arranged to compliment the rhythm of the bridge and of a scale consistent with the local road network.
- Use ornamental tree planting to define and identify the space as a continuation of the Queen Street / Kangaroo Valley Road corridor.

Through an iterative design process the preferred alignment (both vertical and horizontal) was ultimately a balance between providing:

- The optimal road level that still provided 1 in100 year flood immunity.
- A safe horizontal radius for the road design speeds.
- The maximum offset from North Street that minimises impacts on the views to the ridges and escarpment.
- The minimum land take to ensure long-term viability and flood immune land for agricultural businesses.

This process is detailed in Chapter 3 of the environmental assessment.

The Illawarra Gully Wet Forest has been identified in the environmental assessment. The stand of trees is acknowledged and an appropriate landscape treatment would be developed in consultation with Council and affected landowners during the detailed design phase of the project.

Permanent screening of the permanent ancillary site at Tindalls Lane is proposed in the current concept plan. Refer to Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [Figure 3.11 page 22]. Mitigation of the visual impacts of the permanent ancillary site would be further developed during the detailed design phase of the project. There would be opportunity for ongoing input from stakeholders during this phase.

Noise barrier impacts and treatments

Stakeholder identification number(s)

41-43, 147, 175, 197, 215, Shoalhaven City Council and Kiama Municipal Council

Issue description

Submissions relating to the noise barriers raised issues regarding the visual impacts of the barriers and the proposed treatments. Specific concerns relate to potential loss of views, impact on views, the environmental landscape value and scale of highway related infrastructure.

In summary, the respondent(s) raised the following issues:

- The high noise barrier would obscure the view to the escarpment.
- Landscaping on North Street is important for screening however it would impact natural light, therefore the mitigation measures proposed are a 'trade off' which is not acceptable.
- Planting trees on North Street to screen views of the bypass is not an acceptable mitigation measure.

Landscaping treatments to mitigate visual impact, structures and noise barriers need to be effective and adjusted as construction is completed. RMS should continue to liaise with Council regarding landscape design improvements and treatments to mitigate the visual impact of structures (including shared footpaths and street furniture) and noise barriers at the Kangaroo Valley Road interchange and the interface along North Street. Ongoing maintenance proposals should also be discussed with Council.

Supporting structures of the southern and northern interchanges and noise barriers should reflect the character of the area.

- The noise barrier at Huntingdale Park Road would impose on the view of properties facing the barrier given the relative close proximity. The noise barrier would attract graffiti artists. Increased planting on both sides of the noise barrier to deter potential graffiti artists and ease visual impact should be considered.

Additional denser planting should be considered between the Huntingdale Park Road noise barrier and houses on Huntingdale Park Road to mitigate visual impacts.

- Concrete noise barriers are not the preferred form of mitigation of noise impacts to dwellings adjacent to the new highway. Retro-fitting the existing dwellings or through landscape earth mounding is the preferred mitigation measure.

The alternate solutions of noise attenuation for North Street shown in the environmental assessment report have been shown in section only, suggesting no change in profile for the full length (chainage 16300 to chainage 17600). The barrier must fulfil its sound attenuation function but it must not be a dominant element from either side. Some variation of form is necessary.

The two noise barriers proposed to the north of Berry, prior to the off-ramps into the township, should be designed by a professional designer and documented in the environmental assessment.

Response

One of the DGRs for the project was 'an assessment of visual significance of the area, including the escarpment and ridges and the township of Berry, and impact of the proposed alignment.' As part of the assessment undertaken and documented in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment, a contextual and landscape character analysis was undertaken, refer to Section 5 [page 36]. The visual connection to the escarpment and ridges and impact on this connection was illustrated in detail in Section 6.7 [page 54]. The concept design for the project supports the retention of the visual connection between Berry and the escarpment.

As detailed above, the adjustment of the alignment of the project further north away from North Street has assisted in reducing the impacts on the views to the ridges and escarpment. Three representative locations were assessed in regards to impacts on views to the escarpment and ridges. The view from just west of the corner of North Street and Edward Street represented the 'high impact' scenario. In this location there are impacts on the foreground and middle ground views but the views of the ridges and escarpment are not impacted on.

Whilst it is unlikely, the proposed landscaping could have the potential to impact on the 'natural light' of the residences on the south side of North Street. Consultation with residents during the detailed design phase of the project would be undertaken and a shadow study of the proposed design would be developed in order to minimise potential impacts.

The concept plan illustrates 'supplementary street tree planting on the northern side of North Street'. The intention of this planting is not to screen views of the bypass, but rather to enhance the streetscape of North Street and subtly reinforce the grid nature of the town layout. The design would be developed further during the detailed design phase of the project with input from the community and relevant stakeholders.

The objective of the concept design for the project is for any proposed noise barrier (on the North Street side) to be barely visible from North Street. The concept design proposes a response that utilises both mounding and planting to soften and blend any noise barrier into the middle ground landscape, leaving the open pasture foreground and allowing the eye to be drawn up to the dominant ridges and escarpment beyond.

RMS would liaise with Council and local residents to ensure that the development of the land between North Street and the project has a consolidated framework that considers the Berry Equestrian Centre, the pedestrian and movement plan and future asset management and maintenance requirements.

This approach for North Street would be consistent with approach for the southern interchange for Berry. The design framework puts in place the key requirements to retain a local scale character response. This includes the recommendation for use of locally sourced materials and culturally relevant planting.

It is agreed that the noise barrier on the eastern side of Huntingdale Park would have an impact on the outlook for residences. The outlook has been improved through the relocation of the north bound off-ramp away from Huntingdale Park Road (previously Huntingdale Park Road was the off-ramp). This change also means that the existing planted median within Huntingdale Park Road would be retained.

Other measures to further screen noise barriers, discourage graffiti and control access would be investigated during the detailed design phase of the project. Crime Prevention through Environmental Design principles would be applied to develop the optimum outcome. A potential art strategy and use of different (rough textured and/or vegetated) surfaces could be implemented and this would be discussed as part of the community engagement process during the detailed design phase of the project.

Currently no noise barriers are proposed in the Kiama local government area. In Berry, and the remainder of the Shoalhaven local government area, the need for noise barriers is determined in accordance with noise guidelines as outlined in Appendix E – *Technical Paper: Noise and Vibration* to the environmental assessment. The noise guidelines dictate which properties are eligible for architectural treatment.

For any noise barriers in Berry, the mitigation strategy is for the use of a locally relevant combination of earth mounding and walling (not necessarily concrete). The development of the noise barrier would be consistent with the requirements of RMS' 'Noise Wall Design Guidelines'. Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 89] lists a range of requirements for consideration in the development of appropriately integrated sound attenuation including:

- Use mounding to reduce the free standing height of the noise barrier. The mounding would have a maximum slope of 2:1 at pinch points with a preferred maximum slope of 4:1 generally.
- Establish a rhythm with the noise attenuation wall and its planting that reflects the Berry street grid.
- Use planting on the northern side of the noise barrier consistent with RMS planting guidelines. This would include a canopy and ground cover species consistent with the local landscape character.
- Use planting on the southern side of the noise barrier consistent with the existing character along North Street.
- Vary the treatment of the noise barrier, particularly on the on-ramps and off-ramps, to assist in the transition in scale and speed environment from highway to local road.
- Engage with the local community to: gather feedback as the design develops; foster broader community support and ownership for the design outcome; and facilitate integration with the existing pedestrian and movement plan for the township of Berry.

Consistent with the final point above, the community were involved in a series of workshops early in 2012. A consolidation of the findings of these workshops is included in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [internal Appendix A]. The detailed design of the integrated earth mound and noise barriers would be undertaken by a professional designer and documented as part of the requirements the Scope of Works and Technical Requirements. This process would involve ongoing engagement with the community and council.

2.13.3 Operation urban design / landscaping

Landscape character units / Illawarra Gully Wet Forest

Stakeholder identification number(s)

197 and 215

Issue description

Submissions relating to landscaping and revegetation raised issues regarding categorisation of landscape units and the recognition of the value and importance of the mapped Illawarra Gully Wet Forest.

In summary, the respondent(s) raised the following issues:

- The North Berry landscape sub-character units would be better identified as two separately identified landscape character units. Vegetation mapping in Appendix F - *Terrestrial Flora and Fauna* [Figure 3.1.9, Map 9] shows extensive Illawarra Gully Wet Forest in the middle section of the alignment at chainage 13000 to chainage 13950. This is the only forest area on the entire alignment.
- The area of forest from Austral Park Road to Tindalls Lane needs to be considered as a separate landscape character sub-unit (Berry corridor) and the remainder from Tindalls Lane to Broughton Mill Creek as Broughton ridge landscape sub-character unit. The visual impact assessment of North Berry should be reclassified.

Response

The environmental assessment identifies four key overall landscape character units within the project study area: Toolijooa Ridge; Broughton Creek; North Berry; and Berry. The identification of these character units is based on a combination of factors including, but not limited to, topography, land use and built form, vegetation cover and drainage corridors. The identification was not based just on vegetation mapping alone, although this was a consideration. The importance and value of the large tract of remnant Illawarra Gully Wet Forest is recognised. The concept plan for the project supports the reinforcement and enhancement of this tract of forest as illustrated by one of the key planting strategies which is the reinforcement of identified, prioritised and legislated flora and fauna corridors with indigenous and locally sourced provenance material wherever practicable. This is also the case for the reinforcement of the Riverbank Forest at each of the creek crossings along the corridor. The concept design objective would be to support the enhancement and improvement of the connection between the forested escarpment and hills and the Seven Mile Beach National Park. During the detailed design of the project, RMS would undertake targeted consultation with the relevant local community groups to determine a program for the supply of locally sourced seed and propagated plant stock to supplement the plant materials required for the project.

The landscape character and visual impact rating for the North Berry character unit considered the impacts on existing vegetation. The rating of high to moderate impact is appropriate given the overall project context and the ratings applied to the landscape character units within the projects.

Landscape vegetation species / timing

Stakeholder identification number(s)

170, 175, 194, 197 and 216

Issue description

Submissions relating to landscaping and revegetation raised issues regarding appropriate revegetation, indigenous sourcing of plant material, local consultation and the timing for planting.

In summary, the respondent(s) raised the following issues:

- Appropriate planting and revegetation is to be undertaken along the alignment to mitigate visual impacts caused by the highway and associated infrastructure.
- Only locally sourced indigenous species, from the tree list supplied to RMS by Berry Landcare, should be used for revegetation. Revegetation should be of an extended duration to ensure:
 - An adequate supply of plant material is available from local nurseries.
 - Planting can be avoided at times when the temperature would overly stress the trees.
 - Trees that do not survive can be replaced.

A minimum of two years pre-planning is required for the propagation and planting for the revegetation phase of the project.

Fast growing species, such as wattle, are only considered as nurse trees and they would need to be interspersed with more permanent species for effective long-term vegetative screening. The wattles would need to be removed at a later date.

- Landscaping of the alignment with evergreen trees and shrubs should be undertaken now.

Response

The urban and landscape design strategy as applied to the concept design for the project reinforces the local landscape character through a range of appropriate planting and revegetation methods. The concept design for the project blends the highway into the existing landscape character. The core recommended mitigation strategies that relate to planting and revegetation are identified in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* n [page 45] and include:

- Minimise the apparent width of the corridor through reinforcement of the existing landscape patterns and integration of the project with the existing landscape context.
- Integrate new vegetation with the existing landscape character and vegetation communities.
- Ensure that the appropriate footprint is developed as part of the project, including consideration of the construction footprint versus the final footprint.
- Integrate large fill embankments and cut slopes through re-establishing pasture grasses and culturally relevant planting.
- Define minimum design standards for the bridge structures.
- Engage adjacent land owners and community groups in assessing whether mitigation prior to construction (such as landscape planting) can be achieved to help soften or decrease likely impacts of the project.

The corridor is made up of a combination of landscape planting strategies including:

- The reinforcement of the rural pastoral character.
- The introduction of isolated native / indigenous plantings and trees in open paddocks.
- The reinforcing of riparian, creek vegetation and fauna underpasses and rope bridges.
- The use of ornamental tree plantings in and around the interchanges with Berry.
- The reinforcement of identified, prioritised and legislated flora and fauna corridors with indigenous and locally sourced provenance material.

- The engagement with local Landcare groups in the identification and clarification of current and or future targeted projects.

A landscape plan would be developed during the detailed design phase of the project in accordance with:

- The urban and landscape design concepts contained in the environmental assessment and Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*.
- RMS' 'Landscape Guideline' (RTA, April 2008).
- RMS' QA Specifications R178 (Vegetation) and R179 (Landscape Planting), R176 (Native Seed Collection - DRAFT).
- Relevant local Council guidelines and strategies.

In addition, any planting would be consistent with the recommendations of Appendix F – *Terrestrial Flora and Fauna* to the environmental assessment.

Consistent with other RMS major road infrastructure projects, a number of requirements related to an integrated soil and planting approach would be required as part of the Scope of Works and Technical Requirements for the next stage of the project and could include:

- A confirmed process for revegetation and engagement with relevant local Landcare Groups.
- A confirmed process for procurement of locally sourced or indigenous plant material.
- A construction environmental management plan including protection of existing vegetation.
- Adherence to the relevant RMS specifications regarding plant material establishment and maintenance⁵.
- A topsoil management plan and strategy.
- A bushland management and monitoring strategy.

While it is presently too early to define areas to be planted now, the early phases of detailed design may define possible locations for 'early planting works' that could be undertaken in advance of the major civil earthworks.

North Street

Stakeholder identification number(s)

175 and 185

Issue description

Submissions relating to North Street raised issues regarding the appropriate and integrated development of the proposed land between North Street and the proposed highway.

⁵ RMS require locally collected native seed to be used on projects. A lead time of up to two years may be required for procurement of some native seed species.

In summary, the respondent(s) raised the following issues:

- The shared pedestrian / cycle way on North Street is unnecessary as the street would become a cul-de-sac and pedestrian / cyclists could use the road.
- The shared pedestrian / cycle way adjacent to North Street would encourage littering and would take away resident privacy. Landscaping should be planted now.

Response

RMS would liaise with Council and local residents regarding the development of the land between North Street and the proposed highway, aiming for a consolidated framework that considers the Berry Equestrian Centre, the Berry Sportsgrounds, the pedestrian and movement plan and future asset management and maintenance requirements.

Should a shared pedestrian path / cycleway be determined as appropriate for North Street, appropriate associated facilities, including bins to discourage littering, would be included in the final design. Resident privacy would only be impacted by a potential increase in pedestrian and cyclists numbers, which is likely to be offset by a reduction in the number of vehicles on North Street.

While it is presently too early to define areas to be planted now, the early phases of detailed design may define possible locations for planting that could be undertaken in advance of the major civil earthworks.

Highway screening

Stakeholder identification number(s)

2, 8, 191, 192, 197 and 215

Issue description

Submissions relating to highway screening raised issues regarding visual mitigation, landscape integration at particular locations along the proposed project corridor.

In summary, the respondent(s) raised the following issues:

- Additional screen planting should be considered at Toolijooa Ridge. Planting should incorporate large trees in natural grade land above the cutting and should extend to chainage 7950 (south) and chainage 8800 (ridge line) and between chainage 8600 – chainage 8900 (south west). This mature canopy would re-establish the profile of Toolijooa Ridge.
- The batter of the Toolijooa Ridge cutting should be grassed and maintained to reduce visual impacts on nearby residences.
- The function, appearance, configuration and location of the sediment basin at a specific property should form part of the natural landscape.
- Tree planting, serving as a screen and habitat area, should be considered between and adjacent to both sides of the proposed turning circle near the entrance to a specific property and the new highway where the proposed cutting merges with the filled road..
- Impacts of the permanent ancillary facility on the visual amenity of Broughton Ridge should be mitigated by screening this permanent work area from the new highway and the surrounding landscape.

- The spoil excavated from the construction of the southbound on-ramp should be used to construct a 2.5 metre earth mound adjacent to the southbound on-ramp from the roundabout at Kangaroo Valley Road, behind Windsor Drive. The mound should be planted with screening vegetation (in addition to the existing gum trees) to reduce aesthetic and visual impacts at adjacent residences.

Response

The environmental assessment acknowledges that there would be a visual impact on views from the east back toward Toolijooa Ridge. Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* rates the sensitivity to change as having a high to moderate impact. Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [p46] recommends a number of strategies to minimise the impacts including:

- Close to vertical cuttings in the suitable rock.
- Keep the cutting benches at a consistent profile that matches the elevation of the roadway.
- Enclose the view at the end of the cutting to frame views.
- Rollout the top of the cutting at a maximum of 3:1 and establish pasture grasses.
- Establish vegetation to the top of the cutting to ensure integration with the adjacent landscape.

These activities would depend on practicability, eg rolling out of the cutting would be dependent on the rippability of the rock material.

These strategies have been illustrated in the Artist's impression in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 63]. Any additional / supplemental planting to screen Toolijooa Ridge outside of the project extents would need to be agreed with the relevant land owners.

While detailed design for specific sedimentation basins has not been included in the environmental assessment, it is intended that they would be integrated into the natural landscape topography and immediate landscape setting and context.

Tree planting for habitat in the vicinity of the entrance to a specific property is supported. The concept plan illustrates this and a cross section in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 21] shows open forest being reinstated between the project and the access road to the specific property.

The ridge above Broughton Creek on the south eastern side of the Tindalls Lane off-ramp would be planted with native trees and vegetation. There is also a need for tree planting around the permanent ancillary facility. Planting in both these areas is illustrated in the concept plan in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*.

Throughout the project, the large cut and fill embankments would be blended back into the landscape to ultimately reduce the overall visual impact and footprint of the corridor. This is a sustainable approach as it assists the project in balancing the cut and fill and therefore reducing and net transfer of material off-site.

Ramps and screening would also be integrated into the landscape where possible and this would be refined during the detailed design phase of the project.

The use of spoil for integrated mounding and revegetation is a key strategy throughout the project. In the area adjacent to the southbound on-ramp from the roundabout at Kangaroo Valley Road, behind Windsor Drive, the design of any earth mounds would consider:

- The slope, with 1V:3H being the preferred maximum slope for both the establishment of plant material and maintenance of the mound. A 2.5 metre high mound would require a footprint width of approximately 15 metres.
- Drainage from the mound and integration with swales and overland flow paths.
- Safe maintenance access
- The presence of existing trees, where mounding over existing root zone areas or against is not recommended.

2.13.4 Operational light spill

Stakeholder identification number(s)

169, 172, 175, 185 and Kiama Municipal Council

Issue description

Submissions relating to operational light spill raised issues regarding lack of general lighting assessment, proposed mitigation and potential light spill.

In summary, the respondent(s) raised the following issues:

- The environmental assessment does not adequately address street lighting impacts. Potential impacts from lighting on adjacent residential dwellings and the rural characteristic of the area should be minimised where possible.
- The mitigation measures proposed to address vehicle headlight impacts on North Street properties from vehicles travelling on the proposed bridge at Berry.
- Moving the commencement and ending of the on-ramps and off-ramps for the southern interchange at Berry further south would reduce the impact of light spill on North Street properties.
- Broughton Village properties would be affected by traffic and street lighting of the new highway and Austral Park Road interchange. The environmental assessment does not address this issue or proposed mitigation.

Response

A full assessment of lighting impacts during operation of the project was not undertaken as part of the environmental assessment. Lighting impacts were only discussed and assessed in terms of compliance with the relevant codes and standards.

As noted in the environmental assessment, lighting would only be required at interchanges, cross overs and merges. This would be designed to provide 'flag' standard lighting levels in accordance with 'AS/ NZS 1158 Public Lighting Code'. During the detailed design stage of the project, a lighting assessment would be undertaken and a lighting strategy and lighting design would be developed to minimise light spill and contain lighting within the corridor. The lighting assessment would include a headlight glare assessment.

The bridge at Berry would be designed to minimise vehicle headlight glare. As part of the headlight glare assessment, impacts of headlight glare on North Street properties would be considered.

Ramps and associated lighting have been designed in accordance with the relevant design standards. The detailed design of the lighting would also be developed with aim to minimising light spill and containing lighting within the corridor. Light fixtures would utilise cut off fixtures to minimise viewing of the light source.

No lighting is proposed on the bridge at Berry or along the general alignment except where the north bound and south bound ramps associated with the southern interchange merge with the highway.

Current lighting design standards only require lighting at interchanges. Therefore, the general alignment in the vicinity of Broughton Village does not require lighting and there would be no impact on Broughton Village properties from highway lighting.

2.13.5 Operation North Street buffer – uses/ treatment

Stakeholder identification number(s)

175, 185 and 208

Issue description

Submissions relating to the North Street buffer zone raised issues regarding the appropriate and integrated development of the proposed land between North Street and the proposed highway

In summary, the respondent(s) raised the following issues:

- The North Street green space buffer should be expanded to create a quality linear parkland between Kangaroo Valley Road and Bundewallah Creek / Camp Quality Park. The park should include landscaping, native vegetation for habitat, play areas, street furniture and appropriate facilities for dog walkers.
- There is potential for the North Street green buffer zone to be used as a car or coach park which would cause increased noise and pollution.

To allow the existing land opposite North Street to continue being used as a rural agistment area, fencing should be retained on its present alignment with a second fence approximately 14 metres from the road, at the base of the noise barrier. This area would equate approximately with the horse paddock presently adjacent to North Street.

If this is not possible, the fence dividing the bypass from North Street should be made non-intrusive by using materials similar to a chain wire fence. This fence could be erected at the top of the noise barrier or preferably, somewhere down the incline, so that the fence does not impede the remaining view.

Response

There are a number of options for the open space corridor between North Street and the project. The final use of this space would be determined in consultation with the owners and managers of this future land and the community, in order to provide the optimum outcome for Berry. The concept design illustrated in Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment aims to preserve the pastoral open space character, the function of the Berry Equestrian Centre and community sportsground facilities with the backdrop to the escarpment and ridges beyond, while presenting some opportunities for improved pedestrian circulation and amenity. The Berry Equestrian Centre is currently the subject of a separate master plan study being developed by Council in consultation with the Berry Equestrian Centre.

RMS would liaise with Council and local residents to ensure that the development of the land between North Street and the proposed highway has a consolidated framework that considers Camp Quality, the Berry Sportsgrounds, the Berry Equestrian Centre, the pedestrian and access movement plan and future asset management and maintenance requirements for the area.

The issues listed above are all valid recommendations that would be considered during the development of a consolidated plan for the area bounded by North Street, Woodhill Mountain Road, the proposed highway and the southern interchange for Berry.

2.13.6 Operational noise attenuation

Stakeholder identification number(s)

70, 85, 145, 147, 175, 185, 197, 215 and Kiama Municipal Council

Issue description

Submissions relating to attenuation of operational noise raised issues regarding visual impact, appearance, integration, heritage values and potential shadowing.

In summary, the respondent(s) raised the following issues:

- The visual impact of the two noise attenuation barriers to the north of Berry would be a defining feature for passing motorists and adjacent residents.
- The type, appearance and location of the preferred noise attenuation measures for properties affected by traffic noise from the project should be addressed.
- The Huntingdale Park Road noise barrier presents a design opportunity to reflect the heritage of Berry in an aesthetically pleasing manner, with community input and consultation.
- The environmental assessment description of the four metre high embankment on North Street as a 'ha-ha' is incorrect. A 'ha-ha' relies on a boundary dropping away, completely preserving a view with no synthetic barrier necessary at the point of separation.
- The proposed noise barrier on North Street would take away natural light and remove the view of the open paddocks and escarpment.

Response

The two noise attenuation barriers proposed to the north of Berry would be significant elements within the landscape. Working in close consultation with the other environmental specialists involved in the project, RMS and the community, the development of the concept design has been an iterative process with the prime objective of providing an integrated landscape based outcome. The combined mitigation strategies outlined in the environmental assessment seek to maintain the views and connection to the ridges and escarpment and the rural foreground landscape as the defining feature for residents and passing motorists.

At this stage of the design process the preferred noise attenuation measures for properties likely to be affected by traffic noise are detailed in:

- Appendix E – *Technical Paper: Noise and vibration* to the environmental assessment which illustrates the approximate extent of and height to meet the noise mitigation requirements
- Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [page 89] to the environmental assessment which describes the urban design guidelines and recommended mitigation strategies.

- Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [Section 3] to the environmental assessment which provides cross sectional illustrations of the concept design.
- Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* [internal Appendix A] which illustrates a range of options for sound attenuation and integration which were developed during community consultation sessions in 2012.

The proposed noise barrier at Huntingdale Park Road does present an opportunity to be part of an integrated art strategy that reflects the heritage values of the town. Any integrated art strategy would be developed as part of an ongoing consultation process and consider access, maintenance and curatorship of the noise barrier.

It is agreed that the use of the term 'ha-ha' in the cross section illustrated does not represent a conventional 'ha-ha' wall. The term was used based on the principle of concealing a barrier within a natural setting. The term 'ha ha' would no longer be applied to the barrier, but the principle of concealing the noise barrier within the landscape would still apply.

It is recognised that, whilst it is unlikely, the proposed landscaping could have the potential to impact on the 'natural light' of the residences on the south side of North Street. Consultation during the detailed design phase of the project would be undertaken and a shadow study of the design would be prepared. The impacts on the foreground views of the open paddocks would be impacted, however from North Street the views of the escarpment would not be further impacted on as illustrated by the study undertaken on [pages 56 – 61] of Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*.

2.14 Aboriginal cultural heritage

2.14.1 The avoidance of impact and the conduct of impact mitigation

Stakeholder identification number(s)

215

Issue description

Submissions relating to avoiding and mitigating impacts on Aboriginal cultural heritage raised issues regarding proposed impacts on culturally significant areas and discussed the proposed methods for managing those impacts, such as salvage excavation and the Unexpected Finds Procedure.

In summary, the respondent(s) raised the following issues:

- 'Little Mountain' or Dicky Wood's Battle Ground (G2B A13), historical encampments at Broughton Village, 'Brookside' Aboriginal Encampment (G2B A14) and the Toolijooa Ridge Aboriginal Cultural Landscape (TRACL) are sites of great importance to the local Aboriginal community. According to the statement of commitments, areas of these sites affected by the infrastructure would be excavated according to the 'Unexpected Finds Procedure'. Artefacts would be salvaged and the site recorded, but the site would be lost forever.

Archaeological excavation should be conducted early, and prior to construction, in those areas where impact is anticipated to allow for the possibility of avoiding development impact where warranted.

At the battleground and the encampment sites, disturbance to the natural soil profile would be minimised by raising the elevation of the proposed carriageway on imported fill. This means that the sites, if under the road would be covered and compacted forever.

The actual preservation of the sites is as important as the recovery of artefacts.

- The exact location, configuration and scope of the impacts within the construction ancillary facility sites is unknown. Where and if necessary, a delayed and focused pre-construction testing program should be conducted, once areas of planned and unavoidable impact have been defined.

Stakeholders have consistently proposed that monitoring by qualified Aboriginal sites officers is the most effective method of preserving cultural values inherent in artefacts which remain on-site after the completion of any required archaeological salvage excavations.

The request to undertake monitoring during construction is not supported by RMS. Therefore it is requested that the pre-construction testing program be done early enough to be able preservation of the sites by avoiding them if they are found to be in the path of the new infrastructure.

Response

Recordings G2B A13, A14 and the TRACL

The recordings of 'Little Mountain' or Dicky Wood's Battle Ground (G2B A13), historical encampments at Broughton Village, 'Brookside' Aboriginal Encampment (G2B A14), and the Toolijooa Ridge Aboriginal Cultural Landscape (TRACL), are all based primarily on ethno-historical evidence, oral history and contemporary representations from the local Aboriginal community. Although archaeological evidence has also been detected within these places through test excavation programs, the archaeological evidence to date, in itself does not demonstrate the significance and site characteristics derived from the cultural, oral and ethno-historic sources.

All of these recordings consist of large areas with indistinct boundaries, and in the case of the battle ground and historic encampment, the recorded area within which the site is likely to occur is broad. An exhaustive program of test excavations to definitively identify the extent and nature of any potential archaeological records across the identified areas is not considered feasible and would be enormously destructive.

Archaeological test excavations were conducted in areas of moderate and high archaeological potential in portions of these recordings which occur within the proposed construction footprint and as a result salvage excavation prior to construction has been recommended. The objective of the test program was to characterise the nature of the archaeological record so that an appropriate management strategy (such as salvage excavation) can be proposed.

Submissions included discussion around a number of worst case scenarios which could be expected as a result of the project across these recordings and it is also stated that the archaeological investigations to date have been inadequate to provide confidence that such scenarios would not occur. Responses to each scenario are as follows:

- The oral report of a ceremonial ground situated somewhere on Toolijooa Ridge is mentioned. The location of this reported ground is not known and could conceivably have been located anywhere across the ridge, its associated spurs, and slopes, which is an area of over 1000 hectares. Without the rare survival of fragile physical evidence such as carved trees, stone arrangements or ground relief features, such sites may only be identifiable using ethno-historical records or a detailed oral history. It is known from the archaeological survey conducted that there is no such evidence within the small portion of the ridge that would be impacted by the project. The section of the ridge that would be impacted by the project has already been substantially impacted by the existing highway, land clearance, farm buildings, access roads, agriculture and pasture development. The placement of the project across any other section of the ridge would be likely to impact a less disturbed landscape, and therefore a potentially more intact archaeological resource. The current alignment across the ridge represents the best surface option for minimising the impact to cultural heritage values.

- The possibility of encountering evidence of mid to early Holocene occupation (ie 5000 – 10,000 years ago) is mentioned in relation to the Brookside historic Aboriginal encampment. Despite the alluvial context, it is a very rare occurrence to encounter such deposits, especially in open contexts (ie not in a rock shelter). Any such potential is present across the entirety of the Broughton Creek alluvial plain and would be present which ever project traverse was adopted. The location of the historic encampment, relates to the recent past and the current creek alignment. There is no surety that the creek was in its present position in the mid and early Holocene.
- The possibility of encountering burials is mentioned in relation to the Dicky Woods Meadow Battle Ground. Burial sites within alluvial plain contexts are a rare site recording. Most burials on the south coast are found near the mouths of estuaries, naturally elevated sand bodies, coastal middens and in rock shelter deposits. The environmental assessment however acknowledges that the potential for encountering burials in the area of the battle is greater than would normally be expected in similar landforms. Section 7.7 of the environmental assessment and Recommendations 12 and 13 of Appendix J – *Technical paper Aboriginal Cultural Heritage* to the environmental assessment, propose a strategy to manage this potential which includes salvage excavation in areas of direct ground disturbance (such as at bridge piers), and minimising disturbance to the natural ground deposits during the placement of fill. The overlaying of a burial with fill (even if the presence of the burial remains undetected), despite some degree of compaction, is considered to be a preferable outcome by the Aboriginal community, than its direct disturbance from construction impact. Given the broad area involved, and the likely unpredictable arrangement of any burials, a change to the proposed alignment to avoid an exposed burial is a counterproductive strategy as the new alignment may also include burials. The selection of an alignment without the potential for burials would require either the conduct of archaeological excavation at an unfeasible scale, or the selection of a new project corridor away from the Battle ground recording. The latter would require a re-analysis of the eastern half of the project route.

Avoidance of impact and the conduct of salvage excavation and the Unexpected Finds Procedure (UFP)

RMS is committed to the avoidance of impact to Aboriginal sites wherever feasible and where warranted by their significance. The RMS acknowledges however that due to the nature and distribution of the archaeological evidence of Aboriginal occupation, it is not possible to avoid impact to all sites when constructing a large linear infrastructure development such as the project.

RMS is committed to the conduct of salvage excavations well in advance of the commencement of construction impacts. This is documented in Section 7.7 of the environmental assessment and Recommendations 8, 13 and 23 of Appendix J – *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment.

The methodologies for salvage excavation and RMS' 'Unexpected Finds Procedure' (which is provided at appendix M of Appendix J– *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment) employ distinct actions and are conducted with different objectives, in different procedural contexts. Salvage excavation is a strategy for managing impact and is conducted following an assessment of the archaeological deposit and prior to construction. The presence of the deposit and its likely nature are known or predicted factors. The 'Unexpected Finds Procedure' is followed when an unexpected archaeological find is encountered during construction. The procedure includes an assessment component and then the formulation and conduct of a management strategy including provisions to avoid further construction disturbance to a find if such a strategy is warranted. . Both salvage and 'Unexpected Finds Procedure' excavations are directed by suitably qualified archaeologists.

Except in rare cases where archaeological remains of unanticipated (exceptional) significance are encountered, the conduct of salvage excavation is recommended, based on an understanding that construction impact would occur in the immediate area. In areas where salvage would be required across the construction footprint, the strategy of changing the proposed alignment would be counterproductive as the potential for impact in an adjusted alignment is likely to be similar or possibly worse. This is because the archaeological deposits extend beyond the footprint into adjacent areas. Any potential re-alignment of the project during detailed design would be expected to be only minor and therefore likely to impact adjacent archaeological deposits.

In the event that an unanticipated find is of exceptional significance, the defined process in the 'Unexpected Finds Procedure' for the assessment and development of a mitigation strategy would be followed.

2.14.2 Management of impacts across ancillary areas

Stakeholder identification number(s)

252 and 215

Issue description

Submissions relating to ancillary areas raised issues regarding the management of Aboriginal heritage impacts associated with the use of ancillary areas.

In summary, the respondent(s) raised the following issues:

- Wherever possible, placement of temporary ancillary facilities should avoid impacts on areas containing Aboriginal cultural heritage values.
- Temporary (ancillary area) sites should be covered with road base so that the natural soil profile is not disturbed.

Response

The identification and management of potential Aboriginal heritage impacts within ancillary areas is discussed in Section 7.7 of the environmental assessment and in Section 11.1.3 (pp.141-143) of Appendix J – *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment.

The selection of temporary (or ancillary) works areas, would be conducted with the aim of avoiding or minimising impact to Aboriginal sites according to the recommended strategies presented in Appendix J – *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment (Recommendations 21 – 23, Section 11.2, pp.146-147. These include preferential selection of sites in low potential areas, preferential avoidance of areas of moderate to high potential, minimisation of impact through the use of overlying gravels (road base or 'hard stand' gravels), and the conduct of test and salvage excavation where impact is considered unavoidable. It is unlikely that adoption of these measures would avoid impact to all Aboriginal archaeological traces, however any impact to moderate and high value sites would, as a consequence, be avoidable or at a minimum, substantially reduced.

The environmental assessment noted that the use and effectiveness of temporary ground barriers as a means to protect overlain archaeological deposits is a technique subject to on-going review and improvement (Appendix J– *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment, Section 11.1.3, p.143). Recent deployment of this technique by RMS on the Woomargama bypass revealed limitations and potential areas for refinement. As part of the design and deployment of temporary ground barriers for the project, RMS would seek to address recently identified limitations of the technique. This may involve refinement of the technique, following due consideration of local conditions. The deployment of barriers and temporary hard stands would be coupled with a selective program to test and review the effectiveness of the strategy. Such a program would be conducted on a sample of ancillary sites. (Section 11.1.3 Recommendation no. 22b in Appendix J– *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment, p.147).

2.14.3 Procedural compliance and preparation of an Aboriginal heritage management plan

Stakeholder identification number(s)

252

Issue description

Submissions relating to compliance raised issues regarding compliance with the procedural requirements of government authorities and the preparation of an Aboriginal heritage management plan.

In summary, the respondent(s) raised the following issues:

- Copies of any survey assessments, test excavation results or salvage reports and associated OEH Aboriginal site recording forms for further archaeological investigations undertaken as part of the project must be submitted to the OEH for inclusion on the Aboriginal Heritage Information Management System database.
- The recommendations outlined in Appendix J Aboriginal Heritage, Section 11.2 should be incorporated into the Statement of Commitments, project approval and included, as appropriate, within a project specific construction environmental management plan or relevant Aboriginal heritage management plan. These plans should be prepared in consultation with the OEH and registered Aboriginal stakeholders and approved by the Department of Planning and Infrastructure prior to the commencement of construction activities.
- An Aboriginal heritage management plan should be prepared for the project.

Response

RMS would submit copies of any survey assessments, test excavation results or salvage reports and associated Aboriginal site recording forms for further archaeological investigations undertaken as part of the project, to the OEH for inclusion on the Aboriginal Heritage Information Management System database.

The recommendations outlined in Section 11.2 of Appendix J – *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment are incorporated into the Statement of Commitments and would be carried through to project approval and included, as appropriate, within a project specific construction environmental management plan or relevant Aboriginal heritage management plan.

These plans would be prepared in consultation with the OEH and registered Aboriginal stakeholders⁶, and approved by the Department of Planning and Infrastructure prior to the commencement of construction activities.

An Aboriginal heritage management plan would be prepared for the project and would include but not necessarily be limited to:

- An outline of protection measures to avoid impacts to Aboriginal cultural heritage values.
- Specific measures to be applied to works undertaken in close proximity to identified Aboriginal objects and areas of Aboriginal cultural value to minimise and avoid impacts on these areas.
- An outline of any test excavation and/or salvage collection / excavation (by either surface collection or archaeological excavation) that is required to be undertaken.
- An outline of the procedure required if any development or any ancillary works are proposed for areas outside of those areas identified within the environmental assessment.
- An outline of the process that would be followed for continuing consultation with registered Aboriginal stakeholders and OEH.
- An outline of the process for how the Aboriginal heritage management plan procedures would be managed and adhered to during the operational life of the project.
- Procedures that would be followed should an auditing program detect an impact on any known and/or any previously unidentified heritage object/area discovered during construction.

2.15 Non-Aboriginal (historic) heritage

2.15.1 Heritage value and visual significance of the project area

The Berry landscape and context

Stakeholder identification number(s)

41, 215, 223, 234 and Heritage Council of NSW

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the heritage value of the project area including the potential loss of heritage and visual significance of the area.

In summary, the respondent(s) raised the following issues:

- The highway is too close to the Berry town centre and would cause increased visual impacts to Berry. An assessment of the visual significance of the area, including the escarpment and the cultural landscape setting of the town is required. The assessment should also consider the impacts of the project on historic heritage values and the need to minimise impacts on the buffer zones of the township as stated by the National Trust of New South Wales.

⁶ Only sections of the plans relating to Aboriginal heritage management would be reviewed by Aboriginal stakeholders.

- The history of Berry and its present setting between the northern escarpment and the coast have been completely ignored by RMS. It is important to recognise the value of Berry within a late nineteenth century, early twentieth century rural agricultural landscape and the concept of “amenity” should be applied to the town’s heritage as a whole and not simply focus on specific parts of the town’s heritage value, eg the relatively small shopping precinct of Queen’s Street. Mitigation strategies for visual impacts focus on reducing impacts from the town viewed to the north and north-west. However, these strategies ignore the fact that people in Berry value other perspectives.
- The importance of the Coastal Landscape in the culture of Berry and its surrounds is confirmed by various Government and other Agency classifications. This increases the sensitivity of impact on all landscape issues. There would be impacts on the significant Southern Illawarra Coastal Plain and Hinterland Cultural Landscape due to the visual and structural impact of the carriageway formation, deep cuttings, and visually obtrusive embankments. The proposed concrete, large modern structures are intrusions that conflict with the intimate historic values of the town and the environmental assessment does not provide any mitigation measures to manage this impact. The construction of a bypass of Berry avoids the need to widen and transform one of the town’s primary historic grid streets to accommodate the through highway traffic.
- Consideration should be given to the impact of the northern option on the coherence of the town as a historic entity in its entirety from the cemetery at the Kangaroo Valley Road end of town to the Pullman Street precinct.
- In areas, the highway design has been refined to take account of some heritage impacts, for example, the moving of the bridge location over Broughton Mill Creek away from the ‘Mananga’ Homestead a Queen Anne style homestead (Berry Estate Manager’s Residence) built in 1894. Other items such as intersections and roundabouts, and the alignment in general, have also been moved in order to lessen heritage impacts.
- Support for the statement in Appendix K Non-Aboriginal (Historic) Heritage, Section 10.9 to avoid direct impacts on the two cultural heritage sites G2B H48 and G2B H54 by positioning of the ancillary structures.
- Disagreement with two statements in the environmental assessment under the heading of ‘Project aspects which respect or enhance the cultural landscape values’:
 - Building a four to six lane visually dominant, ‘contrasting and modern road form’ along a route that would ‘follow the original corridor of the first European road constructed for vehicles between Berry and Gerringong’ (in 1856) would somehow imbue it with ‘historical and functional integrity’.
 - By simply not needing to widen one of the ‘grid’ streets to build the highway, Berry would be saved from an action that might ‘irrevocably change the amenity and heritage character of the town’.

Berry is considered a thriving rural town and severe impact on heritage items may outweigh any project benefits.

Response

Visual impacts

The environmental assessment presents an analysis of the visual and landscape values of the Berry township and its landscape context within section 7.8 of the environmental assessment and Sections 5.3, 7.3, 9.4 and 9.5 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* (NOHC 2012) to the environmental assessment. This analysis draws upon the analysis and recommendations made by the National Trust of New South Wales (refer Sections 5.3.1 and 5.3.2, pp.71 – 74, Appendix K). The project traverses buffer zones defined by the National Trust (NSW) (refer Figure 9.2, p.116, Appendix K) and strategies for the minimisation and mitigation of impacts to the cultural heritage values of the buffer area are presented in Sections 9.5 and 10.8 of Appendix K.

RMS acknowledges that the project would impact upon visual and contextual landscape values around Berry, which can be mitigated to varying degrees, but there are likely to be some residual physical and contextual changes. Section 10.8 of Appendix K of the environmental assessment proposes recommendations for reducing impacts to visual and landscape components of cultural heritage including:

- Amelioration of adverse visual impacts generally.
- Establishment of appropriate vegetation.
- Incorporation of artistic elements with the use of heritage related materials and local heritage themes reflected in interchanges and structures such as bridges and noise barriers. If feasible this would provide a means for reducing visual impact and acknowledging the heritage values of the surrounding landscape.
- Minimising the obstruction of views from Berry of the surrounding pastoral landscape.

Additional analysis with regard to landscape character and visual amenity is provided in Section 7.6 of the environmental assessment, and Appendix I – *Technical Paper: Urban Design – Landscape Character and Visual Assessment* of the environmental assessment. This analysis includes artist impressions of the project as seen in outward looking views from the northern edge of Berry (for example Figures 42, 44, 46, 48 and 50, in Appendix I – *Technical Paper: Urban Design – Landscape Character and Visual Assessment* of the environmental assessment, internal Appendix A). Except in cases where the viewer is immediately adjacent to noise abatement treatments, the escarpment and associated slopes remain visible above the project. The project itself would be obscured from view by a noise abatement structure which on the Berry (south facing) side, would be landscaped to be consistent with the character of the surrounding area.

The impact of the project on views outwards from the town, to the north and northwest, are considered an appropriate focus of the environmental assessment due to the proposed alignment, and the importance of views to the north and west of the town (of farm lands and the more distant escarpment and slopes) in the maintenance of the landscape character of the town and its context.

The visual impact of the project from a less town-focused perspective is described and assessed in Sections 9.4 and 9.5 of Appendix K– *Technical Paper: Non-Aboriginal (Historic Heritage)* to the environmental assessment. This analysis covers impacts to other view-sheds and wider perspectives across the coastal plain.

RMS acknowledges that the project would pass close to Berry and this is associated with visual and contextual impacts. The proximity of the project to the town is a consequence of multiple balanced factors, including:

- Concern that an alignment where the town is not readily visible would reduce the number of motorists who would chose to turn off the bypass and visit the town.
- A requirement to reduce property severance and maintain the viability of properties on the northern side of Berry.
- Minimisation of impact to cultural heritage and ecological values.
- Utilisation of a crossing point under Kangaroo Valley Road, just east of Huntingdale Park Estate.

Previous landscape classifications

The heritage landscape area identifications noted have been recognised and described in the environmental assessment (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*), section 4.2, p.52). The content and significance associated with these landscape areas has been incorporated within the assessment of the Southern Illawarra Coastal Plain and Hinterland Cultural Landscape (SICPH CL) which incorporates the project and most of the previously defined areas. The SICPH CL was found to have local significance across all assessment criteria (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*), section 7.2, p.102) and the recommended mitigation strategies for the SICPH CL draw upon the previously identified landscape values.

It is noted that none of the previous heritage landform identifications have been acknowledged or formalised by inclusion onto statutory listings by government agencies. The Berry District Landscape Conservation Area and Berry Township Urban Conservation Area have both been defined by the National Trust (NSW). The Berry – Bolong Pastoral Landscape was defined in a Shoalhaven City Council Heritage Study, but has not been recognised or listed in the Shoalhaven Local Environmental Plan or any other planning instrument or heritage listing.

Cultural landscape values

The impact of the project on the cultural heritage values of Berry and its landscape context is an important part of the cultural heritage assessment in the environmental assessment. The assessment includes both consideration of individual heritage items and consideration of the landscape as a whole, through the identification of the SICPH CL (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*), Sections 7 & 9). The SICPH CL recording recognises the visual, historic and functional importance of Berry within this landscape and the interrelationships between the town and its contextual landscape.

The importance of treating the town as a coherent historical entity, extending from Pulman Street in the east, to the Cemetery off Kangaroo Valley Road in the west has been considered during the development of previous landscape evaluations, including the National Trust (NSW) classifications which recognised a core historic subdivision area - comprising the early Pulman Street precinct and the later 1880 street grid west of the creek, and a surrounding buffer area. These divisions are recognised and incorporated within the environmental assessment evaluation of the SICPH CL. It is pertinent to note that the cemetery is not included in either of the National Trust (NSW) area classifications (refer Figures 5.7, and 9.2, p.74 and 116, Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*). This is likely to be due to its location outside of the nineteenth century street grid for the town, and to the surrounding mid to later twentieth century urban development. Despite its obvious historical and social connection with the town, the cemetery falls outside of landscape classifications based on heritage characteristics. The alignment of the project to the east of the cemetery (ie between the cemetery and town), is a consequence of utilising the North Street corridor and the existing southern highway approach to the town. This alignment impacts only the northwestern edge of the town's 1880s grid urban subdivisions, and leaves the majority of the grid intact and contiguous with the Pulman Street precinct (refer Figure 5.8, p.76, Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*).

The wider historical and geographical context of Berry is reviewed in the environmental and historical context sections of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* of the environmental assessment (Sections 3 and 4 pp.13-58). The importance of this context is recognised in the environmental assessment both through the analysis of historical significance criteria (Section 7 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*)) and the identification of the SICPH CL.

Questions around the validity of two statements in the environmental assessment which seek to identify positive aspects of the project on cultural landscape values can be clarified as follows. The first states that there is cultural heritage value in the functional continuity of a bypass which utilised the same general alignment of the original Berry Estate road in the 1850s. It is acknowledged that the physical nature of the project would contrast strongly with that of the former nineteenth and twentieth century roadways. However, function and physical form can have separate heritage values which need not be co-dependent and the continued use of the corridor as the main terrestrial local transport route maintains the original function and historical integrity of the corridor - originally selected by the Berry's as their main estate road. Continuity in function, regardless of physical change is often recognised as a cultural heritage value.

The second statement is that the proposed bypass of Berry would avoid the high degree of heritage impact that would result from widening one of the existing Berry streets to accommodate increased highway traffic. While it is acknowledged that this is a comparison with a non-bypass option, this point is considered valid because all bypass options would result in some level of impact.

It is acknowledged that the two statements contradict each other – continuity of function, through the use of the original highway corridor, could conceivably justify upgrading the existing highway route through Berry, which would result in a high degree of impact to the adjacent heritage buildings. In this instance it is important to make a distinction between the corridor and the actual path of the highway. An upgraded highway may follow the same corridor of an original road alignment without necessarily directly impacting that road or related buildings. Improvements in highway capacity, standards and design would in most cases make the use of the exact original alignment impossible. Despite the fact that the project would bypass the town of Berry, its approaches follow the original corridor and the bypass serves the same function as the main access to and from the town.

Impact on a large number of heritage items

The environmental assessment measures impact according to the significance of the heritage values affected, rather than the number of items subject to impact (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, Sections 7 and 9). This follows statutory requirements and established professional practice. Consideration of the number of items to be impacted does not provide a reliable measure of the severity or acceptability of the overall impact, but it can however provide a degree of confidence in the thoroughness of the assessment conducted. Given the nature and history of the study area, it would be difficult to select any project alignment which did not encounter a similar number of heritage items, given the conduct of comprehensive survey.

The selection of the project alignment has incorporated many revisions with the aim of avoiding and reducing impact to known heritage items and precincts. These are outlined in Section 1.3 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* (p.5) of the environmental assessment. The avoidance of these items is a primary measure of an appropriate design process and is a factor which is hidden when simply considering the anticipated impacts of the proposed alignment.

Toolijooa Ridge and the painting by Lloyd Rees

Stakeholder identification number(s)

70 and 145

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the visual impact of the proposed Toolijooa Ridge cutting and specifically impact on cultural values arising from the depiction of the ridge in famous landscape paintings.

In summary, the respondent(s) raised the following issues:

- The proposed cutting at Toolijooa Ridge would create 'a large scar on this beautiful landscape' visible to train passengers on the South Coast line, and motorists on the Gerringong – Gerroa road. This landscape, and the views to be impacted, has cultural significance, due to it being a source of inspiration for and the subject of, two of 'Australia's most famous landscape paintings': 'The Road to Berry' by Lloyd Rees, and a picture by Brett Whiteley of the same name. It is recommended that the cutting and views to the cutting be screened with large native trees to 'restore the line of Toolijooa Ridge'.

Response

The environmental assessment acknowledges that the proposed Toolijooa Ridge cutting would have a substantial impact to the visual and cultural values of the ridge and surrounding landscape (Appendix J– *Technical Paper: Aboriginal Cultural Heritage*, section 10.4.2, p.127; Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, section 9.4, p.113ff). This impact can be minimised and mitigated to a certain extent through appropriate construction design and the strategic establishment of vegetation. The establishment of native vegetation as a strategy to mitigate the visual impact of the cutting is one of several management actions recommended within the environmental assessment (Appendix J– *Technical Paper: Aboriginal Cultural Heritage* sections 11.1.2 and 11.2, p.139, 145 and 146; Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, sections 9.5 and 10.8, p.117ff and 130).

Several submissions share a view that a painting by Lloyd Rees entitled 'The Road to Berry' (**Figure 2-2**) is based on a view of the Toolijooa Ridge. It is difficult however to match the painting's arrangement of ridges, slopes and the left curved road alignment with any actual view across the Toolijooa Ridge (**refer Figure 2-2**). A review of the evidence provides a strong case for an alternative interpretation – that the Rees painting was inspired by a view, looking west, of the Willow Vale ridgeline, from a point just west of Gerringong in the area of the Cooked River. Key similarities in landscape form and arrangement are illustrated in **Figure 2-3 and Figure 2-4**.

The landscapes of the Illawarra, and particularly around Gerringong where Rees owned a holiday home, were a favoured subject and source of inspiration for Rees. A compilation of landscape art of the Illawarra regions lists 98 works by Rees, from the 1930s to 1980 (<http://www.uow.edu.au/~morgan/illart5.htm#Index>). 'The Road to Berry', purchased by the Art Gallery of New South Wales in 1947, (and ascribed the same date of origin), is described in gallery notes as being painted in Gerringong 'looking into the distance towards the road that led to Berry'. Rees noted that:

"The road to Berry' is a tiny picture I remember painting from under a copse of trees ... and I just remember a small canvas and a sort of rhythmical movement that just happened" (<http://m.artgallery.nsw.gov.au/collection/works/7940/>).

This painting influenced many subsequent painters, including John Olsen and Brett Whiteley. Whiteley drew his own version of the work in 1985 in homage to Rees (<http://m.artgallery.nsw.gov.au/collection/works/62.2006/>). The similarities in landform arrangement (**refer to Figure 2-3 and Figure 2-4**) and the documentation indicating that this is a view from Gerringong, all support a case for the pictured view being the Willow Vale ridgeline. This ridgeline is outside of the project area. If this interpretation is accepted, it follows that the cultural values that may be invested in the pictured view and the corresponding landscape would not be impacted by the proposed Toolijooa Ridge cutting.

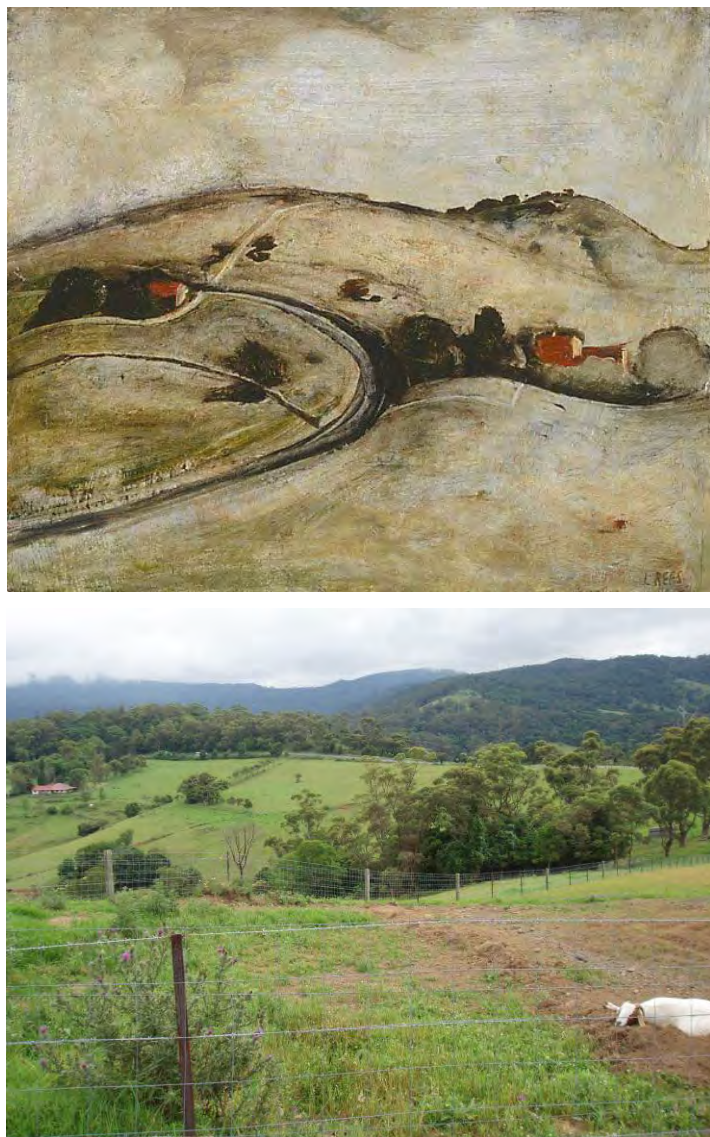
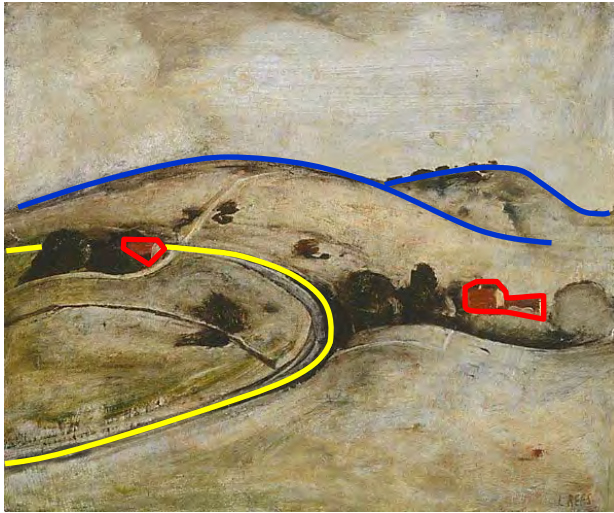


Figure 2-2 Top: Painting by Lloyd Rees 'The Road to Berry' 1947 Art Gallery of New South Wales (<http://m.artgallery.nsw.gov.au/collection/works/7940/>) Bottom: Comparison with the only portion of left curved road across Toolijooa Ridge with an up-slope view orientation.



The original 1947 painting by Rees with diagnostic landscape elements highlighted in blue, yellow and red

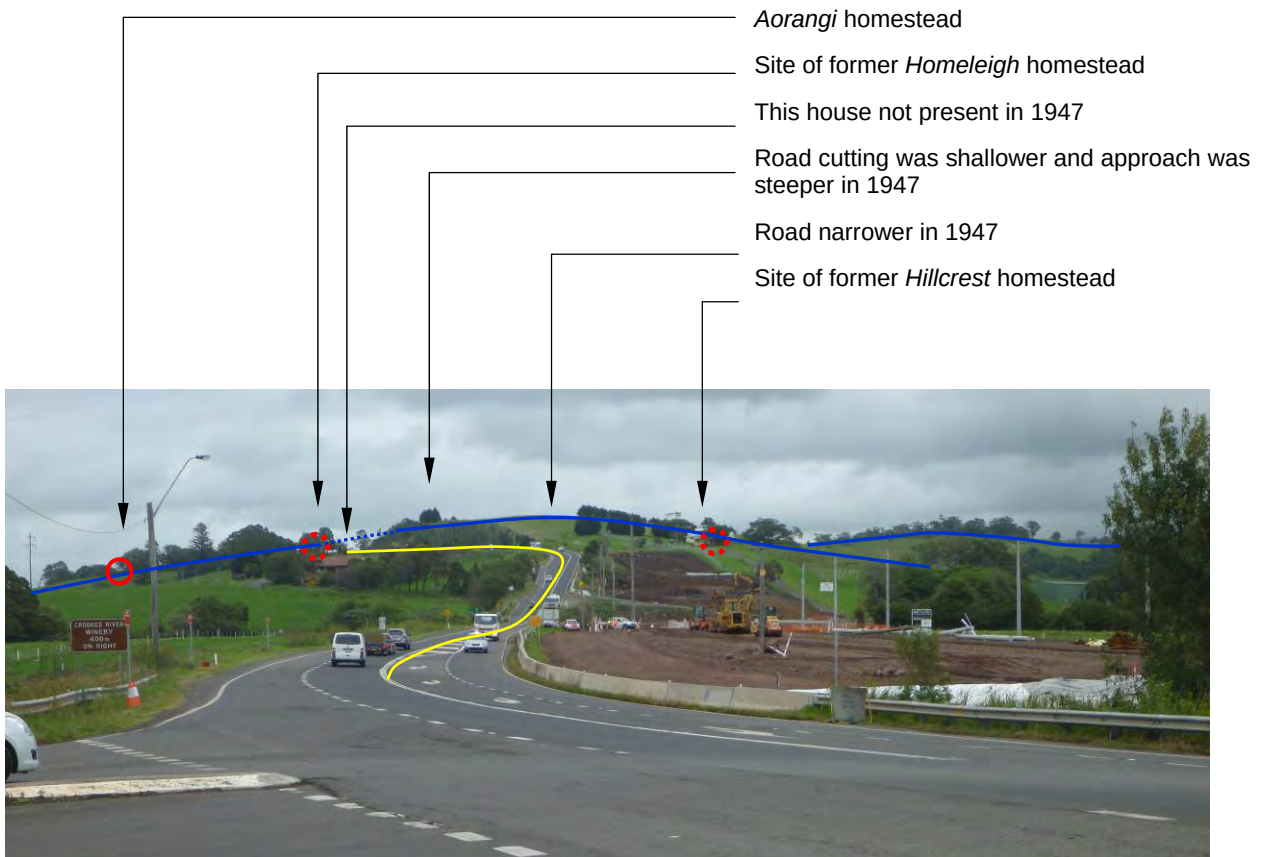
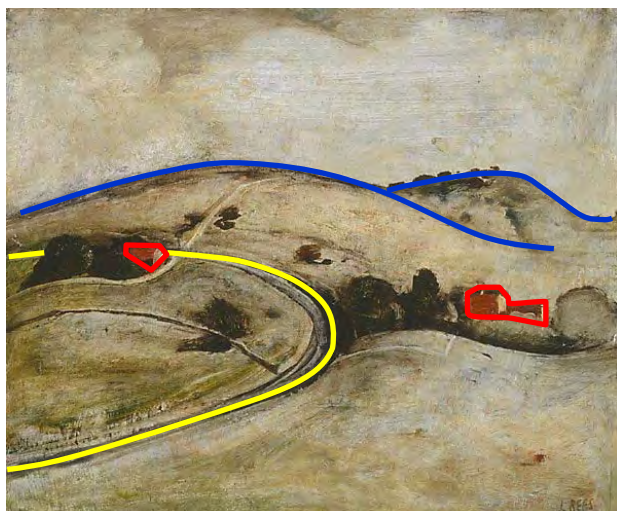


Figure 2-3 Comparison of the 1947 Rees original (top) with contemporary views (Feb 2013) looking west from Gerrington, toward the Willow Vale ridge in the background.



The original 1947 painting by Rees with diagnostic landscape elements highlighted in blue, yellow and red

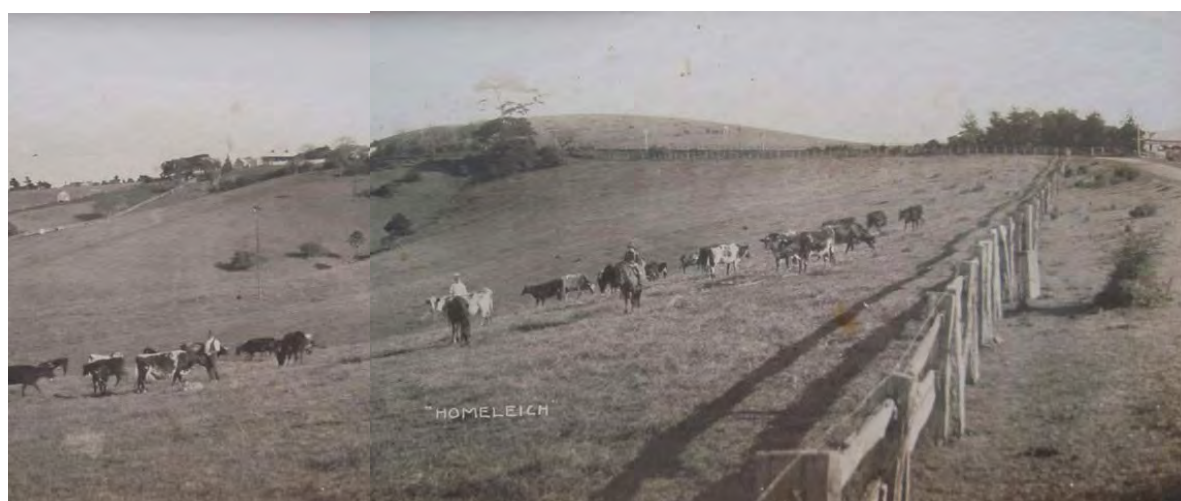
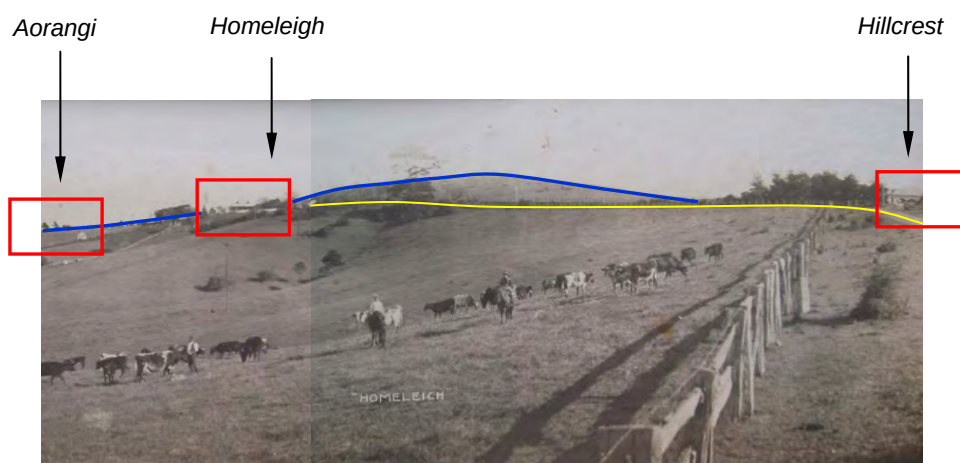


Figure 2-4 Extract from a 1920s panorama photo, looking roughly west along the highway from a point just west of Gerringong. This view predates the 1936 Gerringong bypass which replaced the road bend at the far right with a more regular curve (From a photo of the 'Homeleigh' property by R.P Moore 379 Kent St Sydney, in the collection of Geoff Bailey, Gerringong). Note that in common with the Rees painting, tree cover is concentrated around the homesteads and the hillsides are relatively bare.

Norfolk Island pines

Stakeholder identification number(s)

192

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the potential heritage value of a pair of Norfolk Island Pines close to the highway

In summary, the respondent(s) raised the following issues:

- Two distinctive Norfolk Island pine trees are located at HF70 and are believed to be 130 years old and part of the original planting that was gifted to the Berry community by Alexander Berry and may be of some heritage value.

Response

The two trees identified are situated on, or very close to, the southern boundary of the current highway easement, about 500 metres west of the intersection of Austral Park Road (**Figure 2-5**).

If an age of 130 years is correct, then their planting (in 1883) would have been a result of the administration of the Berry estate by John Hay, who took over from David Berry from 1883. David died in 1889 and his elder brother, Alexander, died in 1873. This pair of trees is clearly a deliberate planting, however the reason for their placement remains a mystery and they do not appear to relate to a former property entrance or driveway. Despite their proximity to, and parallel alignment with, the former Berry Estate road (which at this point corresponds roughly with the existing highway), it is unlikely that they are old enough to date to this period (ie 1856 – 1870s).

A review of aerial photography from 1958 indicates that the trees were substantially smaller than their current size and height. The substantial degree of growth evident since this photograph would be unlikely if the trees had already been in the order of 90 years old (ie planted in 1883).

The diameter of the trees at 1.5 metres above ground are 820 and 870 millimetres and a review of other specimens of a known age in the region would suggest that the diameter growth rate of Norfolk Island pines is about ten to 11.5 millimetres per year. Based on these rates, the two trees identified would have been planted between 1929 and 1940.

Both trees were noted during archaeological surveys of the project alignment, however their limited age and the absence of any related features or history which would allow the identification of heritage significance, meant that they were not considered to reach a threshold that warranted identification as heritage items.

The trees are situated on the proposed toe of the slope of the platform supporting the project carriageway which is elevated above the natural ground level at this point. In the event that the retention of the trees in this proposed development context is assessed to be feasible during the detailed design phase of the project, taking into consideration safety standards for the project, and the long-term health of the trees, then all reasonable efforts would be made to conserve the trees live and *in situ*.



Figure 2-5 View of the two Norfolk Pines, looking southwest, referred to by a respondent as potentially having heritage value (2009 image).

Impact on historical significance of 'Glenvale'

Stakeholder identification number(s)

78

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the impact on the historical significance of Glenvale.

In summary, the respondent(s) raised the following issues:

- Project impacts on a historic property known as 'Glenvale' should be minimised. The 'Glenvale' farm complex is a heritage item under the *Shoalhaven Local Environment Plan* (1985). Its significance, as a Berry tenant cottage, with both the residence and out buildings together with the working farm, and for its contribution to maintaining the Berry pastoral landscape, is identified as having State significance in NSW in the Shoalhaven Heritage Study. The Illawarra Regional Strategy requires planning authorities to protect these landscapes given their importance to agricultural sustainability.

Response

The 'Glenvale' homestead and outbuildings are identified as heritage item G2B H45 in the environmental assessment (refer Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, internal Appendix G, pp.93-96). The listing of this item and the associated property on the Heritage Schedule of the *Shoalhaven Local Environmental Plan*, and *Shoalhaven Heritage Study* is noted in Sections 4.2.1 and 4.2.2 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, p.58 and 56, also internal Appendix A, p.A-5). The environmental assessment found this item to have local significance under criteria (e), (f) and (g).

The project would not directly impact the G2B H45 buildings or their immediate surroundings. However, some portions of the property would be directly impacted due to the straightened alignment of the project along the current highway which constitutes the southern boundary of the *Glenvale* property. This impact would include some nineteenth century road and highway remnants (G2B H23, G2B H22 and G2B H21).

The potential for the project to impact the cultural landscape values of the *Glenvale* property are recognised in the impact analysis for this item (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, internal Appendix I, pp.57-59). Strategies for the minimisation and mitigation of landscape impacts along the southern boundary of this property are covered in the recommendations relating to the SICPH CL (Recommendations 31 – 33, Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, Section 10.8, p.130).

2.15.2 Impact on historical significance of Broughton Village

Impact to Broughton village generally

Stakeholder identification number(s)

169

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the impact on the historical significance of Broughton Village.

In summary, the respondent(s) raised the following issues:

- Properties at Broughton Village are well-recognised as historical assets of the village. Impacts from the project would directly threaten the continued preservation of these properties and no guarantee can be given to their continued stewardship. Broughton Village is a unique remaining example of early rural life. It currently showcases village layout, neighbour interdependence, family property development and relies on natural landscape and amenities. The project would sever and destroy this historic settlement.

Response

The historical values of Broughton Village are recognised in the environmental assessment through the historical background review, individual item assessments in Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, Section 4.1.4 p.30; and separate item entries in internal Appendices D and G.

The town is unusual in that the pattern of ownership of its small allotments never resulted in close or diversified settlement, and the street grid was necessarily placed on undulating spurs, to avoid the Berry Estate lands. As a consequence, the Broughton Village community consists of a relatively spread out collection of residences and farms, which is not limited to the original town survey grid. In the 1930s the original highway alignment was replaced with a bypass to the south and east of the town grid. The current highway follows this alignment. The project consists of a further movement to the south and east, further removing the highway from the central town grid area.

The project alignment is the result of a complex design process which sought to arrive at a feasible compromise amongst multiple competing factors. These included minimising impact to heritage values, minimising property severance, complying with engineering requirements, and visual and social considerations. The proposed alignment represents a substantial reduction in heritage impacts compared to earlier versions which would have resulted in direct impact (demolition) to the historic homesteads of *Brookside* (G2B H28) and *Sedgeford* (G2B H25).

It is acknowledged that the project would still pass through the broad area of the Broughton Village community, and that this would have adverse impacts on the cultural heritage values of the village setting. The integrity of the properties affected by the project construction footprint cannot be maintained, and any consequences for property stewardship remain a matter for the owners of adjoining lands.

Strategies for the minimisation and mitigation of cultural heritage landscape values are discussed in Section 9.5 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* of the environmental assessment, and recommendations are provided in section 10.8, p.130. These include the use of vegetation plantings to mask intrusive visual elements and a general objective to minimise and ameliorate adverse visual impacts.

Impact on the 'Brookside' homestead, Broughton Village

Stakeholder identification number(s)

172

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues relating specifically to the *Brookside* homestead in Broughton Village.

In summary, the respondent(s) raised the following issues:

- The road alignment and a bridge over Broughton Creek would impact on a third generation family farm, 'Brookside' on the Princes Highway at Broughton Village. The farm includes a residential cottage (the oldest building in the district and of significant interest to local historians) and outbuildings which reflect early settlement style. The proposed Broughton Creek Bridge would be directly adjacent to and higher than the cottage and the owners do not want to leave the family farm.

Response

The heritage values of the *Brookside* homestead are described and assessed in the environmental assessment (refer Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, internal Appendices D and G). The homestead complex is recognised as heritage item G2B H28 and found to have local significance under assessment criteria (e) and (g).

It is acknowledged that the impact of the project on the Brookside homestead and associated property would be substantial. The carriageway, via a bridge, would pass about 50 metres behind a residential outbuilding and within 120 metres behind the main residence. The current highway is 100 metres in front of the main residence. The front wing of the main residence is understood to be the oldest portion of the structure and was transported from the site of the original family farmstead, some 500 metres to the east.

The carriageway would be higher than the current roofline of the homestead and would partially separate the homestead from land holdings to the east. The extent of property acquisition associated with the project may include subsurface traces of former structures that were situated downstream of the current homestead buildings (hence the assessment of partial direct impact presented in the environmental assessment).

It is acknowledged that the changes resulting from the construction of the project would transform the amenity of the homestead and associated lands. It is also appreciated that these changes may be considered by the present owners to be an undesirable environment for their continued residence. RMS is committed to ongoing consultation with the affected property owners in order to determine the most appropriate provisions for their continued residence on the property.

Postcode divisions and the spatial identity of Broughton Village

Stakeholder identification number(s)

100 and 169

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised the issue of maintaining the Broughton Village identity and specifically that changes to access may mean that some properties would attract a different postcode designation.

In summary, the respondent(s) raised the following issues:

- Properties at A500A, A500B and A500C Princes Highway currently have addresses in Broughton Village. If accesses to these properties are redirected via Austral Park Road they would become part of the Berry postcode area. The local council and community have recently rallied together to ensure the Department of Lands corrected an oversight in locality naming to ensure the Broughton Village locality was maintained. Objection to property addresses being moved from Broughton Village.

Response

The majority of the area of Broughton Village occurs within the 2534 postcode area.

The western and southern boundaries of this postcode area follow the boundary between the Shoalhaven City Council and Kiama Municipal Council.

The construction and operation of the project would not affect postcode area boundaries.

2.15.3 Managing impacts to 'Glen Devon' cottage and its heritage significance

Heritage listings

Stakeholder identification number(s)

204 and 215

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the impact on the historical significance of 'Glen Devon'. Submissions noted it was unclear whether the property was or is included on the State Heritage Register.

In summary, the respondent(s) raised the following issues:

- 'Glen Devon' is much more significant than the environmental assessment report states. It is listed on the State Heritage Register in the Shoalhaven Heritage Inventory (SHI 2390150, Study Number BO93).
- It is also stated that the property was formerly listed but has since been removed.

Response

Section 4.2 of Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* (p.52) of the environmental assessment provides a review of all heritage listed items in or near to the project, on both statutory and non-government lists and registers. Based on this review, the 'Glen Devon' cottage, and/or property, does not appear on any *statutory* heritage listings or registers. A recent search of the State Heritage Register, State Heritage Inventory, and Schedule 7 of the Shoalhaven Local Environmental Plan 1985 (as amended 21 Oct 2011) has confirmed that this remains the case (refer: <http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx>, <http://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D11/271987>, accessed 13 February 2013).

Confusion over the status of this item probably originates from the proforma used by the Shoalhaven City Council for compiling its Shoalhaven Heritage Inventory. This is a non-statutory inventory for the information of the Council, which has been compiled from multiple sources including the Heritage Study by Peter Freeman Pty Ltd which was completed for Council in 1998. The proforma, includes the words 'State Heritage Register' as a subheading on all pages, and automatically generates an 'SHI number', which could be read to mean State Heritage Inventory. The proformas use of the words State Heritage Register and the creation of a SHI number does not relate to, or infer, the inclusion of the item on either the State Heritage Register or the State Heritage Inventory. The Shoalhaven Heritage Inventory forms for 'Glen Devon' are included in Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* of the environmental assessment, internal Appendix B, p.60-63.

The potential for confusion as a result of the proforma wording is noted in Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* of the environmental assessment, on the first page of internal appendix B where the Shoalhaven Heritage Inventory Forms are presented.

The significance of the 'Glen Devon' buildings

Stakeholder identification number(s)

204, 215 and 248 (Heritage Council of NSW)

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the assessed level of significance of 'Glen Devon' and presented a case for recognising a higher level of significance which would warrant conservation of the cottage.

In summary, the respondent(s) raised the following issues:

- 'Glen Devon' House, 77 North Street, Berry, is assessed as having heritage significance within a local context. The impact on this house, detailed in Table 7-63 of the environmental assessment, is complete direct impact which is to result in its physical loss.

In the analysis against significance criteria for this property presented in Appendix K Non-Aboriginal (Historic) Heritage, Appendix I, it is rated as having local significance against criterion (g). In light of its historic significance it should be rated as having local significance against more of the criteria.

The cottage was originally built in the 1870s with an addition made in the Federation era and as such is equivalent in age to the earliest houses built in the town which are listed on the State Heritage Register in the Pulman Street Heritage Conservation Area. The original dairy may survive as an outbuilding, but further research is needed to establish this. This cottage is significant for its history, for the originality of its structure, for its association with significant townsfolk, and possibly the intactness of its outbuildings and property boundaries. The property is shown on the 1893 Ewings map.

- The Heritage Branch has received separate representations from the local community on new research by the Local Historical Society which indicates that 'Glen Devon' (G2B H11), was actually built in the 1870s and may have originally been a dairy. This would make the building amongst the earliest in Berry.

Response

The further historical research conducted by the Berry and District Historical Society Inc. provides a valuable contribution to the understanding of the European occupation and development of 'Glen Devon' and the associated property. The assessment in the environmental assessment was based on the historical outline presented in the Shoalhaven Heritage Inventory, which did not define a construction date, but indicated construction *prior to 1894* with later additions in the Federation style. The Inventory outline commenced with the residence of Dr Cecil Lacy Dawson and his family in the 1890s, and the subsequent purchase of the property from the Berry Estate in 1908 by his widow, Mabel (nee) Wylde.

This historical outline presented in the research undertaken by the Berry and District Historical Society establishes property occupation from the 1870s, however a direct association with the construction and first use of the 'Glen Devon' cottage remains elusive. There are two compelling reasons for questioning the assumption that the construction of 'Glen Devon' corresponds to the start of the Milligan land tenure in the 1870s. The first is that the earliest and main focus of occupation for the leasehold farm was situated further north on the lease, adjacent to Bundewallah Creek. The second is that the 'Glen Devon' cottage is closely related in orientation and function to North Street and the Berry town grid, which was only established in the 1880s.

Figure 2-6 presents an extract from a map of tenant farms in the northern part of the Berry Estate, dating from around 1892. Refer to Graham, J. 1998 *The Northern Section of the Berry Estate* (first published in *Illawarra Branches* Dec 1998, for a discussion on the date of this map, (<http://www.rootsweb.ancestry.com/~nswgdhs/berry01.htm>). The map shows a holding by a Mrs Milligan of around 36 acres which includes the current location of the 'Glen Devon' cottage in its south western corner. The stated area of the farm is close to the descriptions of 33 and 28¼ acres in the Historical Society outline and this strongly suggests that the same farm is being referred to. Consistent with the adjoining farms, the Milligan holding shows a main farm building, with associated out-buildings, adjacent to Bundewallah Creek in the northwestern corner of the lease.

Multiple factors support a conclusion that this main building group was where original farm occupation and development was focused from the 1870s.

These factors are:

- A close source of water for both the house and dairy would have been a requirement.
- The presence of out-buildings suggests not only a dairy, but indicates the primary importance of the adjacent larger building.
- The only structures shown on the adjacent farms occur in similar creek-side contexts.

Two isolated and single structures are also shown on the c.1892 Estate map, in the south western and south eastern corners of the Milligan lease. The southwestern location approximates the position of the 'Glen Devon' cottage and it is possible that this is the first direct documentary record of this residence. This possibility is stated as fact by one of the respondents referring to the 1893 Ewings map. (John Ewing was a surveyor responsible for the survey of the Berry Estate prior to its sale, and presumably was the source for the Harper and Harper c.1892 map shown in **Figure 2-6** (<http://adb.anu.edu.au/biography/ewing-john-6127>)). If this is so, the building may have been built as a second residence, either for members of the Milligan family, (in 1892 Sydney would have been 21, and James 17 years old) or possibly for the Dawsons as sub-tenants. The absence of associated outbuildings, in contrast to the main building complex on the creek, does not support the contention that this building originally included or operated as a dairy.

The close spatial association of the 'Glen Devon' cottage with the North Street easement provides a strong argument for concluding that the cottage could not predate the roadway. Both the core building and subsequent additions present frontages which are close to and parallel North Street. In contrast to the functional amenity of the main building group situated next to Bundewallah Creek, the position and southern orientation of a residence in the southwestern corner of the lease would be hard to explain if the amenity of North Street had not been present. Prior to the 1880s, North Street did not exist, and the closest public road was probably a southern extension of the current Kangaroo Valley Road, 300 metres to the south (**Figure 2-7**). The current town grid was proposed in 1883 and its subsequent adoption necessitated the reorientation or modification of many existing town buildings to comply with the new consistent east-west alignment (Lidbetter 1993 *Historic Sites of Berry*, BDHS Inc. p.18-19). The North Street easement was one of the first of the new grid alignments to appear as a road on maps (such as the 1895 County map, **Figure 2-7**). This rapid adoption may have been due to its amenity as an access track for the bordering tenant farms. Based on this evidence it is argued that 'Glen Devon' cannot predate the establishment of North Street, which could not be earlier than the mid to late 1880s.

Implications for the assessed heritage significance of G2B H11

The evidence compiled to date does not reliably establish a construction date for 'Glen Devon'. Despite a history of leasehold occupation dating from the 1870s, this occupation cannot be directly related to the 'Glen Devon' buildings. It is considered more likely that another building group, shown on an 1890s map on the same lease holding and formerly situated next to Bundewallah Creek, was the original farm residence and dairy location. Circumstantial evidence based on the age of North Street and its spatial association with 'Glen Devon', strongly suggests that the building cannot be earlier than c.1883.

If an 1870s origin for 'Glen Devon' can be reliably established, then a local level of significance under criteria (e) - potential to yield information, and (f) – rarity, would be a likely conclusion, in addition to the existing assessment of local significance under criterion (g) - representativeness.

The oral and documentary evidence compiled to date establishes a sequence of occupation and ownership which includes some notable local identities and families. These include the Milligan family including Catherine Milligan (1870s to 1903), the Dawson family, including Dr Cecil Dawson and his wife Mabel Dawson, William and Elizabeth Shute, and the Ware family. Mabel Dawson is remembered as a local cattle breeder who was amongst the first in NSW to import Guernsey Cattle from the UK. A number of articles, between 1907 and 1914 which report the results of the Berry Agricultural show, mention a Mrs Dawson and a Dr Dawson in relation to prizes for cattle and horse events.

Without reducing the historical importance or the achievements of those people and families associated with the property that includes 'Glen Devon', it is argued here that the threshold for an assessment of significance under criterion (b) has not been reached, that is, a *strong or special association* with the life or works of a person or group of persons *of importance in the cultural history of the local area*.

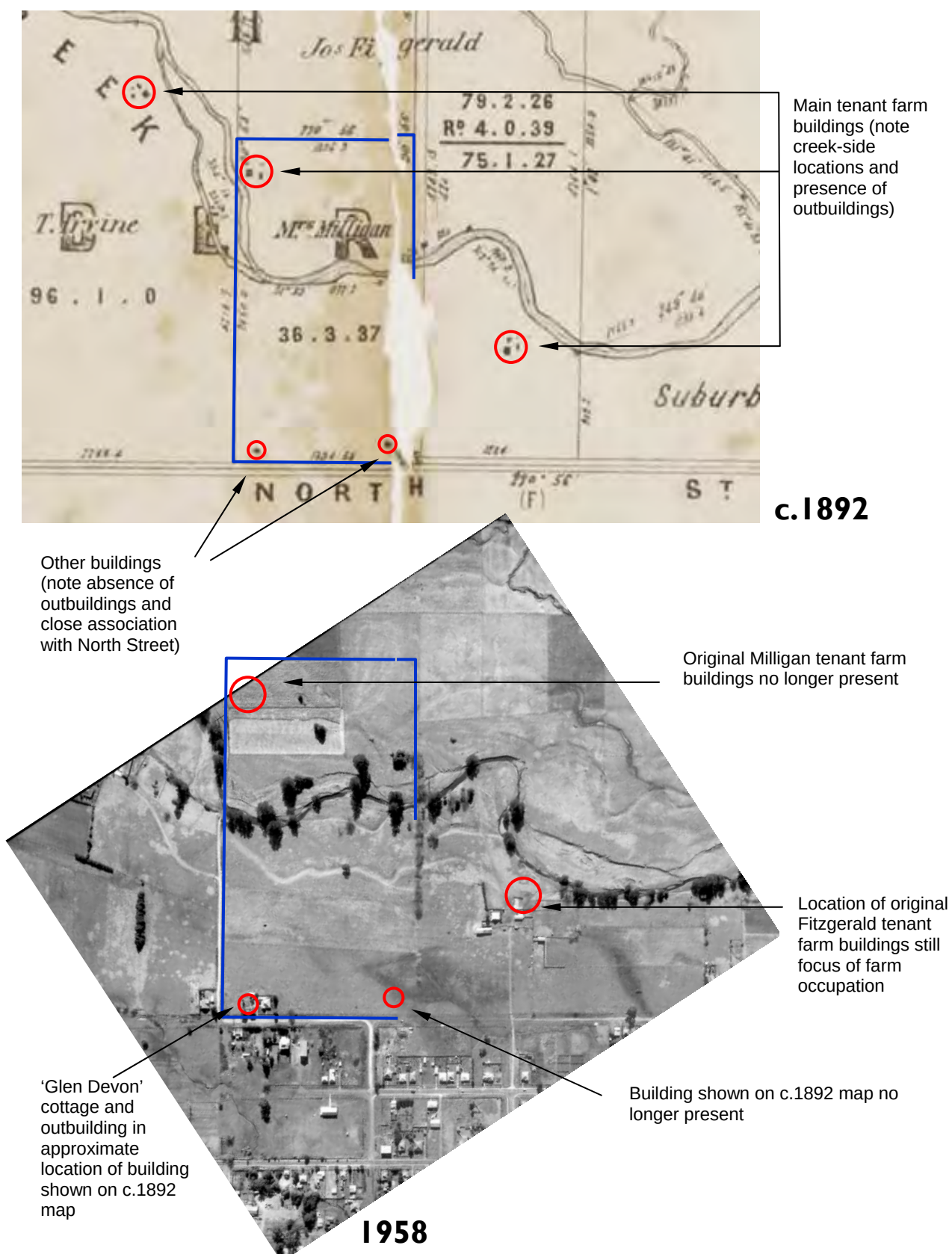


Figure 2-6 Comparison of Berry Estate tenant farm features, mapped in the early 1890s, with 1958 aerial photograph. **Top:** extract from c.1892 map of the northern Berry Estate, showing the original Mrs Milligan leasehold farm holding (blue boundary) ('Part of the Berry Estates, Parishes of Broughton and Coolangatta, County of Camden', printed by Gibbs Shallard & Co. Sydney for Harper and Harper Civil Engineers, State Library of NSW, M_Ser4_000_1_MLMSS315_Map 17); **Bottom:** extract from aerial photo: NSW 699-5038 SH.I Dapto – Ulladulla Run GK11 23.7.58.



County of Camden 1866



County of Camden 1895



Parish of Coolangatta 4th Ed

Figure 2-7 Extracts from County and Parish maps showing the position of the 'Glen Devon' cottage (blue circle) relative to surrounding roads, prior to, and after the establishment of the town grid after 1883. Refer also figure 4.23 of Appendix K of the EA, p. 46).

The potential to realign the project to avoid direct impact to 'Glen Devon'

Stakeholder identification number(s)

204 and 215

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the potential to avoid impact to 'Glen Devon' by modifying the alignment of the proposed bypass.

In summary, the respondent raised the following issues:

- The statement in Non-Aboriginal (Historic) Heritage, Appendix I that "a northern and/or more eastern alternative would exclude the use of the North street corridor and cause significant property severance" is disputed as RMS has moved the road out of the North Street corridor in a great deal of its length in order to move the road to the north of the sporting fields in one area and further away from North Street in another (both to ameliorate problems identified by town members).

Response

This comment relates to a discussion in the Statement of Heritage Impact for 'Glen Devon' (G2B H11) presented in Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, internal Appendix I, p.36 of the environmental assessment). A requirement of the statement is to outline the alternatives to direct impact which have been considered, and explain why they were rejected. In the discussion, the proposed alignment, which partially follows the North Street corridor, is compared to hypothetical alignments to the east and west of 'Glen Devon'. However, the proposed alignment is the only feasible option with acceptable curve geometry that still allows the use of the North Street corridor and the underpass of Kangaroo Valley Road at its optimal location. Any of the hypothetical alternative alignments would have unacceptable or unjustifiable impacts. An eastern deviation would impact on numerous developed town lots. Western alternatives would need to extend substantially further north of 'Glen Devon' before curving to the east, causing significant property severance, loss of an existing farm residence, and additional bridge and construction costs.

Use of the term 'moderate – local significance'

Stakeholder identification number(s)

Heritage Council of NSW

Issue description

One submission relating to non-Aboriginal (historic) heritage impacts noted that terminology used in the main Environmental Assessment report was incorrect.

In summary, the respondent raised the following issues:

- The term 'moderate local significance' used in the environmental assessment for 'Glen Devon' (G2B H11), a Federation House at 77 North Street, is incorrect and is not in accordance with Heritage Council guidelines for assessing significance.

Response

The use of this term was an error. The term 'moderate local significance' does not occur in the detailed assessment of significance provided in the specialist heritage assessment presented in Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage* of the environmental assessment. The environmental assessment found that item G2B H11 was of local significance under criterion (g). The erroneous use of the term 'moderate local' in Section 7.8 of the environmental assessment has no consequences for the assessment findings which are based on those presented in the specialist report.

Management and mitigation of impacts to 'Glen Devon'

Stakeholder identification number(s)

Heritage Council of NSW

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues relating to the assessed level of significance of 'Glen Devon' and presented a case for recognising a higher level of significance which would warrant conservation of the cottage.

In summary, the respondent(s) raised the following issues:

- The cottage and outbuilding should not be demolished and the mitigation strategies in the report are not enough to ensure this. A suitable alternative location for the buildings in Berry should be sought by RMS should a buyer not be found, with RMS engaging in a public/private partnership if necessary.
- The environmental assessment refers to the possibility of materials being salvaged during demolition for reuse as an interpretative feature. This recommendation is not supported by the Heritage Branch as it would be difficult for this kind of salvage to provide a meaningful outcome.
- The Heritage Branch has received separate representations from the local community on new research by the Local Historical Society which indicates that 'Glen Devon' (G2B H11), was actually built in the 1870s and may have originally been a dairy. The Heritage Branch agrees with the local community that re-location of this cottage to a new site should be a required outcome of the project rather than demolition and tokenistic salvage for future 'interpretation'. The current commitment for the cottage is not considered sufficient and re-location of the cottage would be a far superior outcome.

Response

It is understood that the stated requirement of the Heritage Branch that the 'Glen Devon' cottage be re-located to a new site, is predicated on a finding that the cottage dates from the 1870s and would therefore be of greater significance than that determined in the environmental assessment where the age was considered to pre date 1892 and postdate 1883. It is believed that the evidence for 1870s occupation presented by respondents cannot yet be reliably linked to the 'Glen Devon' building. Further research and assessment is required to substantiate a potential 1870s origin for the structure.

In response to the current need to determine the age of the Glen Devon cottage, RMS have commissioned a further, and more detailed investigation, which would include a field inspection by a heritage architect, and further research and analysis of the historical record. The investigation would review the significance assessment of *Glen Devon*, and subject to these results, appropriate impact mitigation strategies would be developed in consultation with the Heritage Branch.

Potential management actions which may be recommended, depending on assessment outcomes, feasibility considerations and re-location constraints include: the conduct of an archival recording, salvage excavations, re-positioning of all or part of the cottage, or demolition of the structure. It is understood that the Heritage Branch does not support the proposal of selective salvage and reuse as an interpretative feature.

It is proposed to replace the environmental assessment Recommendations 19 and 20 (Appendix K – *Technical Paper: Non-Aboriginal (Historic) Heritage*, Section 10.6, p.129), with the following:

19. An archival recording would be conducted of 'Glen Devon' (G2B H11) and its grounds prior to any development impact. This record would be supplemented to include documentation of construction methods and materials exposed during any subsequent works.
- 20a. Further research and assessment would be conducted with regard to 'Glen Devon' (G2B H11) with the aim of further determining the significance of the item and an appropriate management strategy. The assessment would include the following tasks:
 - A review of the documentary and oral history record, with particular reference to determining the origin of the 'Glen Devon' cottage and outbuildings.
 - A physical inspection of the G2B H11 structures by a heritage architect with the aim of determining the age and building history of the structure.
 - Provision of advice on the architectural significance of the structure.
 - Provision of advice on whether and how the building could be physically repositioned to a new location, for the purposes of managing heritage values.
- 20b. In the event that the further assessment of G2B H11 determines that this item has a level of significance which warrants its conservation, then, subject to the procurement of an appropriate new location, identification of a viable function, and a finding that repositioning is structurally feasible, it is recommended that:
 - i. The structure(s) be re-positioned at a new and appropriate location within the local area, and that this be done according to the specifications and provisions of a heritage management plan prepared in accordance with Heritage Branch standards and guidelines.
 - ii. A program of archaeological salvage excavation be conducted at the site prior to the commencement of construction related ground disturbance at the site.
- 20c. In the event that the further assessment of G2B H11 determines that either:
 - a) This item does not have a level of significance which warrants its conservation;
 - b) Repositioning of the whole or part of the structure(s) is not found to be structurally feasible; or
 - c) An appropriate new location cannot be procured;

Then it is recommended that:

- i. An appropriate program of impact mitigation and salvage actions be developed in consultation with the NSW Heritage Branch; and
- ii. A program of archaeological salvage excavation be conducted at the site prior to the commencement of construction related ground disturbance at the site.

Impact on historical significance of the Alexander and David Berry memorial

Stakeholder identification number(s)

197, 215 and Shoalhaven City Council

Issue description

Submissions relating to non-Aboriginal (historic) heritage impacts raised issues regarding the impact on the historical significance of the Alexander and David Berry memorial.

In summary, the respondent(s) raised the following issues:

- RMS should have ongoing discussions with Shoalhaven City Council on the design of the location for the relocated Alexander and David Berry sculptures, including the provision of appropriate landscaping and features for a Shoalhaven / Berry Township gateway structure as provided in Council's draft DCP 82 – Section 3 Signage Strategy – Information Signs that are provided for township gateway signs.
- The Alexander and David Berry Memorial sculpture is inadequately addressed in the environmental assessment. The repositioned Alexander and David Berry Memorial sculpture should be listed as a project component. The position as shown does not reveal the art work as intended and as realised at the existing location. The repositioning of this memorial should be the subject of consultation between the artist, Shoalhaven Council, the interested parties in the Berry community and RMS.

Response

The Alexander and David Berry Memorial sculpture has not been identified as a heritage item due mainly to its recent origin and recent placement within the Berry town environment. Despite this, the memorial commemorates important historical themes relevant to the town and region, and currently serves an important function as a public expression of those themes and as a south bound 'gateway' feature.

The retention and repositioning of the sculpture is recommended in the Landscape character and visual amenity sections of the environmental assessment (Section 7.6 and Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity*). A new location for the sculpture has not been finalised apart from flagging potential locations within the general area of the northern Berry interchange or the proposed roundabout at the intersection of Woodhill Mountain Road and the current highway. Objectives for a new location for the sculpture include pedestrian accessibility, accessible viewing angles for passing car users, and consistency with Shoalhaven City Council requirements.

RMS is committed to conducting consultation with all relevant stakeholders as part of the process for determining a new location for the memorial sculpture.

2.15.4 Policy, guidelines and heritage management plan

Stakeholder identification number(s)

Heritage Council of NSW

Issue description

The Heritage Branch submission regarding non-Aboriginal (historic) heritage impacts raised issues pertaining to heritage related policy, guidelines and the development of a heritage management plan.

In summary, the respondent(s) raised the following issues:

- The statement of commitments which makes the recommendation for archival records to be made available to the public should be strengthened to require lodgement of reports with the Heritage Council of NSW. This is essential for archaeological excavation reports.
- Any approval should include a requirement for the preparation of a Non-Indigenous heritage management plan by RMS as part of the construction environmental management plan, in consultation with the Heritage Council of NSW.
- Conditions of approval should include the requirement for RMS to nominate a specialist heritage manager or heritage consultant for the works. The suitability and qualifications of the consultant are subject to approval by the Director General. The heritage consultant would advise on the detailed design resolution of new works, undertake on-site heritage inductions and inspect new works, design and installation of services; and manage the implementation of the conditions of approval for the project. A report which describes the work, any impacts / damage and corrective works carried out should be submitted to the Director-General and the Heritage Council of NSW for approval within six months of the completion of the works.
- All construction contractors, subcontractors and personnel are to be inducted and informed of their obligations and requirements in relation to historical archaeological sites and 'relics' in accordance with guidelines issued by the Heritage Council of NSW. This should be conducted by the nominated heritage consultant prior to commencing work on site.
- Significant heritage items and built elements not subject to direct impact should be adequately protected from potential damage during the works (recommended condition of approval). Protection systems must ensure historic fabric is not damaged or removed.
- More detailed research and other investigations should be undertaken for each identified heritage item which would be negatively affected by the proposal. This should address specific impacts arising during detailed design and provide mitigation and management measures for those impacts (recommended condition of approval).
- Photographic and archival recording of all affected heritage items should be undertaken prior to the commencement of any construction activity (recommended condition of approval). Recording is to be completed in accordance with guidelines issued by the Heritage Council of NSW. Copies should be made available to the Heritage Office, Department of Planning and Infrastructure, and also to the Local Studies Library and the Local Historical Society in the relevant Local Government areas.
- Affected historical archaeological sites of local significance should be subject to professional archaeological excavation and/or recording before construction works commence (recommended condition of approval). A Research Design, including an Archaeological Excavation Methodology and details of a proposed Excavation Director must be prepared in accordance with Heritage Council guidelines for each site which is to be excavated. Conduct of these works is conditional upon approval by the Director-General of the Department of Planning and Infrastructure and the Heritage Council of NSW.
- On completion of archaeological works, a copy of the final excavation report(s) should be prepared and lodged with the Heritage Council of NSW, the Local Studies Library and the Local Historical Society in the relevant Local Government areas (recommended condition of approval). RMS should also be required to nominate a repository for the relics salvaged from any historical archaeological excavations.

Response

RMS recognise the specified actions and outputs as standards and requirements which are already assumed and inferred as part of the successful and effective completion of the management actions recommended in the environmental assessment.

2.16 Land use and property

2.16.1 External and internal property access during construction

Stakeholder identification number(s)

3, 100, 122, 169 and Kiama Municipal Council

Issue description

Submissions relating to external and internal property access during the construction of the project raised issues regarding compromised access by emergency services, maintenance of legible access to properties during construction and internal access within properties in the long-term.

In summary, the respondent(s) raised the following issues:

- Reasonable, legible access to properties should be maintained during the construction of the project.
- Emergency vehicle and utility service response times could be delayed during construction due to changes in property accesses and confusion around property entry points.
- Appropriate notice should be provided to Kiama Municipal Council and affected residents of any proposed disruption to property accesses, including information on alternative arrangements and anticipated duration of the disruption.
- Internal access to a farm property would be severed by the construction of the project. Access needs to be maintained during construction to enable stock, horses, vehicles (including tractors) and people to access the severed portions and to maintain the property.

Response

The project would require alteration and/or temporary disruption to property accesses during construction. There may also be disruption to internal farm movements where the project would sever a property into two or more parcels or impact boundary lines.

During the detailed design phase of the project, RMS would consult with all affected landowners where temporary property access would be required to maintain external and internal property access during construction. RMS would maintain viable access to properties throughout the construction period. Consultation would continue during construction with advance notification of project schedules, construction works and changes to access arrangements provided to landowners. Outcomes of this consultation for temporary access arrangements would be communicated to both Kiama Municipal Council and Shoalhaven City Council.

Where internal access would be disrupted, alternative arrangements would be negotiated with the affected landowner to enable access to continue with disruption minimised as much as reasonably possible and with consideration to the specific requirements of each property.

To minimise potential impacts on emergency services during construction, RMS would make provision for emergency services vehicles to pass through construction zones to access local properties where practicable. Local emergency services would also be updated on the staging and progress of works that would affect their movement, which would include any temporary changes.

RMS would consult with utility providers that have assets within or in close proximity to the project concerning potential impacts on assets.

2.16.2 Ancillary facilities (construction and operation)

Construction ancillary facilities

Stakeholder identification number(s)

145, 147, 197, 215 and Department of Primary Industries

Issue description

Submissions relating to construction ancillary facilities raised issues regarding the exclusion of certain construction ancillary sites due to environmental constraints such as flooding. Issues regarding the permanent ancillary facility at Tindalls Lane interchange were also raised.

In summary, the respondent(s) raised the following issues:

- Figure 7-18 of the environmental assessment shows construction ancillary site E is subject to flooding during a 1 in 5 year flood event. This does not meet the criteria for ancillary sites.
- Figure 8-3 of the environmental assessment shows construction ancillary site J located on land with potential acid sulfate soils (PASS) and subject to flooding during a 1 in 100 year flood event. The site should be excluded from the project.
- Construction ancillary site L has an unnamed watercourse and tributary flowing through the site. In accordance with the environmental criteria, the ancillary site should not be located within 50 metres of any waterways. Appendix G (page 75) indicates that there is sufficient space to achieve this.

Response

Section 4.4.7 of the environmental assessment identified a number of potential construction ancillary sites, and acknowledged that alternative or additional sites may be identified during the detailed design phase of the project or at a later stage during construction. Typically, sites selected for assessment as ancillary facilities are currently owned by RMS. This allows for some certainty in assessment for Councils, agencies, the community, nearby landowners and tenants, RMS and the future contractor.

Table 4-10 of environmental assessment lists the selection criteria for potential construction ancillary sites. For flooding, sites are to be located above the 1 in 100 year flood level where possible. If sites cannot be located above the 1 in 100 year flood level, it is proposed that sites could be located above the 1 in 20 year flood level subject to the implementation of appropriate mitigation measures to reduce flood risk and impacts on the surrounding environment (such as provision of a sufficient freeboard for storage areas).

Sites near Broughton Creek, such as site E (potential stockpile site for bridge works) and site J (potential administration compound and stockpile site), are located in areas below the 1 in 100 year flood level, as noted in Section 7.5.3 of the environmental assessment. Should these sites be required for ancillary facilities, additional mitigation and management measures were identified in Section 7.5.4 of the environmental assessment. This may include the provision of sufficient freeboard for storage areas, and environmental response procedures to respond to significant weather events. The working areas of the construction ancillary facility would not extend into areas affected by events lower than the 1 in 20 year flood event unless protected or if work in the floodplain is critical (for example, in areas where bridge works are required). Operational uses of the ancillary facilities may vary depending on the environmental risks. For example, the storage of girders would not pose the same environmental risk from inundation as storage of chemicals or fuels.

Section 8.1.1 of the environmental assessment identified areas that have a low risk of PASS based on known geological information. PASS are harmless to the environment if kept in a waterlogged state or under water. Any exposure of PASS to the air due to excavation or lowering of the watertable would lead to the development of actual acid sulfate soils. Site J is identified as being potentially used for stockpiling and as an administration compound (at the existing dwelling). Excavation is not anticipated to be required for the purposes of establishing this facility and so exposure of PASS and potential oxidation into ASS would not occur. However, as detailed in Section 8.1.3 of the environmental assessment, testing for PASS would be undertaken during the detailed design phase of the project to confirm if these areas do contain PASS or ASS, with any confirmed areas to be avoided or otherwise mitigated against, where practicable.

Should site L be required for the project, the working footprint of the ancillary facility would be designed so that it those areas do not extend to within 50 metres of the watercourses located within the site.

Operation ancillary facilities

Stakeholder identification number(s)

145, 147, 197 and 215

Issue description

Submissions relating to operational ancillary facilities raised issues regarding the permanent ancillary facility at Tindalls Lane interchange.

In summary, the respondent(s) raised the following issues:

- The permanent ancillary site list within the environmental assessment should include the permanent ancillary facility site near the Tindalls Lane interchange at chainage 14300 to 14550.
- This facility should be screened from the project and surrounding area.

Response

The permanent ancillary facility site at Tindalls Lane interchange, which would be used for the interim storage of materials and equipment required for road maintenance is identified in the project scope in Chapter 1 and Chapter 4 of the environment assessment, with further specific detail in provided in Section 4.2.16 of the environmental assessment.

The design of the facility would be developed further during the detailed design phase of the project, and consideration of screening of the facility to nearby properties would be considered within the urban and landscape strategy for the project. Refer to **Section 2.13** of this report for issues raised by the respondents concerning the visual impact of the facility.

2.16.3 External and internal property access during operation

Stakeholder identification number(s)

3, 24, 31, 52, 55-63, 65, 71, 72, 74, 76, 78, 80, 81, 84, 86-88, 90-96, 100-106, 108-111, 113-115, 117, 119, 120, 122, 126-128, 136, 137, 139, 140, 144, 148, 157, 161, 162, 165, 167, 169, 170, 172, 173, 176, 198, 199, 201, 212, 214, Kiama Municipal Council and Department of Primary Industries

Issue description

Submissions relating to external and internal property access during operation raised issues regarding specific requirements for permanent changes to external and internal property access as a result of the project.

In summary, the respondent(s) raised the following issues:

- All impacts to property accesses due to the project should be addressed.
- RMS should retain ownership, for maintenance and management purposes, of an underpass constructed to provide access to private properties, regardless of the future status of the access road.
- If agricultural properties are to be severed from the main farm, access to the farm via underpasses would need to be maintained with provision made for facilities to herd stock and enable access for emergency services such as the Rural Fire Service.
- Access for stock from one side of the bridge at Berry to the other as well as access for emergency services (Rural Fire Service) is required.
- The operation of the project could impact on the ability of emergency services and utilities to access properties. The proposed changes may lead to confusion and delays in response times. Some accesses would need to be retained and built into the final design (for example the farm access gate near the site of the present speed camera), while alternative accesses would need to be provided for other properties (for example an option for one property is to provide emergency access adjacent to the northbound carriageway).
- RMS widened the existing highway to provide an overtaking lane after a review in 1990, and in the process removed much of the road shoulder. As a result, access into a property became far more dangerous. This should be readdressed as part of this project.
- The existing access road to properties located opposite Foxground Road from the current Princes Highway is classed as a private road. The proposed access way linking three of these properties is marked as a public road under the current design. This, or other similar changes, is not supported by Kiama Municipal Council.
- Objection to proposed property access arrangements to individual properties including:
 - Property access to an adjoining property could be provided from the south instead of a winding access along the property boundary with a cutting.
 - Land acquisition along the front of a property removes the access to the hillside, which is required for maintenance.
 - An internal access for a property severed by the second Broughton Creek bridge crossing needs to be maintained for stock, vehicles and people to enable property maintenance.
 - The direct access to a property in Broughton Village would be impacted resulting in intensive stock management, which in some cases may be impossible. Necessary access to neighbouring properties would also be limited or removed.

- The proposed access does not provide the same amenity and the maintenance of the driveway is questioned (for example reduced water quality). Driveway improvements should be undertaken by RMS to ensure longevity of the surface.
- Access to an agricultural property on North Street must remain. If this access is not maintained, it would have a significant impact on the operation of the property.
- A proposed property access would result in a significant loss of land, old and large trees, house garden and brick sheds. The excavation required would cause loss of entry within the existing boundary for cars, tractors, heavy vehicles and trucks delivering produce (hay). Unwanted traffic may enter the property as an entrance gate could not be located at the roadside.
- Objection to a proposed property access via a laneway and underpass. If acquired, the laneway should be sealed with the gate and cattle grid to remain.
- The property access on the Austral Park Road interchange northbound exit ramp should have the same line marking treatment as other property accesses along the project. Without warning, exiting vehicles would be focussing on the transitional speed zone and the ramp alignment rather than expecting vehicles to slow for an access.
- The turning circle at the end of Austral Park Road to cater for garbage services in the Kiama local government area is not required as there is no existing provision of garbage services to the properties along Austral Park Road. The facility would represent a security risk to properties, has the potential for illegal dumping and could result in increased council rates due to the introduction of a formal waste management service. Acquisition of land to cater for this component is not justified as the usage would be minimal. An alternative to the u-turn facility at Austral Park Road would be to continue the Austral Park Road extension across the causeway to the other side of the creek and provide the facility in the Kiama local government area.
- The amount of land take and wasted land created from access roads as a result of the project is not supported.
- Left-in / left-out accesses for properties along the highway to Austral Park Road would result in additional travel times. In some cases there is a need for an easement to provide access for neighbouring properties which has the potential for disputes. Some property access refinements could result in a change of postal address (added inconvenience of informing all contacts of new address and entry point) and the relocation of letter boxes to areas no longer easily accessible by foot and with reduce security.
- The proposed amendment to a property access at chainage 12950, locating the access further south, should be reconsidered due to potential conflict resulting from the highway merging with the Austral Park Road intersection at chainage 12800. A consolidated access for properties located on either side of the highway in association with an additional culvert / vehicle underpass at chainage 12825 should be considered. This arrangement could also serve as an emergency vehicle u-turn facility. A consolidated access, as proposed, would improve sight distance, allow left-in / left-out movements and places the access along a straight stretch of road rather than in the middle of a sweeping curve at the end of a cutting. The access and the underpass would need to cater for articulated vehicles, and could also include the fauna underpass already planned at this location.
- An alternative entry / exit to Gembrook Lane via an extension of Gembrook Lane to the existing Princess Highway overpass / Tindalls Lane interchange should be considered. This would connect traffic to a low volume road / grade-separated interchange, providing safer access for residents and reduces the additional travel time required when compared to the current proposal.
- Proposed property accesses requiring a left turn straight onto the highway, without a designated acceleration lane, with oncoming traffic travelling at 100 km per hour are a safety issue.

- Property access at the northern end of the quarry north of Berry is preferred. This would allow the extraction of material from the area currently proposed for the access road.
- The access road running past the Mananga Homestead should not impact on the existing trees or the historical site.
- Driveway access to the Berry Equestrian Centre is likely to cross a shared pedestrian / cycleway, which is a safety risk for pedestrians / cyclists.
- The proposed access road connecting Hitchcocks Lane to Huntingdale Park Road would create traffic restrictions, result in additional traffic on the west side of the highway and impact on land proposed for development. The access road severs an area designated in the Development Control Plan 70 as riparian screening. This may result in additional land being lost to satisfy council requirements.
- Objection to the option proposing access, to the private property south of Victoria Street, via an underpass. Access is required for vehicles up to 4.4 metres, and the underpass would be prone to flooding, therefore cutting access and egress during periods of heavy rain. A closed Victoria Street with access to the property from the cul-de-sac is preferred.
- An alternative property access could be provided by using the existing corridor of land owned by RMS which ends at the northern boundary fence of the property, providing easy access within the property and beside the highway heading south. This would not need significant excavation and would not involve significant loss of trees, gardens, parking and sheds. It would enable the continued use by trucks, tractors and heavy machinery without the danger of turning directly off the highway, and would prevent unwanted traffic if the entry gate was located on the northern boundary. It is also requested that the Schofields Lane option presented by the community be considered to provide access to this property.
- Direct access to Schofields Lane for traffic travelling in a southerly direction has been removed. Residents and vehicles servicing business and properties along Schofields Lane would be required to perform a u-turn at Mullers Lane. This u-turn facility needs to cater for heavy vehicles including 25 metre B-doubles.

Response

External property accesses would be affected by the project, and in a number of cases, accesses would be permanently modified. Changes to internal access arrangements would also be required for a number of properties, where the project would sever or isolate parcels of agricultural land.

Changes to external property accesses were discussed with directly affected landowners during the exhibition of the environmental assessment, and in some cases, adjustments have been made in response to this consultation. These changes are described at **Section 2.8.2** of this report and design changes are discussed in **Chapter 3**, with the key changes occurring at:

- Austral Park Road interchange.
- Austral Park Road extension, specifically, the removal of the u-turn facility.
- Access between Austral Park Road and Tindalls lane for certain properties.
- Tindalls Lane interchange.
- Schofields Lane junction.

RMS would consult with relevant directly affected landowners during the detailed design phase of the project to finalise the access design. Design of accesses, including underpasses, would maintain the current level of access for properties, where practicable, including access for emergency services, heavy vehicles or for maintenance purposes.

RMS has developed a specific design for direct property access to the upgraded highway (refer to Figure 4-15 of the environmental assessment). This has been applied to the Gerringong upgrade, which is now under construction. The design includes the widening of the shoulder to three metres for a distance of 100 metres before an access to make provision for deceleration, linemarked accordingly and sign posting to identify the access.

For properties along the existing highway south of the Toolijooa Road interchange, changes to the line marking of the existing highway forms a permanent part of the Gerringong upgrade and would be maintained under this project. Reductions in traffic volumes as a result of this project should also be beneficial to properties along this section of the existing Princes Highway.

The project proposes modifications to two existing right of way accesses. These would be discussed further with affected landowners and councils during the detailed design phase of the project.

The majority of the length of the current right of access provided on a specific property would be acquired and constructed as a local road, with the required property adjustments. This would be transferred to Kiama Municipal Council upon completion of construction except for the underpass structure which would remain the responsibility of RMS. Pavement and drainage would be transferred to Kiama Municipal Council in accordance with RMS policy. The transfer of this road has been the subject of direct consultation with Kiama Municipal Council. This is discussed in more detail in **Chapter 3**.

The second right of way access that provides direct highway access currently serves a number of properties located to the east of the current highway near the Austral Park Road interchange. This includes properties located to the east of Broughton Creek that cross the creek via a causeway. The right of way access would be altered as direct highway access can no longer be maintained due to road safety constraints. Instead, it would connect to the Austral Park Road extension. This would limit the properties that would be required to use this right of way to the two properties located between Broughton Creek and the project.

The issues raised by respondents concerning the condition and maintenance of the right of way access, and the position of letter boxes, would be discussed further in consultation with the landowners.

The access road alongside the Mananga property, a heritage item, would be designed, where reasonable and feasible, to avoid impacts on existing trees during detailed design. Section 7.7 of the environmental assessment identifies mitigation measures to avoid impacts on the heritage item.

An overpass access to North Street for agricultural properties would introduce additional visual noise and road safety impacts, and was considered cost prohibitive and an underpass is constrained due to flooding. Consultation would continue with this landowner to negotiate the access arrangements during the detailed design phase of the project to consider what would have the least impact on farming and business operations.

Access to the Berry Equestrian Centre would be subject to further consultation with the relevant stakeholders and Shoalhaven City Council. Design of the access to the centre and potential conflicts with pedestrians and cyclists would be considered during these discussions. The Berry Equestrian Centre is discussed further in **Section 2.17** of this report.

The proposed connection between Hitchcocks Lane and Huntingdale Park Road would only serve one property immediately south of Victoria Street and two properties along Hitchcocks Lane. The design option identified in a submission was an alternative discussed with landowners during the exhibition of the environmental assessment, and was not proposed in the environmental assessment. The property access connecting to the proposed cul-de-sac at Victoria St would now connect to the Schofields Lane underpass. This is discussed in more detail in **Chapter 3**.

The proposed underpass at Schofields Lane would be designed to target the 1 in 20 year flood event. Consultation with affected landowners would occur during the detailed design phase of the project.

The proposed access opposite Schofields Lane has been revised following further consultation with the owners and would now connect to the Schofields Lane underpass eliminating the adverse property impacts. This is discussed in more detail in **Chapter 3**.

For internal access between portions of land severed by the project, a suitable means of restoring internal access would be provided, where this can be reasonably reinstated. Where access cannot be maintained, then the severed portion would be acquired. RMS has acquired a number of the properties that would be substantially impacted by severance. Two lots were identified as requiring access provisions to maintain agricultural activities. This included access under the southern abutment of Broughton Creek bridge 3. The design of this access under the bridge would consider the flooding constraints of this area and would be discussed further in consultation with the landowner. Discussion would also focus on reasonable and feasible options for access between adjoining properties.

2.16.4 Utility impacts

Stakeholder identification number(s)

Shoalhaven City Council and Shoalhaven Water

Issue description

Submissions relating to public utilities raised issues regarding impacts on sewer and water assets during the construction of the project.

In summary, the respondent(s) raised the following issues:

- Shoalhaven Water and Shoalhaven City Council have requested that any approval granted for the project is to include the following requirements:
 - RMS is to apply and obtain a certificate of compliance from Shoalhaven Water under section 305, Division 5 of Part 2 of the Water Management Act 2000. Shoalhaven Water would outline the conditions and requirements that are to be adhered to, and would issue a Certificate of Compliance prior to the commissioning of the project once those conditions and requirements have been satisfactorily met.
 - Separate certificates would be obtained if the project proceeds in stages.
 - If the project impacts on the operation, maintenance or serviceability of water and sewer assets of Shoalhaven Water, RMS is to relocate, deviate, protect or redirect those affected infrastructure prior to the commencement of works within 50 metres of that asset.
- An assessment of the capacity changes to the Rising Main 5 and Pumping Station 5 as a result of the sewer diversion near Kangaroo Valley Road, and the deviation of gravity sewer lines that cross the project is required.
- Any Shoalhaven Water AC water main affected by the project would need to be replaced in accordance with Shoalhaven Water standards. Sewer and water assets are not to be located under road pavements other than road crossings, and any Shoalhaven Water assets proposed to be located under pavements are to be relocated at RMS expense.
- A detailed investigation would be required to determine the impact on Shoalhaven Water assets and rectification measures.

Response

During the period leading up to and including the detailed design phase of the project, RMS would consult with Shoalhaven Water concerning assets that would require protection or relocation as a result of the project. This would be undertaken as part of the pre-construction works for the project.

Division 5, Part 2 of the *Water Management Act 2000* relates to the provision of services to a development, and the contributions for the provision of these services. The project would not be connecting to sewer or water supply assets.

2.16.5 Property acquisition

Stakeholder identification number(s)

81, 86, 136, 174, 175, 191, 192, 212 and Kiama Municipal Council

Issue description

Submissions relating to property acquisition raised issues regarding minimising loss of agricultural land, specific requests for and opposition to property acquisition, impacts to the Berry Equestrian Centre, and modification to property accesses.

In summary, the respondent(s) raised the following issues:

- A review of land acquisition should be undertaken, following the completion of the detailed concept design, with the view of minimising the loss of the agricultural land.
- What compensation would be provided for lifestyle impacts during construction and operation?
- A property should be acquired as the project would impact on access arrangements and the outlook of the property.
- Objection to the acquisition of land at a property as this would impact on the future development of attractions and the legacy for the family. Money has been invested in the property to develop it as a tourist attraction to be opened in 2013. Land already acquired by RMS should be used for the project. As such, only three to five metres would be required instead of 20 metres from the property boundary. Compensation should be provided with 10 square metres provided for every metre lost.
- Objection to the acquisition proposal of a property at Broughton as the reduction in area would adversely affect both present and future entitlements to build upon and occupy the property.
- A proposed water quality pond is to be located in an area of remnant forest which has been maintained and re-planted by the property owner. Ownership and custodianship of the remnant forest is preferred over acquisition. The area is part of a plan to return degraded farming land and provide a wildlife corridor from Broughton Creek to the escarpment. Alternative would be for the property owner to maintain ownership of the area with right of way access for RMS to the run-off pond. Preference is for the acquisition of smaller sections of land necessary for the maintenance of the run-off pond only, or that the property owner is consulted and involved in the ongoing maintenance and custodianship of the remnant forest should the whole area be acquired. If land is acquired for a water quality basin, the area should be planted with local tree species and vegetation to serve as a habitat area and a screen for the property.
- Land adjacent to the Berry Equestrian Centre, proposed as part of a land swap, may not be acceptable for the current level of competition currently undertaken and the Berry Equestrian Centre would be degraded by the proposal.

- The design and loss of land for the proposed relocation of the Berry Equestrian Centre would detrimentally affect riders, spectators and the community as a whole. It is in the public interest that the facilities continue to provide dedicated grounds that cater to no less than the present capacity. A reduced area and realignment of activities would restrict and likely prevent the ability of user groups to conduct current equestrian events and would constrain their ability to hold larger events or grow in size.
- The agricultural property on North Street should be acquired as the project would impact on the operation of the property and would provide some respite for North Street residents.
- Objection to a proposed property access as the required excavation would necessitate the acquisition of land resulting in the home becoming unliveable. Option 1 places the cutting virtually on the verandah and near the front of the house. The proposed access would result in the complete loss of the current parking spaces at the front of the house and adjacent to the current driveway.

Response

As detailed in **Section 2.4.3** of this report, the area of land required for the project (including for adjusted property access) has been refined along certain sections of the project as a result of discussions held with the affected landowners. At the completion of the project when surplus land would be disposed of, RMS would consider lot consolidation to ensure agricultural land remains in viable holdings where feasible.

All property acquisition for the project would be undertaken in accordance with the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991*. Full or partial acquisition would be dependent on the impacts of the project on the individual property.

Mitigation and management measures to minimise the impacts to surrounding residences during construction and operation of the project have been identified within the environmental assessment.

The location of permanent operational sediment basins would be confirmed during the detailed design phase of the project. The basins shown in Figure 7-14 of the environmental assessment are indicative only. RMS would acquire the land required for the basins. Landscaping of these areas would be considered subject to the operational performance requirements for the basins.

RMS would explore, in consultation with Shoalhaven City Council and the Berry Equestrian Centre, the options for using residual land parcels along North Street to reconfigure the centre. This has been discussed in detail in **Section 2.17** of this report.

The alignment options along the North Street corridor were considered as part of the design refinements in 2012, including options of greater distance from North Street. The selected alignment provides a 40 metre buffer for North Street while reducing the impact on the agricultural land to help maintain agricultural activities. Mitigation and management measures to minimise traffic noise and visual amenity impacts along North Street have been identified in the environmental assessment.

Property entitlements are discussed in **Section 1.1.7** of this report.

2.16.6 Use and management of residual land

Stakeholder identification number(s)

9, 60, 69, 70, 78, 147, 175, 197, 212, 214-216, Shoalhaven City Council and Kiama Municipal Council

Issue description

Submissions relating to the use and management of residual land parcels generated as a result of land acquisition raised issues regarding management and maintenance of residual land, proposed public uses for residual land, severance and fragmentation.

In summary, the respondent(s) raised the following issues:

- Construction of the project would result in a significant number of isolated pockets of remnant land which would be inaccessible or too small to be viable for agricultural purposes. These are likely to become weed-infested and act as a weed source for neighbouring areas. The environmental assessment report should identify these pockets of land together with the strategy to maintain them in a weed-free state following construction. The following properties, identified in Appendix L Table L-1 and Figures L-1 and L2 of the environmental assessment, are considered to be affected:
 - A specific lot at chainage 9700 to chainage 9900.
 - A specific lot at chainage 11500 at chainage 11650.
 - Two specific lots at chainage 11550 to chainage 12200.
 - A specific lot at chainage 13850 to chainage 14250.
 - Two specific lots at chainage 15550 to chainage 15700.
 - A specific lot at chainage 15700.
 - Four specific lots at chainage 16500 to chainage 17200.
 - A specific lot at chainage 17350 to chainage 17550.
 - A specific lot at chainage 17700 to chainage 17800.
- The maintenance of the North Street buffer should not be the responsibility of residents.
- The residual land at the corner of George Street and Albert Street should become public space with a shared pedestrian / cycleway to provide a linear park linking the North Street sporting area, the North Street highway reserve, Kangaroo Valley Road and Mark Radium Park.
- Mitigation of the Town Creek diversion should include the introduction of water to the creek as high as possible in the watercourse. This could be achieved through an artificial water feature as part of the development of the residual land at the corner of George Street and Albert Street such as a fountain or a waterfall on the embankment to the south at chainage 17425.
- The Austral Park Road interchange near Broughton Village should be moved to the east to reduce the cutting in the hillside and the amount of residual land and road reserve required.
- Ongoing discussion with Shoalhaven City Council requested over the possibility of residual land parcels that are surplus to RMS requirements being transferred to Shoalhaven City Council.
- Adverse impacts created by the project as a result of property severance, including the sterilisation of residual land parcels should be addressed.
- Impacts associated with lot fragmentation as a result of the project should be addressed.

Response

The project has been designed to minimise land use severance by following, where possible, property boundaries or the existing alignment of the highway. However, it is acknowledged that a number of properties would be impacted by land acquisition resulting in severance and some potential land use sterilisation. The impacts of the project on land use are detailed in Section 7.9.2 of the environmental assessment.

As discussed in Section 7.9.2 of the environmental assessment, the strategy for dealing with land use sterilisation or land use severance as a result of the project is to:

- Maintain internal property access between severed portions where feasible to facilitate the existing land use.
- Consolidate residual portions of land created by property severance with neighbouring lots to maintain the current land use.
- Consider alternative uses, such as community and recreational uses, where feasible. For example, the recreational and community uses would be explored for residual portions of land located between the project and North Street and adjacent to the southern interchange.
- Consolidate sterilised parcels of land into the road reserve. The use of these parcels of land would be primarily for landscaping and would be maintained by RMS. These lots include those identified in submissions, being a lot near Austral Park Road interchange, a lot near Tindalls Lane interchange, a lot near the northern interchange for Berry, and a lot near the southern interchange for Berry.

In these instances, RMS would explore these opportunities with the relevant stakeholders during the property acquisition process and the detailed design phase of the project. This would include the uses and ownership of residual portions of land along the North Street buffer and adjacent to the southern interchange for Berry. These uses, ownership and maintenance arrangements would be determined following further consultation with the community and Shoalhaven City Council during the detailed design phase of the project (refer to Section 7.9.3 of the environmental assessment).

For the remaining lots identified in the submissions, one specific property would be completely impacted by the project and no residual land would remain. At a rural residential property owned by RMS, the dwelling would not be directly impacted by the project and external access would remain. As such, RMS would seek to sell this property following the completion of construction. At another specific property, only the required area for the road reserve would be acquired by RMS.

The diversion of Town Creek, and mitigation of these impacts, is discussed further in **Section 2.12** of this report. During the concept design process for the project, consideration was given to the maintenance of low flows in Town Creek by using a culvert. As this required the raising of the highway road surface, this design refinement was not adopted given the visual and noise related impacts along North Street (refer to Chapter 3 of the environmental assessment). Any use of the residual land parcel would be determined during detailed design, with any treatment of Town Creek, south of the project, determined in consultation with Shoalhaven City Council.

As part of the project, a landscaping and revegetation plan would be detailed within the urban and landscape design strategy. This is discussed in Section 7.6 of the environmental assessment. Community consultation on this strategy would occur during the detailed design phase of the project as discussed in **Section 2.13** of this report.

Refer to **Section 2.11** of this report for discussion regarding the maintenance of Town Creek flows.

2.16.7 Land use and development (operation)

Stakeholder identification number(s)

55, 131, 141, 169, 170, 212, 214, Kiama Municipal Council and Crown Lands and Department of Primary Industries

Issue description

Submissions relating to operational land use and development raised issues regarding property severance and impacts of this on dwelling entitlements, consolidation of residual land, impacts of Toolijooa Ridge cutting on private property, and constraints to future development of private land.

In summary, the respondent(s) raised the following issues:

- It is not clear if access would be retained for properties that would be severed from the main property by the project or if land would be subdivided. Subdivision is not preferable as it can lead to ad-hoc small properties resulting in land use conflicts with surrounding properties.
- A full review of the impacts to potential dwelling entitlements within the Kiama local government area as a result of property severance by the project should be provided. The loss of any potential dwelling entitlements as a result of the project is not supported.
- More detail on the categorisation of affected properties is required in order to review the full impacts on property owners.
- The environmental assessment does not contain information regarding any proposed method for dealing with lot amalgamations that may be required as a result of the project.
- Drawings of the Toolijooa Ridge cutting should be supplied to demonstrate if the steep batters of the cutting would be located within the road reserve or on private land. Confirmation of who would maintain these batters is required.
- The remaining portion of a property following construction of the project may not be suitable to accommodate future buildings. Acquisition of the neighbouring property could provide sufficient space to rebuild the dwelling, retain land use and enable the owner to remain at the property.
- Objection to the acquisition of land at an agricultural property. The area to be acquired is flat fertile land which is required for access to proposed dwelling sites, water catchment and general agricultural purposes. Improvements have been made including private internal roads, fences, stockyards and a dam. These have been strategically placed and are required for the proper usage of the property for agricultural and residential purposes.
- The provision of an access to a neighbour's property would impact on agricultural land. The acquisition would impact on a planned house site and manager's residence.
- The project would impact on the amenity and future plans to develop a property to provide a retreat for those of ill health and their families.
- The project would remove a percentage of bushland at an agricultural property that has value and benefits to the property. This includes property amenity, flora and fauna protection, source of resources (such as timber) and livestock shelter. It also represents the last area of bushland remaining between the agricultural areas and Berry. The impacted area should be replaced by at least double of the area lost, using endemic local species.

- The project would require a boundary adjustment and removal of trees and vegetation along the boundary of a property. This would be in breach of the development consent granted for the property.
- The proposed intersection at Queen Street and Kangaroo Valley Road could restrict plans to develop a dual occupancy and access to a private property that fronts onto Queen Street.
- A section of the Princes Highway between Tannery Road and a specific property should be transferred to RMS ownership.
- A section of constructed local road being Pulman Street should be transferred to Shoalhaven City Council.
- Crown land located between the Princes Highway and Woodhill Mountain Road should be scoped for inclusion within the project boundaries.

Response

Residual portions of land would be consolidated, where possible, with adjoining lots to prevent the fragmentation of agricultural land. Along the section of the project between the Toolijooa Road interchange and the Austral Park Road interchange, the project would have direct impacts on dwellings. Isolated portions would also occur which would be below the minimum lot size under the relevant local environmental plan. RMS has purchased the majority of these properties.

It is proposed that the residual portions of land would be reconfigured and consolidated with remaining dwellings associated with these properties that retain external property access, or to consolidate isolated portions with neighbouring properties that have a dwelling or dwelling entitlement. There may be exceptions to this, where dwellings would be directly impacted and where the relocation of the dwelling entitlement would be needed within the remaining lot or on adjoining land. Discussions have also been held with landowners concerning the potential for the consolidation of an adjoining lot to facilitate the rebuilding of a directly impacted dwelling.

The categorisation of the properties was determined based on previous discussions with the owners of the directly impacted residences and the use of aerial photography.

The cut, including steep batter slopes, at Toolijooa Ridge would be within the road reserve and maintained by RMS. Some portions of the batter slopes are proposed to be 'rolled back' to reduce visual impacts, and where practicable sections which are suitable may be incorporated into final property adjustments. If this occurs, this would be negotiated with the landowner.

The removal of the u-turn facility (refer **Chapter 3**) would address issues relating to a potential location for a future residence.

As detailed in **Section 2.4.1** of this report, a number of design refinements have been made in consultation with landowners which have resolved or minimised the extent of impacts on properties or farm infrastructure. This includes refinements at the Austral Park Road interchange, the Austral Park Road extension and the Schofields Lane junction. Where farm infrastructure impacts would remain, adjustments to the farm infrastructure would be undertaken prior to the commencement of construction. This would be undertaken in consultation with the affected landowners during the detailed design phase of the project or early in the construction phase. Design refinements are discussed in more detail in **Chapter 3**.

Mitigation and management measures to minimise the impacts to existing residences during construction and operation of the project have been identified within the environmental assessment.

Biodiversity offsets have been identified to address the residual impacts on biodiversity. The consideration of where the offsets would be provided is outlined in Section 7.3.5 of the environmental assessment and in **Section 2.10** of this report. Responses to issues relating to land acquisition and the valuation of land are discussed in **Section 1.1.5** of this report.

As part of the project, a landscaping and revegetation plan would be detailed within the urban and landscape design strategy. This is discussed in Section 7.6 of the environmental assessment. Community consultation on this strategy would occur during the detailed design phase of the project. This would include consideration of areas where vegetation currently screening the highway would be removed.

Future access to a property on Queen Street is distanced from the roundabout at the northern interchange for Berry. The location of this roundabout would not impact any future plans for a property access however any future development control approvals would likely remain with Shoalhaven City Council.

The transfer of Crown land along the length of the project between Tannery Road and the northern interchange would be discussed with the NSW Department of Trade and Investment (Crown Lands) and Shoalhaven City Council during the life of the project. All other pieces of Crown land identified in the submission are not located in proximity to the project. These pieces of land would not be considered for inclusion into the road reserve or are matters to be discussed directly between the NSW Department of Trade and Investment and Shoalhaven City Council.

2.17 Socio-economic

2.17.1 Construction business impacts (areas outside of Berry)

Stakeholder identification number(s)

169, 172 and Kiama Municipal Council

Issue description

Submissions relating to construction business impacts in areas outside Berry raised issues regarding signage and changes to access and the earning potential of rental property close to the highway.

In summary, the respondent(s) raised the following issues:

- Temporary signage should be provided where direct access to commercial properties has been closed due to construction activities.
- The project near Broughton Village would reduce the value of a property in real terms and prospective earning capacity. The appeal of the property would be affected, and it would be difficult to attract quality tenants during construction and operation due to noise, visual amenity and lighting impacts.

Response

A traffic management plan would be prepared to ensure that disruption is minimised during construction. Continuous access to local roads and properties would be provided, but if temporary changes to access are required, these would be provided in consultation with commercial property owners. Throughout the construction period, residents and road users would be advised before any changes to access are implemented and temporary signage such as variable message signs would be provided where appropriate.

The potential amenity impacts of the project have been assessed within Chapter 7 and Chapter 8 of the environmental assessment, with mitigation and management measures identified to minimise any potential impacts.

RMS would acquire land in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* where the property is directly impacted. Property that is not directly impacted would not be purchased. On occasion and in accordance with RMS policy, RMS may purchase the total property although only part of it is required for the project. This typically occurs when the effect of the project on the remaining land is considered so significant that it warrants total purchase. This would be considered on a case-by-case basis. Where partial acquisition is undertaken, the valuation of the property would consider the impact on the value of the remaining portion of land. This would consider earning capacity of land.

2.17.2 Construction agricultural business impacts

Stakeholder identification number(s)

172

Issue description

Submissions relating to impacts to agricultural businesses during construction raised issues regarding residential relocation and farm operations.

In summary, the respondent(s) raised the following issues:

- The temporary relocation of a Broughton Village farm owner during project construction would need to be on the property to allow the farm to continue to operate. To relocate to the east of the proposed upgrade would not be feasible due to flooding and inaccessibility to basic services (such as healthcare).
During the construction phase farmers would need to continue to manage cattle and farm operations. Temporary bridges and construction fences and excessive noise and construction workers on properties may impair the safe mustering of cattle from one point to another.

Response

Consultation with directly affected agricultural business owners would continue into the construction phase of the project so that business operational and internal access requirements are accommodated. Internal access within farming properties is further discussed in **Section 2.16** of this report. The desire for farmers to remain on properties to manage farm operations during the construction period is noted and RMS would implement all reasonable measures to ensure that this is possible for landowners.

2.17.3 Construction amenity

Stakeholder identification number(s)

169 and 172

Issue description

Submissions relating to amenity during construction raised issues regarding security.

In summary, the respondent(s) raised the following issues:

- Some properties in the project area are located at a considerable distance from the existing Princes Highway providing owners with a sense of security and pleasant amenity. The proposed upgrade, associated access roads and interchanges would directly impact current amenity and security as properties become more visible. During construction, numerous construction workers would be in close proximity to houses and would be able to see the daily routines of residents and contents within their households.

Response

It is acknowledged that some dwellings would become visible from the highway and to construction workers as a result of the project. The introduction of passing traffic and the proximity of the construction team to a dwelling offer passive surveillance of that dwelling, which would increase security rather than decrease it. Passive surveillance is the deterrence of crime or antisocial behaviour by the presence of other people in the area who could witness a crime. In addition, passing drivers would be unlikely to be able to see possessions within a property while travelling at highway speeds.

2.17.4 Construction project employment

Stakeholder identification number(s)

99

Issue description

Submissions relating to employment raised issues regarding employment opportunities for the Aboriginal community during construction.

In summary, the respondent(s) raised the following issues:

- Consideration should be given to employment opportunities for the Aboriginal community in:
 - Bush regeneration, seed collection, supply of native species from nursery and labouring work.
 - Services around public art, anti-graffiti strategies and cultural sites assessment.
 - Assistance with environmental cultural messages and values about the project including signage and rest area design.
 - Short films about the project as education for cultural heritage, training and promotion of positive Aboriginal role models involved in cultural sites assessments.
- The involvement of the Aboriginal community in this way would promote positive Aboriginal role models.
- Access to cultural assets on the project and the environmental connection should be retained for the Aboriginal community.

Response

RMS welcomes the offer of assistance from the Aboriginal community with the project. RMS would follow the NSW Government's 'Aboriginal Participation in Construction Guidelines' (NSW Department of Commerce, 2007). While the project is classed as a Category 3 project under the guideline, RMS would undertake, where practicable, to implement the project as a Category 1 project.

Consultation would continue between RMS and Aboriginal stakeholders regarding the management of Aboriginal cultural heritage within the project area. This would include seeking advice regarding the interpretation of Aboriginal heritage and the identification of appropriate plant species for replanting of the landscape, as well as the commissioning of art or motifs where appropriate. Refer to the mitigation measures included in the Draft Statement of Commitments (Chapter 10), Chapter 7.7 of the environmental assessment and Appendix J – *Technical Paper: Aboriginal Cultural Heritage* to the environmental assessment.

2.17.5 Operation agricultural business impacts

Stakeholder identification number(s)

100, 122, 140, 169, 172 and Department of Primary Industries

Issue description

Submissions relating to impacts on agricultural businesses during operation raised issues regarding farm operations, productivity and viability.

In summary, the respondent(s) raised the following issues:

- The current proposal has negative impacts on the viability of private farm land in the study area.
- The alignment of the highway along North Street would impact on both rural and residential properties. The option to locate the alignment approximately 40 metres from North Street enables both a 40 metre buffer to be established between the North Street residents and the alignment and also reduces the impact on the productive agricultural land of the rural property ie through severance.
- The proposed highway would affect the natural elements of local farms including creek banks, flood plain, tree stands and land gradients which collectively assist in how properties are farmed.
- The project impacts farm operations at a specific property in Broughton Village through the acquisition of land and buildings. These impacts would greatly reduce the farms viability given that the land to be acquired is the most productive on the property, the height of the bridge crossing the property would be too low for a tractor to pass under, the health and productivity of farm animals may be reduced, shelter, shade and water supply for cattle would be lost, there may be an increased potential for erosion and the creek crossing and natural landforms used for cattle mustering would be lost. These impacts could reduce the financial viability of the farm which may result in the owner becoming a financial burden and may affect the quality of life and well-being of the owner and family.
- A specific property in Broughton Village relies on income from two billboards located on the property. The new highway would make the current billboard location obsolete and new State Planning Controls under SEPP 64 would prohibit further possibility of hosting a similar asset, resulting in loss of income.
- The compulsory acquisition of land from a specific property in Broughton Village is approximately 25 per cent. The affected land is the most productive pasture on the property as it receives good sunlight from the north, is relatively flat and easily accessible. The proposed upgrade and interchange would not only reduce the carrying capacity, but would also remove the ability of stock to be moved onto the remaining portion of the land.
This land also has a tree lined driveway which provides shared amenity for stock from a neighbouring property. Loss of these trees directly impacts on available shade and shelter for stock.

- There would be a loss of productive agricultural land from a specific property in Broughton Village through the acquisition of 10 acres of prime paddock at the highest point of the property which affords good drainage in high rain periods. The paddock provides most of the winter fodder and hosts a dam that provides water for stock. The proposed highway would alter the natural landform and would prevent water runoff to the dam. The acquisition would remove mature shelter trees and would result in a lower carrying capacity for the property.
The proposal would have a significant negative impact on the value of the property through the loss of stock carrying capacity of at least eight breeding cows and a reduction in hay making capacity, resulting in a loss of income and a requirement to purchase feed.
- Valuable flood free, high agricultural land was taken from the dairy farm on North Street to avoid segregating the sports ground from the town (in agreement with landowner). Further proposed amendments to the route from North Street residents would require additional land-take, further impacting the dairy farm and business viability.
- A dairy farm on North Street presently acts as a support farm for the owner's current dairy. As a result of RMS responding to North Street residents and further adjusting the highway alignment, the North Street farm has lost 11 acres of high, flood free land, meaning the opportunity to recommission the farm has been lost, along with a family tradition.

Response

Where possible, the orientation of property boundaries has been considered during the design of the project so that the impact on farms would be minimised. Refer to Chapter 3 of the environmental assessment for a summary of the process undertaken to develop and assess route options for the project and select the preferred option.

The design has included measures to restore internal access on fragmented properties and consultation would continue with directly affected rural business operators to minimise impacts on farm operations. At present, seven rural operators have been acquired in full and other directly affected owners may still be acquired in accordance with RMS 'Land Acquisition Guide' (RTA, 2011) and under the terms of the *Land Acquisition (Just Terms Compensation) Act 1991*. Internal access within farming properties is also discussed in Section 7.9 of the environmental assessment. Flooding impacts and mitigation measures are discussed in Section 7.5 in of the environmental assessment.

At project completion, acquired land would be repackaged, where possible, as viable agricultural properties, and sold on the open market.

The project would cause existing traffic flows to divert from the existing highway to the proposed route. Outdoor advertising in certain locations may be bypassed by the new highway and owners may seek to relocate the signage to maintain advertising income. The *State Environmental Planning Policy No 64 – Advertising and Signage* (SEPP 64) requires that outdoor signage be developed in consultation with RMS and Council and that signage must adhere to the local signage development control plan if one is in place. SEPP 64 therefore does not prevent existing outdoor advertising from being relocated to an appropriate location elsewhere on an agricultural property. An appropriate location would be visible to motorists but without impacting visual amenity or creating a safety hazard.

2.17.6 Operation business impacts (Berry)

Stakeholder identification number(s)

114, 122, 142, 215 and 234

Issue description

Submissions relating to impacts on businesses in Berry during operation raised issues regarding impacts on visitor numbers, access and amenity.

In summary, the respondent(s) raised the following issues:

- Appendix M Socio-economic, Section 5.2.5 fails to address the potential positive impact on business that could be gained by a predicted traffic volume increase from 55 per cent to 84 per cent using the Princes Highway rather than the 'Sandtrack'.
- The environmental assessment does not consider the imposition of a 21st century highway upgrade on a town that has successfully resisted modernisation and trades on its heritage which could impact negatively on the district's numerous accommodation providers.
- Rather than improving the situation in Berry, the proposal could cause long-term damage to the economic benefits generated by tourism and regional visitation.
- While the bypass would bring improvements, such as removing trucks from the town, there would be negative impacts such as visual amenity and a decline in business. The increased speed limit of traffic on the highway would impact the amenity of businesses. The speed limit should be reduced on the highway through the whole built-up area of Berry.
- The environmental assessment report states the importance of the town remaining visible for ongoing economic viability. However, Berry is a destination in its own right and businesses do not rely on chance visit.
- RMS' argument, used to justify the current location of the interchange, that the town needs to be visible for motorists to decide to leave the highway and visit the town are not relevant. RMS' research on other successful bypasses, such as Berrima, proves this.
- The potential decrease in usage of community facilities within Berry, specifically the Berry Equestrian Centre, would impact on local businesses.
- The proposed property access for the dairy farm on North Street would have a devastating effect on the personal training business currently being operated from that property.

Response

This response considers amenity issues relating to businesses only. Issues associated with amenity impacts on the broader community are discussed in **Section 2.17.11** of this report.

The removal of traffic from the centre of Berry would benefit the majority of businesses in the area and create opportunities for new businesses. The project would introduce new infrastructure into the region, some of which would be visible and would change the ambience of Berry.

The project near Berry has been designed to reduce amenity impacts by increasing the distance of the bridge at Berry from the town and lowering the height of the bridge and the highway in the vicinity of North Street. At the Kangaroo Valley Road interchange, the project would be in a cutting and associated ramps would connect from the cutting up to existing road levels. Measures to mitigate the remaining amenity impacts are described in Section 7.2 and Section 7.6 of the environmental assessment and are included in the Statement of Commitments in Chapter 10 of the environmental assessment.

The environmental assessment states, on page 466, that the design makes it possible to see Berry. However, it is not a requirement of the design that Berry is visible for the town to continue to attract visitors. Berry is a destination town in its own right as described in Appendix M – *Technical Paper: Socio-economic* (Page 15) to the environmental assessment. The removal of highway traffic from Queen Street, Berry, along with the measures described above would improve amenity for businesses and tourists. There would be opportunities for businesses to develop their offerings to residents and tourists or for new businesses to start up.

Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment includes artist's impressions of the character of Berry following construction of the project. The images show a continuance of the pastoral connection and that views of the escarpment would be maintained. This would encourage tourists to continue to visit the area. Visitors to Jaspers Brush accommodation providers may experience visual impacts but would also benefit from the project through safer and more efficient access to the area and to Berry township. For more details refer to Appendix M – *Technical Paper: Socio-economic* (Section 5.2.5).

On balance, the environmental assessment found that the project would benefit rather than damage businesses in the town and surrounding localities.

The upgraded highway would bypass Berry so any diversion of traffic from the 'Sandtrack' is assumed to join the highway rather than the route through Berry. As detailed in Section 7.1.2 of the environmental assessment, the 'Sandtrack' provides an alternative route between Gerringong and Bomaderry which allows motorists to bypass the project area. Therefore following construction of the project, it is assumed that the expected transfer of traffic from the 'Sandtrack' to the project would be unlikely to impact businesses in Berry as this traffic does not enter Berry under the existing situation. Some businesses in Gerringong and Gerroa which serve passing traffic may experience a decrease in trade, however the proportion that are reliant on passing trade is low (refer to Appendix M – *Technical Paper: Socio-economic* (Page 52)).

2.17.7 Operation business impacts (areas outside Berry)

Stakeholder identification number(s)

65, 169 and 172

Issue description

Submissions relating to operational impacts on businesses in areas outside Berry raised issues regarding increased journey distances which would increase travel costs for businesses and the earning potential of rental property close to the highway.

In summary, the respondent(s) raised the following issues:

- Proposed access arrangements for Gembrook Lane would increase travel distances, fuel required, and business running costs which would add up significantly over the years.

- The project near Broughton Village would reduce the value of a property in real terms and prospective earning capacity. The appeal of the property would be affected, and it would be difficult to attract quality tenants during construction and operation due to noise, visual amenity and lighting impacts.

Response

The design for the Gembrook Lane access presented in the environmental assessment consisted of a left-in / left-out only junction at about Chainage 13770. Under the access arrangements presented in the environmental assessment, residents living on Gembrook Lane would be required to travel to the nearest u-turn facilities at the Tindalls Lane and Austral Park Road interchanges, which would add between one and six kilometres to existing journeys from their property.

RMS has considered alternative access options at Gembrook Lane and a design change is proposed that would include an underpass connection from Gembrook Lane to the Tindalls Lane interchange. Under the new design properties would be able to access Gembrook Lane from the north or the south via the Tindalls Lane interchange, without the need for additional travel and u-turn at Austral Park Road when travelling from the south. For further details of the design changes, refer to **Chapter 4** of this report. Consultation with property owners in this location would continue throughout the detailed design phase of the project.

The response to issues concerning the earning potential of property is provided in **Section 2.17.1** of this report.

2.17.8 Operation signage

Stakeholder identification number(s)

Kiama Municipal Council

Issue description

Submissions relating to operational signage raised issues regarding access to and from the highway at Austral Park Road interchange.

In summary, the respondent(s) raised the following issues:

- Heavy vehicles which service the rural farm properties would be forced to use the existing highway from the Austral Park Road interchange. Given the distance between Foxground and Toolijooa it is likely that vehicles could miss the Austral Park exit, forcing them to travel to Gerringong in order to turn around. Very large, advance warning signs are needed to advise motorists that access to the existing Princes Highway is from the Austral Park Road interchange only, along with signage advising motorists that access to the new highway is along the old highway.

Response

If drivers miss their exit from the highway then they would incur extra vehicle operating costs and time costs while they re-route to their destination. Adequate signage would reduce the likelihood of this occurring.

Signage would be provided in accordance with RMS policy. The policy aims to ensure legible and appropriate signage to localities, tourist attractions and businesses. Consultation with Councils about suitable signage would continue until project completion.

RMS would ensure that RMS traffic information services such as 'Live Traffic NSW' are updated with construction and traffic switching information to minimise disruption and delay. RMS would undertake a program of on-site advisory works prior to traffic switching on new alignments to advise drivers of new routes by utilising advertising, stakeholder databases, portable variable message signs and other communication methods.

RMS would ensure that mapping data is provided to the NSW Land and Property Information. Typically this would then be available to external parties for digital mapping upgrades to services such as in-car GPS navigation systems.

2.17.9 Operation community facilities and recreation

Berry Equestrian Centre

Stakeholder identification number(s)

56-59, 61-63, 71, 72, 74, 76, 80, 84, 86-88, 90-96, 101-106, 108-111, 113-115, 117, 119, 120, 126-128, 137, 139, 144, 148, 157, 162, 165, 167, 173, 198 and Shoalhaven City Council

Issue description

Submissions relating to the Berry Equestrian Centre raised issues regarding the safety of riders and the standard required for a relocated facility.

In summary, the respondent(s) raised the following issues:

- Based on the limited information on the impacts within the environmental assessment report, the current Berry Equestrian Centre would not be able to be modified to maintain the current level of service and safety for the Berry Equestrian Centre.
An options paper should be prepared, with input from the Berry Equestrian Centre, to examine modifications to the current site and assess other, more suitable sites for the Berry Equestrian Centre within close proximity to Berry.
- A commitment is sought from RMS that equestrian facilities would be relocated / re-established to a level acceptable to the Berry Equestrian Centre.
If RMS and the Berry Equestrian Centre cannot agree on the relocation or the provision of new facilities, the Director-General of the Department of Planning and Infrastructure should facilitate a resolution.
- RMS should have an ongoing discussion with Shoalhaven City Council on the potential impacts of the land used by the riding school which may result in consideration of relocating that use or mitigating impacts including noise.
- Design and loss of land would have a significant impact on the ability to conduct events at the Berry Equestrian Centre.
- The Berry Equestrian Centre competition grounds are required to be rectangular / square in shape, 140 metres x 140 metres, level, well drained and with a good riding surface to cater for at least four dressage arenas or two show jumping arenas.
The parking area should be a minimum of 90 metres x 160 metres, designed for horse floats and trucks, with each parking bay equivalent to minimum four normal vehicle parking spaces to accommodate unloading / loading and tie-up of horses.
- Horse floats and trucks would require an indented driveway of at least 15 metres to allow vehicles to park off the roadway while entry gates to the Berry Equestrian Centre are opened. Access currently allows for easy entry, manoeuvrability, parking and exit of horse floats and trucks.

- Following project approval the Berry Equestrian Centre, needs to remain in close proximity to the Berry township, Berry Sporting Complex, public toilets and other amenities and Berry Showground for overnight yarding of horses; have easy access from outside Berry; secure storage on site; suitable parking and manoeuvrability for horse floats and vehicles. The competition arena should be located away from distractions such as the skate park, roads and other public facilities.
Club Committee members live within five minutes of the existing facilities as numerous trips are required to unlock access gates and transport equipment to events.
- The project would impact on significant improvements made by non-profit sporting clubs at the Berry Equestrian Centre including a good all weather riding surface, administration / shelter shed for officials, canteen and spectator viewing area, shed for storage of dressage and show jumping trailers and equipment; location of container and construction of a storage annex for pony club gear and secondary show jumping equipment; safety fencing to protect riders and horses from falling into the adjoining creek and gully.
- Due to the proximity of vehicles there may be increased safety risks for users of the Berry Equestrian Centre, particularly children. Increased noise, which has the potential to agitate horses, would result from increases in traffic volumes and speed and result in safety incidents at the Berry Equestrian Centre.

Response

The concept design drawings on display at the Berry project office included an indicative outline of a potential configuration for the Berry Equestrian Centre that may be established using land from an adjacent property that would be acquired by RMS. However the indicative outline was an inaccurate representation of the amount of adjacent land available and led to uncertainty amongst the riding community, especially around the potential of the reconfigured site to accommodate a facility of similar standard.

Discussions would be undertaken between RMS, Shoalhaven City Council as the land owner and the Berry Equestrian Centre to establish a new configuration for the centre. RMS has agreed with Shoalhaven City Council that the club would be provided with an equivalent facility on a larger parcel of land than was suggested within the environmental assessment, to be consistent with the current size of the facility. Shoalhaven City Council has engaged an architect to prepare a concept plan in consultation with RMS and the Berry Equestrian Centre, as illustrated in **Figure 2.9**. Two concept plan options have been developed to respond to the issues described above. These indicative plans will form a basis for any future discussion about the site.

Respondents also raised concerns about the proximity of vehicles to the Berry Equestrian Centre and noise and other impacts of the highway on riders. Respondents were particularly concerned about noise during equestrian competitions. Proposed noise mitigation measures include a barrier between the western end of the bridge at Berry and Kangaroo Valley Road and low noise pavement along the length of the alignment (further details are provided in Section 7.2 of the environmental assessment). The barrier could take the form of a wall or embankment and would be located between the Berry Equestrian Centre and the project. It would provide separation of users of the Berry Equestrian Centre from the project.

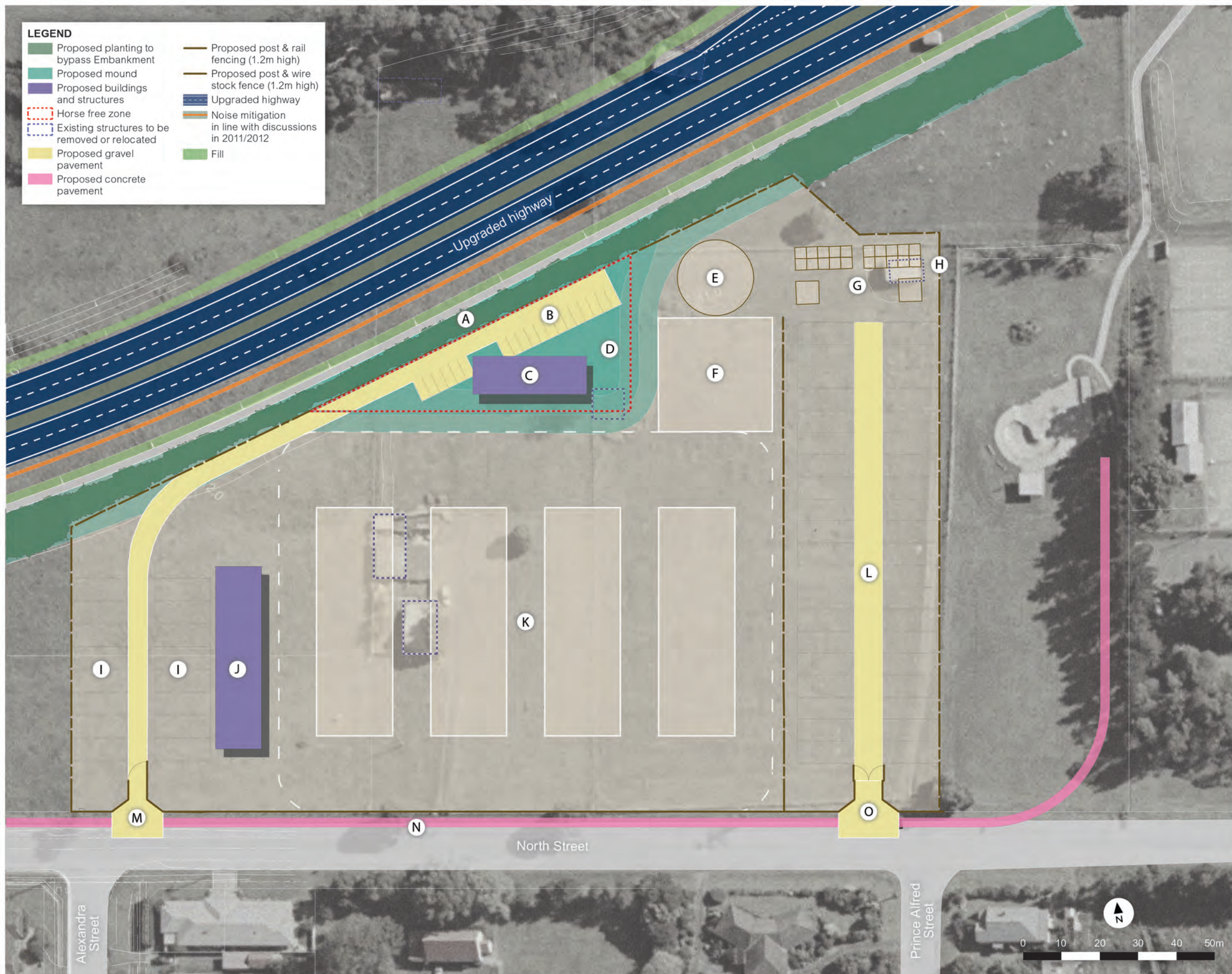
Project impacts on community recreational areas

Stakeholder identification number(s)

114 and 208

Issue description

Submissions relating to impacts on community recreational areas raised issues regarding the impact of the project on the quality and safety of facilities.



LEGEND

Proposed planting to bypass Embankment	Proposed post & rail fencing (1.2m high)
Proposed mound	Proposed post & wire stock fence (1.2m high)
Proposed buildings and structures	Upgraded highway
Horse free zone	Noise mitigation in line with discussions in 2011/2012
Existing structures to be removed or relocated	Fill
Proposed gravel pavement	
Proposed concrete pavement	

DESIGN NOTES

- A Noise barrier**
(Option 1 in Urban Design Strategy) Concrete attenuation barrier with internal 1800mm high stock fence. Note landscaped buffer would be reduced in width to allow for vehicle access and parking.
- B Car parking**
20 standard bays within horse free zone. Associated with club house on mound. Gravel parking area.
- C Club house**
30 X 10m building footprint to house kiosk, toilets, kitchen, administration, and gathering area. Includes a covered viewing terrace with BBQ facilities to the south overlooking the dressage arenas. Potential to utilise electrical and plumbing services from existing cottage.
- D Mounding**
Earthworks associated with Bypass to be extended into the site to form a raised terrace area (approx 1 - 2m high). This will provide an elevated position for the clubhouse and a bank to view the dressage arenas.
- E Lunging area**
20m minimum diameter.
- F Horse warm up area**
Minimum of 30 x 30m.
- G Horse yards and wash bays**
Back to back yards (3 x 3m) with two freestanding wash bays (6 x 6m).
- H Pedestrian gate**
- I Overflow float parking**
Allowance for 16 bays (15 x 6m) on grass.
- J Equipment storage sheds**
Machinery shed with six bays (8 x 12m) for the equipment storage of various events and clubs. Consolidates the existing storage sheds and containers. Each roller door entry to be minimum of 4m wide x 3m high. Located for ease of access and also to offer some protection from the strong southwesterly winds.
- K Dressage arenas**
Four 60 x 20m arenas. Includes a 20m wide buffer zone to ends and 10m wide buffers to the sides of the arenas.
- L Float parking**
Allowance for 40 bays (15 x 6m) on grass. Post and wire fence partitions float area from dressage arenas.
- M Clubhouse entry gate**
Gravel or concrete entry area with 5m min wide gate to gravel driveway. Post and rail fence fronting North St steps in 15m to provide a standing area for entering / exiting vehicles. Includes an information and entry signage board.
- N Pedestrian footpath**
Proposed footpath relocated on North Street verge (3m off road to allow for parallel parking to North Street).
- O Float vehicle entry gate**
Gravel or concrete entry area with 7m min wide gate. Post and rail fence fronting North St steps in 15m to provide a standing area for entering / exiting vehicles. Includes an information and entry signage board.

Figure 2.8 Berry Equestrian Centre
Draft schematic plan – option 1

Source: Ayling Drury / landscape architecture

LEGEND

Proposed planting to bypass Embankment

Proposed mound

Proposed buildings and structures

Horse free zone

Existing structures to be removed or relocated

Proposed gravel pavement

Proposed concrete pavement

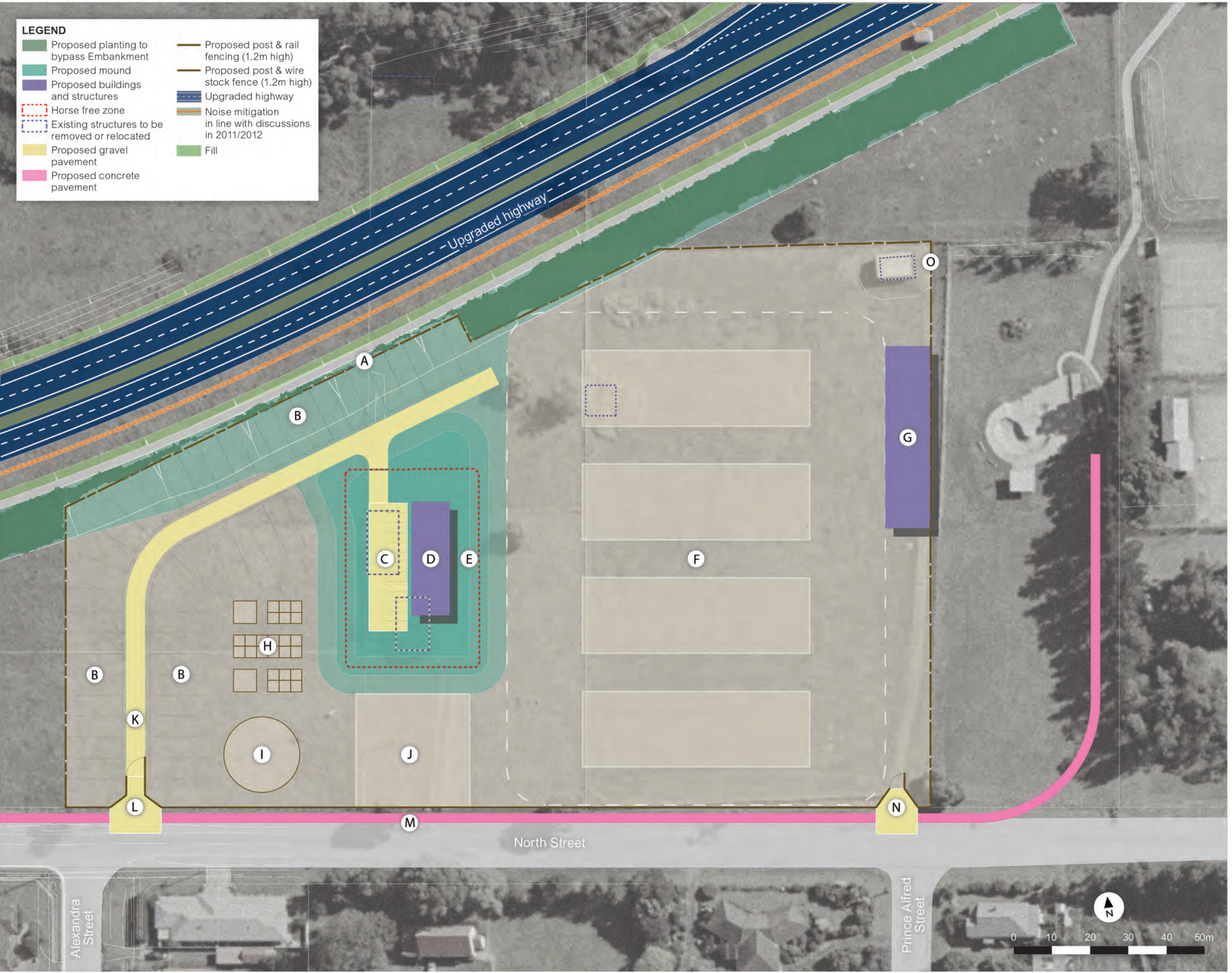
Proposed post & rail fencing (1.2m high)

Proposed post & wire stock fence (1.2m high)

Upgraded highway

Noise mitigation in line with discussions in 2011/2012

Fill



DESIGN NOTES

- A Noise barrier (Option 1 in Urban Design Strategy)**
Concrete attenuation barrier with internal 1800mm high stock fence. Note landscaped buffer would be significantly reduced in width to allow for float parking.
- B Float parking**
Allowance for 45 bays (15 x 6m) on grass. Bypass mounding graded to accommodate northern bays.
- C Car parking**
15 standard bays within horse free zone. Associated with club house on mound. Gravel parking area.
- D Club house**
30 X 10m building footprint to house kiosk, toilets, kitchen, administration, and gathering area. Includes a covered viewing terrace with BBQ facilities to the west overlooking the dressage arenas. Potential to utilise electrical and plumbing services from existing cottage.
- E Mounding**
Earthworks associated with Bypass to be extended into the site to form a central mound area (approx 1 - 2m high). This will provide an elevated position for the clubhouse and a bank to view the dressage arenas. The mound also offers protection from strong southwesterly winds.
- F Dressage arenas**
Four 60 x 20m arenas. Includes a 20m wide buffer zone to ends and 10m wide buffers to the sides of the arenas.
- G Equipment storage sheds**
Machinery shed with six bays (8 x 12m) for the equipment storage of various events and clubs. Consolidates the existing storage sheds and containers. Each roller door entry to be minimum of 4m wide x 3m high. Located for ease of access and also to create a screen between the arenas and skate park.
- H Horse yards and wash bays**
Back to back yards (3 x 3m) with two freestanding wash bays (6 x 6m).
- I Lunging area**
20m minimum diameter.
- J Horse warm up area**
Minimum of 30 x 30m.
- K Main vehicle entry**
Allowance of 5m min width. Grass surface.
- L Main entry gate**
Gravel or concrete entry area with 5m min wide gate. Post and rail fence fronting North St steps in 15m to provide a standing area for entering / exiting float vehicles. Includes an information and entry signage board.
- M Pedestrian footpath**
Proposed footpath relocated on North Street verge (3m off road to allow for parallel parking to North St.
- N Service vehicle access**
Secondary gated entry at existing location for direct entry to storage sheds as required.
- O Pedestrian gate**

In summary, the respondent(s) raised the following issues:

- The proposal would sever existing recreational land to the west of the Berry Equestrian Centre, removing access to the existing recreational area along Bundewallah Creek. This is a popular track for local recreation, and the local community has invested much time in regenerating the area.
Consideration should be given to providing a walking track underneath the bridge at Berry to retain this important local access.
- Existing community grounds, specifically the Berry Equestrian Centre, are frequently used and supported by local funding (through fundraising efforts). These community grounds are now under serious threat as a result of the project, and users and supporters would be dramatically impacted by any change to the grounds.
- The safety of children, teenagers and young adults using existing community facilities (eg the skate park and the Berry Equestrian Centre), would be impacted by the close proximity of the proposed road alignment. It would be an unfortunate, negative, social impact if these facilities become unused and inaccessible due to safety concerns.

Response

The project design aims to minimise impacts on the Berry sportsground and adjacent community facilities such as the Berry Equestrian Centre. The project alignment was modified during the concept design to avoid Camp Quality Memorial Park and to minimise the land acquisition from the sportsground. **Section 2.17.9** of this report responds to issues raised specifically in relation to the Berry Equestrian Centre.

RMS would acquire land at the Berry sportsground that lies to the north of the project. RMS has consulted with Shoalhaven City Council about the severed portion of the sportsground and it is understood that Shoalhaven City Council do not wish to retain pedestrian access to this land. As such, there would be no pedestrian access under the bridge at Berry. This portion of land would require amalgamation with adjoining land, however it has limited use given it is located within the riparian corridor of Bundewallah Creek (refer also to Chapter 7.9 of the environmental assessment). The existing walking route along Bundewallah Creek would remain as far as the bridge at Berry. This would connect to a new pedestrian and cycle route linking North Street to Kangaroo Valley Road and Mark Radium Park.

There would be no access from the sportsgrounds and skate park to the project. The design incorporates safety features such as safety barriers to prevent vehicles leaving the highway if involved in an accident and fencing to prevent pedestrians entering the highway corridor. Noise barriers would be provided between the western end of the bridge at Berry and Kangaroo Valley Road to mitigate noise levels for users of the community facilities at North Street and would also add to the separation from the highway. Visual impact mitigation measures such as planting would also add to the separation of recreational users from the highway.

2.17.10 Operation community cohesion / severance

Severance of Berry township

Stakeholder identification number(s)

4, 41, 49, 50, 67, 79, 89, 118, 130, 135, 138, 175, 193, 200, 201, 215, 226, 227, 233, 234, 236, 239, 241, 242, 244 and 246

Issue description

The submissions relating to severance of the Berry township focussed primarily on cohesion and severance impacts of the bypass and interchange at Kangaroo Valley Road.

In summary, the respondent(s) raised the following issues:

- RMS states that, in deciding the preferred route, the preferred option provides the best cost-benefit outcome. However, this assertion is not supported by proper economic analysis.
- The impacts of severance on the Berry township have been ignored and are not fully addressed in the environmental assessment. Of all the options considered, the preferred route has the largest social and environmental impact on Berry because it:
 - Is not a true bypass but rather a through-pass which bisects Berry, splits North Street and divides the town in two. The Kangaroo Valley Road interchange would dwarf and divide the town into 'east' and 'west' Berry.
 - Cuts-off the growth centre of Berry from the town centre. Residents from 'west' Berry would have to negotiate the Kangaroo Valley Road interchange roundabouts to access social infrastructure such as schools and shops.
 - Cuts the town off from the surrounding rural and natural landscapes.
 - Is too close to the unique, historic Berry town.
 - Imposes an ongoing (ie post construction) impact on the largest number of people (compared to other options).
- Objection to claims that the northern bypass divides the town and separates residents from town amenities. The town is currently divided by the Princes Highway. Once the northern bypass is constructed, the north and south halves of Berry would be joined by Kangaroo Valley Road bridge, allowing access to the shops, schools, churches, and playing fields.
- The removal of highway traffic from Queen Street does not justify the removal of important links that create community cohesion in Berry. A highway, with a greatly increased traffic volume, would cut across the town. The bridge at Kangaroo Valley Road would be the only link to facilities and services and the Southern Highlands. North Street, a quiet, rural street greatly enjoyed by residents, pedestrians and cyclists would be severed, and escarpment views lost.
- Page 142 of the environmental assessment states that the NSW Department of Planning and Infrastructure requests pedestrian connectivity between Kangaroo Valley Road and Berry be maintained. The issue of connectivity is not adequately covered in Section 7.10 as pedestrians would have to cross two major roundabouts to walk from 'west' Berry to 'east' Berry where most social infrastructure is located.
- Within the next few years there would be more dwellings to the west of the new bypass (520) than in the original town to the east of the bypass (460). The terms 'west' and 'east' Berry were coined by RMS and are continually used in the environmental assessment as a justification for the visual and, apart from one bridge, physical severance of this area. RMS has acknowledged the scale of the severance of the township when they referred to the selected northern option as an 'internal bypass' when talking to community members in the Berry project office.
- While the realigned highway would remove a large majority of traffic from the main street, thus improving connectivity on both sides of Queen Street, the proposed width, 50 kilometres per hour speed limit and suburban nature of Queen Street provides much greater cohesion than the proposed 'east' and 'west' Berry under the current proposed alignment. The value of the connection between 'east' and 'west' Berry, or between either side of Queen Street has not been calculated. The true net cost-benefits to the town are unknown.

Any analysis of effects should include more than just those most affected (including North Street residents).

- The severance of North Street fails to address the feelings of the whole community which enjoys this quiet rural area; a peaceful excursion along North Street would be replaced with traversing two busy roundabouts and an overpass with traffic speeding noisily below; the advisability of reducing access to Kangaroo Road from two streets to one is unsatisfactorily addressed; visual connection across one wide bridge does not compensate for the loss of the land contours that currently link the older and the newer parts of the community.

RMS has disregarded its own studies and claim that the Kangaroo Valley Road bridge, built to the same height as the existing roadway, would be sufficient to retain and even reinforce connectivity to this severed area of town.

Response

As detailed in Section 7.6.3 of the environmental assessment, it is recognised that residents of Berry west of the project may experience feelings of severance. This would result from the introduction of new infrastructure between this area and the rest of Berry and from the severance of North Street which currently provides vehicular and pedestrian access.

The concept design for the project includes elements to minimise this impact, by constructing the highway in a cutting below Kangaroo Valley Road and constructing interchange ramps from the level of the highway in the cutting up to existing road levels. The existing topography in this area and the design ensure that the proposed infrastructure maintains the current pedestrian route to Berry via Kangaroo Valley Road. It also aims to minimise the intrusion of new infrastructure on the built form and on people's movements between both parts of the town. A pedestrian and cycle route between Kangaroo Valley Road and North Street is also proposed, improving access. RMS is committed to on-going consultation with Shoalhaven City Council and the community regarding the layout of the interchange and highway in the vicinity of North Street and Kangaroo Valley Road.

Community cohesion in Berry would greatly improve with the removal of heavy traffic from Queen Street, which is considered the hub of the town. This would allow residents and visitors to move freely between the northern and southern parts of Berry, as well as improve access to facilities on Queen Street. Some of the submissions acknowledge the benefits to the wider community of removing heavy traffic from Queen Street, and the literature on findings of other bypassed towns in NSW reinforces this.

The residents of Berry to the west of the project would retain access to services and facilities east of the proposed southern interchange for Berry. As detailed in **Section 2.8.4** of this report, future population growth in Berry, west of the project has been included in the traffic modelling and the development of the concept design. There is no justification for altering the design on the grounds that future population west of the interchange would be greater than that to the east. This population would have the same access to existing infrastructure in Berry.

The southern interchange for Berry would improve links between areas east and west of the project and enhance safety for users by introducing safe crossing points at roundabouts which would act to control traffic and allow, through the inclusion of refuges, pedestrians to cross one stream of traffic at a time.

Severance may be reduced by maintaining the visual connection between the areas to the east and west of the proposed southern interchange for Berry, with the overpass designed to remain at the same height as the existing road. Plans illustrating the cross section of the route are available for viewing at the project office in Berry. The roundabouts and verges on Kangaroo Valley Road would also be planted to mitigate the separation of areas of Berry to the east and west of the project.

The socio-economic impact assessment methodology has had regard to likely positive and negative impacts of the preferred route on individuals, communities and groups. Mitigation measures are proposed to minimise impacts of anticipated negative outcomes of the proposal. Some individuals and groups may be more affected than others in the process, but on balance, with mitigation, the project would provide benefits to a wider community, including safety benefits for road users.

Section 2.17.11 of this report describes the role of economic analysis in environmental assessment.

Severance of rural communities

Stakeholder identification number(s)

169 and 172

Issue description

The submissions relating to severance of rural communities raised issues regarding severance of links with neighbours and support.

In summary, the respondent(s) raised the following issues:

- The proposed upgrade would have significant social impacts on an elderly land owner at a specific property in Broughton Village as it severs access to neighbours who regularly provide assistance (eg transportation, medical treatment and social interaction). RMS' suggestion to alternatively walk Broughton Creek Bridge 3, and the resulting isolation caused by the access severance, is not acceptable. Consideration should be given to providing access for surrounding neighbours to assist the property owner.
- The proposed highway would sever direct neighbour access to existing properties in Broughton Village. Calls for consideration to be given for the rural nature of the area and the interdependence of neighbours, particularly in emergency situations when neighbours can quickly access each other. There is a 'neighbourhood watch' system in place, and neighbours care and watch over each other's homes and welfare. If the proposal proceeds in its current form, direct links to neighbouring properties would be lost and the alternative route would be over two kilometres (via Austral Park Road, the link road and the old highway).

Response

As outlined in Section 7.9.2 of the environmental assessment, property underpasses, access under the Broughton Creek bridges and an extension to the existing cattle underpass would be provided for properties near Toolijooa Ridge. Consultation with the affected property owners would continue during the detailed design phase of the project.

Directly affected owners who experience hardship as a result of the project may apply for full acquisition by RMS in accordance with RMS' 'Land Acquisition Guide' (RTA, 2011) and under the terms of the *Land Acquisition (Just Terms Compensation) Act 1991*.

2.17.11 Operation amenity

Tourism, lifestyle and amenity impacts

Stakeholder identification number(s)

17, 60, 67, 130, 133, 156, 169, 172, 175, 206, 215, 223 and 234

Issue description

Submissions on impacts on tourism, lifestyle and amenity raised issues relating to increased traffic, noise and loss of views.

In summary, the respondent(s) raised the following issues:

- The project would improve the amenity and ambience within Berry by improving parking availability (and subsequent access to local services), reducing travel times and increasing connectivity for the community. It would provide Berry with the opportunity to enhance its position as a premier south coast tourist destination and as a great place to live and work.
- At present, heavy traffic volumes through the town impact on local connectivity making it difficult to cross the road by car or foot, and the noise of heavy vehicles is disturbing and affects sleep patterns.
- Support for the issues raised in the Berry Alliance (BOB) submission relating to amenity. Amenity needs to be applied to all town heritage and not restricted to the shopping precinct of Queen Street.
- An alternative bypass is the only solution and the project, as submitted, should be rejected on environmental grounds as well as undesirable and unsympathetic design features not in keeping with the history and ambience of Berry.
- The preferred route presented in the environmental assessment report would have significant impacts on the amenity of Berry and surrounding districts including:
 - The lifestyle of residents and visitors, who currently enjoy picturesque and peaceful roads around Berry, would be disrupted.
 - The surrounding escarpment and rainforests attracting people to the area would all be impacted and no one would want to visit the town with a highway just metres away.
 - The proposed bypass is a large, modern structure that would destroy the relationship between the town's pastoral fringe and historic landscape.
 - The proposal would change the overall feeling of the town to a 'ghetto' atmosphere located underneath bridges and divided into two sides.
 - The preferred route promises to sever the town from its heritage escarpment views and threaten Berry's status as an idyllic, intimate, historic rural town.
 - The area currently has a pristine landscape which is quiet and unaffected by traffic. This would be destroyed forever if the bypass is built. RMS is committed to the movement of traffic but no consideration has been given to the benefits of Berry or the welfare of its inhabitants.
- The success of a bypass of Berry can be measured by how well it protects the character and amenity of the town.
- Should the proposal proceed, Berry's character and amenity would be lost. There is no way to mitigate against the impacts of the highway from severing the town from its physical and cultural landscape. The giant footprint would ensure residents and visitors see, hear and feel its effects every day.

- Bisecting Berry is a poor decision in terms of amenity and Berry's relationship to its environment.
- Replacement of the Kangaroo Valley Road bridge with a pair of Bebo arches (cut and cover) would detract less from the town's amenity.
- The 50/50 option for route alignment between the farm on North Street and North Street properties is a very important issue for the future amenity of the residents of North Street and the Berry township.
- The proposed alignment does not achieve RMS' stated objectives, nor does it preserve cultural patterns or avoid significant features in the landscape (namely Berry township). The current design does not respect the communities and towns along the highway, as it fails to minimise the impact on the amenity of Berry residents and rural communities. This major oversight can be attributed to serious flaws in the economic analysis of the project.
- Some homes in the project area are currently located a considerable distance from the existing Princes Highway, providing owners with a sense of security and pleasant amenity. The proposed upgrade would directly impact the current amenity and sense of security at these homes as they would become more visible and accessible to passing traffic.

Response

The project would introduce new infrastructure into the region. Parts of this would be visible from the surrounding area and traffic using the highway may be audible from locations within Berry, which would impact amenity and the character of Berry.

The design of the project near Berry has been improved to reduce amenity impacts and the impacts on the character of Berry as a whole, by increasing the distance of the bridge at Berry from the town, lowering the height of the bridge and the highway in the vicinity of North Street. Bridge design and the appropriateness of bebo arches are discussed in **Section 2.4.1** of this report. The colour and material used on structures, including noise barriers and bridges, would be designed to be unobtrusive in the environment (refer to Statement of Commitment LVA4 in Table 4-1 of this report).

The environmental assessment considers amenity within Berry at locations beyond Queen Street. Impacts on residents in North Street, Victoria St and Huntingdale Park Road are described in Sections 5.2.1, 5.2.7, and 5.1.7 of Appendix M – *Technical Paper: Socio-economic* of the environmental assessment. The assessment determined that amenity impacts of the project were location specific, hence the identification of certain locations in the report, but Appendix M – *Technical Paper: Socio-economic* of the environmental assessment considers impacts on the amenity of Berry as a whole. There would be residents that experience decreased amenity and others that experience increase amenity, but on balance, it is considered that the outcome for Berry as a whole is positive.

The landscape character and visual amenity assessment is included at Chapter 7.6 of the environmental assessment and Appendix I – *Technical Paper: Urban Design, Landscape Character and Visual Amenity* to the environmental assessment. In particular Section 7.6.3 of the environmental assessment includes illustrations of the landscape with the project. The connection to the rural landscape and views to the escarpment are retained, which minimises the impact on the character.

Refer to **Section 2.17.3** of this report for the benefits of passive surveillance.

The environmental assessment responds to the requirements issued by the Director-General of the NSW Department of Planning and Infrastructure (refer to **Appendix A** of the environmental assessment). An environmental assessment aims to provide a detailed assessment of the environmental and social impacts that may result from the construction and operation of a major project. It is not a cost benefit assessment and does not include a cost benefit assessment, because some elements cannot have a dollar value placed on them and would therefore be overlooked, for example, social cohesion and lifestyle impacts. The socio-economic impact assessment aims to identify both positive and negative impacts of the project but does not aim to monetarise these as this would lead to a bias towards consideration of those elements that were easily valued in dollars.

Noise impacts on amenity

Stakeholder identification number(s)

169, 175, 215 and 234

Issue description

Submissions relating to noise impacts on amenity raised issues regarding the ability of residents to enjoy a rural and outdoor lifestyle.

In summary, the respondent(s) raised the following issues:

- The NSW Road Noise Policy Environmental Criteria for Road Traffic Noise states its intention to 'preserve amenity appropriate to land use' (page 5), however none of the stated criteria relate to noise affecting outdoor amenity. The rural amenity of Berry and its environs, a feature valued by residents and tourists alike, is not preserved by implementation of architectural treatments and double glazing. Many fear the loss of Berry's attractive 'outdoor' culture due to increased traffic noise from the planned bypass.
- Residents purchased their properties in the area because they enjoy an open living style, with windows and doors left open day and night to enjoy fresh air, breeze and rural sounds such as birds and cows. House design affords natural cross ventilation. It is unreasonable to expect residents to live with closed windows and doors to mitigate traffic noise.
- The bypass would be highly audible as it sweeps into Berry off the ridge from the east and Berry would no longer be 'an intimate historic rural town' worthy of visitor attention.
- Noise from the highway would impact and disrupt residents (adults and children) and their indoor and outdoor activities including reading, relaxing, concentrating, studying, gardening, sports/exercise, picnicking.

These impacts would be felt in the immediate vicinity and beyond. Noise impacts would detract people from partaking in these activities and using local exercise paths/areas, negatively impacting the community leaving their health at risk and increasing the possibility of crime and vandalism. Berry should remain the quiet, pleasant place it is.

Additionally, the proposed walkway alongside the proposed highway would attract noisy cyclists and skateboarders, adding to the noise pollution.

Response

Noise mitigation measures are described in Section 7.2 of the environmental assessment and Appendix E – *Technical Paper: Noise and Vibration* to the environmental assessment.

As detailed in **Section 2.9.6** of this report, low noise pavement would be used along the length of the alignment. Low noise pavement would reduce noise levels by around 3 dB at receivers and all outdoor areas near the project. Low noise bridge expansion joints (such as finger joints) would be used for all bridges constructed as part of the project.

Within Berry two noise barriers would be provided to further reduce noise impacts from the project. As shown in Figure 7-7 of the environmental assessment, one barrier would be located along the northbound off-ramp at the southern interchange for Berry, adjacent to Huntingdale Park Road. The other barrier would be located between the project and North Street, from Kangaroo Valley Road to the western end of the bridge at Berry.

The implementation of these mitigation measures would reduce noise levels and, in some instances, remove the need to use architectural treatments, such as fresh air ventilation and upgraded window and door seals. Low noise paving would reduce impacts to outdoor amenity across the project and the noise barriers would allow residents in Berry to continue to enjoy outdoor spaces.

However, with the implementation of the above mitigation measures, there would still be 20 residences across the project area that would be eligible for architectural treatments. This includes nine rural properties in locations where it is not cost effective to construct noise barriers.

Removal of heavy vehicle traffic from Queen Street would enhance the intimacy of Berry as an historic town. The bypass is not expected to affect tourist visitation to Berry.

Potential noise impacts from skateboarders and cyclists using the shared path are acknowledged. Noise impacts are expected to be low and usage would not be expected to differ greatly from the existing usage of North Street by pedestrians, cyclists and skateboarders. Measures to manage amenity impacts arising from the shared path would be considered during detailed design in consultation with Council.

Amenity assessments

Stakeholder identification number(s)

130, 175, 207, 208, 215, 230 and 234

Issue description

Submissions relating to the amenity assessment in the environmental assessment report raised issues regarding amenity impacts being felt more widely in the town of Berry.

In summary, the respondent(s) raised the following issues:

- Comparisons to towns such as Berrima, Yass, Karuah and Goulburn are not relevant. Each of these towns has a bypass with, at most times, no visual contact with the town. Improved quality of life and environmental amenity cannot be presumed for Berry when the highway upgrade actually bisects rather than bypasses the town. RMS is well aware that the attraction of Berry for both residents and tourists is its historic, rural character and its scenic beauty. Any structure imposing on this detracts from the town as a whole.
- The definition of amenity in the environmental assessment under Construction Phase Impacts was not used to guide decisions made by RMS when selecting a preferred route and concept designs.
- Amenity impacts include any factors that affect the ability of a resident, visitor or business owner to enjoy their home and daily activities, for example, noise, vibration, detrimental changes to views or changes to air quality.'

- Amenity for RMS extends no further than Queen Street between Prince Alfred and Albany streets. Any route selected would have achieved improved amenity for this shopping area. The preferred northern route impacts heavily on the amenity of the rest of the town.
- Amenity of Berry as a whole is not discussed in the environmental assessment. Comments concentrate on Queen Street, North Street, the Kangaroo Valley overpass and Huntingdale Park. The gap between what RMS intends to change and what the community values and wants to be maintained is enormous.
- Improved amenity in Queen Street is used to generalise about improved amenity and lifestyle quality for the residents of Berry. Loss of views, increased noise and the physical impact of the project on the town are reduced to consideration of mitigation measures for residents of North Street and Huntingdale Park. The impact on lifestyle for all residents of Berry is not considered in Section 5.2 Operational Phase Impacts in the environmental assessment. No other residential area in 'west' Berry is mentioned. There is no recognition by RMS that all areas of Berry are valued and used by all residents.
- The summary in Appendix M Part 5.2.8: Mitigation Measures – Operation merely repeats what is to be found earlier in Appendix M and elsewhere. It is difficult to accept RMS statement:
 "Community consultation would continue around the amenity impact and design of noise mitigation measures."
 Amenity would suffer from the physical impact of the upgrade which, once completed, cannot be rectified.
- The following statement from Appendix M, page M-42 of the environmental assessment demonstrates the lack of consideration for Berry as an entity rather than just a shopping strip:
 'While the design of the upgrade has been unable to overcome the removal of an access point for west Berry residents, the trade-off following the bypass is expected to be improved safety for pedestrians and cyclists and the strengthening of Berry's identity as a destination town.'
 Berry's identity as a destination town, given the number of visitors who book for a stay in the area, would not be strengthened by the preferred route; rather it would be weakened by loss of amenity to the town overall.
 The visual impact and intrusiveness of a project of this size would have an adverse impact on the area's tranquillity and quality of life and may impact negatively on the local tourism industry, agriculture and the Berry/South Coast 'brand'.
 It is critical that Berry retains its unique character and charm as a tourist destination.
- The socio-economic study in the environmental assessment has no economic modelling of the social costs/benefits. This lack of modelling acts to skew the cost/benefit analysis in a way that is likely to be detrimental to the community and has resulted in sub-optimal project design outcomes that would have a large social and environmental impact on the township of Berry.
- The following point made in Appendix M (Technical paper: Socio Economic) is disputed:
 'Improved amenity in Berry is expected to reinforce a sense of community identity and wellbeing which, in turn, is expected to have positive outcomes for community cohesion'.
- Adverse social and town planning impacts have been omitted from the statement of commitments'.
- There is concern that the project has had a significant impact on real estate values since house prices in Berry are generally lower closer to the new alignment and properties take longer to sell. There is also concern that values may drop even further when the bypass is operational due to increased traffic and noise.

Response

It is acknowledged that the project would have impacts on amenity (refer to Appendix M – *Technical paper: Socio-economic* of the environmental assessment).

Section 4.2 of Appendix M – Technical paper: Socio-economic to the environmental assessment presents a literature review of bypassed towns. This review confirms that where main streets have been reclaimed by the town and residents' amenity has improved greatly. The removal of heavy traffic from Queen Street, and the barrier that this currently creates between the northern and southern parts of town, is likely to increase amenity in Berry. It would also increase the opportunity for pedestrian trips around the town which would contribute to social cohesion. Removal of heavy traffic from Queen Street would improve amenity beyond Queen Street for the majority of Berry residents. Improved amenity would benefit businesses located in this area as well as create opportunities for new businesses. It would also increase the attraction of Berry as a tourist destination as described in **Section 2.17.10** of this report.

Improved air quality in particular would improve for all residents of Berry and those further afield.

The socio-economic impact assessment for the project determined that negative amenity impacts would be location specific. Residents of North Street and in areas of Berry to the west of the project would experience changed access, increased noise and interrupted views to the escarpment. Proposed mitigation measures include landscaping, noise barriers, low noise pavements, architectural treatments to the properties most affected by noise. Ongoing consultation would continue during the detailed design phase of the project to ensure appropriate solutions.

The environmental assessment responds to the requirements issued by the Director-General of the NSW Department of Planning and Infrastructure (refer to Appendix A). An environmental assessment aims to provide consolidated / balanced information to make a decision on a major project on behalf of the community where there are competing interests. It is not a cost benefit assessment and does not include a cost benefit assessment, precisely because some elements cannot have a dollar value placed on them and would therefore be overlooked, for example, social cohesion and lifestyle impacts. The socio-economic impact assessment aims to identify both positive and negative impacts of the project but does not aim to monetarise these as this would lead to a bias towards consideration of those elements that were easily valued in dollars.

There would be residents who experience decreased amenity and others who experience increased amenity, but on balance, it is considered that the outcome for Berry as a whole would be positive.

2.17.12 Operation business impacts (Berry) - Victoria Street

Stakeholder identification number(s)

133, 146 and 201

Issue description

Submissions relating to impacts during operation raised issues regarding the diversion of tourists from Mark Radium Park to the commercial centre of Berry.

In summary, the respondent(s) raised the following issues:

- Option 1 for Victoria Street (closure) would:
 - Encourage travellers entering Berry towards the town centre (Queen Street) and Apex Park, supporting local business and the utilisation of facilities and reinforcing the role of Queen Street as the shopping and business precinct.
 - Encourage traffic that would otherwise have diverted down Victoria Street to pass by and patronise local businesses on Queen Street.

Response

The potential benefit to businesses in Berry as a result of the closure of Victoria Street is noted. Section 7.10 and Appendix M – *Technical paper: Socio-economic* of the environmental assessment considered the impacts of the closure of Victoria Street (Option 1 of three options). If travellers are discouraged from visiting Mark Radium Park due to the closure of the Victoria Street access, they may also choose to visit other parks on their route rather than the town of Berry, although there are attractive parks within Berry such as Apex Park. It is likely that if travellers wished to stop in a town on their trip then they may already be doing this, which would indicate that additional benefits to Berry businesses would be unlikely.

2.17.13 Operation amenity - Victoria Street

Stakeholder identification number(s)

23, 31, 89, 146, 178-184, 190, 200 and 201

Issue description

Submissions relating to amenity during operation raised issues regarding noise and visual impact of retaining or closing Victoria Street to traffic.

In summary, the respondent(s) raised the following issues:

- Option 1 for Victoria Street (closure) is unacceptable as increased traffic flows in local streets would upset current residents and seriously affect the amenity of currently peaceful areas.
- Berry is a historic town and a popular tourist destination. The charm of its heritage street grid is one of the attractions for 'tree changers'. RMS should respect this and not introduce changes such as the closure of Victoria Street that unnecessarily impact on amenity.
- Victoria Street closure retains and enhances the residential nature of Victoria Street. It makes good design sense that the south-bound on-ramp should run off Queen Street rather than a residential street.
- Option 1 for Victoria Street (closure) minimises the visual impact of the highway on the western end of town with tree plantings, providing a much needed and expected buffer for such a large intrusion of infrastructure.

Options 2 and 3 would leave the western end of Victoria Street fully exposed to the highway and additional infrastructure, which would be highly visually intrusive.

- Urban design supports the proposal for Option 1 for Victoria Street (closure), which considers an integrated outcome that is forward looking and would serve Berry in the long-term.
- Victoria Street closure provides a quiet precinct adjacent to the Arbour and the Grange.
- Option 3 for Victoria Street provides the greatest benefit to residents and visitors to Berry.

Response

Section 7.10 and Appendix M – *Technical paper: Socio-economic* of the environmental assessment considered the impacts of the closure of Victoria Street (Option 1 of three options).

The environmental assessment found that the closure of Victoria Street (Option 1) would not be expected to change noise amenity for residents in the southern areas of Berry as a whole. Some streets would experience increased traffic volumes and other streets lower traffic volumes, and on balance the amenity of Berry would be improved overall as a result of the project.

An additional amenity benefit of Option 1 raised by the community but not included in Section 7.10 of the environmental assessment would be that the highway may be less visually intrusive to residents of Victoria Street if it was closed as there would be the opportunity for planting at the cul-de-sac.

Option 3 would increase the visual impact as a result of an increase in the road infrastructure that would be visible at the end of the street. Visual impacts would be mitigated using landforms such as mounds and planting but it is recognised that the infrastructure would be visible from Victoria Street.

Following assessment of the three options and a review of feedback received through the environmental assessment exhibition and submissions process, Option 3 with the modifications presented in **Chapter 4** of this report has been selected as the preferred option. Refer to **Section 2.22** of this report for further details about Victoria Street.

2.17.14 Operation community facilities and recreation – Mark Radium Park

Victoria Street Options 1, 2 and 3 impacts on Mark Radium Park

Stakeholder identification number(s)

6, 12, 15, 16, 18, 20, 22, 23, 27, 28, 31-34, 36-38, 40, 44, 45, 48-50, 64, 75, 79, 89, 112, 121, 129, 133, 134, 146, 149, 152, 154, 168, 178-184, 186, 187, 189, 193, 200, 201, 215 and Shoalhaven City Council

Issue description

Submissions relating to the three options for Victoria Street raised both positive and negative comments on the impacts on Mark Radium Park.

In summary, the respondent(s) raised the following issues:

- Support for Victoria Street Option 1 (closure) as it would:
 - Have least impact and land-take of Mark Radium Park.
 - Have no impact on the duck pond.
 - Provide an 'arc' of connected recreational green spaces along the southern edge of the bypass, extending from Berry sports field in the east to Mark Radium Park and potentially further to the south-west.
 - Optimise potential future use and opportunities for the expansion of Mark Radium Park, which is currently used by local residents, including the Arbour and Bupa Care Services facility who are active in its upkeep. It could serve the growing residential population, including Huntingdale Park estate.

- Make it less convenient for travellers to make an en route stop in Berry. Arguments in favour of Victoria Street Options 2 and 3 for the preservation of Mark Radium Park as a tourist stop assume that tourists would readily negotiate off-ramps and roundabouts to visit the park, when there are other highway stops that are more attractive if the tourist is not specifically visiting Berry.
- Improve pedestrian and cyclist access and amenity and provide a safe pedestrian and cyclist environment for parks and walkways through adopting crime prevention through environmental design (CPTED) principles.
- Provide a cul-de-sac at the western end of Victoria Street.

Urban design supports the proposal and has considered an integrated outcome that is forward looking and would serve Berry in the long-term.

- Victoria Street Option 1 (closure) would change the future use of Mark Radium Park from its current primary use as a local council reserve used by travellers as an informal rest stop. The park should be enhanced to make it more attractive. Option 1 offers the greatest opportunity to present Mark Radium Park as a shining example of connectivity and urban design. The form and function that has been achieved at Apex Park on the eastern side of Berry should be replicated for Mark Radium Park.
- Victoria Street Option 1 (closure) would provide Berry with an opportunity to reinforce its reputation for being the 'town of trees' by facilitating the potential upgrade of Mark Radium Park as a green gateway to the town. Request for RMS to enter a constructive dialogue with the community and council (irrespective of the final option chosen for Victoria Street), to create a green link from Victoria Street at the western end of Berry, across the northern side of the town to Woodhill Mountain Road on the eastern side of town. This would include a shared pedestrian and cyclist path to provide an easy and safe connection the school community and elderly. This is crucial to the continued prosperity of the town.
- Opposition to Victoria Street Option 1 (closure) as Mark Radium Park is a gateway to the town and an important infrastructure component in Berry, accessed by turning onto Victoria Street from the highway. It is rarely used by Berry residents, but is used by many travellers who pass north and south. Removing access via Victoria Street would negate the park's purpose as a local council reserve. Option 1 does not afford easy access to the park as travellers would have to negotiate their way around Kangaroo Valley Road and it would no longer be used as a traveller / tourist stop. It would become a local hang out and a dumping ground. Locals would not use the park as it would be adjacent to a freeway on-ramp with cars accelerating down the hill.

Council and volunteers spend a great deal of time and money keeping this an attractive and worthwhile part of the Berry township. Council has recently sealed the access road and the facilities are first class. Option 2 or 3 for Victoria Street maintains easy access to Mark Radium Park for travellers arriving from either north or south. The closure of Victoria Street would isolate Mark Radium Park from passing traffic, directing it to limited rest stop facilities in the town. It would result in the Mark Radium Park facilities being redundant and therefore ignored by Shoalhaven City Council, which currently maintains them to a high standard.

The proposed closure of Victoria Street would not preserve the future of Mark Radium Park as suggested.

- Victoria Street Option 1 (closure) is stated in meeting notes of 23 May 2012 as having marginally less impact on Mark Radium Park than the other two options. Preservation of Mark Radium Park was one of the rationales for selecting the closure of Victoria Street. Under questioning from residents, this differential has disappeared to a point where there is almost no benefit to Mark Radium Park from the closure of Victoria Street.

- The process undertaken by RMS in reaching the decision to advocate for the closure of Victoria Street relied heavily upon minimising impact and land-take of Mark Radium Park (RMS Meeting Notes, 23 May 2012). Key data used at this time is now known to be incorrect and incorrect data was used in RMS decision to proceed with Option 1.

Table 7-21 states that, as a positive impact of Option 1, it has the 'least impact and land take of Mark Radium Park'. This is incorrect. Option 2 has the least, and the difference between all options is minimal at only 4 per cent.

Correct reporting of figures is required for accurate submissions from a properly informed community. This is a serious shortcoming of proper process by RMS, and it does not meet even the baseline expectations for a project of this type.

- Revised figures indicate there is little difference between the three Victoria Street options with regard to the impact and loss of park area. Option 1 is 25 per cent (previously 13 per cent), Option 2 is 25 per cent (previously 17 per cent) and Option 3 is 29 per cent (previously 26 per cent). Previous figures may have influenced opinion.

Mark Radium Park is:

- An important visitor/tourist amenity.
- The recipient of significant recent funding by Shoalhaven Council to upgrade parking and general facilities.
- A well-used reserve and safety stopover for travellers.
- Not used as a local park.
- Not used by residents of The Arbour or Bupa Care Services facility - contrary to RMS Meeting Notes of 23rd May that states Mark Radium "is used by local residents of The Arbour and Bupa Care Services facility". A Landcare group from The Arbour volunteers as a community service to maintain the park but it is not otherwise used by locals.

RMS' intention to make it a local park with the provision of playground equipment would not be successfully achieved.

- Further refinements to the design and road boundaries (percentage impacts) alongside Mark Radium Park for the three Victoria Street options means the impact on Mark Radium Park is no longer an issue and should not be considered in the final decision.

Mark Radium Park serves as an important local council reserve for travellers with Option 3 for Victoria Street the only option that maintains this.

- The preservation of Mark Radium Park is one of the goals for RMS' redesign of the Victoria Street precinct. The park serves as an important tourist gateway to the southern end of town and is rarely used by locals. RMS hopes to reconfigure Mark Radium Park as a local park. There would be little amenity in the park for young families or older residents with a high speed highway and access ramp adjacent to it.

Under Options 1 and 2 the park would be inaccessible to travellers. A modified Option 3 (Victoria Street remains open with a two-way local access street linking Queen Street and Victoria Street and then extended to Bupa Care Services facility) with signage at both the highway's southern Berry exits (expanded to include Mark Radium Park), would ensure the park is visible and easily located by travellers with obvious access back to the highway.

A two way access, built to local road standards from the Queen Street roundabout, would take little more land from Mark Radium Park than the current proposed high speed access ramp.

- Option 3 for Victoria Street with two way access to and from Queen Street is the safest access for northbound tourists stopping at Mark Radium Park who wish to enjoy tourist attractions of Berry. Option 3 continues the life of this local council reserve.

Option 1 would stop Mark Radium Park providing this recreational facility. Option 2 would keep the park 'alive' but does not have the flexibility of Option 3.

- Two way access around Mark Radium Park, with adequate signage on the highway, would best preserve the park as a tourist facility in a tourist town.
- Mark Radium Park is an institution in Berry. It is a haven for travellers, with hundreds of people using it daily and many more during holiday periods. It is the only true park between Berry and Milton that is easily accessible from the highway and provides a pleasant stop over.

Any changes on Victoria Street are objectionable, as the street is currently enjoyed by the community for many activities, including monthly markets. The continuation of Mark Radium Park as functioning as a local council reserve with easy access for tourists and local residents is supported. RMS should undertake further discussions with council to minimise the impacts on Mark Radium Park and to retain its use as reserve with appropriate highway signage.

- As much land as possible should be retained for Mark Radium Park.
- RMS' belief that Mark Radium Park would be used as a local park by young families is misguided. The park is too far away from the CBD facilities (cafes etc.). There are few young families in what is the 'senior' part of town with its two over 55 villages and a nursing home.

Response

Since Section 7.10 and Appendix M – *Technical Paper: Socio-economic* of the environmental assessment were prepared, three options for access to Victoria Street have been considered. The impact that each option would have on Mark Radium Park has been assessed and the design for the western end of Victoria Street has aimed to minimise the impact on the park. The environmental assessment stated that impacts to the park were: Option 1 – 13 per cent; Option 2 – 17 per cent; and Option 3 – 26 per cent. Further investigations during the continued refinement of the concept design have found that the impacts are actually: Option 1 – 25 per cent (3161 m²); Option 2 – 24 per cent, (2937 m²); and Option 3 – 29 per cent, (3609 m²). The total size of Mark Radium Park is 12,494m²

RMS has noted the comments from the community regarding the impacts on Mark Radium Park under each option and has considered them in the selection of a preferred option.

The preferred option, Option 3 with modifications, retains access between Victoria Street and the highway. For further details about the Victoria Street options assessment refer to **Section 2.22** and **Chapter 4** of this report.

The community has informed RMS that the primary use of Mark Radium Park is as an informal rest stop. It is used lightly by locals although there is potential for usage to increase as the population of Berry to the west of the project grows. To ensure continued use of Mark Radium Park, the preferred option would allow tourists to access the park from the southern interchange for Berry via a two-way road between Queen Street and Victoria Street.

The preferred option would require land take from Mark Radium Park, reducing the size of the park. The design has been developed to minimise the impact so that the use of Mark Radium Park would continue.

RMS notes the opportunity to provide a 'green link' through Berry for pedestrians and cyclists. The project design includes a pedestrian and cycle path from Queen Street / Kangaroo Valley Road to North Street. The design of the open space between the highway and North Street is subject to community consultation. There is potential to provide a continuous pedestrian and cycle route from Mark Radium Park to Woodhill Mountain Road.

Mark Radium Park design refinements

Stakeholder identification number(s)

60, 152, 215 and Shoalhaven City Council

Issue description

Submissions relating to the design of Mark Radium Park raised issues regarding the alignment and footprint of the access and signage.

In summary, the respondent(s) raised the following issues:

- The impacts on Mark Radium Park from the proposed on-ramp which would be adjacent to the park and constructed to RMS standards.
- Mark Radium Park is a popular local council reserve for through traffic. If access to the park is via a circuitous route then it is unlikely to get the same patronage and become an area for antisocial behaviour. It may be possible to construct a low standard alignment between the Queen Street roundabout and the loop in Mark Radium Park similar to the access to Victoria Street (including a similar dished gutter traversing the road to ensure low speed). This would also maintain connectivity between Queen Street and Victoria Street, but in a controlled environment.
- The best preservation of the character and use of the Mark Radium Park and the southern end of Queen Street should be sought. Building the road to the standards of Berry's heritage street grid, approximately six metres in width, would reduce the visual and physical impact of the bypass in this area while still allowing room to pass stranded vehicles. Only when it becomes the southbound on-ramp should the road be built to RMS highway standards which would allow good connectivity and smooth traffic flow in and out of the park. A roundabout, also built to local road standards at the base of the park, and a two-way road extending past Bupa Care Services facility to a southern ramp to the highway would complete connectivity. Appropriately positioned signage on the bypass showing the Kangaroo Valley interchange, Mark Radium Park exit should ensure it remains an important safety amenity for tourists and visitors.

Response

Section 7.10 and Appendix M – *Technical paper: Socio-economic* of the environmental assessment considered the impacts of the closure of Victoria Street (Option 1 of three options).

Following feedback received through the environmental assessment display period and submissions process, the three options were reconsidered. Each of these options would have a different impact on Mark Radium Park and amenity of residences in the vicinity. Option 3 with the modifications presented in **Chapter 4** of this report has been selected as the preferred option and has been designed to minimise the impact on the park. Refer to **Section 2.22** of this report for further details on Victoria Street. Option 3 as modified, retains access between Victoria Street, the southbound on-ramp and Queen Street. Amenity impacts of Options 1 and 3 are discussed in **Section 2.17.13** of this report and impacts on Mark Radium Park in **Section 2.17.14** of this report.

2.18 Soils and geology

2.18.1 Construction Acid Sulfate Soils / Potential Acid Sulfate Soils

Stakeholder identification number(s)

215

Issue description

Submissions relating to acid sulfate soils (ASS) and potential acid sulfate soils (PASS) raised issues regarding the presence of PASS at sites identified for ancillary facilities, impacts of flooding on PASS and the need for mitigation to manage impacts relating to the management of ASS and PASS.

In summary, the respondent(s) raised the following issues:

- Sites identified in Figure 8-3 of the environmental assessment for ancillary facilities are also identified as areas of PASS risk and in an area where 1 in 100 year flooding may occur.
The environmental assessment does not address the impact of the dual constraints of flooding and PASS.
The environmental assessment should include mitigation measures regarding impact on the surrounding environment to manage PASS.

Response

ASS and PASS are described and assessed in Section 8.1 of the environmental assessment.

An area close to a section of the highway alignment south of Berry has been identified as being of low ASS risk at depths greater than four metres. Alluvial floodplain soils at the Broughton Creek floodplain and at the bypass of Berry has been identified as having low risk of PASS being encountered. These areas are mapped in Figure 8-2 and Figure 8-3 of the environmental assessment respectively.

The risk of encountering PASS or ASS during works associated with the project is considered to be low and would be limited to floodplain areas at Broughton Creek and near Berry where piling, construction of embankments, bridges, culverts, stormwater detention basins and other land forming works would be undertaken.

Notwithstanding, RMS recognises that any exposure of PASS to air or the lowering of the watertable due to excavation would lead to the development of actual ASS which would potentially have major environmental, agricultural and structural impacts in affected areas if not adequately managed.

Consequently, RMS has committed to undertake the following environmental management measures which are also included in section 8.1.3 of the environmental assessment:

- Undertake testing for PASS during detailed design and seek opportunities to avoid them and to avoid any lowering of the water table in the vicinity. If this is not possible, limit areas of disturbance as much as possible and implement management measures documented in an acid sulfate soil management plan including actions such as:
 - Temporarily store, bund and treat excavated material and use treated material appropriately.
 - Undertake specific leachate control procedures.
 - Implement protocols should any unexpected ASS related incidents occur.

- Implement monitoring programs, such as water quality monitoring of areas downstream of PASS risk areas.
- Develop the ASSMP in accordance with the 'Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulphidic Black Ooze' (RTA 2005).

Flooding would not result in the exposure of PASS to air and impacts of flooding on ASS or PASS would be limited to disturbance of excavated material containing ASS or PASS. The management of excavated material would be included in the acid sulfate soil management plan.

2.19 Air quality

2.19.1 Construction dust

Stakeholder identification number(s)

78, 169, 172, 185, 191, 208, 215 and 251 (EPA)

Issue description

Submissions relating to air quality during construction raised issues regarding dust and health impacts at nearby properties and mitigation measures for controlling dust and emissions due to construction activities.

In summary, the respondent(s) raised the following issues:

- Construction dust would have impacts on farm usage, houses, furniture, fittings, pastures, water supply, laundry and human health. What mitigation measures are proposed for dust impacts during the construction of the project?
- The project would cause air quality impacts from diesel and other fuel emissions as a result of mechanical plant and vehicles, specifically during earthmoving and blasting process. How would RMS ensure acceptable air quality is maintained?
- The preparation of a detailed air quality monitoring plan to manage potential air emissions from the project should form part of any approval for the project. This should be undertaken by suitably qualified and experienced person(s) in consultation with the EPA. The EPA would use this document as a guide when determining and placing any air emissions monitoring requirements as conditions of any Environment Protection Licence that may be applied to the project.

Response

An air quality impact assessment for the project was undertaken by PAEHolmes (now Pacific Environment Limited) and documented in Section 8.2 and Appendix N-*Technical paper: Air Quality* of the environmental assessment.

As discussed in the environmental assessment, there is potential for some short-term nuisance impact at those residences closest to construction activities (modelled at approximately two g/m²/month at the most effected receptor). In this context, the term "nuisance impact" is used to describe dust deposited on surfaces that may then require cleaning. This could include impacts such as dust settling on items such as solar panels and roof areas which may carry dust into rainwater tanks. It should be noted that the modelling does not include any specific mitigation measures which would need to be adopted as part of the ongoing management of the ancillary/stockpile sites. The modelling is therefore conservative.

Health impacts may arise from the inhalation of fine particles. Dust from construction is generally coarse and short-term and not likely to give rise to health impacts.

Additionally, the project area is in an open environment with good dispersal conditions which would enable much particulate pollution to be blown away. Remaining dust pollution would be managed through the implementation of standard management and mitigation measures.

Monitoring would also be carried out at those residential properties closest to each construction area. Monitoring requirements would be included in the air quality management plan which would be prepared by suitably qualified and experienced person(s) in consultation with the EPA and included as part of the overall construction environmental management plan that would be developed post approval and prior to the commencement of construction.

The detailed mitigation measures included in Section 8.2 and Appendix N – *Technical Paper: Air Quality* of the environmental assessment) relate to both construction dust and emissions from construction equipment and would be implemented to manage and mitigate air quality impacts of the project. Proposed mitigation measures are:

Construction dust

Prior to the commencement of construction, develop an air quality management plan, which would incorporate measures to minimise dust generation from the project and would form part of the overall construction environmental management plan for the project. The air quality management plan would include the following provisions:

- Minimise dust generation from the project by:
 - Stabilising all disturbed areas as soon as practicable to prevent or minimise wind-blown dust.
 - Watering unsealed roads, with unsealed trafficable areas kept sufficiently damp during working hours to minimise wind-blown or traffic generated dust emissions.
 - Controlling truck speed and movements onsite and restrict trucks to designated roadways.
 - Installing truck wheel washes or using other dust removal procedures to minimise the transport of dust offsite, and regularly inspecting public roads to remove and dispose of any dust, soil or mud deposited on public roads by construction vehicles.
 - Modifying or stopping construction activities during periods of high wind, if necessary.
 - Maintaining stockpiles and handling areas in a condition that minimises windblown or traffic generated dust.
 - Using water sprays, sprinklers and water carts if needed to adequately dampen stockpiles, work areas and exposed soils to prevent the emission of dust from the site.
 - Regularly inspecting and maintaining erosion control structures to ensure silt does not become a source of dust.
 - Maintaining all equipment for dust control to keep it in good operating condition. The equipment would be operable at all times with the exception of shutdowns required for maintenance.
- Locate dust monitors in areas close to sensitive receivers to monitor dust accumulation against the standard criteria. These would include areas where there is potential for amenity impacts due to dust deposition on roofs (leading to rainwater tanks) and solar panels. Dust monitoring would be undertaken on a monthly basis or as otherwise proscribed by the Environment Protection Licence.

- On sites where there is a clear and unambiguous dust impact resulting from the construction of the project, implement appropriate management measures including:
 - Disconnect water tanks from roofing and maintain water supply to properties using tanks.
 - Wash-down of the roof at the completion of dust generating works to ensure a clean roof for water supply and reconnection of the water tanks.
- Minimise construction vehicle and plant emissions by:
 - Maintain all vehicles, including trucks entering and leaving the site, in accordance with the manufacturer's specification to comply with all relevant regulations.
 - Maintain all construction equipment to ensure exhaust emissions comply with the Protection of the Environment Operations Act 1997.

None of these measures were included in the dust modelling to provide the worst case dust emission scenario for assessment. The construction environmental management plan would ensure that these mitigation measures are adopted and emissions are kept to a minimum.

2.19.2 Operation dust

Stakeholder identification number(s)

41, 78, 156, 169, 170, 172, 175, 191, and 215

Issue description

Submissions relating to air quality during operation, raised issues regarding dispersion modelling, air quality monitoring and health impacts due to increased air pollution.

In summary, the respondent(s) raised the following issues:

- The Gerroa tip site is not an appropriate location to base meteorological data for air quality modelling for the environmental assessment as Gerroa experiences different weather conditions to Berry.
- The environmental assessment should specify and assess all monitoring programs for measuring air quality. The use of monitoring programs is supported, provided the monitoring program has a focus on outcomes.
- The upgraded highway would cause increased air pollution with long-term effects on residents in Berry, Broughton Village and Toolijooa.
- Drinking water quality at properties in Broughton Village may be impacted from increased traffic on the new highway.
- A specific property near the cutting through Toolijooa Ridge queried if a plastic or concrete noise barrier would be installed on the southern side of the property. Installation of a noise barrier would help prevent the excessive amount of carbon dioxide generated from trucks using the climbing lane reaching the property.

The property is only 50 to 60 metres from the proposed highway. South and south-west winds would expose the property to excessive pollution from the highway.

Response

The operational air quality assessment for the project calculated vehicle emissions and modelled the dispersion of those emissions in the vicinity of the proposed roadway in the first and tenth year of operation. The modelling assessed the predicted concentrations against the EPA air quality criteria for each pollutant. These criteria are summarised in **Table 2-2** below.

Table 2-2: NSW EPA air quality assessment criteria

Pollutant	Goal	Averaging period	Source
Carbon monoxide	30 mg/m ³ 10 mg/m ³	1-hour 8-hour	WHO (2000) NEPC (1998)
Nitrogen dioxide	246 µg/m ³ 62 µg/m ³	1-hour Annual	NEPC (1998) NEPC (1998)
Particulate matter < 10 µm (PM ₁₀)	50 µg/m ³ 30 µg/m ³	24-hour Annual	NEPC (1998) EPA (1998)

mg/m³ – milligrams per cubic metre

ppm – parts per million

µg/m³ – micrograms per cubic metre

Hourly traffic volumes were used to illustrate the diurnal variations in traffic flow and changes in fleet mix, such as the percentage of heavy vehicles. These calculations were carried out for different sections of roadway as well as two operating years to account for increases in traffic over time. Predictions were made at each of the nearest receptors.

All predictions of carbon monoxide and nitrogen dioxide were found to be well below the assessment criteria, even when added to existing background levels which already include emissions from existing vehicles.

Both the 24-hour and annual average PM₁₀ concentrations were predicted to remain below their respective air quality criteria. There were no predictions above one µg/m³ (annual average) at any of the nearest receptors. Levels were also anticipated to remain relatively constant from 2017 to 2027, indicating no significant increase in the future due to traffic on the proposed roadway. It is likely that levels this low would not be detected by monitoring. These levels would also not be detectable in water tanks, particularly since it would be the coarser particles that would fallout and deposit in water tanks, not the finer (PM₁₀) which would make up the majority of the particles in vehicle emissions.

Noise barriers are proposed in the vicinity of Toolijooa Ridge however, where noise barriers are installed, these are unlikely to have any measurable effect on air quality, other than to increase the turbulence in the immediate area and increase dispersion.

Meteorological data sourced from Gerroa (approximately three kilometres from the northern end of the project) represented the closest and most complete data available. Without meteorological data of this nature it is not possible to model for averaging periods longer than an hour. In other words, no predictions could be made for long-term nitrogen dioxide or PM₁₀, nor could hourly varying emissions data be used. While RMS acknowledges there would be slight differences between local meteorology between the areas of the proposed roadway alignment and Gerroa, there are likely to be similarities on an annual basis.

RMS also notes that there is a high percentage of stable atmospheric conditions in the Gerroa dataset which relate to poor dispersion conditions and potential higher ground level concentrations. This may lead to more conservative predictions in some cases.

Given the length of the project roadway (approximately 11 kilometres), it is very difficult to obtain good quality meteorological data (both in terms of quality and quantity) for a number of sites along the alignment. The data requirements are highly specific in terms of the parameters necessary for dispersion modelling and RMS considers the Gerroa data set represented the best data available.

The air quality management plan developed for this project would include monitoring of the modelled air pollutants at the nearest sensitive receptor, for a period after operation. Once it can be established that the resulting concentrations remain below the air quality criteria, monitoring would cease.

2.20 Waste management

2.20.1 Construction spoil management and excess spoil

Stakeholder identification number(s)

Kiama Municipal Council

Issue description

Submissions relating to construction spoil management and excess spoil raised issues regarding management / mitigation measures for controlling waste and cut and fill requirements created from construction activities.

In summary, the respondent(s) raised the following issues:

- The environmental assessment should include calculations of cut and fill material for the project, along with details on the proposed strategy for the disposal of unwanted fill and/or source of any fill required to make up shortfalls.
- Further information should be provided on temporary stockpiling or disposal of unsuitable quality material generated from construction.
- Kiama Municipal Council requests that it be notified and given first option to retain any dismantled, relocated or excavated materials from within its road reserve. All reasonable effort should be made when removing items to minimise damage and maximise the re-use potential.

Response

Earthworks and materials are discussed in Chapter 4 of the environmental assessment.

Based on the concept design for the project, the total earthworks volume is estimated at around 1.3 million cubic metres. It is envisaged the majority of this material would be generated from excavating cuttings and processed for use in embankments and road foundations.

Around 1.0 million cubic metres of material would be used as embankment fill and around 70,000 cubic metres of material required for the select material zone could be sourced from cuttings. The select material zone is a foundation layer for the road pavement which needs material with higher strength qualities.

It is predicted that including an allowance for unsuitable quality material of around 100,000 cubic metres, the earthworks cut to fill balance would be within 50,000 cubic metres.

Materials for the select fill would preferably be sourced from the deeper cuttings throughout the project, where the material is of suitable quality. This would minimise the need for imported fill material. Cut or other material that is deemed unsuitable quality or is excess would be stockpiled and stabilised until needed as part of the landscaping or possibly used as visual screening or for noise mounds during construction. Further investigations would be undertaken during the detailed design phase of the project to determine the availability of quality fill and select material.

Additional construction materials would be sourced off site. This may include fill or select material to address shortfalls in required volumes in the event that material won by the project is found to be of unsuitable quality. The majority of raw and manufactured materials would be hauled from quarries and batch plants located to the north of the site at: (for fill) Dunmore, Albion, Albion Park, Bombo Shellharbour, Dunmore, Albion Park, and Bombo; and (for select material) Tomerong and Falls Creek.

A management strategy to limit the extent of excess spoil generated by the project and methods to dispose of excess spoil would be implemented. This may include the following options:

- Reduction of spoil volume through detailed design refinement or use within the project.
- Further geotechnical investigation during detailed design which may lead to design refinements that reduce the predicted volume of excess spoil.
- The flattening of embankment slopes where space is available.
- Consideration of engineering, geotechnical, urban design and land take of the major cut at Toolijooa Ridge to limit the volume of excess material generated.
- Formation of noise mounds.
- Use of material for any preloading of soft soils.
- Use of excess spoil for preloading activities, however the required volume is not expected to be substantial.
- Provision of excess spoil⁷ to adjoining landowners, Shoalhaven City Council or other parties requiring spoil.

Excess material would be disposed of at an appropriately licenced waste management facility.

Construction stockpile sites would temporarily store construction materials or materials generated from within the construction site. This could include road base constituents, stripped topsoil, and excess spoil of unsuitable quality for project use. Site establishment activities for all stockpile sites would include the erection of site fencing and establishment of sediment and erosion control measures. The sites would be managed in accordance with the 'Stockpile Site Management Procedure' (RMS, 2011).

Based on the current concept design there would be a limited impact on council infrastructure. Dismantled, relocated or excavated materials from within road reserves are unlikely to be available for reuse. Disposal of these materials would be the responsibility of the selected contractor.

⁷ Any provision of excess spoil to a third party would be dependent on the demonstration by the third party that it has obtained the necessary approvals for the use of the spoil (such as a development consent from the local council or a licence under Section 143 of the *Protection of the Environment Operations Act 1997*). Appropriate environmental controls would be installed at sites where excess spoil would be delivered.

2.20.2 Construction waste management

Stakeholder identification number

Environmental Protection Authority

Issue description

Submissions relating to construction waste management raised issues in relation to proper disposal of waste in accordance with any condition of approval or environment protection licence for the project and the NSW 'Waste Classification Guidelines'.

In summary, the respondent raised the following issues:

- Condition of any project approval should be that all waste materials removed from the project site would only be directed to a waste management facility or premises lawfully permitted to accept the materials.
- Condition of any project approval should be that waste generated outside the project site would not be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the *Protection of the Environment Operations Act 1997*, if such a licence is required in relation to that waste.
- Condition of any project approval should be that all liquid and/or non-liquid waste generated on the project site would be assessed and classified in accordance with Waste Classification Guidelines (Department of Environment, Climate Change and Water, 2009), or any superseding document.

Response

Waste management is addressed in section 8.4 of the environmental assessment. In order to minimise the impacts of waste material generated by the project, RMS would comply with any condition of approval or environment protection licence applicable to the project and would implement the following management and mitigation measures, which are also documented in the environmental assessment:

- Manage and dispose of all waste in accordance with relevant State legislation and government policies including the *Waste Avoidance and Resource Recovery Act 2001*, *Waste Avoidance and Resource Recovery Strategy 2007* (Department of Environment and Conservation (DECC), 2007) and the *Waste Reduction and Purchasing Policy* (RTA, 2009).
- Prepare a waste management plan as part of the construction environmental management plan detailing appropriate procedures for waste management according to the waste management hierarchy of principles:
 - Avoidance of unnecessary resource consumption to reduce the quantity of waste being generated.
 - Recovery of resources for reuse onsite or offsite for the same or similar use, without reprocessing.
 - Recovery of resources through recycling and reprocessing so that waste can be processed into a similar non-waste product and reused.
 - Disposal of residual waste.

- Dispose of all residual waste to a suitably licensed landfill or waste management facility where there are no other feasible and reasonable options for waste avoidance, reuse or recycling. Waste materials requiring removal from the site would be classified, handled and stored onsite in accordance with the 'Waste Classification Guidelines: Part 1 Classifying Waste' (Department of Environment, Climate Change and Water, 2009) until collection by a contractor for disposal.

2.20.3 Operation waste management

Stakeholder identification number

169

Issue description

Submissions relating to operational waste management raised issues in relation to roadside litter and how this would be managed.

In summary, the respondent raised the following issue:

- The project would cause increased litter, increasing risk to the existing ecosystem, farm animals, stock and potential for grass fires. What mitigation measures are proposed to prevent litter from the project impacting properties and water supplies?

Response

During the operational phase of the project, roadside litter would be expected to occur along the length of the project.

As stated in section 8.4.2 of the environmental assessment, periodic inspections (by RMS or its contractors) and removal of roadside litter would be undertaken in accordance with the existing RMS road maintenance and litter collection program for the Princes Highway.

2.21 Greenhouse gas

2.21.1 Construction greenhouse gas emissions / contributions

Stakeholder identification number(s)

70 and 215

Issue description

Submissions relating to greenhouse gas (GHG) and climate change raised issues regarding the reduction of activities leading to GHG emissions from the project.

In summary, the respondent(s) raised the following issues:

- Appendix O Greenhouse Gas and Climate Change provides a detailed analysis of the project GHG emissions, however it does not recommend measures to reduce project GHG emissions. Significant emissions are being generated on Stage 1 Gerringong upgrade due to trucks delivering fill from the project through Berry, along Coolangatta Road to a point close to Swamp Road.
- The environmental assessment should examine in detail the most significant activities generating GHG and offer ways to reduce them where possible.

Response

The key sources of GHG emissions were identified and quantified as part of the GHG assessment undertaken for the project. Section 8.5 of the environmental assessment summarises the key findings of the GHG assessment. Appendix O of the environmental assessment presents the detailed GHG assessment results, GHG emissions activity data and calculation methodology.

GHG emission sources that can be impacted by decisions made by designers, constructors, managers and/or road operators are categorised into three different scopes, to identify and classify emissions sources according to the extent to which the project has operational control over the emissions. The scopes are:

- **Scope 1** – Direct emissions: GHG emissions generated by sources owned or controlled by the project, e.g. emissions generated by the use of diesel fuel by project-owned construction plant, equipment or vehicles.
- **Scope 2** – Indirect emissions: GHG emissions from the generation of purchased electricity in project-owned or controlled equipment or operations. These GHG emissions are generated outside of the project's boundaries, e.g. the use of purchased electricity from the grid.
- **Scope 3** – Indirect upstream emissions: GHG emissions generated in the wider economy due to third party supply chains as a consequence of activity within the boundary of the project, e.g. GHG emissions associated with the offsite mining, production and transport of materials used in the construction or maintenance of the road.

During construction, the major source of GHG emissions for the project would be from the use of diesel fuel to operate construction equipment on site, accounting for 95 per cent of direct Scope 1 GHG emissions and 50 per cent of total emissions (Scope 1, Scope 2 and Scope 3). The use of materials for construction of the pavement, bridges, drainage infrastructure and road furniture would also be a major source of GHG emissions, accounting for 89 per cent of indirect Scope 3 GHG emissions and 45 per cent of total GHG emissions (Scope 1, Scope 2 and Scope 3). Pavement asphalt and cement, concrete and structural steel would contribute significantly to the emissions associated with construction materials.

Section 8.5.4 of the environmental assessment presents mitigation measures to avoid, minimise or manage GHG impacts associated with the project. These are:

- Select the most fuel efficient plant, equipment and vehicles practicably available through consultation with subcontractors and suppliers.
- Ensure that all plant and vehicles are maintained regularly to maintain fuel efficiency.
- Procure locally produced goods and services where feasible and cost effective to reduce transport fuel emissions.
- Specify construction materials with lower emissions intensity in the detailed design (eg recycled steel in place of virgin steel and asphalt in place of concrete, where engineering and other technical specifications can be met and the alternative is reasonable and feasible. This measure could also be applied to the selection of maintenance materials in the operational stage.
- Seek opportunities to reduce the quantity of construction materials used through innovative design and construction methodologies.
- Where reasonable and feasible, procure recycled content road construction and maintenance materials such as recycled aggregates in road pavement and surfacing (including crushed concrete, granulated blast furnace slag, glass, slate waste and fly ash). This measure forms part of RMS' implementation of the NSW Government's 'Waste Reduction and Purchasing Policy'.

- Consider the procurement of renewable energy technologies (eg solar photovoltaic, wind power) for power generation onsite during the construction stage.
- Design earthworks to, where reasonable and practicable, avoid long haulage distances and reduce excess spoil.

During operation, the project would decrease the number of vehicle kilometres travelled on the road and increase average vehicle speeds. As a result of this, vehicle fuel efficiency would improve for most road sections resulting in a predicted reduction in GHG emissions by 11 per cent in 2017 and seven per cent in 2037. To further reduce GHG emissions during operation, RMS would:

- Specify energy efficient street lighting appropriate for project needs.
- Encourage the use of less GHG intensive modes of transport by incorporating a shared pedestrian/cycle path at the Kangaroo Valley Road overbridge and bus pick up and drop off facilities in the design of the upgrade.

2.22 Victoria Street

This section provides a summary of the issues raised in submissions that related to the three options for Victoria Street that were presented in the environmental assessment. It presents issues that were both for and against each of the options and provides a response based on the design changes that have been made. Detailed summaries and responses to these issues are provided in **Section 2.8**, **Section 2.17** and **Section 2.7** of this report.

Stakeholder identification number(s)

1, 4-6, 9-23, 26-28, 31-40, 44-51, 53, 54, 60, 64, 66, 67, 70, 75, 79, 82, 83, 85, 89, 97, 98, 107, 112, 121, 123, 125, 129, 132-134, 138, 146, 149-156, 158-160, 163, 164, 168, 171, 177-184, 186-190, 193, 195, 196, 199-201, 203, 206, 208, 211, 213, 215, 234, 237, 245 and Shoalhaven City Council

Issue description

A total of around 110 submissions were received that raised issues relating to the Victoria Street options presented in the environmental assessment. The issues included:

- The process for determining the preferred option in the environmental assessment.
- Expressions of support or opposition for a particular option. A number of submissions presented only an opinion regarding a particular option. A count of these opinions has been included below.
- Potential modifications to the options presented in the environmental assessment, including the underpass at Schofields Lane.
- Property access arrangements.
- Positive and negative issues for and against each of the three options.

Respondents raised issues regarding the process undertaken and level of community consultation involved in the determination of the preferred option for the environmental assessment. Detailed descriptions of these issues and responses has been provided in **Section 2.7** of this report. In summary, these issues included:

- A number of community meetings and forums were held on the closure of Victoria Street at which many community members voiced their disagreement at having Victoria Street closed. However RMS continues to document Victoria Street as closed.

- There was much community discussion regarding Victoria Street prior to the exhibition of the environmental assessment. The option to close the western end of the street came from the Parents and Citizens committee of the local school who organised a petition on the grounds of school children safety. Residents in disagreement organised a petition opposing the closure.
- RMS has not been transparent in its consultation on the closure of Victoria Street and the consultation process has been flawed. RMS stated that it was not concerned which of the three options for Victoria Street adopted and it was up to the community and council to make the decision. Community members organised a meeting to decide what would be best for the town. Two days before the meeting, RMS announced that they would be basing their costing on a closed Victoria Street. The subsequent working group meetings to discuss the southern Berry interchange were therefore a waste of time and money. The decision and timing of the announcement has been questioned by members of the community.
- During the early stages of consultation RMS stated that Victoria Street was shown as closed on project drawings for the purpose of discussion and a final decision had not been made. Victoria Street closure was shown as the preferred option in the environmental assessment.
- RMS' argument for closing Victoria Street is the preservation of Mark Radium Park. This decision was based on incorrect figures regarding the percentage of Mark Radium Park that would be forfeited with each of the three options proposed by RMS. RMS misinformed the community and has not publicly corrected the error. Despite the inaccuracy, material with incorrect figures was distributed.

Of the 110 submissions relating to Victoria Street, 61 submissions expressed support for a specific Victoria Street option, including:

- 16 respondents supported or preferred Victoria Street option 1.
- Nine respondents supported or preferred Victoria Street Option 2.
- 36 respondents supported or preferred Victoria Street Option 3.

31 submissions expressed opposition to a specific Victoria Street option, including:

- 29 respondents were opposed to Victoria Street Option 1.
- Two respondents were opposed to Victoria Street Option 2.
- No respondents were opposed to Victoria Street Option 3.

Additionally:

- Five respondents expressed support for Victoria Street to remain open without specifying a preference for a particular option.
- One respondent expressed a neutral preference on the three options for Victoria Street, stating that RMS is capable of designing the most logical, environmentally considerate and cost effective bypass for Berry.
- One respondent raised an alternative to the three options for Victoria Street, suggesting that a flyover into Victoria Street could be constructed coming from the southern end which crosses over the highway.

Certain submissions received presented modifications to Victoria Street Option 3. These modifications included:

- Design and construct the road between the roundabouts at Queen Street and Victoria Street to local road standards (in accordance with Shoalhaven City Council standards) as opposed to RMS highway design standards. The southbound on-ramp would be designed to RMS highway design standards and would commence south of the roundabout at Victoria Street.
- Extend the local two-way road south of Victoria Street to connect to the Bupa Aged Care Facility and an adjoining property. The southbound on-ramp would commence south of these property accesses.

Submissions also raised concerns regarding the suggested modification to Victoria Street Option 3, noting that these options would increase costs of the project and spread the impact of the southern interchange for Berry over a wider footprint.

Victoria Street Option 3 included the requirement for an underpass near Schofields Lane to provide access to a private property. The following issues were raised in relation to Schofields Lane and the proposed underpass:

- Objection to design Options 2 and 3 for Schofields Lane. An alternative access option which would allow more traffic to use the underpass south of Victoria Street (to reduce traffic impacts on the Arbour) would put traffic from the east side of the highway to the west side impacting on the Huntingdale Park Estate residential area and Hitchcock's Lane. This traffic should be put directly onto the highway.
- Proposal for a two-way road that goes under the highway slightly further south than the proposed underpass, turns left to reach a T-section at Schofields Lane, then left onto the highway north. This road would be half the length of the current proposal, require only one bridge, would use land already owned by RMS and would allow plenty of distance for Berry traffic to merge before the left-in / left-out movement south of the underpass. It would provide access for residents and the Bupa Aged Care Facility as well as benefiting residents and businesses on Schofields Lane.
- Support for a Schofields Lane underpass as it would resolve the traffic issues for the Arbour and Bupa Care Services facility, have less impact on Graham Park, avoid splitting designated riparian land on a specific property, prevent traffic flows which would restrict future development, keep extra traffic out of Huntingdale Park Estate, resolve requests from Schofields Lane residents and businesses for a southbound right turn by using the underpass, and solve access issues for properties on the eastern side of the highway.

Respondents also raised general access issues associated with properties near Victoria Street. This generally involved support for separating the Bupa Aged Care Facility access from Pepper Farm Drive. Suggested changes include:

- Providing a separate access road that connects to Victoria Street.
- Extending a local road south from an open Victoria Street to provide access to the Bupa Aged Care Facility and continuing to become the southbound on-ramp.
- Providing the Bupa Aged Care Facility and adjacent private property access to the southbound on-ramp.

Modifications were also presented for Victoria Street Options 1 and 2. These were generally related to providing access to the Bupa Aged Care Facility and the adjacent private property. Two suggestions were also provided in the event that Option 1 was carried forward as the preferred option, including:

- A reduction to the length of the southbound on-ramp.
- The closure of Victoria Street at the Prince Alfred Street end to retain existing local road access for residents but discourage short cuts from Shoalhaven Heads and Coolangatta Road.

Submissions received detailed the potential positive and negative impacts associated with each of the options presented in the environmental assessment as well as the modified Option 3 presented in community submissions. Detailed descriptions of these issues and responses are provided in **Section 2.8**, and **Section 2.17** of this report and these issues are summarised in **Table 2-3**.

Table 2-3 – Victoria Street options – positive and negative issues raised in submissions

Victoria Street Option	Positive issues raised	Negative issues raised
Option 1	• Provides the best value for money. • Requires the least amount of infrastructure, including pavements and drainage. • Reduces construction costs. • Maximises community benefits. • The southern interchange for Berry would be adequately serviced by Queen Street. • Resolves the majority of the issues associated with Victoria Street documented in the <i>Berry Bypass Alignment Issues Report</i> in January 2012. • Minimises impacts on Mark Radium Park and the duck pond. • Enhances the residential nature of Victoria Street. • Reduces the visual impact of the highway from Victoria Street. • Provides the opportunity to create a pedestrian and cycle link from Victoria Street to Woodhill Mountain Road. • Provides opportunities for change of, and increase in use of Mark Radium Park by a growing population. • Benefits businesses in Queen Street if tourists were to stop for a break in Berry rather than at Mark Radium Park. • Provides the opportunity to enhance Mark Radium Park and integrate with urban design principles. • The closure of Victoria Street would discourage speeding. • Reduces noise impacts on Victoria Street.	• Gives no consideration to the rest of the town and would only benefit the residents of Victoria Street. • The closure of Victoria Street in the location presented in the environmental assessment discriminates against residents of the Grange. Any proposed closure should be moved further east to include the Grange and Windsor Drive. Closing Victoria Street east of George Street would eliminate through traffic near the school. • Increases traffic flows in local streets and decreased amenity. • Changes the historic street grid layout of Berry. • Tourists would be less likely to use Mark Radium Park as an informal rest stop and it may fall into disuse, leading to problems with antisocial behaviour. • An accident at the Queen Street roundabout or on the southbound on-ramp would cause congestion and block access to the highway. • Increases emergency response times for residents at the western end of Victoria Street. • Increases travel times for residents in Victoria Street. • The western end of Victoria Street would become dangerous and congested. • Safety issues related to increased traffic conflicting with pedestrians and local roads, some of which do not have footpaths.

Victoria Street Option	Positive issues raised	Negative issues raised
Option 2	• The December 2011 revised Berry bypass plan which had Queen Street and Victoria Street accepting southbound traffic seemed a logical and practical solution. • Enables easier access onto the highway to Nowra. • Provides faster egress for emergency vehicles and an alternative route in case of a problem on the southern interchange for Berry on-ramp.	• Decreases visual amenity for residences on Victoria Street. • Tourists would be less likely to use Mark Radium Park as an informal rest stop and it may fall into disuse, leading to problems with antisocial behaviour. • Only caters for southbound traffic. • Only accommodates a small number of vehicles. • Increases noise impacts on Victoria Street.
Option 3 and Option 3 with modifications presented in submissions	• Minimises impact on local traffic arrangements. • Maintains connectivity within Berry. • Maintains efficient access for emergency services to the western end of Victoria Street. • Reduces impact on Mark Radium Park. • Improves traffic safety on Pepper Farm Drive. • Improves traffic flow on Victoria Street. • Amenity improvements in Berry and Mark Radium Park. • Reduces cost of the project by removing the underpass at Schofield's Lane. • Easier access to the highway for residents at the western end of Victoria Street, especially elderly residents. • Minimises impact on local bus routes. The western end of Victoria Street is a bus route providing an essential service from Gerringong through Berry to Nowra for school children and other commuters.	• Increases costs and wider footprint of the southern interchange for Berry. • Decreases visual amenity for residences on Victoria Street. • Only accommodates a small number of vehicles. • Increases noise impacts on Victoria Street.

2.22.1 Response

Section 3.6.6 of the environmental assessment presented three options for the western end of Victoria Street. These options included:

- Option 1** Full closure of Victoria Street (created by a cul-de-sac) with a southbound on-ramp from Queen Street, providing access to the new bypass.
- Option 2** Victoria Street remains open, providing one-way travel between Queen and Victoria streets, with a southbound on-ramp south of Victoria Street.
- Option 3** Victoria Street remains open, maintaining two-way travel adjacent to the highway between Queen and Victoria streets, with a southbound on-ramp south of Victoria Street.

Five working group meetings to discuss the southern interchange for Berry and Victoria Street precinct were held by RMS between March and July 2012. The important topics of discussion included: whether Victoria Street should remain open or be closed as part of the project; and the future use of Mark Radium Park. Community agreement on a preferred option for Victoria Street could not be achieved during these meetings.

During the working group meeting of 17 April 2012, RMS advised that for the purpose of the environmental assessment, only one of the Victoria Street options could be presented in the concept design for review by the Department of Planning and Infrastructure.

RMS held an internal review on 23 May 2012 (meeting notes are available on the project website), to review the three proposed options for Victoria Street against the project objectives and DGRs for the project. This assessment found Option 1 to be slightly favoured over the other options, although the differences between the options were marginal. As a result, Option 1 was included in the environmental assessment as part of the preferred option, with the understanding that the concept design did not preclude any of the options being developed in the future.

The decision to include Option 1 in the concept design for the purpose of the environmental assessment was based on:

- Option 1 would have the smallest overall footprint and least impact on Mark Radium Park. It was considered that Option 3 would have the greatest impact on Mark Radium Park.
- Option 1 would require the least amount of infrastructure and pavement to be constructed and therefore construction and maintenance costs would be reduced.
- The reduced footprint and limited impact to Mark Radium Park would have the least visual impact of the three options.
- The reduced footprint would require the least amount of land acquisition.
- Safety benefits for elderly residents and school children would be achieved by reducing conflict points on Victoria Street.

It was noted that Option 3 would have the least impact on local traffic flow and existing turning arrangements. As a result, Option 3 would provide the best amenity outcomes for local north-south roads between Queen Street and Victoria Street. There was concern that Option 1 may attract anti-social behaviour due to its reduced visibility and accessibility. Emergency vehicle access to the western end of Victoria Street was raised as an issue associated with Option 1.

RMS sent an e-mail to the working group on 13 June 2012 in order to inform the community of the decision to proceed with Option 1 for the purpose of the environmental assessment. RMS advised the community that provision had been made to ensure all three Options could be implemented and that the final decision would be made following the receipt of community feedback during the exhibition of the environmental assessment.

As detailed in **Section 2.22.2** of this report, a number of submissions were received raising issues for and against the closure of Victoria Street. Submissions received from the community and government stakeholders provided a greater understanding of the issues relating to the three options for Victoria Street. This included:

- An improved understanding of the impact of the project on Mark Radium Park. The difference in land take between the three options was much smaller than originally perceived.
- Opinions relating to the future use of Mark Radium Park. Shoalhaven City Council and members of the community both expressed a desire for the park to be retained as a local council reserve, primarily used by travellers as an informal rest stop. This would require access to the park from the southern interchange for Berry and as such would require a two-way road between Queen Street and Victoria Street and appropriate sign posting.
- A variety of concerns around proposed changes to the local road network within Berry. Concerns generally related to loss of access to the highway and amenity impacts that may result from altered local traffic movements within Berry.

A combination of these factors, as well as community support and revised property access requirements, lead RMS to consider a design that included a two-way road between Queen Street and Victoria Street, a roundabout at the western end of Victoria Street linking to the southbound on-ramp, various property access changes and an underpass near Schofields Lane. This is a modification of Option 3 as presented in the environmental assessment. These changes are described in **Chapter 3** of this report.

Support for, and opposition to, the proposed Victoria Street options, as well as modifications to these options and an alternative suggestion of a flyover into Victoria Street from the south, were noted. The changes made to concept design were considered to best meet the opinions raised in the submissions.

Proposed modifications to Victoria Street Option 3 suggested in submissions were considered as follows:

- Design and construct the road between the roundabouts at Queen Street and Victoria Street to local road standards.
RMS response – RMS has implemented a design change to include a two-way road between Queen Street and Victoria Street (refer to **Chapter 3** for further details). The entire width of the project just south of the southern interchange for Berry would be considered. RMS would assess the expected traffic volume, speed and driver behaviour and design the road between Queen Street and Victoria Street accordingly.
- Extend the local two-way road south of Victoria Street to connect to the Bupa Care Services facility and an adjoining property.
RMS response – RMS noted this proposed modification, however, considered that the underpass at Schofields Lane provided the best solution for property access within the area. This underpass would provide access to additional properties that could not be serviced by the suggested modification.

The opposition to the modifications suggested in other submissions was noted by RMS. The design changes adopted by RMS would not increase the overall footprint of the southern interchange for Berry.

The underpass at Schofields Lane was presented as part of Victoria Street Option 3 in the environmental assessment. The design options for this underpass discussed by respondents were not presented in the environmental assessment. These options were discussed with surrounding land owners as part of the community consultation undertaken during and the exhibition of the environmental assessment.

This consultation, as well as on-going consultation that has been undertaken following the exhibition period, has led to refinements of the underpass design. As a result of the design changes at Victoria Street, the underpass at Schofields Lane has been included in the concept design and is detailed in **Chapter 3** of this report.

The underpass at Schofields Lane would provide access to numerous properties south of Victoria Street. This underpass would present Bupa Care Services the opportunity to construct a separate access to its facility. This separate access to the Bupa Care Services facility would not be provided as part of the project given that the existing access to this facility would not be impacted by the project. Access to the underpass would be provided to the adjoining private property as part of the project.

Socio-economic issues

As a result of the project, the overall amenity within Berry would be expected to improve. The decision to open or close Victoria Street would have different amenity benefits and impacts on different areas in Berry.

Option 1 would improve amenity on Victoria Street, particularly at the western end through the creation of a cul-de-sac. However, Option 1 would have amenity impacts on the local north-south streets between Queen Street and Victoria Street.

Option 3 would maintain the existing amenity of the local north-south streets between Queen Street and Victoria Street as it would have the least impact on local traffic movements. Amenity on Victoria Street would be better than currently experienced because of the exclusion of northbound right turn in movement from the upgraded highway.

Option 2 would generally maintain amenity on the local north-south streets between Queen Street and Victoria Street. However, this would not be to the same extent as Option 3 as only southbound traffic movements would be allowed at Victoria Street.

Option 1 would be expected to have the least visual impact. The closure of Victoria Street would mean that the highway infrastructure may be less visually intrusive to residents of Victoria Street. With the selection of Option 3 as the preferred option, RMS would plant screening vegetation adjacent to the highway to minimise the potential visual impacts. Option 2 would have similar visual impacts to Option 3.

There is potential that Option 1 could encourage tourists to stop in Berry due to Mark Radium Park being inaccessible from the upgraded highway. However, being unable to access Mark Radium Park from the highway may also mean that tourists would bypass Berry altogether and choose to stop elsewhere.

The arrangements for access to Mark Radium Park under the revised preferred option for Victoria Street would not be expected to greatly change the current numbers and behaviour of tourists who stop there. The accessibility of Mark Radium Park from the highway would not be expected to impact businesses in Berry.

None of the Victoria Street options were expected to greatly impact the amenity or businesses within Berry. However, Option 3 was considered to result in the least changes to amenity and residents' lifestyle.

Traffic issues

Option 1 would redirect northbound traffic travelling from Nowra via the southern interchange for Berry. Additional travel time would be required for northbound traffic that currently turns right at Victoria Street. However, this would be less than two minutes more than existing conditions during peak public holiday conditions in 2037. The closure of Victoria Street would also result in additional travel time of around 30 seconds for the traffic that currently turns left from Victoria Street onto the highway. This movement would result in the redistribution of traffic onto other local roads. This would equate to around 1200 vehicles per day on the day of opening.

If Victoria Street is closed it is acknowledged that traffic incidents at the Queen Street / Kangaroo Valley Road / southbound on-ramp roundabout or on the southbound on-ramp itself would have the potential to restrict traffic movements southbound from Berry; which could result in detours, delays and congestion.

Options 2 and 3 would minimise the transfer of traffic to local north-south street between Queen Street and Victoria Street. In 2037, daily traffic volumes on these local north-south streets are predicted to be around two times greater when compared to existing levels but around three times greater if Victoria Street were closed.

The expected removal of a large proportion of through traffic which currently uses Victoria Street to travel between the Princes Highway and Prince Alfred Street is expected to result in lower vehicle speeds along this route and a corresponding improvement in road safety. The Victoria Street intersection and adjoining road layouts would be appropriately designed to ensure safety and ease of access for all traffic movements.

Victoria Street Option 3 would be expected to have the least impact on access for emergency services and public transport routes. There would be a small increase in travel time for vehicles required to travel north from Victoria Street and vehicles requiring access to Victoria Street from the south. However, this would be offset by the decreased travel time between Gerringong, Berry and Nowra on completion of the Gerringong upgrade, the project and the Berry to Bomaderry upgrade.

The inclusion of Option 3, with the modifications presented in **Chapter 3**, as the preferred Option would not change the pedestrian and cyclist facilities associated with the southern interchange for Berry and North Street corridor detailed in the environmental assessment. Pedestrian and cyclist arrangements would be provided according to relevant guidelines to ensure that adequate access arrangements, amenity and safety are provided and maintained.

Noise issues

The revised preferred option at Victoria Street would not be expected to increase noise levels above existing levels. As a whole, the project is expected to improve noise levels within Berry. Vehicle numbers within Berry would generally decrease and traffic efficiency improvements on the highway would reduce the need for vehicles to accelerate and decelerate.

3 Project changes

This chapter describes changes proposed to the project to deal with issues raised during the assessment of the project. Proposed changes are summarised in **Table 3.1** and discussed in more detail in **Section 3.1** to **Section 3.11 of this report**.

Table 3.1 Summary of design changes

#	Chainage location	Description of refinement	Property acquisition change +/-	Chapter 3 Section reference
1	9450 – 9880- about 500 metres north of Broughton Creek crossing number one	Change of ownership status of property access road to reduce the extent of asset handed over to Council for ongoing maintenance following completion of the project.	Unchanged - affects land already acquired by RMS. Reduction in the extent of asset to be handed over to Council by about 330 metres.	4.1
2	Turnaround facility at the northern end of the proposed Austral Park Road extension	Removal of turnaround facility on Austral Park Road extension.	Reduction of about 0.8 hectares.	4.2
3	11800 – 12300- opposite Austral Park Road	Property access and boundary adjustment to minimise land acquisition and farm operational impacts.	Reduction of about 1.3 hectare.	4.3
4	12260- opposite Austral Park Road	Changed property access arrangement.	Unchanged.	4.4
5	12820 – 13150- about 550 metres south of the Austral Park Road interchange	Property access adjustment and flood mitigation.	Unchanged - affects land already acquired by RMS.	4.5
6	13610 – 13825- opposite the Tindalls Lane interchange	Changed local road access arrangement for Gembrook Lane.	Unchanged.	4.6
7	13850- at the Tindalls Lane interchange	Increase curve radius to optimise alignment.	Unchanged - affects land already acquired by RMS.	4.7
8	14430- at the southern end of the Tindalls Lane interchange	Changed property access to reduce business operational impacts.	Unchanged.	4.8
9	15500 – 15650- at the northern interchange for Berry	Removal of retaining wall and reshaping of a constructed dam.	Additional acquisition of about 0.3 hectares.	4.9
10	17450- to the north west of Kangaroo Valley Road, Berry	Town Creek diversion realigned to minimise impacts on affected properties and farming operations.	Unchanged- the diversion would be located in an easement to be accessed and maintained by the property owner.	4.10

#	Chainage location	Description of refinement	Property acquisition change +/-	Chapter 3 Section reference
11	17700 – 19000- just south of the southern interchange for Berry	Victoria Street Option 3 adopted with additional modifications to facilitate property access. Two-way connection between Victoria Street and Queen Street, with a roundabout at the western end of Victoria Street. One-way southbound on- ramp south of the roundabout.	Additional acquisition of about 0.05 hectares of Mark Radium Park.	4.11
12	17700 – 19000- about 900 metres south of Berry	Modified Schofields Lane intersection and underpass with connecting property accesses.	Additional acquisition of about 0.6 hectares.	4.12

3.1 Change 1: Property access road ownership between Chainage 9450 to Chainage 9880 about 500 metres north of Broughton Creek crossing number one

3.1.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has updated a proposed property boundary on the Broughton Creek Floodplain, about 500 metres north of the first crossing of Broughton Creek, to reflect a change of ownership of the property access road. The access road would be public road from the junction with the existing Princes Highway to the point where it splits into two at about chainage 19550. The access road to the western most property would become a private access road.

3.1.2 Environmental assessment

The change in ownership reflected in the design change has been undertaken to alleviate issues raised concerning ongoing maintenance of local roads required by the original design. The change reduces the length of public road that RMS would need to handover to Kiama Municipal Council by about 330 metres and therefore reduce Council's liability for ongoing maintenance. The change of ownership affects land already acquired by RMS and therefore does not change the amount of acquisition required. Overall the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no additional adverse environmental impacts.

3.2 Change 2: Turnaround facility at the northern end of the proposed Austral Park Road extension

3.2.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has removed the heavy vehicle turnaround facility originally proposed at the northern end of the Austral Park Road extension.

3.2.2 Environmental assessment

The design change is proposed in order to address issues raised during the environmental assessment process and reduces land acquisition impacts for an affected property by about 0.08 hectare. It is considered that the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts.

3.3 Change 3: Property access and boundary adjustment at Chainage 11800 opposite Austral Park Road

3.3.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has revised a property access and adjusted the road boundary and increased the radius of the highway alignment to 900 metres to minimise potential impacts on farm operations and the capacity of an existing farm dam that was impacted by the original design. The revised design has been developed in consultation with the affected land owner.

3.3.2 Environmental assessment

The revised access and boundary arrangement has been designed to substantially alleviate potential impacts on property acquisition and farm operations in consultation with the affected landowner. The design change reduces the required property acquisition for the affected property by about 1.3 hectares and maintains the capacity of the existing farm dam. The change in radius of the highway alignment requires a slightly larger impact on an RMS owned property on the eastern side of the highway. It is considered that the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts.

3.4 Change 4: Property access at Chainage 12260 opposite Austral Park Road

3.4.1 Description

A property access arrangement as presented in the environmental assessment has been changed. Under the original design, property access was provided via a right of way to the existing highway at about Chainage 11900. The original access design is shown in **Figure 3.1**.

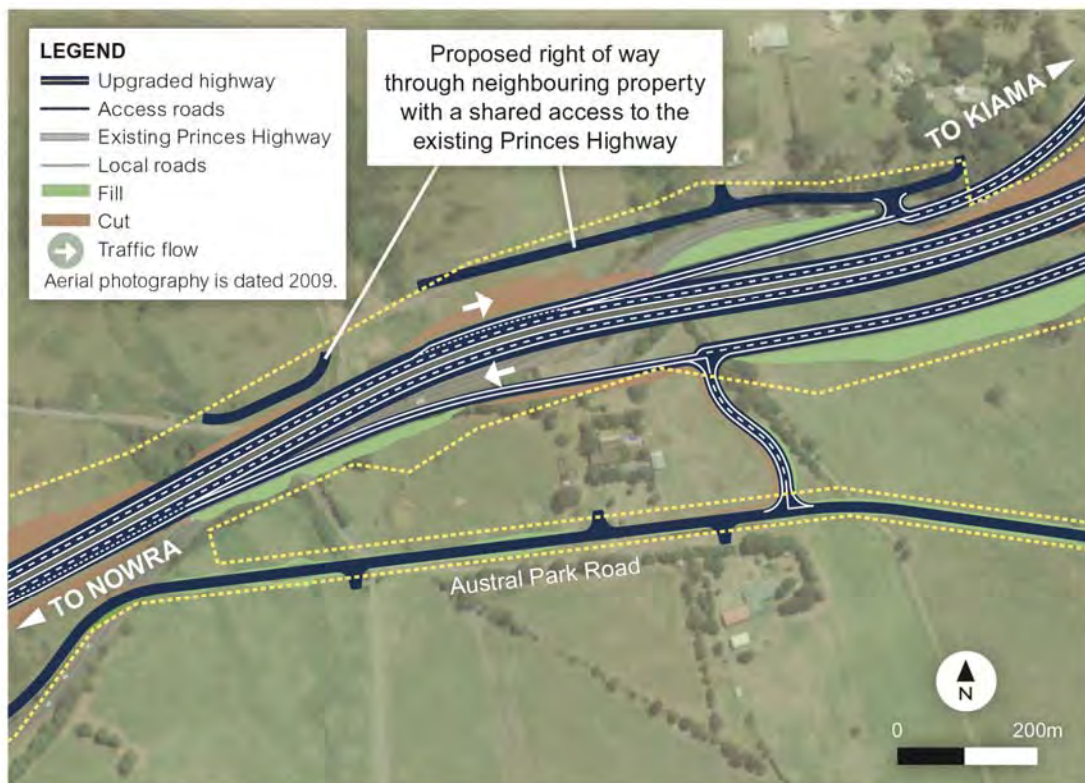


Figure 3.1 Property access at chainage 12260

Design presented in the environmental assessment
(RMS, November 2012)

The proposed new access reduces land use impacts and acquisition on the neighbouring property and would be limited to left-in / left-out movements only. The new access would connect directly to the upgrade at about Chainage 12260. The proposed design is shown in **Figure 3.2**.

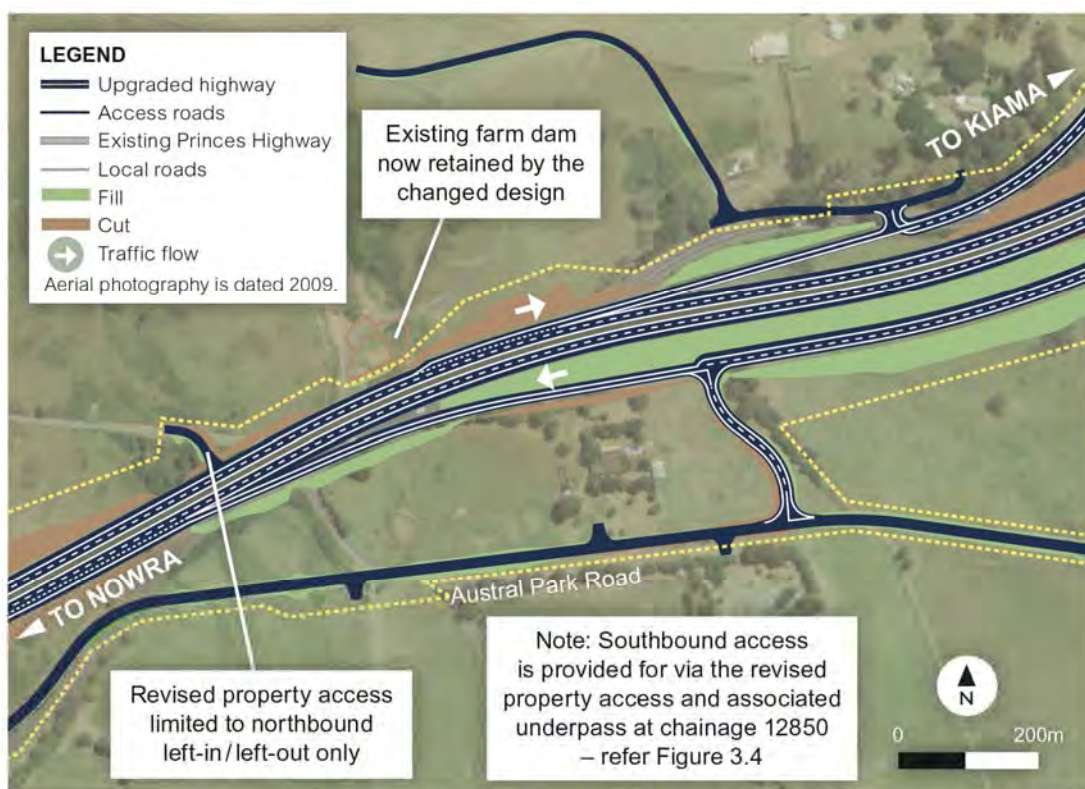


Figure 3.2 Property access at chainage 12260

Refined design (April 2013)

3.4.2 Environmental assessment

The revised design limits access movements for the affected property to left-in / left-out movements only and southbound access to the property would require travel to the proposed new underpass discussed in **Section 3.5** of this report to perform a u-turn in order to access the left-in / left-out driveway. This would result in about three kilometres of additional travel and about two and a half minutes of travel time compared to the existing conditions. Property acquisition for the affected property would remain unchanged under the new design. The additional impacts associated with the design change have been discussed with the affected property owners and the detailed design would be subject to ongoing consultation to ensure that potential impacts are minimised.

3.5 Change 5: Property access and flood mitigation at Chainage 12820 about 550 metres south of the Austral Park Road interchange

3.5.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has revised the design for a property access at Chainage 12850. The design presented in the environmental assessment included a left-in / left-out only access driveway at about Chainage 12890, about 550 metres south of the Austral Park Road interchange and a combined drainage and fauna underpass culvert about 80 metres north of this, at about Chainage 12810. The original access design is shown in **Figure 3.3**.

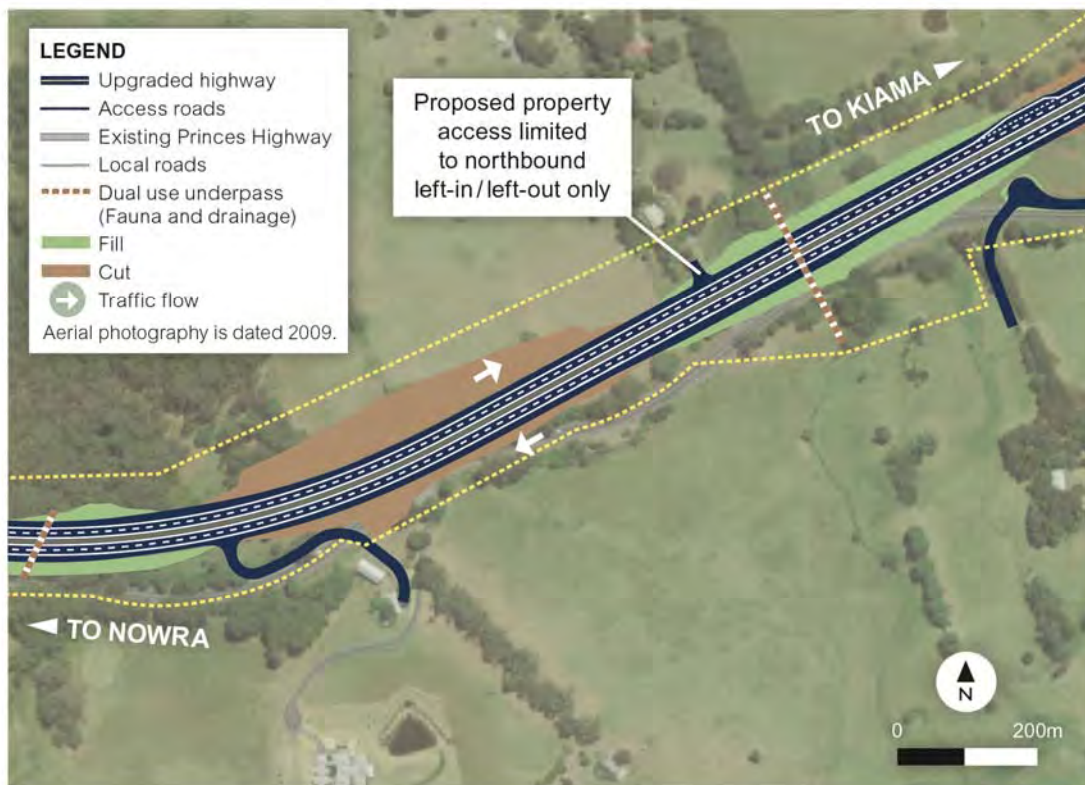


Figure 3.3 Property access at chainage 12850

Design presented in the environmental assessment
(RMS, November 2012)

Issues raised in submissions included potential flooding impacts associated with the road embankment in close proximity to the house and the possibility for blockage of the drainage culvert structure.

The revised design has been developed in consultation with the property owners and now provides two property accesses at this location. The existing proposed left-in / left-out driveway would remain and an additional underpass connection to the eastern side of the project would also be provided. The large fill embankment required at this location enables the underpass to be included without significantly affecting the main alignment. The new underpass would provide flood flow relief in the event of culvert blockage or overflow in large rainfall events and alleviates concerns that the road embankment would affect flooding on the property. The left-in / left-out driveway would provide flood free access in the event that the underpass is unusable in large rainfall events.

In addition to alleviating potential flood impacts, the inclusion of the new underpass reduces the travel time required for the affected property to access the project and travel southbound. It provides an opportunity to link to a property on the eastern side of the project and reduce the travel time required to access the property from the south and reduces travel time for southbound access for a property immediately to the north as discussed in **Section 3.4.2** of this report. The proposed design is shown in **Figure 3.4**.

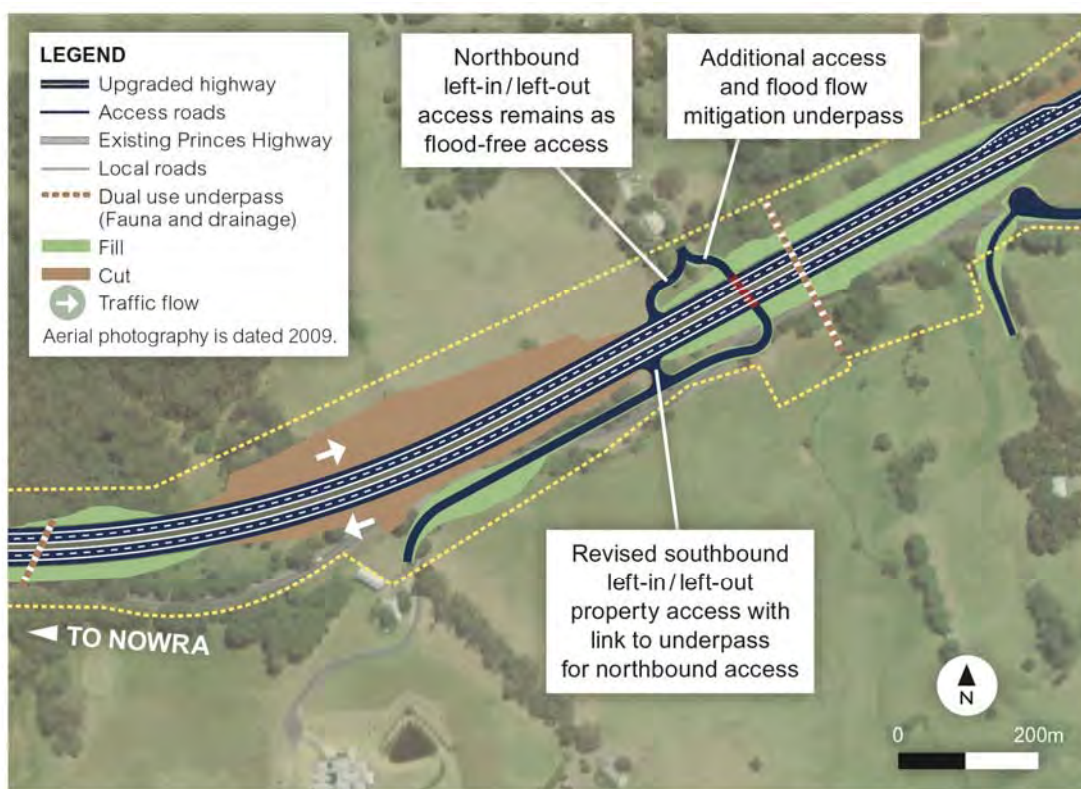


Figure 3.4 Property access at chainage 12850

Refined design (April 2013)

3.5.2 Environmental assessment

The revised access arrangement has been designed in consultation with the affected property owners to substantially alleviate potential flooding impacts on the affected property and also to improve the access for the properties on the eastern and western sides of the project.

The design change is considered to be substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts. The detailed design would be subject to ongoing consultation with the affected landowners to ensure that potential impacts are minimised.

3.6 Change 6: Local road access- Gembrook Lane, opposite the Tindalls Lane interchange

3.6.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has changed the design to include an underpass connection from Gembrook Lane to the Tindalls Lane interchange.

The design for the Gembrook Lane access presented in the environmental assessment consisted of a left-in / left-out only junction at about Chainage 13770, opposite the Tindalls Lane interchange. Under the original design, property owners would be required to travel north to the Austral Park Road interchange and perform a u-turn in order to access Gembrook Lane from the south. The design included in the environmental assessment is shown in **Figure 3.5**.

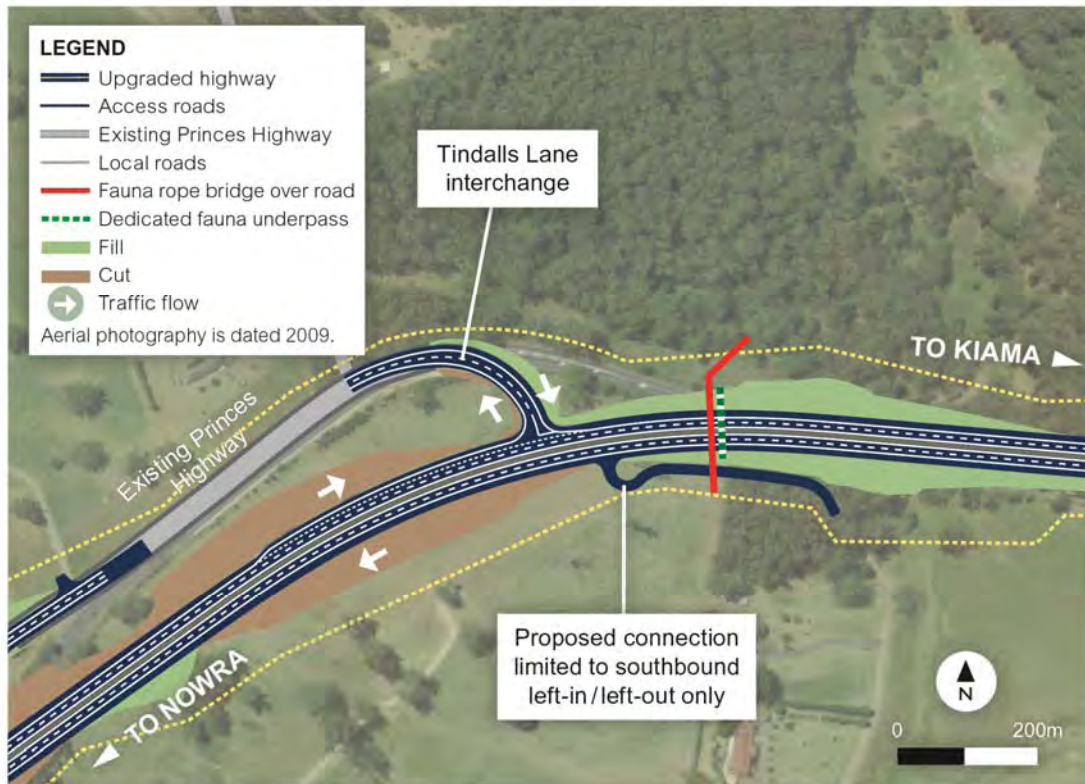


Figure 3.5 Gembrook Lane intersection

Design presented in the environmental assessment
(RMS, November 2012)

The large fill embankment required at this location enables an underpass to be included without significantly affecting the main alignment. The proposed design is shown in **Figure 3.6**.

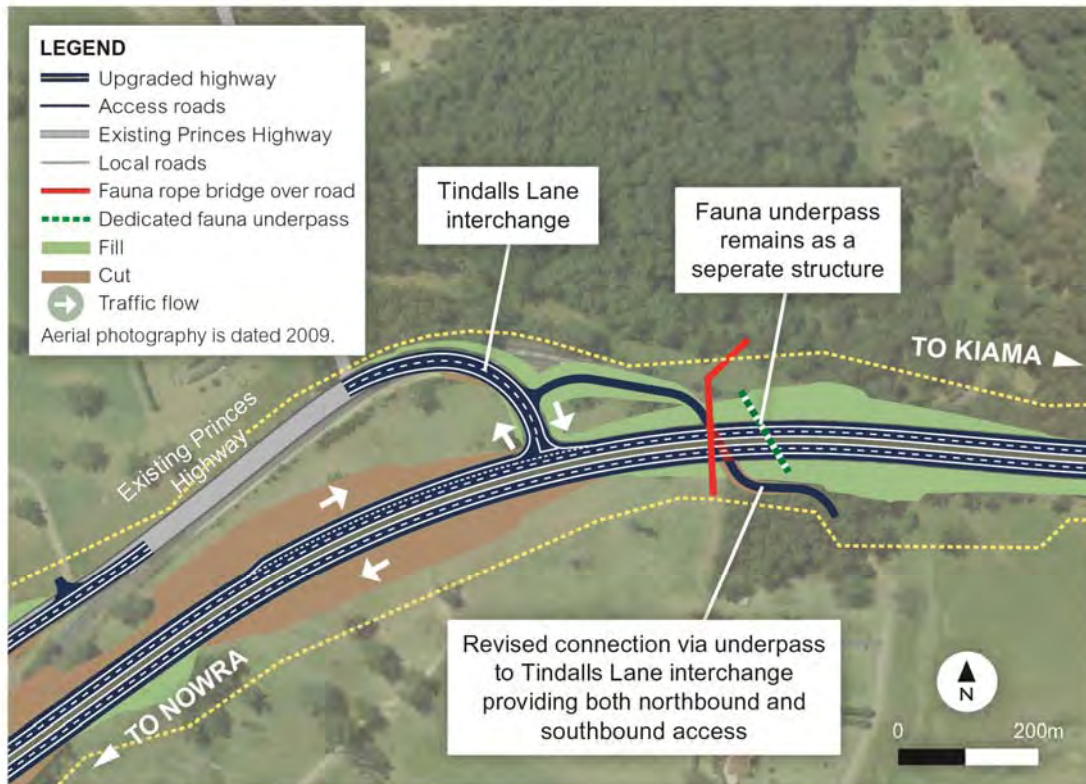


Figure 3.6 Gembrook Lane intersection
Refined design (April 2013)

3.6.2 Environmental assessment

The revised design for the Gembrook Lane access arrangement has been developed in response to issues raised in submissions and significantly improves the access provisions for properties on Gembrook Lane. Under the new design properties would be able to access Gembrook Lane from the north or the south via the Tindalls Lane interchange, without the need for additional travel and u-turn at Austral Park Road when travelling from the south.

The changed design requires no additional land acquisition and is considered to be substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts.

3.7 Change 7: Curve radius increase at Chainage 13850 at the Tindalls Lane interchange

3.7.1 Description

Following further engineering consideration and design review, RMS has increased the horizontal curve radius on the main alignment at Chainage 13850, at the Tindalls Lane interchange from 600 metres to 750 metres. The change conforms to design parameters and optimises the safe design of the project.

3.7.2 Environmental assessment

The change in horizontal curve radius requires a slightly larger footprint, but can be accommodated within land already acquired by RMS. The design change optimises the safe design of the upgrade in this location and is consistent with the project definition as assessed in the environmental assessment resulting in no adverse additional environmental impacts.

3.8 Change 8: Property access at Chainage 14430 at the southern end of the Tindalls Lane interchange

3.8.1 Description

In response to issues raised following exhibition of the environmental assessment as discussed in **Section 2** of this report, RMS has revised a property access to minimise potential impacts on the use of the property and in particular future planned areas for quarrying within the property. The revised design has been developed in consultation with the affected land owner.

3.8.2 Environmental assessment

The revised access has been designed to alleviate potential impacts of the original access design on quarrying operations in consultation with the affected landowner. Land acquisition under the new design is unchanged compared to the original design. It is considered that the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts.

3.9 Change 9: Constructed dam adjustment at Chainage 15500 at the northern interchange for Berry

3.9.1 Description

Following further engineering and constructability consideration, RMS has removed the retaining wall at Chainage 15500 originally proposed as part of the design of the northern interchange for Berry. The retaining wall has been replaced with an earth embankment to reduce the construction risks of building a retaining wall on potentially soft soils associated with the Broughton Mill Creek floodplain. The new earthworks would slightly increase the construction footprint at this location and require a constructed farm dam to be reshaped in order to maintain its existing capacity.

3.9.2 Environmental assessment

The design change would increase the construction footprint at this location and increase the land acquisition required for the project by about 0.3 hectares. The reshaped constructed dam would be designed to maintain its existing capacity and minimise the potential impacts on farm operations.

It is considered that the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts. The detailed design would be subject to ongoing consultation with the affected landowners to ensure that potential impacts are minimised.

3.10 Change 10: Town Creek diversion to the north west of Kangaroo Valley Road, Berry

3.10.1 Description

In response to issues raised during the environmental assessment as discussed in **Section 2** of this report, RMS propose to change the alignment of the Town Creek diversion in order to minimise potential impacts to existing farm operations for the affected properties. The design presented in the environmental assessment provided an alignment that starts at about Chainage 17450, to the north west of Kangaroo Valley Road and meanders across two properties and Rawlings Lane before entering Bundewallah Creek. The original design presented in the environmental assessment is shown in **Figure 3.7**.



Figure 3.7 Town Creek diversion

Design presented in the environmental assessment
(RMS, November 2012)

The proposed new design includes a straighter alignment that is wholly contained in the property to the west of Rawlings Lane rather than affecting both properties. The new alignment would be contained within an easement to the west and parallel to Rawlings Lane and has been developed in response to consultation with the two affected property owners as the option that least impacts ongoing farming activities. The proposed design is shown in **Figure 3.8**.

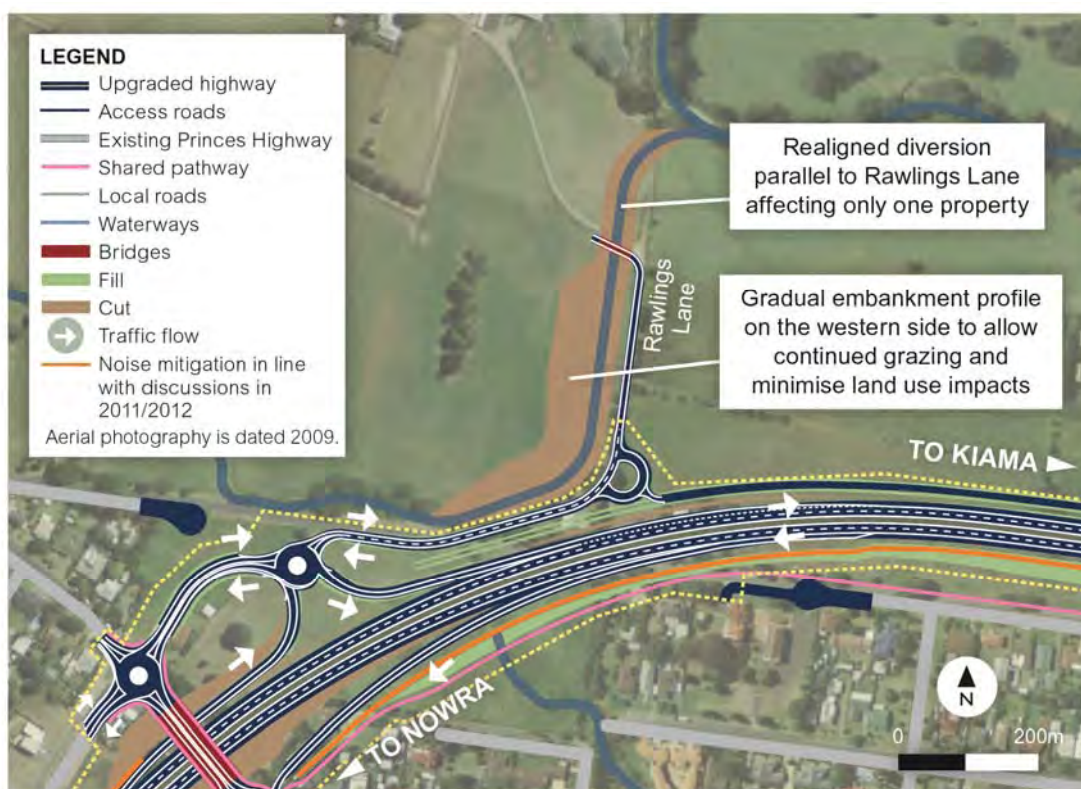


Figure 3.8 Town Creek diversion
Refined design (April 2013)

3.10.2 Environmental assessment

The design change would not affect land acquisition as the new alignment would continue to be maintained by the property owner affected and the land would still be able to be used for the existing farming activities. It is considered that the design change is substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts. The detailed design would be subject to ongoing consultation with the affected landowners to ensure that potential impacts are minimised and an appropriate design is provided.

3.11 Change 11: Victoria Street access arrangement just south of the southern interchange for Berry

3.11.1 Description

The environmental assessment presented three options for the revised Victoria Street access arrangement just south of the southern interchange for Berry. As discussed in **Section 2.22** of this report, the preferred option carried forward for the purposes of the environmental assessment was Option 1 involving closure of Victoria Street with a cul-de-sac at the western end and a one-way southbound on ramp commencing at Queen Street, joining the highway at Chainage 18150. The arrangement included an access road for a property to the south of Victoria Street connecting to the cul-de-sac at the western end of Victoria Street. Option 1 is shown in **Figure 3.9**.



Figure 3.9 Victoria Street access arrangement

Design presented in the environmental assessment as the preferred option (RMS, November 2012)

In response to the issues raised during the environmental assessment as discussed in **Section 2** of this report, RMS has reviewed the design of the Victoria Street access arrangement and proposes to adopt an alternative design. The revised design is Option 3 presented in the environmental assessment, with some additional modifications to property accesses.

Under the revised design, Victoria Street would remain open with a two-way connection between Queen Street and a roundabout at the western end of Victoria Street. A one-way southbound on-ramp would be provided south of the roundabout connecting to the highway at about Chainage 18300.

The property access road provided under the original design would now connect to an updated Schofields Lane underpass at about Chainage 18650 (refer **Section 3.12** of this report). The property access would be provided as a one-way access road. Although access to the Bupa nursing home is not affected by the project, there remains an opportunity for Bupa to privately construct a second access in the future should the appropriate approvals be gained.

The proposed design change for the Victoria Street access arrangement is shown in **Figure 3.10**.



Figure 3.10 Victoria Street access arrangement

Refined design (April 2013)

3.11.2 Environmental assessment

The revised design for the Victoria Street access arrangement maintains the existing traffic flow patterns on the local road network and maintains the existing level of southbound connectivity to the highway. The revised arrangement has been designed with consideration to minimising potential impacts on Mark Radium Park, but would require about 0.05 hectare of additional construction footprint. However overall changes are substantially consistent with the project definition as assessed in the environmental assessment and would result in no adverse additional environmental impacts.

3.12 Change 12: Schofields Lane intersection about 900 metres south of Berry

3.12.1 Description

The design for the Schofields Lane intersection, about 900 metres south of Berry presented in the environmental assessment included a northbound left-in / left-out only junction with the Princes Highway, with a deceleration lane provided (refer to **Figure 3.11**).



Figure 3.11 Schofields Lane intersection

Design presented in the environmental assessment
(RMS, November 2012)

In response to the issues raised during the environmental assessment as discussed in **Section 2** of this report and as part of the development of the revised Victoria Street access arrangement, the design for the Schofields Lane intersection has changed to provide left-in / left-out access both northbound and southbound connected via an underpass. Property access roads connect to the intersection on the eastern side of the project. The intersection has also been moved 20 metres to the north to reduce property boundary impacts associated with its larger footprint.

During the development of the new design, RMS has considered the requirement to provide safe deceleration into the southbound junction. The component of the intersection on the eastern side of the project has been configured to allow sufficient space between the end of the southbound on-ramp from Victoria Street and an appropriate deceleration lane. The proposed design change for the Schofields Lane intersection is shown in **Figure 3.12**.

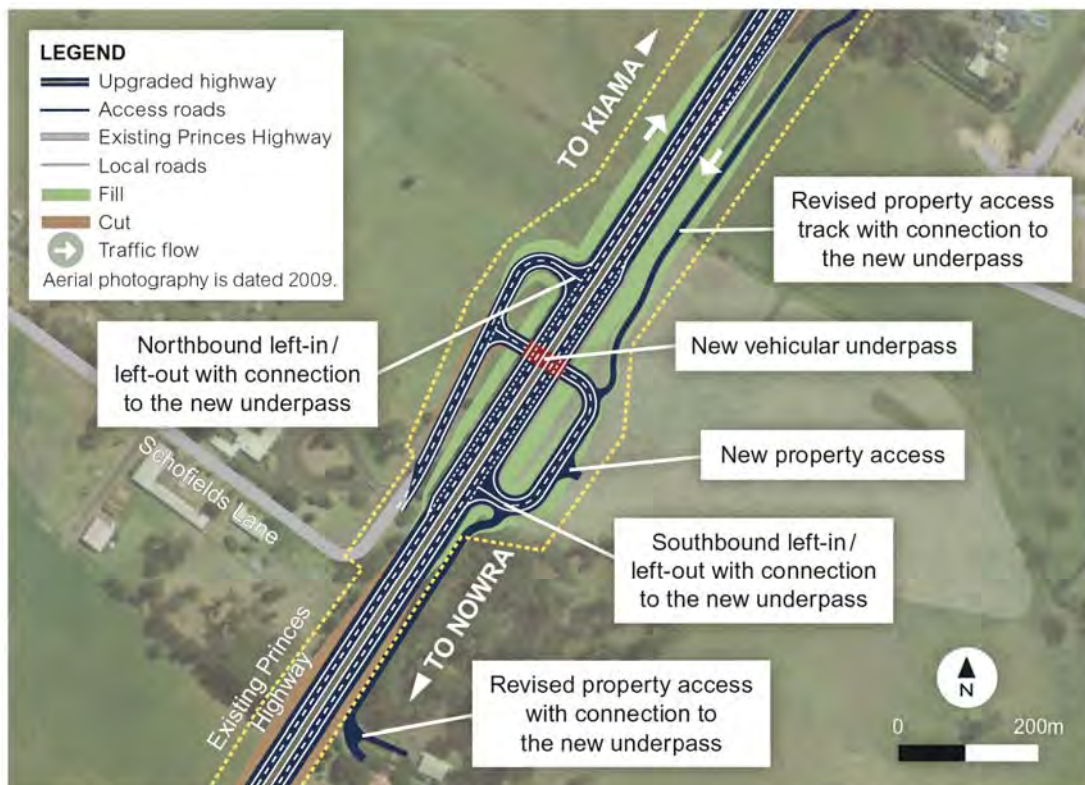


Figure 3.12 Schofields Lane intersection
Refined design (April 2013)

3.12.2 Environmental assessment

The changed design requires about 0.6 hectares of additional property acquisition associated with a larger footprint compared to the original design, but would significantly improve connectivity and access to Schofields Lane and properties on the eastern side of the highway. Through the provision of the underpass, access would be possible to and from the highway in both northbound and southbound directions, reducing travel time by eliminating the need for u-turns at the southern interchange for Berry or Mullers Lane.

There would be some travel time increase for the property to the south of Victoria Street on the eastern side of the highway, as vehicles from that property would now be required to travel south on the access road to the new underpass and then north in order to access Berry. This would increase travel time by about 1.6 kilometres and just less than two minutes compared to the direct highway access currently servicing this property. There would be a safety benefit provided however, by eliminating the need for a right turn across highway traffic to travel north, which is currently required. Changes to this property access and the proposed design have been developed in consultation with the affected property owner in order to minimise potential impacts. The Mullers Lane u-turn facility would still be required to service one property to the south of the Schofields Lane intersection.

The intersection has been designed in consultation with affected property owners and minimises land acquisition and land use impacts as far as possible. The changes to access have also been designed to minimise additional vegetation clearance, especially with regard to the stand of trees opposite Schofields Lane. Given the benefits provided by the revised design and the consultation process undertaken during its development, changes are substantially consistent with the project definition as assessed in the environmental assessment and would result in no substantial additional adverse environmental impacts. The detailed design would be subject to ongoing consultation with the affected landowners to ensure that potential impacts are minimised.

4 Revised Statement of Commitments

The environment assessment for the Foxground and Berry bypass project identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the issues raised in the public submissions, the draft Statement of Commitments for the project (refer to Chapter 10 of the environmental assessment) have been revised to respond to submissions received so as to improve clarity and allow for better ongoing management, auditability and compliance tracking. Should the project be approved, the revised commitments in **Table 4.1** would guide the subsequent phases of the Foxground and Berry bypass project.

The definitions of Construction, Pre-construction and Operation are as set out in the Minister's Conditions of Approval.

The revised statement of commitments is provided in **Table 4.1**.

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

Outcome	Ref. number	Key action	Timing	Reference document
Environmental management				
Compliance and continuous improvement in environmental management.	EM1	The head contractor for the project will have an Environmental Management System (EMS).	Pre-construction and construction.	ISO 14001:2004 Environmental Management Systems — requirements with guidance for use. ISO 19011:2003 Guidelines for Quality and/or Environmental Management Systems Auditing. RTA QA specification G36 — environmental protection.
	EM2	Environmental management plans will be developed and implemented by suitably qualified and experienced personnel and will incorporate as a minimum the mitigation and management measures in the environmental assessment.	Pre-construction and construction.	Guideline for the Preparation of Environmental Management Plans (DIPNR 2004). Chapters 7 and 8 of the environmental assessment.
Provide a consistent methodology to manage environmental issues.	EM3	Environmentally sensitive areas (such as native vegetation, river flat eucalypt forest and cultural heritage) within the construction site boundary will be marked on sensitive area maps, demarcated and signposted where necessary. Maps will be made available during all on-site inductions to construction personnel.	Pre-construction and construction.	Chapters 7 and 8 of the environmental assessment.
	EM4	All construction personnel will receive training regarding environmental management.	Pre-construction and construction.	

Outcome	Ref. number	Key action	Timing	Reference document
Community consultation				
The community is informed about the project.	CC1	The community will be kept informed with measures such as: • Letter box drops, media releases and community updates. • An internet site established and maintained for the duration of the project. • Variable message signs. • The project office. • Email to registered stakeholders. • Targeted consultation with affected individuals or groups. Information to be provided will include: • Changes to access and traffic conditions. • Details of future works programs. • General construction progress.	Pre-construction and construction.	Community Involvement and Communications. Draft: A resource manual for staff (RTA 2008a). Community involvement plan.
Ensure effective management of community inquiries or complaints.	CC2	Communication management will include: • A 24 hour toll-free contact telephone number. • Directions on how to register a complaint or make an inquiry. • Acknowledgement of complaints within 24 hours. • A complaint recording and tracking system.	Pre-construction and construction.	Community Involvement and Communications. Draft: A resource manual for staff (RTA 2008h). AS 4269 Complaints Handling. Community involvement plan.

Outcome	Ref. number	Key action	Timing	Reference document
Traffic and transport				
Minimise traffic and road safety impacts on the highway and local roads.	TT1	Construction vehicle movements and works programs will incorporate traffic control measures to minimise traffic and transport impacts on local roads and the existing highway.	Pre-construction and construction.	RTA Traffic Control at Work Sites (RTA 2003a). RTA QA Specification G10 Control of Traffic. Section 7.1 of the environmental assessment.
	TT2	Road safety on 'the Sandtrack' will be monitored during construction. Should additional road safety issues be identified appropriate road safety measures will be implemented where reasonable and feasible, in consultation with Kiama Municipal Council and Shoalhaven City Council.	Construction.	Section 7.1 of the environmental assessment. Section 2.8 of the response to submissions.
Efficiency for highway users is improved once operational.	TT3	Traffic levels and operational performance will be monitored during peak periods, at approximately 6 and 12 months following completion of the project	Operation.	Section 7.1 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
Noise and vibration				
Minimise construction noise and vibration impacts.	NV1	Mitigation and management measures, such as noise barriers, pre-dilapidation surveys and monitoring, will be used to minimise construction noise and vibration at sensitive receivers.	Construction.	Interim Construction Noise Guideline (DECC 2009). Assessing Vibration: A Technical Guide (DEC 2006). NSW Industrial Noise Policy (EPA 2000). Environmental Noise Management Manual (RTA 2001). AS 2436-1981 Guide to noise control on construction, maintenance and demolition sites. Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (Australian and New Zealand Environment Conservation Council (ANZECC), 1990). Assessing Vibration: A Technical Guideline (Department of Environment and Conservation (DEC), 2006). German Standard DIN 4150 Part 3. Section 7.2 of the environmental assessment. Response to submissions.
	NV2	If required due to ground conditions, impact piling ('driven piles') will be conducted during standard working hours.	Construction	Section 2.9 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Minimise operational noise impacts.	NV3	Reasonable and feasible mitigation measures, such as noise barriers in the vicinity of North Street and Huntingdale Park Road and architectural treatments, will be developed and implemented to meet the noise criteria applicable to the project in consultation with the sensitive receiver.	Pre-construction and construction.	Road Noise Policy (OEH, 2011). RMS Environmental Noise Management Manual (RTA, 2001). Section 7.2 of the environmental assessment.
	NV4	Operational noise monitoring will be undertaken approximately one year after project opening, in accordance with RMS' Environmental Noise Management Manual (RTA, 2001). If monitoring indicates a clear trend that traffic noise levels exceed those predicted, further feasible and reasonable measures will be investigated in consultation with a qualified and experienced acoustic specialist and affected property owners.	Construction and operation.	Road Noise Policy (OEH, 2011) Environmental Noise Management Manual (RTA 2001). Section 7.2 of the environmental assessment.
	NV5	The feasibility of constructing noise protection on the western side of Mark Radium Park will be investigated.	Pre-construction and construction.	Section 2.9 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Biodiversity				
Manage impacts on flora and fauna.	BD1	Areas of vegetation identified to be retained will be managed as environmentally sensitive areas.	Pre-construction and construction.	RMS Biodiversity Guidelines (RTA, 2011). Section 7.3 of the environmental assessment.
	BD2	Pre-clearing fauna surveys, clearing procedures, including staged clearing where there are hollow trees, and methods to control noxious and environmental weeds and pests will be developed and implemented prior to clearing activities, in consultation with a suitably qualified and experienced ecologist.	Pre-construction and construction.	RMS Biodiversity Guidelines: Guide 1 - Pre-clearing process for fauna rescue associated with road works (RTA, 2011). RMS Biodiversity Guidelines: Guide 2 Exclusion zones (RTA 2011) RMS Biodiversity Guidelines: Guide 4 - Clearing of vegetation and removal of bushrock (RTA, 2011) DEC (2004) Threatened species survey and assessment: Guidelines for developments and activities (working draft). Section 7.3 of the environmental assessment.
	BD3	Natural and artificial habitat features, such as bat roost and nest boxes, will be installed to replace hollow-bearing trees that are removed.	Pre-construction and construction.	RMS Biodiversity Guidelines: Guide 8 Nest Boxes (RTA 2011) Threatened species survey and assessment: Guidelines for developments and activities (working draft). Section 7.3 of the environmental assessment
	BD4	A fauna monitoring program will be developed in consultation with OEH. This program will allow the assessment of the effectiveness of fauna mitigation measures including nest boxes, bat roost boxes, fauna underpasses, rope bridges and fauna fencing.	Pre-construction, construction and operation.	RMS Biodiversity Guidelines (RTA, 2011). Section 7.3 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
	BD5	Soil that has been stripped, stockpiled and/or reinstated as part of the construction works will be appropriately managed to maintain available seed bank.	Pre-construction and construction.	RMS QA Specification G40 Clearing and Grubbing. RMS QA Specification R178 Vegetation. RMS QA Specification R179 Landscape Planting. Section 7.6 of the environmental assessment. Section 2.13 of the response to submissions.
Mitigate impacts on wildlife corridor and connectivity.	BD6	Fauna mitigation structures, such as fauna underpasses, fauna overpasses and fauna fencing will be provided where reasonable and feasible. These structures will be designed to assist the safe passage of fauna underneath or over the highway.	Pre-construction, construction and operation.	Section 7.3 of the environmental assessment.
	BD7	Vegetation will be retained, where practicable, under bridges, at temporary creek crossing sites, adjacent to ancillary sites and in the vicinity of rope bridges.	Pre-construction, construction and operation.	Section 7.3 of the environmental assessment.
Minimise impacts on fish and aquatic habitat.	BD8	Permanent and temporary waterway crossings will be designed and constructed in accordance with the fish classification of each waterway.	Pre-construction and construction.	Policy and Guidelines for Aquatic Habitat Management and Fish Conservation (NSW Fisheries 1999). 'Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings' (Fairfull and Witheridge 2003).

Outcome	Ref. number	Key action	Timing	Reference document
Offset residual vegetation loss.	BD9	A biodiversity offset package will be developed in consultation with the biodiversity offset strategy and in consultation with OEH and DTIRIS. The area of restoration or offsetting would be guided by a simulated assessment of the project impacts and potential offsets using the BioBanking Assessment Methodology with a minimum of 2:1 for riparian vegetation.	Pre-construction and construction.	Section 7.3 and Appendix F of the environmental assessment. Section 2.10 of the response to submissions.
Surface water and groundwater				
Minimise impacts to water quality during construction and operation.	SG1	Water quality measures such as water quality basins, swales or bioretention systems at sensitive receiving environments will be designed and installed to respond to the project water quality design criteria.	Pre-construction and construction.	Managing Urban Stormwater: Council Handbook (EPA, 1998). Section 7.4 of the environmental assessment.
Minimise water quality impacts and impacts to the flow regimes of Town Creek and Bundewallah Creek.	SG2	A design and revegetation strategy for the Town Creek diversion will be developed during detailed design and will include measures to: • Maintain flushing efficiency. • Mitigate erosion risk at the connection with Bundewallah Creek. The design of the diversion will be finalised in consultation with directly affected landowners. The Town Creek diversion will be stabilised to mitigate erosion risk prior to operation.	Pre-construction and construction.	Managing Urban Stormwater – Volume 1 (Soils and Construction) (Landcom (2004) Managing Urban Stormwater – Soils and Construction, Volume 2D – Main Road Construction (known as the Blue Book) (DECCW 2008) Guidelines for In stream Works on Waterfront Land (NSW Office of Water, 2012) Section 7.4 of the environmental assessment. Section 2.11 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Minimise impacts on farm dams.	SG3	Permanent losses to farm dam catchments and inflows will be identified during detailed design. Mitigation strategies will be developed in consultation with affected landowners and implemented where reasonable and feasible.	Pre-construction.	Section 7.4 of the environmental assessment.
Minimise impacts on drinking water supply	SG4	Drinking water drawn from Broughton Creek will be maintained through measures identified in commitment AQ1. In the event that water drawn from Broughton Creek does not meet existing drinking water quality standards, an appropriate source of potable water will be made available to affected residents, following consultation.	Construction.	Section 2.11 of the response to submissions.
	SG5	RMS will consult with landholders along the existing Town Creek alignment, below the proposed diversion, to confirm that there are no Basic Landholder Rights (under the Water Management Act 2000) to access water for domestic or stock purposes.	Pre-construction.	Section 2.11 of the response to submissions.
Minimise changes in current flow regimes.	SG6	Waterway structures will be designed to maintain existing flow regimes, where practicable.	Pre-construction.	Section 7.5 of the environmental assessment.
Manage the impacts associated with changes to flooding and drainage.	SG7	Detailed design will seek to minimise increases in peak flood levels in the 1 in 100 year flood event.	Pre-construction.	Section 7.5 of the environmental assessment.
	SG8	Changes to flood impacts on property will be identified as part of detailed design. Where increased flood impacts to structures, such as residences, are identified, mitigation measures will be proposed and implemented where reasonable and feasible.	Pre-construction and construction.	Section 7.5 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
Minimise impacts on channel structure.	SG9	Impacts on stream channel structure diversion will be minimised during detailed design. Measures to be considered may include culvert sizing, energy dissipation measures, scour protection and other design features to control flow intensity and direction.	Pre-construction.	Section 7.5 of the environmental assessment.
Minimise the impact on groundwater levels.	SG10	Groundwater monitoring of water levels and water quality will be undertaken. Where levels and/or quality indicate that the project is potentially having an adverse impact, mitigation measures will be considered and implemented where reasonable and feasible.	Construction.	Section 7.4 of the environmental assessment.
Conservation of water.	SG11	Water efficient work practices, such as water reuse and recycling for road construction and revegetation irrigation will be implemented, where feasible. In the event that surface water from watercourses or groundwater is required to supply water to the project, a site specific impact assessment will be carried out in consultation with the NSW Office of Water and potentially affected stakeholders.	Construction.	Section 7.4 of the environmental assessment. Section 2.11 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Landscape character and visual amenity				
Landscape character and visual amenity impacts of the project are minimised.	VL1	The detailed design will be developed with reference to the minimum reference design requirements and the findings of the CM+ Urban Design Study for the following project components: • All bridges within the project, with consideration of the Bridge Aesthetics Design Guidelines (RTA 2003). • Embankments across Broughton Creek west of Toolijooa Ridge. • Noise attenuation measures barriers along the length of the project.	Pre-construction.	Bridge Aesthetics Design Guidelines (RTA 2003). Noise Wall Design Guideline (RTA 2006). Section 7.6 of the environmental assessment.
	VL2	Councils and the local community will be engaged during detailed design to receive feedback on an urban and landscape design strategy for the project and the integration of existing pedestrian access and mobility plans for Berry.	Pre-construction.	Community Involvement and Communications. Draft: A resource manual for staff (RTA, June 2008). Existing pedestrian access and mobility plans for Berry. Section 7.6 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
	VL3	To respect the rural and historic character of Foxground and Berry, noise barriers and bridges will be designed using forms, materials, colour and texture that are sensitive to the area, that complement the existing rural character and, where possible and desirable, that recede into the landscape. Planting and revegetation will be used to help blend the project into its setting and screen and visually soften built elements.	Pre-construction and construction.	Section 2.13 of the response to submissions.
	VL4	Landscaping treatments will include native plant species endemic to the local area and where practicable, locally sourced seed and propagated plant stock will be used to supplement the plant materials required for the project.	Pre-construction and construction.	Section 7.6 of the environmental assessment. Section 2.13 of the response to submissions.
Minimise impacts of lightspill	VL5	A lighting strategy and design will be undertaken during detailed design to minimise the impacts of light spill. Detailed design will address mechanisms for reducing the impacts of headlight glare from vehicles travelling on the bridges at Berry and Broughton Creek.	Pre-construction	Section 7.6 of the environmental assessment. Section 2.8.10 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Aboriginal heritage				
Manage impacts on Aboriginal heritage.	AH1	Aboriginal sites identified to be conserved will be managed as environmentally sensitive areas.	Pre-construction and construction.	Section 7.7 of the environmental assessment.
	AH2	Disturbance to the natural soil profile of G2B A13 and G2B A14 will be avoided, where practicable.	Pre-construction and construction	Section 7.7 of the environmental assessment.
	AH3	Conduct a program of archaeological salvage at sites G2B A16, G2B A18, G2B A24, G2B A29, G2B A30, G2B A31, G2B A32, G2B A32, G2B A33, G2B A36, and G2B PAD1.	Pre-construction and construction.	Section 7.7 of the environmental assessment."
Any unknown Aboriginal objects and/or places encountered are assessed.	AH4	If any skeletal remains or unknown Aboriginal objects or places are encountered, works that would potentially impact the find will stop immediately. Works will not re-commence until appropriate clearance has been received.	Pre-construction and construction.	Skeletal remains — Guidelines for the management of human skeletal remains under the Heritage Act 1977 (NSW Heritage Office 1998). RMS 'Standard Management Procedure - Unexpected Archaeological Finds' (RTA, 2012)
	AH5	All construction personnel will receive training in the management of Aboriginal cultural materials, including legal obligations, the application of protocols and the recognition of Aboriginal cultural materials.	Pre-construction and construction	Section 7.7 of the environmental assessment.
Non-Aboriginal heritage				
Minimise impacts on non-Aboriginal heritage.	NA1	Mitigation (archival record, test/salvage excavation) will be completed for impacted heritage items.	Pre-construction and construction	How to prepare archival records of heritage items (NSW Heritage 1998b). Section 7.8 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
	NA2	An archival recording of Glen Devon (G2B H11) and its grounds will be conducted prior to the commencement of construction	Pre-construction and construction	Section 7.8 of the environmental assessment Section 2.15 of the response to submissions.
	NA3	Non-Aboriginal sites identified to be conserved will be managed as environmentally sensitive areas.	Pre-construction and construction.	Section 7.8 of the environmental assessment.
	NA4	If any unknown non-Aboriginal heritage items are encountered, all works that would potentially impact the find will stop immediately. Works will not recommence until appropriate clearance has been received.	Pre-construction and construction.	Section 7.8 of the environmental assessment. RMS 'Standard Management Procedure – Unexpected Archaeological Finds' (RTA, 2012)
Archival records are prepared and made available to the public.	NA5	An archival record will be prepared for any directly impacted heritage item. Copies will be kept in RMS' library and distributed to the Kiama library and Shoalhaven library (Nowra branch).	Pre-construction, construction, as relevant.	How to prepare archival records of heritage items (NSW Heritage 1998). Section 7.8 of the environmental assessment.
Land use and property				
Appropriate compensation will be paid for property acquisition.	P1	Negotiation for all property acquisitions will be in accordance with RMS' Land Acquisition Information Guide (RTA, 2011). Compensation assessment will be in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.	Pre-construction and construction.	Land Acquisition Information Guide (RTA, 2011). Land Acquisition (Just Terms Compensation) Act 1991. Section 7.9 of the environmental assessment.
Property access will be maintained.	P2	Property access will be maintained during construction. If temporary or alternative access is required, it will be provided in consultation with the affected landowner/s.	Construction.	Community Participation and Communications. A Resource Manual for Staff (RTA, 2010). Section 7.9 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
	P3	Affected property owners will be consulted during detailed design regarding long term access requirements via underpasses.	Pre-construction and construction.	Section 7.9 of the environmental assessment. Section 2.16.3 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
Socio-economic				
Manage impacts to directly affected properties.	SE1	Negotiations for property acquisition will include consideration of property adjustments, where required, to maintain farm management practices.	Pre-construction and construction.	Land Acquisition Information Guide (RTA, 2011). Land Acquisition (Just Terms Compensation) Act 1991. Section 2.17 of the response to submissions.
	SE2	Stock refuge will be maintained at Broughton Creek bridge 2 and will be determined during detailed design in consultation with landowners.	Pre-construction, construction and operation.	Section 7.5 of the environmental assessment.
Minimise economic impacts on Berry and agricultural businesses.	SE3	Appropriate destination signage will be provided near to interchanges.	Operation.	RTA's Guide Signposting (RTA 2007) and Tourist Signposting Manual (RTA 2009d).
	SE4	Consultation with Shoalhaven City Council will continue through detailed design and construction regarding assistance towards the development of strategies to address the continued economic viability of Berry.	Pre-construction and construction.	Community Involvement and Communications. Draft: A resource manual for staff (RTA, June 2008). Community involvement plan.
Minimising impacts to recreational facilities during construction and operation.	SE5	Access to recreational facilities will be maintained during construction and operation of the project, where practicable, including consideration of assistance to the relocation of the Berry equestrian centre during construction.	Pre-construction, construction and operation	Community Involvement and Communications. Draft: A resource manual for staff (RTA, June 2008). Community involvement plan. Section 2.17 of the response to submissions.

Outcome	Ref. number	Key action	Timing	Reference document
	SE6	Access to local creeks, including access to the existing Broughton Creek bridge will be maintained during construction and operation to provide access for recreational fishers, where safe and practicable.	Pre-construction, construction and operation	Section 7.10 of the environmental assessment.
Soils and water quality				
Minimise erosion and sedimentation.	SW1	Management measures will be designed, installed and maintained to minimise erosion and sedimentation from construction activities.	Pre-construction and construction.	Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2006). Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction (DECC 2008b). Section 8.1 of the environmental assessment.
	SW2	A soil conservation specialist will be engaged to provide advice on erosion and sedimentation control.	Pre-construction and construction.	Erosion and Sedimentation Management Procedure (RTA, 2008). Section 8.1 of the environmental assessment.
	SW3	Stabilisation of exposed areas will be undertaken progressively.	Pre-construction and construction.	RTA QA Specification R178 Vegetation.

Outcome	Ref. number	Key action	Timing	Reference document
Avoid contamination of waterways.	SW4	Monitoring of water quality upstream and downstream of the project site will be undertaken before and during construction. Also refer to SG4	Pre-construction and construction.	Section 7.4 and 8.1 of the environmental assessment. Erosion and Sedimentation Management Procedure (RTA, 2008). Managing Urban Stormwater – Soils and Construction Volume 1 (Landcom, 2004). Managing Urban Stormwater – Soils and Construction, Volume 2D – Main Road Construction (DECCW, 2008). RMS QA Specification G38 Soil and Water Management. RMS QA Specification G39 Soil and Water Management (Erosion and Sediment Control Plan).
Acid sulfate soils (ASS) to be avoided are protected.	SW5	Areas of ASS to be avoided will be fenced and signposted as exclusion zones before and during any works in the vicinity.	Pre-construction and construction.	Section 8.1 of the environmental assessment. Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfidic Black Ooze (RTA 2005).

Outcome	Ref. number	Key action	Timing	Reference document
Impact of exposing acid sulfate soils is minimised.	SW6	Exposed ASS will be neutralised and ~~protected from~~ surface run-on will be minimised. Any acid runoff or acid material will be contained and treated.	Pre-construction and construction.	Section 8.1 of the environmental assessment. Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfidic Black Ooze (RTA 2005). Protection of the Environment and Operations Act 1997.
Impact of exposing unforeseen occurrences of contaminated soils is minimised.	SW7	Targeted soil contamination investigations will be undertaken during detailed design, if required. A remedial action plan will be developed if contamination is found to pose unacceptable risks to the environment and human health.	Pre-construction and construction.	Section 8.1 of the environmental assessment. Contaminated Land Management Guideline (RTA 2005).
Air quality				
Minimise dust impacts to sensitive receivers.	AQ1	Standard dust and emission control measures will be implemented to manage construction air quality impacts at sensitive receivers.	Construction.	Section 8.2 of the environmental assessment.
Air quality environmental management measures are effective.	AQ2	Monitoring will be undertaken to assess the effectiveness of the air quality environmental management measures. Where required, additional feasible and reasonable environmental management measures will be used.	Construction.	Section 8.2 of the environmental assessment. AS 3580.10.1-1991 Methods of Sampling Analysis of Ambient Air. DECC guideline Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (August 2005). AS 2922 Ambient Air Guide for Siting of Sampling Equipment.

Outcome	Ref. number	Key action	Timing	Reference document
Hazards and risks				
Minimise risks and hazards to the environment and community.	HR1	Spills will be contained immediately. Bunded areas within the construction site and ancillary facilities, or other areas where suitable containment measures are in place to prevent discharge into watercourses, will be used for storage of potentially hazardous and/or contaminating materials and activities.	Pre-construction and construction.	AS 1940 The Storage and Handling of Flammable and Combustible Liquids. DEC Bunding and Spill Management Guidelines (in DEC Environmental Protection manual for Authorised Officers). Environmental compliance report: Liquid chemical storage, handling and spill management — Part B Review of best practice and regulation (DECC 2005). RTA Code of Practice for Water Management (RTA 1999b).
Impacts to the eastern gas pipeline are to be avoided.	HR3	Protection measures for the eastern gas pipeline and suitable construction methods when working in the vicinity of the pipeline will be implemented in consultation with Jemena (Eastern Gas Pipeline).	Pre-construction and construction.	Australian Standard AS 2885.1-2007 Pipelines – Gas and liquid petroleum – Design and Construction.
Hazards and risks during operation are minimised.	HR4	Permanent water quality basins, swales or other appropriate controls will be designed during the detailed design phase to protect waterways from spills.	Pre-construction and operation.	Section 8.3 of the environmental assessment.

Outcome	Ref. number	Key action	Timing	Reference document
Waste management				
Minimise waste.	SM2	The waste minimisation hierarchy principles of avoid, reduce, reuse, recycle or dispose will apply to all aspects of the project.	Construction.	Waste Avoidance and Resource Recovery Strategy (DECC 2006). NSW Government's Waste Reduction and Purchasing Policy. Environmental guidelines — assessment, classification and management of liquid and non-liquid waste (DECC 1999).
Greenhouse gas emissions				
Minimise greenhouse gas emissions and energy use.	GG1	Energy efficient work practices will be implemented, including consideration of: • Energy efficient design of site buildings. • Design of site compounds and the batch plant to minimise unnecessary vehicle movement. • Regular servicing of site plant and equipment. • Training of construction personnel in energy efficient plant operation. • The use of accredited GreenPower. • Use of locally sourced materials where available and of suitable quality.	Pre-construction and construction.	Section 8.5 of the environmental assessment. AS/NZS 1158:1.1.2005.

Outcome	Ref. number	Key action	Timing	Reference document
Ancillary facilities				
Minimise impacts of ancillary facilities.	AF1	Ancillary facilities (excluding temporary stockpiles) not identified in the environmental assessment will be located in areas: • More than 50 metres from waterways for the active area of the ancillary facility. • Where there is no significant clearing of native vegetation beyond that already required for the project. • That minimise impact on amenity of the closest sensitive receiver (unless a negotiated agreement is in place). • On relatively level ground.	Pre-construction and construction.	Section 4.4.7 of the environmental assessment. Interim Construction Noise Guideline (DECC 2009).
	AF2	Ancillary chemical storage facilities will be located above the 1 in 100 year flood level unless otherwise identified the construction environmental management plan.	Pre-construction and construction.	Section 4.4.7 of the environmental assessment.
	AF3	Temporary stockpiles will be located in areas: • Of low ecological and heritage conservation significance. • At least 50 metres from waterways. • Outside the 10 year ARI floodplain. • On relatively level ground.	Pre-construction and construction.	Section 4.4.7 of the environmental assessment. Managing Urban Stormwater. Soils and Construction, Volume 1 (Landcom 2006). Stockpile Site Management Procedure (RMS 2011)

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Appendix A

Respondent details

Appendix A – List of respondents

Respondent	Stakeholder identification number	Section number where issues are addressed
Private individual	1	2.22.1
Private individual	2	2.9.7, 2.13.3
Private individual	3	2.10.4, 2.12.3, 2.16.1, 2.16.3
Private individual	4	2.4.4, 2.7.4, 2.8.13, 2.17.10, 2.22.1
Private individual	5	2.8.13, 2.8.16, 2.22.1
Private individual	6	2.8.16, 2.17.14, 2.22.1
Private individual	7	2.3.2, 2.10.1
Private individual	8	2.9.7, 2.13.3
Anonymous	9	2.4.3, 2.8.3, 2.9.1, 2.9.8, 2.12.4, 2.16.6, 2.22.1
Private individual	10	2.2, 2.4.3, 2.7.1, 2.8.13, 2.9.1, 2.9.6, 2.22.1
Private individual	11	2.8.8, 2.8.12, 2.8.16, 2.22.1
Private individual	12	2.8.13, 2.17.14, 2.22.1
Anonymous	13	2.22.1
Anonymous	14	2.22.1
Private individual	15	2.8.11, 2.8.15, 2.17.14, 2.22.1
Anonymous	16	2.17.14, 2.22.1
Anonymous	17	2.2, 2.8.11, 2.8.13, 2.17.11, 2.22.1
Private individual	18	2.8.13, 2.17.14, 2.22.1
Private individual	19	2.8.13, 2.22.1
Private individual	20	2.2, 2.8.11, 2.8.13, 2.8.16, 2.17.14, 2.22.1
Private individual	21	2.8.15, 2.22.1
Anonymous	22	2.8.13, 2.8.16, 2.17.14, 2.22.1
Anonymous	23	2.8.11, 2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	24	2.2, 2.7.1, 2.7.2, 2.16.3
Private individual	25	2.3.1
Private individual	26	2.8.13, 2.8.16, 2.22.1
Private individual	27	2.8.13, 2.17.14, 2.22.1
Private individual	28	2.8.13, 2.17.14, 2.22.1
Private individual	29	2.4.4
Private individual	30	2.4.3
Private individual	31	2.8.13, 2.16.3, 2.17.13, 2.17.14, 2.22.1
Private individual	32	2.8.11, 2.8.13, 2.8.14, 2.17.14, 2.22.1
Private individual	33	2.8.12, 2.8.13, 2.17.14, 2.22.1
Private individual	34	2.8.11, 2.17.14, 2.22.1
Anonymous	35	2.8.13, 2.22.1
Anonymous	36	2.8.13, 2.17.14, 2.22.1

Respondent	Stakeholder identification number	Section number where issues are addressed
Private individual	37	2.2, 2.7.4, 2.8.3, 2.8.13, 2.17.14, 2.22.1
Private individual	38	2.7.4, 2.8.13, 2.17.14, 2.22.1
Private individual	39	2.8.13, 2.22.1
Private individual	40	2.8.13, 2.17.14, 2.22.1
Interest group/organisation	41	2.4.3, 2.4.4, 2.6.1, 2.7.1, 2.9.1, 2.9.8, 2.13.2, 2.15.1, 2.17.10, 2.19.2
Private individual	42	2.13.2
Private individual	43	2.13.2
Anonymous	44	2.8.11, 2.8.13, 2.8.16, 2.17.14, 2.22.1
Anonymous	45	2.8.13, 2.8.16, 2.17.14, 2.22.1
Private individual	46	2.22.1
Anonymous	47	2.7.4, 2.8.11, 2.8.13, 2.8.15, 2.9.7, 2.22.1
Private individual	48	2.17.14, 2.22.1
Private individual	49	2.4.4, 2.8.13, 2.8.16, 2.17.10, 2.17.14, 2.22.1
Anonymous	50	2.4.4, 2.8.13, 2.8.16, 2.17.10, 2.17.14, 2.22.1
Anonymous	51	2.8.13, 2.8.16, 2.22.1
Private individual	52	2.16.3
Private individual	53	2.22.1
Anonymous	54	2.8.13, 2.8.15, 2.22.1
Private individual	55	2.16.3, 2.16.7
Anonymous	56	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	57	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	58	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	59	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	60	2.4.3, 2.5.1, 2.5.2, 2.8.13, 2.8.16, 2.11.5, 2.16.3, 2.16.6, 2.17.11, 2.17.14, 2.22.1
Private individual	61	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	62	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	63	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	64	2.8.13, 2.8.16, 2.17.14, 2.22.1
Private individual	65	2.8.3, 2.16.3, 2.17.7
Private individual	66	2.8.13, 2.22.1
Interest group/organisation	67	2.4.4, 2.7.3, 2.8.3, 2.8.8, 2.8.16, 2.17.10, 2.17.11, 2.22.1
Private individual	68	2.12.1
Private individual	69	2.10.1, 2.10.3, 2.10.4, 2.16.6
Private individual	70	2.2, 2.8.8, 2.8.13, 2.10.1, 2.13.2, 2.13.6, 2.15.1, 2.16.6, 2.21.1, 2.22.1

Respondent	Stakeholder identification number	Section number where issues are addressed
Anonymous	71	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	72	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	73	2.2
Private individual	74	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	75	2.8.11, 2.8.12, 2.8.13, 2.17.14, 2.22.1
Anonymous	76	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	77	2.12.2
Private individual	78	2.7.1, 2.8.3, 2.9.7, 2.10.4, 2.12.2, 2.12.4, 2.15.1, 2.16.3, 2.19.1, 2.19.2
Private individual	79	2.4.3, 2.4.4, 2.7.1, 2.7.3, 2.7.4, 2.8.8, 2.8.16, 2.17.10, 2.17.14, 2.22.1
Anonymous	80	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	81	2.9.6, 2.16.3, 2.16.5
Private individual	82	2.22.1
Private individual	83	2.22.1
Private individual	84	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	85	2.8.13, 2.13.6, 2.22.1
Interest group/organisation	86	2.6.1, 2.9.6, 2.13.2, 2.16.3, 2.16.5, 2.17.9
Private individual	87	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	88	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	89	2.4.3, 2.7.4, 2.8.11, 2.8.13, 2.8.16, 2.17.10, 2.17.13, 2.17.14, 2.22.1
Anonymous	90	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	91	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	92	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	93	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	94	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	95	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	96	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	97	2.8.11, 2.22.1
Private individual	98	2.8.13, 2.22.1
Interest group/organisation	99	2.7.3, 2.17.4
Private individual	100	2.4.3, 2.6.1, 2.9.7, 2.9.8, 2.10.2, 2.11.1, 2.11.5, 2.13.2, 2.15.2, 2.16.1, 2.16.3, 2.17.5
Private individual	101	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	102	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	103	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	104	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	105	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	106	2.9.6, 2.13.2, 2.16.3, 2.17.9

Respondent	Stakeholder identification number	Section number where issues are addressed
Private individual	107	2.8.13, 2.22.1
Private individual	108	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	109	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	110	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	111	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	112	2.8.13, 2.17.14, 2.22.1
Private individual	113	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	114	2.5.2, 2.16.3, 2.17.6, 2.17.9
Private individual	115	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	116	2.10.1, 2.13.2
Private individual	117	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	118	2.2, 2.4.2, 2.4.4, 2.6.1, 2.7.1, 2.17.10
Private individual	119	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	120	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	121	2.8.13, 2.17.14, 2.22.1
Private individual	122	2.7.3, 2.12.1, 2.16.1, 2.16.3, 2.17.5, 2.17.6
Interest group/organisation	123	2.8.11, 2.8.13, 2.22.1
Private individual	124	2.4.4
Private individual	125	2.22.1
Private individual	126	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	127	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	128	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	129	2.2, 2.8.13, 2.17.14, 2.22.1
Private individual	130	2.3.1, 2.3.2, 2.4.2, 2.4.3, 2.9.8, 2.17.10, 2.17.11
Private individual	131	2.16.7
Private individual	132	2.22.1
Private individual	133	2.8.12, 2.8.13, 2.9.7, 2.17.11, 2.17.12, 2.17.14, 2.22.1
Private individual	134	2.8.11, 2.8.13, 2.17.14, 2.22.1
Private individual	135	2.4.2, 2.4.3, 2.4.4, 2.7.1, 2.7.3, 2.8.3, 2.13.2, 2.17.10
Private individual	136	2.16.3, 2.16.5
Private individual	137	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	138	2.4.2, 2.4.4, 2.7.1, 2.7.4, 2.17.10, 2.22.1
Private individual	139	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	140	2.16.3, 2.17.5
Private individual	141	2.13.2, 2.16.7
Interest group/organisation	142	2.15.1, 2.17.6
Private individual	143	2.4.2
Private individual	144	2.9.6, 2.13.2, 2.16.3, 2.17.9

Respondent	Stakeholder identification number	Section number where issues are addressed
Private individual	145	2.10.1, 2.10.4, 2.13.2, 2.13.6, 2.15.1, 2.16.2
Anonymous	146	2.4.2, 2.8.11, 2.8.12, 2.8.13, 2.8.16, 2.9.10, 2.17.12, 2.17.13, 2.17.14, 2.22.1
Private individual	147	2.10.1, 2.10.4, 2.13.2, 2.13.6, 2.16.2, 2.16.6
Private individual	148	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	149	2.8.11, 2.8.12, 2.8.13, 2.17.14, 2.22.1
Anonymous	150	2.22.1
Private individual	151	2.8.13, 2.22.1
Private individual	152	2.8.11, 2.8.13, 2.8.16, 2.17.14, 2.22.1
Private individual	153	2.22.1
Private individual	154	2.2, 2.8.16, 2.17.14, 2.22.1
Private individual	155	2.3.1, 2.22.1
Private individual	156	2.4.2, 2.4.4, 2.8.3, 2.8.13, 2.9.6, 2.9.7, 2.17.11, 2.19.2, 2.22.1
Anonymous	157	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	158	2.22.1
Anonymous	159	2.7.4, 2.8.11, 2.8.13, 2.8.16, 2.22.1
Anonymous	160	2.8.13, 2.8.16, 2.22.1
Private individual	161	2.4.2, 2.4.4, 2.8.2, 2.8.5, 2.9.6, 2.10.1, 2.10.4, 2.16.3
Anonymous	162	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	163	2.8.13, 2.22.1
Private individual	164	2.8.11, 2.22.1
Anonymous	165	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	166	2.8.3, 2.8.9
Anonymous	167	2.9.6, 2.13.2, 2.16.3, 2.17.9
Anonymous	168	2.2, 2.8.13, 2.17.14, 2.22.1
Private individual	169	2.4.3, 2.8.3, 2.9.1, 2.9.6, 2.9.7, 2.9.8, 2.10.3, 2.10.4, 2.11.1, 2.11.5, 2.13.2, 2.13.4, 2.15.2, 2.16.1, 2.16.3, 2.16.7, 2.17.1, 2.17.3, 2.17.5, 2.17.7, 2.17.10, 2.17.11, 2.19.1, 2.19.2, 2.20.3
Private individual	170	2.8.10, 2.9.7, 2.10.2, 2.10.3, 2.11.1, 2.12.2, 2.13.2, 2.13.3, 2.16.3, 2.16.7, 2.19.2
Anonymous	171	2.8.13, 2.8.16, 2.9.10, 2.22.1
Private individual	172	2.4.2, 2.8.3, 2.9.1, 2.9.4, 2.9.6, 2.9.7, 2.9.8, 2.11.1, 2.11.5, 2.12.4, 2.13.2, 2.13.4, 2.15.2, 2.16.3, 2.17.1, 2.17.2, 2.17.3, 2.17.5, 2.17.7, 2.17.10, 2.17.11, 2.19.1, 2.19.2
Anonymous	173	2.9.6, 2.13.2, 2.16.3, 2.17.9

Respondent	Stakeholder identification number	Section number where issues are addressed
Anonymous	174	2.8.3, 2.9.7, 2.13.2, 2.16.5
Private individual	175	2.2, 2.4.2, 2.4.3, 2.4.4, 2.8.2, 2.8.10, 2.9.1, 2.9.4, 2.9.7, 2.9.8, 2.11.8, 2.13.1, 2.13.2, 2.13.3, 2.13.4, 2.13.5, 2.13.6, 2.16.5, 2.16.6, 2.17.10, 2.17.11, 2.19.2
Private individual	176	2.16.3
Anonymous	177	2.9.7, 2.22.1
Private individual	178	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	179	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	180	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	181	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	182	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	183	2.8.13, 2.17.13, 2.17.14, 2.22.1
Private individual	184	2.8.13, 2.17.13, 2.17.14, 2.22.1
Anonymous	185	2.4.3, 2.5.2, 2.8.2, 2.9.1, 2.9.4, 2.9.6, 2.9.7, 2.9.8, 2.13.3, 2.13.4, 2.13.5, 2.13.6, 2.19.1
Private individual	186	2.8.13, 2.17.14, 2.22.1
Private individual	187	2.3.3, 2.8.11, 2.8.15, 2.8.16, 2.17.14, 2.22.1
Private individual	188	2.8.13, 2.22.1
Private individual	189	2.8.13, 2.8.16, 2.17.14, 2.22.1
Private individual	190	2.17.13, 2.22.1
Private individual	191	2.9.1, 2.9.5, 2.9.7, 2.13.3, 2.16.5, 2.19.1, 2.19.2
Private individual	192	2.10.1, 2.10.4, 2.11.5, 2.13.3, 2.15.1, 2.16.5
Private individual	193	2.4.4, 2.8.11, 2.9.7, 2.17.10, 2.17.14, 2.22.1
Anonymous	194	2.2, 2.7.1, 2.13.3
Private individual	195	2.22.1
Private individual	196	2.8.13, 2.22.1
Interest group/organisation	197	2.10.1, 2.10.2, 2.10.4, 2.11.5, 2.13.2, 2.13.3, 2.13.6, 2.15.3, 2.16.2, 2.16.6
Private individual	198	2.9.6, 2.13.2, 2.16.3, 2.17.9
Private individual	199	2.8.10, 2.16.3, 2.22.1
Anonymous	200	2.8.16, 2.10.5, 2.17.10, 2.17.13, 2.17.14, 2.22.1
Anonymous	201	2.8.12, 2.8.13, 2.8.14, 2.8.16, 2.9.10, 2.16.3, 2.17.10, 2.17.12, 2.17.13, 2.17.14, 2.22.1
Private individual	202	2.8.1, 2.8.2
Anonymous	203	2.4.3, 2.9.7, 2.9.8, 2.12.2, 2.13.2, 2.22.1
Private individual	204	2.15.3
Anonymous	205	2.4.2

Respondent	Stakeholder identification number	Section number where issues are addressed
Anonymous	206	2.2, 2.8.16, 2.12.1, 2.17.11, 2.22.1
Anonymous	207	2.17.11
Private individual	208	2.4.1, 2.4.3, 2.8.1, 2.8.3, 2.9.1, 2.9.6, 2.10.3, 2.13.2, 2.13.5, 2.17.9, 2.17.11, 2.19.1, 2.22.1
Anonymous	209	2.2, 2.4.1, 2.4.2, 2.4.4, 2.7.3, 2.9.6, 2.13.2
Private individual	210	2.10.1, 2.10.4
Private individual	211	2.22.1
Private individual	212	2.11.6, 2.16.3, 2.16.5, 2.16.6, 2.16.7
Private individual	213	2.7.4, 2.8.13, 2.22.1
Private individual	214	2.11.6, 2.16.3, 2.16.6, 2.16.7
Interest group/organisation	215	2.3.2, 2.3.3, 2.4.2, 2.4.3, 2.4.4, 2.6.1, 2.7.1, 2.7.3, 2.8.1, 2.8.2, 2.8.3, 2.8.4, 2.8.7, 2.8.8, 2.8.9, 2.8.11, 2.8.12, 2.8.13, 2.8.14, 2.8.16, 2.9.1, 2.9.2, 2.9.3, 2.9.5, 2.9.6, 2.9.7, 2.9.8, 2.9.9, 2.10.1, 2.10.2, 2.10.4, 2.11.5, 2.13.2, 2.13.3, 2.13.6, 2.14.1, 2.14.2, 2.15.3, 2.16.2, 2.16.6, 2.17.6, 2.17.10, 2.17.11, 2.17.14, 2.18.1, 2.19.1, 2.19.2, 2.21.1, 2.22.1
Interest group/organisation	216	2.10.1, 2.10.4, 2.13.3, 2.16.6
Private individual	217	2.2
Private individual	218	2.7.3, 2.9.6
Private individual	219	2.2
Private individual	220	2.2
Private individual	221	2.2
Private individual	222	2.2, 2.9.6
Interest group/organisation	223	2.2, 2.15.1, 2.17.11
Private individual	224	2.2
Private individual	225	2.2
Private individual	226	2.2, 2.7.1, 2.17.10
Private individual	227	2.4.2, 2.4.4, 2.17.10
Private individual	228	2.2
Anonymous	229	2.2
Private individual	230	2.2, 2.17.11
Private individual	231	2.2
Private individual	232	2.2, 2.10.1
Private individual	233	2.2, 2.4.2, 2.9.6, 2.17.10
Private individual	234	2.2, 2.4.2, 2.8.13, 2.9.6, 2.13.2, 2.15.1, 2.17.6, 2.17.10, 2.17.11, 2.22.1
Private individual	235	2.2
Private individual	236	2.2, 2.17.10

Respondent	Stakeholder identification number	Section number where issues are addressed
Private individual	237	2.8.13, 2.22.1
Private individual	238	2.2
Private individual	239	2.2, 2.17.10
Private individual	240	2.2
Private individual	241	2.2, 2.7.1, 2.17.10
Private individual	242	2.2, 2.4.4, 2.17.10
Private individual	243	2.2
Private individual	244	2.2, 2.4.4, 2.9.7, 2.17.10
Private individual	245	2.2, 2.4.4, 2.22.1
Private individual	246	2.4.4, 2.17.10
Kiama Municipal Council	Kiama Municipal Council	2.5.1, 2.7.3, 2.8.2, 2.8.3, 2.8.6, 2.8.7, 2.8.8, 2.8.9, 2.8.10, 2.9.5, 2.10.4, 2.11.5, 2.12.2, 2.12.3, 2.13.2, 2.13.4, 2.13.6, 2.16.1, 2.16.3, 2.16.5, 2.16.6, 2.16.7, 2.17.1, 2.17.8, 2.20.1
Shoalhaven City Council	Shoalhaven City Council	2.7.3, 2.8.2, 2.8.3, 2.8.4, 2.8.13, 2.13.2, 2.15.3, 2.16.4, 2.16.6, 2.17.9, 2.17.14, 2.22.1
Shoalhaven Water	Shoalhaven Water	2.16.4
Heritage Council of NSW	Heritage Council of NSW	2.15.1, 2.15.3, 2.15.4
Environment Protection Agency	Environment Protection Agency	2.3.2, 2.6.2, 2.9.1, 2.9.2, 2.9.3, 2.9.5, 2.9.7, 2.9.8, 2.11.1, 2.19.1, 2.20.2
Office of Environment & Heritage	Office of Environment & Heritage	2.10.1, 2.10.3, 2.14.2, 2.14.3
Crown Lands	Crown Lands	2.16.7
Department of Primary Industries	Department of Primary Industries	2.4.2, 2.4.4, 2.10.1, 2.10.2, 2.10.3, 2.10.4, 2.10.5, 2.11.1, 2.11.2, 2.11.3, 2.11.4, 2.11.5, 2.11.7, 2.16.2, 2.16.3, 2.16.7, 2.17.5