

## Environmental aspects and impacts register

This Environmental Aspect and Impact Register has been prepared by Arup to supplement the Environmental Risk Analysis conducted as part of the Environmental Impact Statement (EIS). This register has been updated with relevant risks as included in the Project Risk Register Rev B.

The identification of significant construction activities and associated impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The risk management process involved an assessment of all specific project activities/aspects in or near environmentally sensitive areas and resulted in the development of a list of environmental risks (effects and impacts) and a corresponding risk mitigation strategy and risk ranking. Each environmental risk was categorised, based on the following:

- The environmental aspect.
- Relative scale of the potential impact.
- Type of potential impact.
- Likelihood of occurrence.

The identification of risks included a review of the proposed works, the CoA (June 2014), and review of the environmental risks identified by the EIS and the Submissions / Preferred Infrastructure Report.

An environmental risk assessment workshop was conducted to identify the environmental constraints associated with the Work Under the Contract and address the environmental risks associated with the constraints and activities undertaken.

The environmental risk assessment workshop was used to identify risk mitigation and management strategies to eliminate or reduce the risk exposure. These risk mitigation strategies are consistent with the environmental safeguards and management measures listed in the Environment Assessment documents listed in Annexure G36/A3.

Risk mitigation strategies are incorporated into the construction procedures and Environmental Work Method Statements within the CEMP.

The workshop was also used to raise general awareness of good environmental management practices among staff and subcontractors working on the Site and to develop ideas and actions to improve environmental practices.

Participants included site management staff, Environmental Site Representative, Environmental Officer, the soil conservationist, the project ecologist, representatives from relevant regulatory Authorities, the Environmental Representative and representatives from the Principal.

This Environmental Aspects and Impact Register has been revised as part of the construction contract.

**Table 1 Aspects and impacts register**

Issue	Construction activity / aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures (to be considered and where applicable further developed in associated management documents)	Risk level following mitigation	Management Documents / Training Required
Hydrology and flooding	<ul style="list-style-type: none"> <li>Waterway crossings</li> <li>Transverse drainage</li> <li>General earthworks and construction</li> <li>Ancillary Facilities</li> </ul>	<ul style="list-style-type: none"> <li>Alteration to flood behaviour due to road infrastructure structures placed on floodplain</li> </ul>	High	<ul style="list-style-type: none"> <li>Design drainage structures to cope with design flood events.</li> <li>Cane drain diversions to be designed in consultation with the relevant drainage unions and impacted landowners.</li> <li>Locate compounds / plant / storage above the 20 ARI flood level unless a contingency plan to manage flooding is prepared and implemented.</li> <li>Evacuation and access will be assessed in consultation with landowners.</li> <li>Design and build temporary crossings to be stabilised and minimise scour / erosion during flood events.</li> <li>Install scour protection as early as possible.</li> <li>Look at predicting flood events from gauges or rainfall predictions</li> </ul>	Medium	CONSTRUCTION SOIL AND WATER QUALITY MANAGEMENT PLAN EWMS Establish design for temporary waterway crossings. Induction Contingency Plan
		<ul style="list-style-type: none"> <li>Increases in flood afflux levels during flood events</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Increases in duration of flood inundation</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Increases in flood impacts and damage costs on residential properties and cane land</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Change to creek bed and bank stability due to increases in runoff volumes and flow rates</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Impacts to flood evacuation and access movements</li> </ul>	Medium		Low	
Soils, sediments and water	<ul style="list-style-type: none"> <li>Clearing and grubbing</li> <li>Earthworks</li> <li>Storage of fuels, chemicals and other dangerous goods</li> <li>Material stockpiles</li> <li>Maintenance of plant and equipment, including servicing and refuelling</li> <li>Sediment basin management</li> <li>Drainage works</li> <li>Water use / extraction</li> <li>Concrete works</li> <li>Temporary access road construction / removal from waterway areas.</li> <li>Waterway crossings</li> <li>Noxious weed treatment</li> <li>Underboring</li> </ul>	<ul style="list-style-type: none"> <li>Potential for groundwater discharge during construction, resulting in localised drawdown of groundwater resources</li> </ul>	Significant	<ul style="list-style-type: none"> <li>Appropriately designed erosion control structures (eg sedimentation basins, ERSED-straw bales, silt fences and sand bags) will be installed, maintained and cleaned regularly.</li> <li>Locate spoil stockpiles, plant and equipment away from drainage lines, watercourses or stormwater drains in accordance with established criteria.</li> <li>Install clean water diversions to ensure clean and dirty water are not mixed on site.</li> <li>Storage, compound access and parking areas stabilised, as early during works as practicable.</li> <li>Chemical storage meets WorkCover and EPA bunding/storage requirements.</li> <li>Wheel mud reduction/ cleaning measures at exit of sites where required.</li> <li>Well designed temporary waterway crossings minimising risk of fines in waterways and designed to address larger flow volumes.</li> <li>Buffer zones of vegetation will be maintained adjacent to waterways for as long as practical.</li> <li>Rehabilitation and landscaping works of disturbed areas undertaken as soon as the works are completed and/or progressively where possible.</li> <li>Appropriately designed, implemented and maintained silt control systems to mitigate risk of water pollution during</li> </ul>	Low	CONSTRUCTION SOIL AND WATER QUALITY MANAGEMENT PLAN EWMS Basin management procedure ERSED training RMS mulch and tannin protocol Unexpected discovery of contamination land procedure Induction Project specifications Frac-out contingency plan for horizontal/directional drilling
		<ul style="list-style-type: none"> <li>Changes to water chemistry altering aquatic habitats, including threatened species habitats</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Major impacts to various sensitive receiving environments through accidental release of water pollutants during construction</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Impact to water quality due to fuels and leaks and inappropriate storage of material</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Changes in water chemistry, in particular pH values, affecting aquatic ecosystems</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Exposed soils during earthworks or landscaping will erode and cause sedimentation of waterways and aquatic environments</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Potential acidic leachate from exposure of acid sulfate soils</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Potential release of tannins from stored mulch piles</li> </ul>	Significant		Low	
		<ul style="list-style-type: none"> <li>Disturbance of contaminated material causing pollution</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Contamination from underboring frac-out</li> </ul>	Significant		Medium	

Issue	Construction activity / aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures (to be considered and where applicable further developed in associated management documents)	Risk level following mitigation	Management Documents / Training Required
		<ul style="list-style-type: none"> <li>Erosion risk following temporary cessation of work between completion of embankment construction and extraction from cuttings before mainline construction commences</li> </ul>	Significant	<ul style="list-style-type: none"> <li>upgrade of the creek bridges.</li> <li>Implement concrete washout process within bunded areas.</li> <li>Provide and maintain spill kits.</li> <li>Consult / confirm with EPA and Primary Industries for temporary creek crossings construction / removal methods.</li> <li>Establish clean water catch drains/ diversion early in Project before topsoil stripping.</li> <li>Design drainage to maximise dirty water to sediment basins.</li> <li>Engage soil conservationist to advise on ERSED issues.</li> <li>Install signage at discharge points to assist workers to understand implications of dirty water release in sensitive areas.</li> <li>Implement the RMS dewatering guidelines.</li> <li>Implement the RMS Acid Sulfate Soil Management Procedure.</li> <li>Implement appropriate procedures to identify, contain, handle and management contaminated material.</li> <li>Implement the RMS mulch and tannin protocol.</li> <li>Early installation of permanent water treatment structures.</li> <li>Temporary stabilisation of exposed surfaces.</li> </ul>	Medium	
Biodiversity	<ul style="list-style-type: none"> <li>Clearing of native vegetation</li> <li>Stockpile/haul road construction near vegetation</li> <li>Works near / in creeks and temporary crossings</li> <li>General earthworks near vegetation</li> <li>Vehicular movements</li> <li>Open excavation works</li> <li>Use of chemicals</li> <li>Noise impacts</li> <li>Bushfires</li> </ul>	<ul style="list-style-type: none"> <li>Clearing and fragmentation of native vegetation, including threatened ecological communities and loss of habitat for threatened species</li> </ul>	High	<ul style="list-style-type: none"> <li>Induct personnel on biodiversity issues and mitigation measures.</li> <li>Ensure vegetation clearing boundaries are clearly marked and visible as per CONSTRUCTION FLORA AND FAUNA MANAGEMENT PLANS</li> <li>Prior to construction, identify and fence all flora and fauna habitat areas required to be protected.</li> <li>Minimise clearing of all vegetation and undertake progressive revegetation.</li> <li>Implement ongoing weed monitoring and management programs.</li> <li>Disturbed areas will be monitored for effective soil stabilisation and restoration / rehabilitation.</li> <li>Implement a staged clearing process and undertake fauna rescue during clearing as required.</li> <li>Engage arborist to provide advice on habitat tree health and provide ongoing advice.</li> <li>Design and construct all temporary and permanent waterway crossings to maintain fish passage.</li> </ul>	Medium	CONSTRUCTION FLORA AND FAUNA MANAGEMENT PLAN EWMS WMS Vegetation clearing procedure Fauna handling and rescue procedure Coastal Emu Management Plan Induction
		<ul style="list-style-type: none"> <li>Loss and fragmentation of terrestrial fauna habitat impacting on threatened species and populations, including direct impacts on threatened flora and potential impacts on threatened fauna as a result of habitat loss and fragmentation</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Loss and fragmentation of riparian and aquatic habitat</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Direct mortality of protected and threatened fauna</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Creation of barriers to fauna movement</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Edge effects from road noise, light and wind turbulence</li> </ul>	Medium		Medium	
		<ul style="list-style-type: none"> <li>Invasion and spread of terrestrial and aquatic weeds and pest fauna species</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Impacts on aquatic habitat resulting from impacts on hydrology, groundwater and water quality</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Potential spread of disease pathogens</li> </ul>	Medium		Low	

Issue	Construction activity / aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures (to be considered and where applicable further developed in associated management documents)	Risk level following mitigation	Management Documents / Training Required
		<ul style="list-style-type: none"> <li>Potential for vehicle interactions with fauna, including Coastal Emus.</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Undertake threatened species management as required under the Conditions of Approval.</li> <li>Implement washing procedures to prevent the spread of pests and disease.</li> <li>Undertake monitoring as required in the Approval.</li> <li>Obtain permits from Fire authorities during high risk fire periods</li> <li>Implement mitigation measures included in Coastal Emu management plan, including fencing where required.</li> </ul>	Low	
Visual amenity, urban design and landscaping	<ul style="list-style-type: none"> <li>General earthworks and construction</li> <li>Stockpiling</li> <li>Open excavation works</li> <li>Clearing of vegetation</li> <li>Construction site compounds</li> <li>Rehabilitation of disturbed land</li> <li>Cuttings</li> <li>Evening / night works</li> </ul>	<ul style="list-style-type: none"> <li>Temporary visual impacts as a result of construction activities and ancillary facilities</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Landscape and rehabilitation plan including extensive seeding planting in required areas will be developed and implemented.</li> <li>Embankments and cuttings will be stabilised by the use of appropriate landscape treatments.</li> <li>The use of night-lighting will be minimised where possible during the construction phase and directed away from residential areas.</li> <li>Site compounds and areas surrounding them will be kept tidy and be regularly cleaned and maintained.</li> <li>Undertake landscaping and revegetation works in accordance with the approved Urban Design and Landscape Plan.</li> <li>Monitoring and weed control</li> </ul>	Low	Urban Design Landscape Plan EWMS CONSTRUCTION FLORA AND FAUNA MANAGEMENT PLAN Induction
		<ul style="list-style-type: none"> <li>Poor management of revegetation by contractor</li> </ul>	Medium		Low	
Aboriginal heritage	<ul style="list-style-type: none"> <li>Early works including non-substantial construction activities e.g. services relocations.</li> <li>Planned salvage of Aboriginal heritage items</li> <li>Clearing of vegetation</li> <li>Initial removal of topsoil</li> <li>Construction of site compounds and stockpile areas</li> <li>Temporary access roads</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance and / or destruction of Aboriginal sites, artefacts and cultural places</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Prior to construction, identify and assess Aboriginal heritage items on proposed sites and predict potential impacts.</li> <li>Induct personnel on heritage issues and mitigation measures.</li> <li>Protect identified heritage items with protective fencing, exclusion zones or flagging and signage from being disturbed during construction.</li> <li>Undertake salvage works in accordance with the CONSTRUCTION HERITAGE MANAGEMENT PLAN prior to impacting site.</li> <li>If design changes or construction activities impact on areas outside of those identified in the EIS, OEH and relevant Aboriginal groups will be consulted and approval obtained pre any required salvage.</li> <li>Implement unexpected find procedures as required.</li> </ul>	Low	CONSTRUCTION HERITAGE MANAGEMENT PLAN EWMS CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN Unexpected archaeological find procedure Education and training package Induction
		<ul style="list-style-type: none"> <li>Impacts on unknown Aboriginal sites or artefacts</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Change in visual integrity of cultural area</li> </ul>	High		Medium	
		<ul style="list-style-type: none"> <li>Finding / disturbing burials or human remains</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Impact (machinery vibration, stockpiles, blasting) during the construction period to identified sites</li> </ul>	Low			
Non-Aboriginal historic heritage	<ul style="list-style-type: none"> <li>Early works</li> <li>Clearing of vegetation</li> <li>Initial removal of topsoil</li> <li>Construction of site compounds and stockpile areas</li> <li>Temporary access roads</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance and/or destruction of items of heritage significance, including items listed on heritage registers</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Prior to construction, identify and assess non- Aboriginal heritage items on proposed sites and predict potential impacts.</li> <li>Induct personnel on heritage issues and safeguards.</li> <li>Protect identified heritage items with protective fencing, exclusion zones or flagging from being disturbed during construction.</li> <li>Undertake archival recording as specified in the CONSTRUCTION HERITAGE MANAGEMENT PLAN.</li> </ul>	Low	CONSTRUCTION HERITAGE MANAGEMENT PLAN EWMS CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN Unexpected archaeological find procedure Education and training package
		<ul style="list-style-type: none"> <li>Change in the visual character of historic heritage items, precincts or places</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Vibration damage during the construction period to identified sites</li> </ul>	Medium		Low	
		<ul style="list-style-type: none"> <li>Impact on undiscovered or undocumented heritage sites.</li> </ul>	Medium		Low	

Issue	Construction activity / aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures (to be considered and where applicable further developed in associated management documents)	Risk level following mitigation	Management Documents / Training Required
				<ul style="list-style-type: none"> <li>Regular inspection of heritage protection fencing.</li> <li>Implement unexpected find procedures as required.</li> <li>Landholder consultation.</li> </ul>		Induction
Traffic and transport	<ul style="list-style-type: none"> <li>Temporary access roads</li> <li>General earthworks and construction</li> <li>Import of material / plant / equipment.</li> <li>Construction site compounds</li> <li>Construction vehicle movements and deliveries</li> <li>Travel to /from site</li> </ul>	<ul style="list-style-type: none"> <li>Temporary disruptions / delays to local and highway traffic</li> </ul>	High	<ul style="list-style-type: none"> <li>Develop and update Traffic Management Plans</li> <li>Identify and assess roads likely to be affected by Project construction and develop methods to minimise traffic increases.</li> <li>Undertake before and after dilapidation surveys on local roads</li> <li>Traffic controllers and / or signage for both egress and ingress off the work sites.</li> <li>All vehicles carrying materials to be adequately covered to prevent any loss of material, which may cause driver safety issues.</li> <li>Implement mitigation measures in Coastal Emu management plan, including fencing, speed limits, signs, and training.</li> </ul>	Medium	CONSTRUCTION TRAFFIC AND ACCESS MANAGEMENT PLAN
		<ul style="list-style-type: none"> <li>Temporary restrictions to private access roads</li> </ul>	Medium		Low	CONSTRUCTION AIR QUALITY MANAGEMENT PLAN
		<ul style="list-style-type: none"> <li>Changed traffic patterns</li> </ul>	High		Medium	CONSTRUCTION WASTE AND ENERGY MANAGEMENT PLAN
		<ul style="list-style-type: none"> <li>Noise vibration and dust nuisance to residents on haul routes</li> </ul>	Significant		Low	EWMS
		<ul style="list-style-type: none"> <li>Potential for vehicle interactions with fauna, including Coastal Emus</li> </ul>	Medium		Low	Coastal Emu Management Plan
Noise and vibration	<ul style="list-style-type: none"> <li>Site establishment</li> <li>Clearing and grubbing</li> <li>Demolition</li> <li>Earthworks and drainage</li> <li>Blasting crushing and screening</li> <li>Rock hammering and drilling</li> <li>Quarrying</li> <li>Road furnishing</li> </ul>	<ul style="list-style-type: none"> <li>Temporary noise impacts on sensitive receivers during construction</li> </ul>	High	<ul style="list-style-type: none"> <li>Liaise (agreements where applicable) with local communities and affected residents.</li> <li>Adherence to working hours in CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN unless otherwise approved.</li> <li>Implement operational noise mitigation measures as early as possible.</li> <li>Respite periods for particularly noisy / short duration activities (in accordance with regulatory guidelines and/or CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN).</li> <li>Construction equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and "smart" reversing alarms.</li> <li>Reduced use of horns to signal trucks loaded where residences close by.</li> <li>Regular noise monitoring to monitor predicted verses actual noise levels.</li> <li>Implementing management measures where regenerated noise is found to be excessive and agreements are not in place.</li> <li>Managing construction vehicle routes and speed of vehicles.</li> <li>Establish and maintain complaints management system.</li> <li>Building condition reports on potentially impacted buildings as required by Project approval.</li> <li>Undertake trial blasting to establish site law for follow up blasting.</li> </ul>	Medium	CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN
		<ul style="list-style-type: none"> <li>Temporary vibration impacts on sensitive receivers during construction</li> </ul>	Medium		Low	EWMS
						<ul style="list-style-type: none"> <li>Blasting procedure</li> <li>Complaints procedure</li> <li>Induction</li> </ul>
Greenhouse gas emissions	<ul style="list-style-type: none"> <li>Vehicular movements</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse gases emitted from construction plant, equipment and vehicles</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Vegetation clearance minimised where feasible.</li> </ul>	Low	CONSTRUCTION WASTE AND ENERGY MANAGEMENT PLAN

Issue	Construction activity / aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures (to be considered and where applicable further developed in associated management documents)	Risk level following mitigation	Management Documents / Training Required
	<ul style="list-style-type: none"> <li>Vehicle emissions</li> <li>Equipment / plant use</li> <li>Vegetation clearing</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse gases embodied in materials consumed in construction or impacted by the project, such as vegetation removal and soil disturbance</li> </ul>	Medium	<ul style="list-style-type: none"> <li>Reuse of materials maximised where possible.</li> <li>Maximise use of resources with recycled components / contents.</li> <li>Consider feasibility of use of biofuels.</li> </ul>	Low	EWMS Induction
Air quality	<ul style="list-style-type: none"> <li>Site establishment</li> <li>General earthworks</li> <li>Vegetation clearing</li> <li>Bulk earthworks</li> <li>Drilling and blasting</li> <li>Spoil handling – including liming of Acid Sulphate Soils.</li> <li>Stockpiling</li> <li>Vehicular movements</li> <li>Material haulage</li> <li>Quarrying</li> <li>Vehicle emissions</li> <li>Handling of chemicals, waste and hazardous goods</li> </ul>	<ul style="list-style-type: none"> <li>Potential for decreases in air quality during construction associated with dust generating activities and emissions from heavy construction machinery</li> <li>Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities</li> <li>Potential adverse health effects</li> <li>Impacts on water quality and vegetation health from dust deposition</li> <li>Complaints from neighbours</li> </ul>	Medium Low Low Low Medium	<ul style="list-style-type: none"> <li>Induct personnel on air quality issues and safeguards.</li> <li>Suppress dust on unsealed surfaces, stockpiles and other exposed surfaces.</li> <li>Modify or cease operations during high winds.</li> <li>All trucks on public roads to cover loads.</li> <li>Vehicles, equipment, machinery used and all facilities – designed, operated and maintained to control the emission of smoke, dust, odours and fumes.</li> <li>Vegetation clearing to be staged to minimise time and area that surfaces are exposed.</li> <li>All disturbed areas stabilised, revegetated and/or landscaped as soon as practicable.</li> <li>Install wheel wash facilities</li> <li>No burning or incineration of any material at any time.</li> <li>Regularly inspect erosion control measures.</li> <li>Dust monitoring.</li> </ul>	Low Low Low Low Low	CONSTRUCTION AIR QUALITY MANAGEMENT PLAN EWMS CONSTRUCTION SOIL AND WATER QUALITY MANAGEMENT PLAN ESCP Complaints procedure Induction
Resource management and waste	<ul style="list-style-type: none"> <li>General earthworks</li> <li>Vegetation clearing</li> <li>Open excavation works</li> <li>Spoil handling</li> <li>Stockpiling</li> <li>Quarrying</li> <li>Material haulage</li> <li>Handling of chemicals, waste and hazardous goods</li> </ul>	<ul style="list-style-type: none"> <li>Disposal of unsuitable or surplus earthworks material</li> <li>Disposal of green waste (not including millable timber)</li> <li>Disposal of materials resulting from replacement of existing pavements</li> <li>Depletion or sterilisation of non-renewable resources, including sand and aggregate materials</li> <li>Direct impacts to existing quarries</li> <li>Difficult disposal of waste materials including hazardous waste</li> </ul>	Medium Medium Medium Medium Medium Medium	<ul style="list-style-type: none"> <li>Refine cut-and-fill balance and maximise reuse of material on site.</li> <li>Develop and implement a resource management strategy.</li> <li>Maintain a waste register.</li> <li>Manage waste in accordance with the Waste Classification Guidelines and PoEO Act.</li> <li>Use recycled products where possible</li> <li>Undertake additional waste classification where required</li> <li>Locate appropriate waste removal contractor and / or appropriately licenced waste facilities in the area</li> </ul>	Low Low Low Low Low Low	CONSTRUCTION WASTE AND ENERGY MANAGEMENT PLAN EWMS Induction

**Environmental Risk Assessment Workshop  
Pacific Highway upgrade – Woolgoolga to Ballina  
Early Works Wave 1&3(Part)**



**VENUE:** Summerland Room, Level 1, 76 Victoria St, Grafton

**DATE:** 27 July 2015

**Attendees:**

- EPA/Agencies Representatives
- RMS Representatives
- Golding Representatives
- Geolink Representatives including Ecologist
- Soil Conservationist

Dean Gregory	RMS	Rob Blyth	Golding
Sonia Brown	RMS	Douglas Caldwell	Golding
Peter Felsch	RMS	Bianca Hollis	Golding
Janelle Bancroft	RMS	Wayne Marshall	Golding
Matt Stephens	RMS	Duncan Thompson	GeoLink
Craig Dunk	EPA	David Andrighetto	GeoLink
Peter Higgs	EPA	Peter Menzies	Soil Con
Stuart Murphy	EPA	Jeff Boylan	Pacific Complete
Daniel Saunders	ER (SMEC)		
James Sakker	Fisheries		

## **Introduction**

An environmental risk assessment workshop was conducted to identify the environmental constraints associated with the Work Under the Contract and address the environmental risks associated with the constraints and activities undertaken.

The environmental risk assessment workshop was used to identify risk mitigation and management strategies to eliminate or reduce the risk exposure. These risk mitigation strategies are consistent with the environmental safeguards and management measures listed in the Environment Assessment documents listed in Annexure G36/A3.

Risk mitigation strategies are incorporated into the construction procedures and Environmental Work Method Statements within the CEMP.

The workshop was also used to raise general awareness of good environmental management practices among staff and subcontractors working on the Site and to develop ideas and actions to improve environmental practices.

Participants included site management staff, Environmental Site Representative, Environmental Officer, the soil conservationist, the project ecologist, representatives from relevant regulatory Authorities, the Environmental Representative and representatives from the Principal.

This Environmental Aspects and Impact Register (Appendix A2 of the CEMP) has been is to be revisited and revised as part of the construction contract.



## Environmental Risk Matrix

Level	Likelihood	Description
A	Almost certain	Is expected to occur during the project, 90% or > probability
B	Likely	Will probably occur during the project, ~50% probability
C	Moderate	Might occur at some time during the project, ~10% probability
D	Unlikely	Could occur at some time during the project, ~1% probability
E	Rare	Only occur in exceptional circumstances, < 1% probability

  

Level	Consequence	Description
1	Insignificant	Negligible Discharge
2	Minor	Uncontrolled Discharges in Minor Quantities
3	Moderate	Moderate Breach of Environmental Statutes
4	Major	Major Breach of Environmental Statutes
5	Severe	Shutdown of Project Due to Environmental Breach

Likelihood	Consequences				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Severe
A (Almost Certain)	Medium	Significant	High	High	Extreme
B (Likely)	Medium	Medium	Significant	High	Extreme
C (Moderate)	Low	Medium	Significant	High	High
D (Unlikely)	Low	Low	Medium	Significant	High
E (Rare)	Low	Low	Low	Medium	Significant

Activity	Potential Hazard	Risk Score	Safeguards / Controls
weed management	spread of weeds	significant	weed survey weed control separation of propagules management of topsoil pathogen management
fauna relocation	injury	significant	ecologist survey fauna handler staged clearing unsound tree survey (early identification)
Clearing / grubbing /topsoil	clearing outside boundaries unexpected discovery ERSED weed spread	significant	survey boundary (hold point) ecologist onsite Staged clearing unexpected discovery procedures soil conservationist stockpile management EWMS root ball fish habitat
mulching	tannin leachate - water pollution combustion weed propagules	medium	mulch management protocol leachate management stockpile size and location Resource Recovery Order - Waste Regulation - Raw mulch Order - Pasteurise garden organics Order
Demolition	hazardous waste	significant	material survey licenced contractor material tracking approved disposal reuse of materials fauna
ancillary facilities	flood level	medium	flood management plan elevated hard stand constructed on stumps bunded storage
quarrying (cutting)	ERSED Dust steep embankments noise vibration	medium	ERSED Plans (per Blue Book & soil conservationist) dust / noise monitoring earthworks management plan
earthworks	ERSED Dust noise vibration fauna impacts	medium	ERSED Plans soil conservationist dust / noise monitoring earthworks management plan
site vehicle management	dust noise vibration fauna interaction	medium	dust management noise /dust/ vibration monitoring fauna monitoring / exclusion fencing
waste management	contamination loss of resource	medium	segregation of waste asbestos management

Activity	Potential Hazard	Risk Score	Safeguards / Controls
			washout management construction material salvage recycling
excavation (acid)	exposure of acid sulfate material	medium	acid sulfate management procedures
ASM treatment pad & stockpiles	acid runoff	medium	acid sulfate management procedures dedicated storage and treatment pad flood immunity
underboring waterways	dewatering runoff waterway embankment stability disturbance of ASM frac out	medium	waste water management ERSED controls ASM management plans frac out response procedures
utility adjustment	dewatering runoff disturbance of ASM open trenches within boundary of EPL	medium	waste water management ERSED controls ASM management plans fauna barricading
wick drains	acid leachate	low	leachate management
drill /blast	dust noise vibration	medium	blast management plan monitoring
waterway crossings	ERSED impact to waterways	medium	Blue Book controls diversions during construction timing
revegetation	weeds ERSED	medium	early and progressive revegetation stabilisation (Blue Book)
Detention basin	water quality impacts	significant	constructed to Soil Conservationist design (blue book) detention basin management procedures
ESC	water quality impacts	significant	ESC Plans to Soil Conservationist design Soil conservationist review detention basin management procedures