



# Appendix 2

## Updated Table of Mitigation Measures

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**Table A2.1**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Noise and Vibration</b>	
Construction noise	<p data-bbox="531 414 1401 443">Limit construction activities outside of INP standard hours of operation to:</p> <ul data-bbox="531 454 1444 611" style="list-style-type: none"> <li data-bbox="531 454 1444 544">• a maximum of three teams, consisting of a generator, lighting set, welder, forklift / telehandler, crane, and power tools, or equivalent, at any one time; and</li> <li data-bbox="531 555 1366 611">• activities within the Processing Plant and Administration Area, Rail Container Laydown and Storage Area, and Chlor-alkali Plant only.</li> </ul> <p data-bbox="531 622 1422 712">Ensure the equipment operated would have sound power levels equivalent to those nominated in the noise and vibration impact assessment (MAC, 2022).</p> <p data-bbox="531 723 1417 835">If construction activities are to be undertaken coincident with operations (following the 18 month to 2 year construction phase), no additional equipment would be used to that presented in the EIS (2013) noise source figures and existing equipment would be re-deployed.</p> <p data-bbox="531 846 1425 969">Provide details to occupants of residences adjoining construction activities, with details ahead of time regarding the type of activities, their duration and specific measures to minimise noise during the period. Provide occupants with contact details for personnel managing the construction activities.</p> <p data-bbox="531 981 1401 1037">Silence all mechanical plant and equipment with appropriate mufflers and enclosures.</p> <p data-bbox="531 1048 1313 1081">Ensure, where possible, equipment is not left idling unnecessarily.</p> <p data-bbox="531 1093 1348 1149">Ensure all contractors and personnel understand and minimise noise sensitivities by:</p> <ul data-bbox="531 1160 1437 1877" style="list-style-type: none"> <li data-bbox="531 1160 954 1193">• Minimising the use of air brakes;</li> <li data-bbox="531 1193 1329 1249">• No queuing of vehicles adjacent to any residential receptor, or if unavoidable switch engines off;</li> <li data-bbox="531 1261 1406 1350">• Parking of vehicles where appropriate to shield locations prior to being used for maintenance work undertaken outside standard hours of operation;</li> <li data-bbox="531 1361 1409 1395">• No warming of vehicles permitted before the nominated working hours;</li> <li data-bbox="531 1395 1257 1429">• Accessing sites via entry points most remote to receptors;</li> <li data-bbox="531 1440 930 1473">• Conservative driving methods;</li> <li data-bbox="531 1473 1102 1507">• Minimising the use of radios and loud voices;</li> <li data-bbox="531 1507 1425 1574">• Locating machinery to orientate direct noise away from closest sensitive receptors;</li> <li data-bbox="531 1585 1377 1641">• Placement of mobile barriers/screens or extraction faces adjacent to static rock breaking sources to shield neighbouring receptors;</li> <li data-bbox="531 1653 1321 1709">• Undertake regular maintenance of machinery to minimise noise emissions;</li> <li data-bbox="531 1720 1377 1776">• Use of quietest suitable machinery reasonably available for selected work activities;</li> <li data-bbox="531 1787 1361 1843">• Ensure the coincidence of noise/plant machinery to minimise noise emissions; and</li> <li data-bbox="531 1854 1437 1877">• Being aware of the expectation of landowners and surrounding residents.</li> </ul> <p data-bbox="531 1888 1337 1944">Respond to legitimate complaints from surrounding landowners and occupiers in a timely manner.</p>
<p data-bbox="201 1955 1257 1977">Black Text = Original EIS (RWC 2013a) including revisions under the Response to Submissions (RWC, 2013b).</p> <p data-bbox="201 1989 659 2011">Blue Text = MOD 1 (the proposed modification).</p>	



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Noise and Vibration (Cont'd)</b>	
Construction noise (Cont'd)	Position the areas for loading and unloading materials and equipment as far away as possible from surrounding residences during site establishment and construction phase.
	Install broadband (frequency modulated) reversing alarms instead of tonal reversing alarms on all earthmoving equipment.
	Installation of an air conditioning system at residential receivers would be effective in facilitating further noise reductions for the interior of the residence (as this would allow for windows to be kept closed).
	Establish noise monitoring procedures for identifying and managing elevated noise levels.
Operational noise	Restricting all but processing, transport and low noise maintenance activities to daytime only.
	Install broadband (frequency modulated) reversing alarms on all mobile equipment.
	Ensure the mining fleet operated would have sound power levels equivalent to those nominated in the noise and vibration impact assessment (MAC, 2022).
	Construct semi-enclosed barriers and screens to ensure attenuation of noise generated by the crushing plant and ore handling circuit.
	Place the rock breaker within the open cut as opposed to the ROM pad.
	Complete a detailed review of potential enclosures, noise barriers and other attenuating measures prior to construction, taking into consideration the frequency and amplitude generated by the processing plant, to ensure (and demonstrate) sufficient acoustic attenuation is provided.
	Prepare a Noise Management Plan.
Maximum noise level (sleep disturbance)	Restrict train loading and unloading to after 6:00am and before 10:00pm unless the allocated rail path requires an overnight turn-around of the train.
	Implement and enforce a noise management plan which requires operators to avoid high impact events, e.g. between container and wagon. Operators unable to adhere to noise management requirements would be excluded from operating that equipment.
	Construction of a 300m long barrier along the western boundary of the Project Rail Siding.
	Install duratray (or equivalent) lining on rail wagons.
Blasting and vibration	Design and implementation of each blast by a suitable qualified blasting engineer or experienced shot-firer.
	Design each blast to ensure the assessment criteria are complied with at all residential receptors in the vicinity of the Project Site.
	Identify the blast envelope during design of each blast.
	Modify blast designs, mitigation measures and operating procedures, if required, on the basis of monitoring results.
	Initiate blasts between the hours of 9:00am and 5:00pm Monday to Saturday only. No blasts would be initiated outside these hours, except for safety or emergency reasons.
	Establish and maintain an environmental complaints line and register of complaints in accordance with the requirements of the Environment Protection Licence, once issued.
	Respond promptly to any issue of concern or complaint raised by the community or a government agency.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Noise and Vibration (Cont'd)</b>	
Noise management plan mitigations	Provide training and awareness to contractors and employees regarding the statutory, construction and operational requirements for the Project.
	Identify noise affected properties consistent with the environmental assessment and any subsequent assessments.
	Outline mitigation measures required to achieve the noise limits established.
	Outline measures to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms).
	Outline the procedure to notify property owners and occupiers that could be affected by noise from the mine.
	Establish a protocol to handle noise complaints that includes recording, reporting and acting on complaints.
	Describe proactive and predictive modelling and real-time reactive management protocols for managing noise during adverse meteorological conditions.
Blasting and vibration management plan mitigations	Provide training and awareness to contractors and employees regarding statutory, construction and operational requirements for the Project.
	Identify potential blast and vibration affected properties consistent with the environmental assessment and any subsequent assessments.
	Outline mitigation measures to use to achieve the blast limits established.
	Outline the procedure to notify property owners and occupiers that could be affected by blasting and vibration from the mine.
	Establish a protocol to handle blast and vibration complaints that includes recording, reporting and acting on complaints.
	Specify procedures for undertaking independent blast investigations.
	Describe proactive and predictive modelling and real-time reactive management protocols for managing blasting during adverse meteorological conditions.
Road and vehicle noise	<p>In addition to standard road pavement treatments to provide for a 20 year life for the entire Obley Road, AZL would apply an asphaltic concrete seal ('hot seal') to:</p> <ul style="list-style-type: none"> <li>• A 2.4km section of Obley Road between the Newell Highway and approximately 200m south of the Zoofari Lodge entrance; and</li> <li>• 950m section of Obley Road from the Toongi Road intersection.</li> </ul>
	ASM (Holdings) would ensure, through contractual arrangements with transport operators, that the trucks used achieve sound power levels specified in Australian Design Rule (ADR) 28/01 External Noise of Motor Vehicles.
	Reference to RTA (2001) indicates that a reduction in the speed of travel from 100km/hr to 80km/hr would further reduce truck passby noise by 4dB. ASM (Holdings) will continue to liaise with Dubbo City Council, TCSA and other relevant stakeholders regarding the possible reduction in the speed limit along this stretch of road.
	Construction of a 3m high, 1km long road noise barrier on land owned by Taronga Western Plains Zoo, or implementation of alternative noise mitigation measures, to achieve road noise reduction equivalent to 5dBA to 10dBA.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Air Quality</b>	
Dust management - site establishment	Adopting a Level 2 watering to achieve 75% control of dust from haul roads.
	Apply gravel to disturbed areas where possible.
	Establish rehabilitation / cover crops where possible over exposed areas.
	Modify working practices by limiting excavation during periods of high winds.
	Limit the extent of clearing of vegetation and topsoil to the designated footprint required for construction and appropriate staging of any clearing.
	Confine all vehicles on site to designated routes with speed limits enforced.
	Control and reduce trips and trip distances where possible, for example by coordinating delivery and removal of materials to avoid unnecessary trips.
Dust management - operations	Adopting a Level 2 watering to achieve 75% control of dust from haul roads.
	Implement water injection during drilling of ore and overburden.
	Prevention of wind erosion on stockpiled material.
	Ensure the top surface of the Solid Residue Storage Facility maintains a high moisture content to avoid generation of wind blown dust.
	Employ water sprays on materials during screening operations.
	Employ spray curtains at all crushers and miscellaneous transfer points not already located within enclosures.
Processing plant	Operation of a bag house to capture particulate matter from the grinding mill.
	Regulate emissions from stacks and vents by operating within the prescribed in-stack concentration limits. This would be initially determined through the detailed design phase and verified by in-stack monitoring.
	Undertake periodic extractive monitoring to demonstrate compliance with in-stack limits (every 3 months for the first year of operation and then annually thereafter if compliance is easily achieved).
	Implement a regular and documented maintenance and inspection program for all plant items where emissions to air are deemed likely.
	Incorporate emission reduction design to reduce operating SO <sub>2</sub> concentration of the Sulphuric Acid Plant stack to comply with criteria at sensitive receivers.
	Complete modelling of gaseous emissions from the final plant design and provide results, along with discussion on application of all reasonable and feasible emissions reduction technology, to the Environment Protection Authority.
Greenhouse gas	Maximise energy efficiency as a key consideration in the development of the mine plan. This includes electricity and process steam co-generation from the waste heat of the sulphuric acid plant.
	Implement an energy use and efficiency program.
	Undertake regular maintenance on diesel and electrically powered plant to ensure they operate efficiently.
	Develop targets for greenhouse gas emissions and energy use, monitor and report against these targets.
	Dedicate a number of trucks for the excavator to minimise truck idling times.
	Ensure that haul trucks are fully loaded to maximise productivity and efficiency.
	Assess and review lighting plant efficiency periodically.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Radiation</b>	
Greenhouse gas (Cont'd)	<p>Establishment of radiation design criteria, including:</p> <ul style="list-style-type: none"> <li>• Design of the residue storage facilities as zero-discharge facilities with a geo-membrane lining and leak detection system;</li> <li>• Ensuring all heavy mining equipment is air conditioned to minimise impacts of dust to workers;</li> <li>• Minimise dust using standard dust suppression techniques (wetting of materials before handling, wetting of roadways, provision of dust collection and extraction systems);</li> <li>• Construction of a separate wash-down pad for vehicles that have come from any operating areas;</li> <li>• Bunding to collect and contain spillages from tanks containing process slurries;</li> <li>• Burial of, or bunding of the residue pipeline within defined corridors to control spillage from residue pipeline failures;</li> <li>• Providing sufficient access and egress for mobile equipment to allow clean-up where there is the possibility for large spillages;</li> <li>• Leach and precipitation of radionuclides from ore to production of final compounds for despatch and disposal as solid or liquid residue;</li> <li>• Installation of venturi scrubber and wet electrostatic precipitator (ESP) as part of the FeNb processing circuit to capture and remove volatilised Polonium 210 and Lead 210 prior to ventilation from the circuit; and</li> <li>• Slurrying and mixture of residues from the FeNb processing circuit scrubber and ESP with the solid residues to be disposed of in the Solid Residue Storage Facility.</li> </ul> <p>Classification of work areas and workers</p> <ul style="list-style-type: none"> <li>• The Applicant has defined the whole of the Project Site within the fence-line as a “supervised area” (as defined in ARPANSA, 2005). Within this broader area, the open cut would be defined as a “controlled area” as would the milling and crushing areas, and the light rare earths processing area.</li> <li>• The Applicant has defined the FeNb processing circuit as a controlled area based on the capture and removal volatilised Polonium 210 and Lead 210 prior to ventilation from the circuit.</li> <li>• Employees working in the controlled areas would be defined as designated radiation workers. Other workers would be defined as “non-designated” radiation workers.</li> </ul> <p>Site access control</p> <ul style="list-style-type: none"> <li>• All visitors entering and departing the Project Site would be required to report to the gatehouse or other nominated locations for registration including time of arrival and departure, and an induction, if required.</li> <li>• Vehicle access would be through a controlled access point and exit from site would require all vehicles having trafficked the controlled area to pass through the wheel wash. Water from the wheel wash and wash-down areas would be collected and settled to remove solids, then treated for re-use at the on-site water treatment plant.</li> </ul>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Radiation (Cont'd)</b>	
Greenhouse gas (Cont'd)	<p>Change room facilities</p> <ul style="list-style-type: none"> <li>• Workers in the “controlled area” (“designated workers”) would be required to change into work clothes at the commencement of their shift and then shower and change into “street clothes” at the end of their shift. This would be a general health and hygiene requirement (not just a radiation requirement) that would be implemented once the Project commences and would continue throughout the life of the Project.</li> <li>• Dirty clothes would be laundered on-site, with waste water sent to an on-site water treatment plant.</li> </ul> <p>Establishment of state-wide administrative controls including:</p> <ul style="list-style-type: none"> <li>• pre-employment and routine medical checks for workers;</li> <li>• inductions and regular training of all employees and contractors;</li> <li>• development of safe work procedures, which includes radiation safety aspects;</li> <li>• procedures to segregate, isolate and clean up contamination or contaminated equipment;</li> <li>• procedures for equipment or materials leaving the controlled area;</li> <li>• mandatory use of personal hygiene facilities (wash facilities) at entrances to lunch rooms and offices;</li> <li>• employment of suitably qualified and experienced radiation safety professionals to assist during the final design, construction and the operational phases of the Project; and</li> <li>• use of a computer-based data management system to store and manage all information relating to radiation management and monitoring.</li> </ul> <p>Systems for managing potentially radioactive wastes.</p> <ul style="list-style-type: none"> <li>• Material such as contaminated equipment and wastes from operational areas, including discarded conveyor belts, rubber lining material, pipes, filter media and used protective equipment would be cleaned on-site and disposed in accordance with approved regulatory controls.</li> <li>• Spill management procedures (in the event a Liquid Residue Storage Facility pipeline did leak/rupture).</li> </ul> <p>Install a system to capture and remove volatilised Polonium 210 and Lead 210 prior to ventilation from the FeNb processing circuit.</p> <p>Remove and residues from the scrubbing circuit and combine with other solid residues for disposal in the Solid Residue Storage Facility.</p>
<b>Surface Water</b>	
	<p>Surface water would be managed on site according to quality, namely:</p> <ul style="list-style-type: none"> <li>• clean water, namely runoff (typically upslope) that is not affected by any disturbed areas or Project-related activity(ies);</li> <li>• dirty or sediment-laden water, namely runoff containing only sediment and originating from disturbed or bare areas within the Project Site; or</li> <li>• contaminated water, namely water with the potential to contain chemicals or salt.</li> </ul>





**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Surface Water (Cont'd)</b>	
Sediment loss	<p>Sediment loss would be controlled by a series of best management practices including:</p> <ul style="list-style-type: none"> <li>• diverting surface water runoff away from active works areas;</li> <li>• minimising areas of disturbed ground by:                             <ul style="list-style-type: none"> <li>– only disturbing land when works are required;</li> <li>– delineating no-go areas; i.e. controlling access to only those area that would be worked; and</li> <li>– effectively and promptly stabilising ground that has reached its final design form of land that would not be re-worked within 20 days;</li> </ul> </li> <li>• implementing ancillary or secondary measures such as:                             <ul style="list-style-type: none"> <li>– reducing slope lengths on disturbed surfaces to control soil loss;</li> <li>– using sediment fence or similar sediment traps where necessary; and</li> <li>– using a series of “wet-type” sediment basins and actively managing them to the requirements of Landcom (2004) and DECC (2008d) (See RWC, 2013).</li> </ul> </li> <li>• Inspect all surface water control structures at least quarterly and following any rainfall event of more than 10mm in 24-hours to ensure their adequacy and identify where remedial action is required.</li> <li>• Ensure that all potentially salt or chemically laden water is retained within the Project Site and is used for processing operations or is pumped to the Liquid Residue Storage Facility.</li> <li>• Ensure that all potentially sediment-laden water is directed to appropriately designed sediment basins and is either used for processing operations or dust suppression or, following testing to verify the quality of the water is acceptable, is discharged to natural drainage.</li> <li>• Ensure that all surface water flows from undisturbed sections of the Project Site are diverted around disturbed sections and permitted to flow to natural drainage.</li> <li>• Ensure that all roads within the Project Site are constructed in accordance with DECC (2008b).</li> <li>• Ensure that the capacity of existing and proposed water storages to be constructed under the Applicant’s harvestable rights does not exceed 182ML.</li> <li>• Ensure that all areas where reagents or processing-related chemicals or by-products are sealed, banded and, where appropriate, covered, with a suitable sump for the collection and removal of incident rainfall.</li> </ul> <p>• Ensure that all areas of proposed disturbance, with the exception of the proposed open cut, are progressively rehabilitated and that surface water control structures are removed once the rehabilitated areas have achieved a 70% cover.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Surface Water (Cont'd)</b>	
Surface water management structures	<p>Surface water management structures that would be constructed within the Project Site would include the following.</p> <ul style="list-style-type: none"> <li>• Clean water diversions to divert surface water runoff from undisturbed sections of the Project Site around areas of proposed disturbance.</li> <li>• Dirty water diversions to divert sediment-laden water to sediment basins for settling prior to discharge to natural drainage or use for processing operations.</li> <li>• Diversion of dirty water runoff from mineralised ore (ROM Pad) and waste rock emplacement and collection within storage basins. As these basins fill, the water would be pumped to the Liquid Reside Storage Facility to ensure no discharge from the Project Site.</li> <li>• Sealed and bunded areas for the retention of potentially contaminated runoff within the Processing Plant and Project Site Administration Area. Runoff from areas not exposed to potentially contaminating reagents would be diverted to sediment basins for settling prior to discharge to natural drainage or use for processing operations.</li> <li>• Twelve principal sediment and storage basins for the collection of sediment-laden or potentially contaminated water for transfer to the Water Re-use Dam, Process Water Pond or, following settling of suspended sediment, discharge to natural drainage via a stabilised spillway. A range of smaller sediment basins/stormwater retention structures would be constructed as required adjacent to the haul road and down-slope of the Liquid Reside Storage Facility, Solid Residue Storage Facility and Salt Encapsulation Cells as constructed.</li> <li>• A Water Re-use Dam for collection and storage of sediment-laden water for use for dust suppression, processing operations or discharge to natural drainage.</li> <li>• A Process Water Pond for the storage of water from the water pipeline and other water sourced from onsite for use within the processing plant.</li> </ul>
Site administration area	<p>Sediment-laden water only, would be drained to sediment basin 1.</p> <p>Excess stormwater ultimately directed to Wambangalang Creek via engineered outlets.</p>
Rail container laydown and storage area	<p>Area concrete sealed and bunded with temporary storage areas for loaded and unloaded containers individually bunded to contain potential spills.</p> <p>Sediment-laden stormwater runoff would drain to sediment basin 3.</p> <p>Excess stormwater ultimately directed to Wambangalang Creek via engineered outlets.</p>
Processing plant area	<p>Mixture of sealed and bunded areas and unsealed areas.</p> <p>Bunded areas to contain a sump.</p> <p>Sediment-laden stormwater runoff would drain to sediment basin 2.</p> <p>Excess stormwater ultimately directed to Wambangalang Creek via engineered outlets.</p>
ROM pad	<p>Runoff from this area drained to a dedicated storage basin (SB12). Sediment from this basin periodically removed and placed in Solid Residue Storage Facility.</p> <p>Diesel pumps installed to pump water to Liquid Reside Storage Facility.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

<b>Environmental Aspect</b>	<b>Management and Mitigation Measure</b>
<b>Surface Water (Cont'd)</b>	
Haul road	Drain to a series of sediment basins
Open cut	Initially free-draining and could potentially produce sediment-laden water.
	Dirty water diversion drains and temporary sediment basins constructed around perimeter or within footprint of open cut. Water pumped to the re-use dam, process water pond, used for dust suppression, or discharged to natural drainage following settling of suspended sediment.
Waste rock emplacement	Runoff into storage basins SB4 and SB5 with sediment removed periodically and placed in Solid Residue Storage Facility. Pumps installed to pump trapped water to Liquid Residue Storage Facility.
Solid residue storage facility	During construction of Solid Residue Storage Facility, runoff diverted to sediment basins.
	Clean water diversion drain constructed to divert runoff from the catchment of watercourse C from accumulating against the southern embankment.
	Once constructed, the Solid Residue Storage Facility would be double lined with HDPE or equivalent and would be internally draining.
Liquid residue storage facility	During construction of Liquid Residue Storage Facility, rainfall would be diverted around the exposed surfaces through the construction of diversion banks.
	Incident rainfall on the exposed surfaces during construction would be diverted to one or more sediment basins.
	During the operational life of the Liquid Residue Storage Facility cells, water levels would be managed to ensure maximum rate of evaporation is achieved.
	Liquid Residue Storage Facility isolated from surface water flows and would not discharge to natural drainage. The only losses from the Liquid Residue Storage Facility would be via evaporation.
	Complete a detailed analysis of wave run-up and (if necessary) provide for management measures as required.
Additional surface water measures	Inspect all surface water control structures at least quarterly and following any rainfall event of more than 10mm in 24-hours to ensure their adequacy and identify where remedial action is required.
	Ensure that all potentially salt or chemical-laden water is retained within the Project Site and is used for processing operations or is pumped to the Liquid Residue Storage Facility.
	Ensure that all potentially sediment-laden water is directed to appropriately designed sediment basins and is either used for processing operations or dust suppression or, following testing to verify the quality of the water is acceptable, is discharged to natural drainage.
	Ensure that all surface water flows from undisturbed sections of the Project Site are diverted around disturbed sections and permitted to flow to natural drainage.
	Ensure that all roads within the Project Site are constructed in accordance with DECC (2008b).
	Ensure that the capacity of existing and proposed water storages to be constructed under the Applicant's harvestable rights does not exceed 182ML.
	Ensure that all areas where reagents or processing-related chemicals or by-products are sealed, bunded and, where appropriate, covered, with a suitable sump for the collection and removal of incident rainfall.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Surface Water (Cont'd)</b>	
Additional surface water measures (Cont'd)	Ensure that all areas of proposed disturbance, with the exception of the proposed open cut, are progressively rehabilitated and that surface water control structures are removed once the rehabilitated areas have achieved a 70% cover.
	Ensure that all roads within the Project Site are constructed in accordance with Soils and Construction: Managing Urban Stormwater Vol. 2b (DECC, 2008b).
	Maintain a >20m buffer between the Project Site Administration Area and Watercourse C.
	Inspect all surface water control structures at least quarterly and following any significant rainfall event (to be defined within the Surface Water Monitoring Program – see Commitment 19.2).
	Design and construct any infrastructure with 40m of waterfront land in accordance with the Controlled Activity Approval Guidelines issued by NOW.
<b>Groundwater</b>	
	Ensure a <i>Groundwater Management Plan</i> is prepared by a suitably qualified expert including guidance on interpretation of groundwater data.
	Construct each cell of the Solid Residue Storage Facility and SEC with a double liner, at least one of which is HDPE.
	Construct the Solid Residue Storage Facility and each SEC cell with a leak detection system and leak / seepage collection mechanisms.
	Maintain the leak detection system following the completion of the SECs until such time as leakage is deemed (by hydrogeologist) to be unlikely.
	Install groundwater monitoring bores around the Solid Residue Storage Facility and SECs to monitor for changes in water chemistry which could indicate a leak.
	Construct each cell of the Liquid Residue Storage Facility with a HDPE liner.
	Weld the liner to form a continuous barrier over the internal embankments.
	Adopt and implement a <i>Cell and Liner Construction Protocol</i> which would incorporate the following. <ul style="list-style-type: none"> <li>• Certification of all lining material from the manufacturer prior to delivery to the Project Site.</li> <li>• Registration of all individual batches of the lining material recorded by the contractor.</li> <li>• Construction of cell foundations in accordance with the extents and grades shown on the final drawings.</li> <li>• Preparation of the cell foundations to ensure removal of all roots, rocks and other matter which could impact on the liner.</li> <li>• Procedures for reviewing works completed if delays incurred between cell foundation preparation and liner laying.</li> <li>• Final inspection procedures and contingency measures.</li> </ul>
	Adopt and implement a <i>Liner Integrity Testing Protocol</i> which would incorporate the following. <ul style="list-style-type: none"> <li>• Installation of the HDPE lining by an experienced contractor.</li> <li>• Conformance of all lining material and construction methods and testing to the relevant Australian Codes.</li> </ul>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Groundwater (Cont'd)</b>	
	<ul style="list-style-type: none"> <li>• Certification of all equipment prior to the start of installation and at regular intervals during the work.</li> <li>• Testing of the welding of the liner by the contractor and by an independent testing organisation.</li> <li>• Removal and off-site laboratory testing of small sections of the liner and contingency measures.</li> </ul> <p>Monitor the water balance within each cell, based on on-site monitoring of rainfall, evaporation and discharge.</p> <p>Monitor water levels and quality beyond the downstream toe of all external embankments.</p> <p>Design and implement a <i>Leak Detection Response Strategy</i>.</p> <p>Harvest precipitated salts in accordance with a <i>Salt Harvesting Protocol</i>.</p> <p>Manage potential leakage from the Liquid Residue Storage Facility, Solid Residue Storage Facility and SECs in accordance with Commitments 8.1 to 8.12 above.</p> <p>Manage potential leakage from the Liquid Residue Storage Facility, Solid Residue Storage Facility and SECs in accordance with Commitments 8.1 to 8.13 above.</p> <p>Establish deep rooted vegetation between Liquid Residue Storage Facility Areas 2 and 3 within the proposed Biodiversity Offset Area.</p> <p>Include monitoring of standing water levels in <i>Water Management Plan</i> and any significant rise or decline of these levels be investigated immediately.</p>
<b>Terrestrial Ecology</b>	
Avoidance of impacts – native vegetation	<p>The site of the proposed processing operations and related infrastructure has been located over land which has been cleared of most trees for cropping and grazing and has been regularly cultivated for many years, i.e. there is no remnant native vegetation.</p> <p>The areas targeted for the positioning of disturbance associated with the management of waste materials and residues generated by the mining and processing operations considered local landforms and vegetation with efforts made to exclude the following areas.</p> <ul style="list-style-type: none"> <li>• Threatened ecological communities listed under the EPBC and TSC Acts.</li> <li>• The remnant vegetation of Dowds Hill, identified by OzArk (2013a) as a regionally significant remnant.</li> <li>• Larger and intact remnants of native woodland vegetation, in particular, those wooded hill tops to the north of the open cut and north of Dowds Hill.</li> <li>• Major watercourses, several of which contain the Fuzzy Box Woodland on alluvial soils of the Southwestern Slopes, Darling Riverine Plains and Brigalow Belt South bioregions.</li> </ul> <p>All areas suitable for listing as EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC have been avoided through re-design of the Proposal. Furthermore, 61.8ha of this community would be protected in perpetuity within the Biodiversity Offset Area.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Terrestrial Ecology (Cont'd)</b>	
Avoidance of impacts – native vegetation (Cont'd)	<p>The size and location of the Liquid Residue Storage Facility was redesigned to reduce the impact on the TSC Act Listed NSW Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions EEC to 0.1ha (on the margin of the Processing Plant Area). It is likely that in final design of the Liquid Residue Storage Facility, this 0.1ha would be avoided along with the remaining 21.9ha which would be protected in perpetuity within the proposed Biodiversity Offset Area.</p> <p>Undertake Obley Road realignment and clear zone creation activities to limit disturbance to 2.05ha of CW213 White Box - White Cypress Pine - Inland Grey Box woodland on the western slopes of NSW.</p>
Avoidance of impacts – pink-tailed worm-lizard	<p>In order to avoid as many known records of the Pink-tailed Worm-lizard, and minimise the potential for impacts on additional species, the Applicant undertook the following impact avoidance.</p> <ul style="list-style-type: none"> <li>• The design of the Solid Residue Storage Facility was modified to avoid a known occurrence of the species on moderate quality habitat (Habitat Area 4a).</li> <li>• Several of the proposed cells of the Salt Encapsulation Cells have been modified to avoid impact on high quality habitat associated with a known occurrence of the species (Habitat Area 4e).</li> <li>• The design of Liquid Residue Storage Facility Area 4 was modified to avoid the known recorded and high quality habitat of Habitat Area 6.</li> <li>• Several proposed soil stockpile locations have been discounted due to encroachment of areas of high or moderate quality habitat (in particular Habitat Area 4).</li> </ul>
Minimisation of impacts	<p>Noting the largest area of impact would be associated with the Liquid Residue Storage Facility, the Applicant has, at significant cost, continued to modify the processing operations to improve water efficiency. Through this process optimisation, the water required has been reduced by approximately 20% since the Planning Focus Meeting, in turn reducing the area required for the Liquid Residue Storage Facility.</p> <p>Further reducing the areas required for the Liquid Residue Storage Facility, the Applicant has committed to the construction of a reverse osmosis water recycling plant to further reduce the volume of liquid residue discharged to the Liquid Residue Storage Facility. The process and water recycling optimisation has reduced the overall liquid residue generation by 50%, in turn reducing the area required for the Liquid Residue Storage Facility.</p> <p>As the area required for the Liquid Residue Storage Facility has been reduced, the Applicant targeted exclusion of those Liquid Residue Storage Facility Areas located on more ecologically sensitive areas. In particular, Liquid Residue Storage Facility Area 7 to be located on the “Ugothery” property to the north of Dowds Hill would have impacted on areas of two EECs, White Box - Yellow Box - Blakely's Red Gum Grassy Woodland EEC and Fuzzy Box Woodland EEC.</p> <p>Cell C of the Solid Residue Storage Facility has been modified to minimise the area of disturbance to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland EEC.</p> <p>Ancillary areas of disturbance such as soil stockpiles have also been modified to minimise impacts on EECs. No soil stockpile area is now located over areas mapped as EECs</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Terrestrial Ecology (Cont'd)</b>	
Mitigation of impacts – vegetation clearing	<p>In order to mitigate the unavoidable impacts resulting from vegetation clearing, the Applicant would implement the following design features, operational controls and management measures.</p> <ul style="list-style-type: none"> <li>• Induct and train employees and contractors on environmental requirements and procedures.</li> <li>• Only clear sufficient vegetation for the subsequent 12 months operation only.</li> <li>• Ensure that all areas of proposed disturbance are clearly marked on the ground prior to the commencement of clearing campaigns to minimise the potential for over clearing of vegetation.</li> <li>• Install appropriate erosion and sediment control measures prior to vegetation clearing activities.</li> <li>• Directly transfer stripped soil materials onto rehabilitation areas where practicable to maximise the opportunity for retention of the natural seed stock, and thereby maximise the revegetation of the final landform with endemic species.</li> <li>• Spray weeds, where appropriate, prior to the topsoil stripping activities to avoid their proliferation on stockpiles or in subsequently rehabilitated areas</li> <li>• Undertake a program of weed control prior to soil stripping activities and following re-vegetation to ensure native plants are not overgrown during their early periods of growth</li> <li>• Undertake vegetation clearing operations, where practicable, between April and September to limit adverse impacts on tree dependent avifauna and microchiropteran bats.             <ul style="list-style-type: none"> <li>– Engage a suitably qualified ecology expert to undertake a pre-clearance study of all areas to be disturbed and to relocate any identified threatened fauna to suitable habitat.</li> <li>– Undertake all clearing of trees in accordance with a Vegetation Clearing Protocol (VCP). The VCP would require clearing of mature trees to be undertaken as follows.</li> <li>– Check all trees for the presence of nesting or roosting fauna before felling or pushing then start tree removal immediately after visual inspection.</li> <li>– When a tree with hollows requires removal, the tree is to be gradually nudged at intermittent intervals so that any animal occupying a habitat tree has the chance of vacating the area after the initial disturbance period.</li> <li>– Avoid leaving trees on ground unmanaged for more than two weeks as these would quickly become habitat for hollow dependent species.</li> </ul> </li> <li>• Familiarise staff undertaking pre-clearing assessments prior to the clearing campaign in order to:             <ul style="list-style-type: none"> <li>– ensure they understand the nature and extent of each stage clearing;</li> <li>– determine what habitats are to be affected, the species which could be effected and how to manage species that may be affected by the activity; and</li> <li>– orientate themselves with the location, nature and extent of unaffected habitat so that they would know the best locations to release relocated fauna.</li> </ul> </li> </ul>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Terrestrial Ecology (Cont'd)</b>	
Mitigation of impacts – vegetation clearing (Cont'd)	<ul style="list-style-type: none"> <li>• Salvage tree trunks, major limbs and, if practicable, minor branches for use in rehabilitation of the Project Site or enhancement of the BOA. If material is stockpiled, signs would be erected noting the significance and importance of this material for future rehabilitation and habitat creation.</li> <li>• Confine, where practicable, vehicular access to formed and marked roads and tracks.</li> <li>• Limit vehicle speed limits within the Project Site to limit the potential for vehicle trauma to wildlife.</li> <li>• Following the completion of clearing operations, fence, as appropriate, sections of the Project Site not required for ongoing operations to limit access by non-authorized personnel.</li> <li>• Revegetate the Project Site as described in Section 2.17 (RWC, 2013) and in accordance with a Mining Operations Plan, or equivalent Rehabilitation Management Plan required by DRE, to be prepared prior to the commencement of activities on the Project Site.</li> <li>• Ensure species used during rehabilitation operations are consistent with vegetation community types located within the vicinity of the area to be rehabilitated and are suitable for the proposed final landform and land use.</li> <li>• Monitor all areas of progressive and final rehabilitation and undertake remedial action in the event that rehabilitation does not comply with the relevant completion criteria.</li> <li>• Fully implement the proposed Biodiversity Offset Strategy.</li> <li>• Prepare an Integrated Land Management Plan (ILMP) (incorporating measures for application, measurement and management of the specific activities to be implemented within the proposed BOA) in consultation with the relevant government agencies. OzArk (2013a) has prepared a template for the preparation of the ILMP, following the standard format presented in the Guide to Establishing a Biodiversity Offset Area. Presented as Appendix 17 of OzArk (2013a), the ILMP template provides a detailed outline of the standard and additional management actions to be defined within the ILMP following approval of the proposed BOA (refer to Section 2.17.8.5, RWC, 2013).</li> </ul>
Mitigation of impacts – Pink-tailed worm-lizard	Conservation, enhancement and management of known high-quality potential habitat areas.
	Passive relocation of Pink-tailed worm-lizards from the eastern half of the open cut.
	Assisted relocation of Pink-tailed worm-lizards from the western half of the open cut.
	Monitoring and reporting. <ul style="list-style-type: none"> <li>• Progress reports would be commissioned by AZL to follow each major survey and collection period, i.e. at the end of spring and the end of autumn. These reports would detail the areas surveyed, the animals collected and their relocation positions. It would also report on any modifications to the habitat areas that may be required.</li> <li>• An annual report would be prepared in June of each year to be submitted to both SEWPaC and OEH. This would contain the results of the two survey and collection periods for the year and recommend any changes to habitat modifications that may be required.</li> </ul>





**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Terrestrial Ecology (Cont'd)</b>	
Mitigation of impacts – other threatened species	<p>Sandy creek and river banks in the Central West catchment are known breeding sites for the Rainbow bee-eater. Given there would be some construction required within such habitats for bridge upgrades, the following mitigation measures would be implemented.</p> <ul style="list-style-type: none"> <li>• Plan all bridge upgrades outside the breeding period (between august to January).</li> <li>• If this timing is not possible, inspect any creek bank to be affected for mouse size / snake sized horizontal holes in the expose incised creek bank.</li> <li>• If suitable holes detected, commission an experienced ecologist to determine if Rainbow bee-eaters could be affected by the activity and manage them accordingly.</li> </ul>
	Limit the speed of all machinery on the Project Site at night (nominally maximum of 20km/h) to reduce the risk of collision with arboreal fauna and nocturnal birds (dunnarts, gliders and owls).
	Require employees to obey speed limits when travelling to and from work.
Offsetting of impacts	Where the impact on biodiversity cannot be avoided or mitigated, a biodiversity offset area has been proposed.
<b>Aquatic Ecology</b>	
	Iterative refinement of the footprint of the Project Site to reduce the loss of upper catchment area to the smallest rea practicable
	All new structures across watercourses would be designed and constructed in line with the <i>Guidelines and Policies for Aquatic Habitat Management and Fish Conservation</i> (NSW Fisheries, 1999) and <i>Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings</i> (Fairfull & Witheridge, 2003).
	Pipelines across perennial watercourses would be installed by directional drilling (under-boring) methods or possibly hung below the rail line for larger bridge crossings such as that of the Macquarie River.
	Pipelines across ephemeral watercourses would be installed by trench excavation during periods of no flow within the channels and in accordance with <i>Controlled Activities on Waterfront Land Guidelines 2012</i> for laying pipes and cables in watercourses on waterfront land.
	To ensure that the remaining riparian corridors are not further impacted by the Proposal, the Applicant would implement the following measures. <ul style="list-style-type: none"> <li>• Mark exclusion zones around riparian vegetation to avoid potential impacts.</li> <li>• Exclude stock from the riparian corridor within the Project Site.</li> </ul>
	Preparation and implementation of an Erosion and Sediment Control Plan to include the following. <ul style="list-style-type: none"> <li>• The provision for minimising clearing of vegetation across the Project Site and the appropriate location of silt fences and sediment traps.</li> <li>• Minimise the discharge of sediment from the Project Site and other areas of construction, e.g. water pipeline installation, road upgrades.</li> </ul>
	All hazardous and potentially contaminating materials would be contained within bunded areas and on impenetrable surface to mitigate the potential water contamination from runoff of contaminants.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Aquatic Ecology (Cont'd)</b>	
	<p>Fit a Johnson Screen with a maximum of 2mm mesh and a max approach velocity of 0.4m/s to the Macquarie River pipeline water intake system to minimise loss of eggs, larvae and juvenile fish.</p> <p>The reconstruction of the bridge across Wambangalang Creek would be undertaken in such a manner so as to not to impact upstream habitat or change the current habitat regime of the Freshwater eel-tailed catfish. The design principles outlined in the <i>Guidelines and Policies for Aquatic Habitat Management and Fish Conservation</i> (NSW Fisheries, 1999) and <i>Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings</i> (Fairfull &amp; Witheridge 2003) would be incorporated into the design of the bridge. During construction works, flows would be maintained within the creek reflecting the conditions at the time of construction.</p>
<b>Aboriginal Heritage</b>	
Avoid impact -Group A	<p>Exclusion of the following areas of higher archaeological potential.</p> <ul style="list-style-type: none"> <li>• Remnant vegetation of Dowds Hill.</li> <li>• Larger and intact remnants of native woodland vegetation.</li> <li>• Major drainage lines.</li> </ul> <p>Impact on the 26 sites located outside the impact footprint and at no direct or indirect risk of harm would be avoided. The locations of these sites would be clearly marked on mine plans and the areas avoided by all activities associated with the construction and operation of the mine and related infrastructure.</p>
Avoidance with management -Group B	<p>Eleven sites are located adjacent to component disturbance areas and face possible direct impacts. These specific sites would be managed as follows.</p> <ul style="list-style-type: none"> <li>• Project Ste personnel would be alerted to their location and the location of the sites would be shown on mine plans.</li> <li>• Each site would be revisited by a suitably qualified archaeologist before construction, resurveyed and temporarily fenced until earthworks in the general vicinity is complete.</li> <li>• Work crews in the vicinity of any of these sites would be informed by way of an induction as to the site's location and its legislative protection under the NPW Act. All work crews would be informed that the fenced area remains a "no-go" area for the duration of the works.</li> </ul> <ul style="list-style-type: none"> <li>• If, at the time of construction, it becomes obvious that a site in this category would be impacted by the proposed works, the site would be managed as a Group C site with specific management recommendations formulated following the site visit by a suitably qualified archaeologist.</li> </ul> <p>One site (TS-GG-01) could suffer over time from modification of the drainage coming from the proposed open cut. Once the eastern half of the open cut has begun, a condition assessment schedule would be implemented to ensure that the site is not being harmed.</p> <p>Prior to the installation of the tailings pipeline and the construction of the haul road between the Processing Area and the Solid Residue Storage Facility, permanent high visibility markers are to be installed along the boundary of the PAD associated with site TV-AS3. The permanent markers are to be installed at minimum 10m spacings where the boundary of the PAD occurs within 25m of the haul road.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Aboriginal Heritage (Cont'd)</b>	
Sites requiring management - Group C	This group includes sites either partially or completely within the impact footprint where cultural material was identified but where sub-surface archaeological deposits are considered unlikely.
	Collected surface artefacts are to be transferred to the custody of the RAP's via a Care Agreement which would be drafted and included in the <i>Aboriginal Cultural Heritage Management Plan</i> for the Project.
	The transfer of custody of the scar-bearing portions of the scarred trees to be impacted would also be subject of a Care Agreement.
Aboriginal Heritage - general	Disturbance on the Project Site, unless appropriately cleared by the RAPs, would remain within the limit of disturbance nominated in the EIS (RWC, 2013)
	Should any other objects or Aboriginal sites be identified during the course of construction, the Applicant would implement an <i>Unanticipated Finds Protocol</i> , as presented in <i>Appendix 5 of OzArk (2013b)</i> (RWC, 2013).
	An <i>Aboriginal Cultural Heritage Management Plan (ACHMP)</i> would be prepared, including a Statement of Commitments with respect to the management of the identified (any as yet unidentified) sites. The ACHMP would incorporate the proposed management of sites included in this EIS, measures which have been reviewed by the RAPs for the Proposal.
	The site induction process for all personnel would include Aboriginal cultural heritage as a core component. The information presented would include: <ul style="list-style-type: none"> <li>• Artefact recognition and implementation of the correct procedure if artefacts are recognised;</li> <li>• The procedures that must be followed if artefacts are identified; and</li> <li>• The penalties if the procedure is not followed.</li> </ul>
	Continuing to modify processing operations to improve water efficiency thereby reducing the area required for the largest disturbance footprint, the Liquid Residue Storage Facility.
<b>Historic Heritage</b>	
	Identify on relevant plans all identified sites and ensure that activities in the vicinity of those sites are appropriately managed.
	Avoid impacts on sites DZP-HIF1 and DZP-HIF2 by establishing a fence and buffer zone around the sites.
	Unless unavoidable due to rail line upgrade, avoid DZP HS1.
	Document and record sites DZP-HS2, DZP-HS3 and DZP-HS4, prior to dismantling, and provide this record to Dubbo City Council and the NSW State Archives. Site DZP-HS2 is not recorded as having significance, however, would be documented together with the timber railway crossings to be dismantled and replaced.
	If items of suspected historic heritage significance are identified throughout the life of the Proposal, the following procedures would be implemented. Step 1 – No further earth disturbing works would be undertaken in the vicinity of the suspected item of historic heritage significance. Step 2 – A buffer of 20m x 20m would be established around the suspected artefact. No unauthorised entry or earth disturbance would be allowed within this buffer zone until the area has been assessed. Step 3 – A qualified archaeologist would be contacted to make an assessment of the discovery. Mitigation procedures would then be developed and implemented based on the assessment.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Soils and Land Capability</b>	
Soil stripping	Strip soil material to the depths identified in Section 2.3.3.3 and Tables 2.1 and 2.2 of EIS (RWC, 2013).
	Ensure that soil material to be stripped is maintained in a slightly moist condition during stripping. Material would not be stripped in either an excessively dry or wet condition.
	Grade or push soil into windrows using graders or dozers for later collection by elevating scrapers or loading into trucks by front-end loaders to minimise compaction of soil materials.
	Use soil materials immediately in areas undergoing progressive rehabilitation, where practicable. Where this is not practicable, place soil transported by truck directly into storage or place soil transported by scrapers in thick "lifts" to minimise compaction.
	Minimise compaction of soil materials during grading or pushing of soil into windrows and loading into trucks.
Soil stockpiling	Construct the stockpiles as wind rows within each area, avoiding the construction of a single stockpile covering the entire area.
	Use bulldozers or other equipment to push soil dumped by scrapers into stockpiles (to avoid tracking over previously laid soil by the scraper) whenever possible. If material is deposited directly by scrapers it would be deposited in thick "lifts" to minimise compaction.
	Minimise, as far as practicable, the operation of machinery on soil stockpiles to minimise compaction.
	Ensure that soil stockpiles have a maximum height of 3m for subsoil and 2m for topsoil material.
	Leave the surface of the stockpile with an even but roughened surface to assist in erosion control and seed germination and emergence.
	If long term storage (>3 months) is planned, fertilise and establish an appropriate vegetative cover as soon as possible on all soil stockpiles to be retained for more than 3 months.
	Where practical and when conditions are suitable, allow occasional grazing on the vegetated stockpiles to encourage natural return of organic material, e.g. manure. When grazing livestock on stockpiles, livestock would be removed when the soil is wet enough that stock cause poaching of the soil. Livestock would also be removed when groundcover is less than 60% to encourage survival and growth of the pasture species.
Soil respreading and rehabilitation	Test the subsoil to ensure that it is not toxic to plant growth. Major threats are salinity that has built up from adjacent liquid residue storage facilities, and elevated levels of some micronutrients from prolonged reducing (waterlogged) conditions.
	Ensure that subsoil to be worked is moist or dry, but not wet.
	Form sub-grade to desired shape prior to application of subsoil.
	Tyne sub-grade (approximately 60cm deep) to provide an undulating boundary and disrupt barriers to water movement from compaction.
	Place subsoil to achieve similar density (or slightly less) than natural subsoil. This would be achieved by placing subsoil in relatively thick lifts (20cm) with an elevating scraper and minimising further traffic on areas where material has been placed.



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Soils and Land Capability (Cont'd)</b>	
Soil respreading and rehabilitation (Cont'd)	Lightly tyne the surface between lifts to reduce creation of slowly permeable layers.
	Prior to respreading, the topsoil would be tested to determine the ameliorants required to achieve the desired level of plant growth.
	Tyne the surface of underlying subsoil material below the depth of compaction to minimise formation of a dense layer at the top the subsoil / growth material.
	Ensure that topsoil is not respread when either excessively dry or wet.
	Minimise, as far as practicable, the operation of machinery / vehicles on respread topsoil material to minimise compaction.
	Place the soil material with only a few lifts from an elevating scraper or similar with sufficient regrading to create a density similar to natural soil.
	Establish vegetation on topsoiled areas as quickly as possible to minimise the risk of erosion from wind or water.
	Establish Land and Soil Capability Classes as nominated in Table 4.71. (EIS, 2013)
<b>Traffic and Transportation</b>	
	Preparation and implementation of a <i>Construction Traffic Management Plan</i> which addresses the following.
	<ul style="list-style-type: none"> <li>• Road and bridgeworks during the construction phase and potential impacts for existing road traffic and for vehicles accessing the Project Site.</li> <li>• Utility upgrades adjacent to or across public roads.</li> <li>• Consideration of the respective intersections including temporary speed limits and other controls.</li> </ul>
	<ul style="list-style-type: none"> <li>• Significant deliveries including any oversize and overmass loads and the suitability of the existing road to accommodate them. In particular, consideration of constraints posed by the existing causeway over Wambangalang Creek would be required prior to its upgrade.</li> <li>• Traffic interaction at key intersections where there is a marked increase in traffic.</li> <li>• Arrangements for employees to have suitable access to and from the Project Site.</li> <li>• Impacts on other road users during the construction phase including the school bus, cyclists and pedestrians.</li> <li>• Impacts on the operation of the Zoo.</li> <li>• Avoidance of traffic delays during busy periods such as public holidays, Easter and Christmas holidays.</li> </ul>
	Construction of all road and intersection upgrades in accordance with Austroads Standards and Council specifications with suitable dimensional capacity to accommodate the anticipated oversized loads.
	Intersection upgrades to provide simplified traffic interaction and provide appropriate warning(s) relating to the increased volume of heavy vehicles.
Preparation and implementation of a Code of Conduct for contractors / employees travelling to and from the Project Site. The code would:	



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Traffic and Transportation (Cont'd)</b>	
	<ul style="list-style-type: none"> <li>• identify the designated access routes;</li> <li>• cover the Applicant's expectations with respect to drivers' behaviour, management of speed and fatigue;</li> <li>• require the avoidance (wherever practical) of school bus operating periods;</li> <li>• specific driving protocols when avoidance of school bus periods is not practical; and</li> <li>• include disciplinary responses in the event of non-compliance with the code.</li> </ul> <p>Regular discussions with the school bus company(ies) to ensure that information regarding school bus routes, times and pick-up / drop-off locations remains up to date.</p> <p>The use of car pooling and buses where practical.</p> <p>Communication with organisers of "Zoo to Zoo" road cycling-type annual events to minimise impacts on construction activities, mine operations and the events.</p> <p>Education of the workforce through inductions, toolbox talks etc.</p> <p>Scheduling of shift changes to avoid peak traffic periods in Dubbo by at least 1 hour.</p> <p>Payment of a road maintenance contribution to Dubbo City Council commensurate with traffic volumes generated by the Project. Any maintenance contribution would take into consideration the road upgrades that are proposed by the Applicant.</p> <p>Upgrade Obley Road to provide a 10m pavement seal (two 3.5m lanes + two 1.5m shoulders) over a 12m formation between the Newell Highway and Toongi Road</p> <p>Provide for a 7.5m clear zone on all straight sections, and at least a 9m clear zone on the outside of all curves, of Obley Road between the Newell Highway and Toongi Road. Where the establishment of such a clear zone cannot be attained without impacting on important fauna habitat, e.g. breeding hollows, existing infrastructure, e.g. walkway / cycleway, or encroaching on freehold land, wire rope safety barriers would be installed 500mm from the outer edge of the pavement.</p> <p>Upgrade the intersection between Obley Road and the main visitor entrance to the Taronga Western Plains Zoo to provide an extended channelized right turn into the zoo.</p> <p>Upgrade the intersection between Obley Road and Toongi Road to provide channelized left turn deceleration lane, an auxiliary right turn acceleration lane on to Obley Road and channelized right turn from Obley Road into Toongi Road.</p> <p>Upgrade the crossings of Hyandra Creek, Twelve Mile Creek and Wambangalang Creek.</p> <p>Apply an asphaltic concrete seal to 2.4km section of Obley Road from the Newell Highway (200m beyond Zoofari Lodge / Dundullimal Homestead intersections) and 950m section of Obley Road from the Toongi Road intersection.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Traffic and Transportation (Cont'd)</b>	
	<p>Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible modification to pedestrian / cyclist access to Taronga Western Plains Zoo and implement if identified as reasonable, feasible and without creating subsequent drainage, amenity of other traffic hazard.</p> <p>Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible installation of lighting at entrances to the Taronga Western Plains Zoo subject to confirmation as to compliance with relevant standards and agreement of payment of operating costs.</p> <p>Upgrade Toongi Road to provide an 8.5m sealed pavement over a 10m formation.</p> <p>Advise personnel on 'Fatigue Management' as part of Staff induction.</p>
Newell Highway	<p>Consultation with Council and RMS in relation to moving the 60km/hr speed zone on the Newell Highway to the south of the Obley Road intersection (currently located approximately 1km north).</p>
Obley Road	<p>Provision of additional school bus stop pullover areas in consultation with the school bus operator(s) and Council.</p> <p>Consultation with the relevant cycling groups to provide specific consideration of safety aspects associated with their use of the road, particularly where sight distance is limited.</p> <p>Consultation with Council and RMS in relation to moving the 60km/hr speed zone on Obley Road to the south of the Dundullimal Homestead access road.</p>
Toongi Road	<p>Ensure that a suitable access point is established for the existing waste transfer station.</p> <p>Consultation with the relevant cycling groups to provide specific consideration of safety aspects associated with their use of the road, particularly where sight distance is limited.</p> <p>Consideration of intersection design for the Project Site Entrance from Toongi Road to address the risk posed by complacency of Project traffic turning in and out of the Project Site Entrance into Toongi Road (which has very low background traffic).</p>
Rail Crossings	<p>Where possible, scheduling trains outside the peak traffic periods (8:00am to 9:00am and 3:00pm to 4:00pm) to reduce the impact of traffic delays at rail crossings.</p>
<b>Visual Amenity</b>	
Visual Screens	<p>Stockpile Area 1 (refer to Figure 2.6 of EIS) has been designed to be oriented along the western side of the rail easement and would be vegetated with fast growing tree and shrub species to create a vegetated amenity bund.</p> <p>The amenity bund would provide screening of the processing plant operations from vantage points on Toongi Road, The Springs Road and to a lesser extent Obley Road. As establishment of the processing plant would be one of the initial construction activities to be undertaken on the Project Site, the vegetation cover and trees on the soil stockpiles would have 18 months to 2 years to establish prior to commencement of operations</p> <p>The Applicant would consider any reasonable request by a potentially affected resident for assistance to create a visual screen adjacent to their residence through planting of fast growing vegetation and/or landscaping, where such a screen would effectively reduce the visual impact of activities throughout the life of the Proposal.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Visual Amenity (Cont'd)</b>	
Rehabilitation	The outer embankments of the Liquid Residue Storage Facility, Solid Residue Storage Facility, Waste Rock Emplacement and Salt Encapsulation Cells would be progressively rehabilitated. The establishment of a grass cover over these outer embankments would reduce the contrast between the surrounding agricultural paddocks and these structures.
Project Site	Implementation of the proposed BOA, which would incorporate the protection and enhancement of native vegetation across and surrounding the Project Site.
	Construction of the processing plant and other infrastructure within the Project Site from non-reflective, neutral coloured material.
Lighting	Ensure all construction lighting within the Project Site would be designed to meet the criteria of Zone A2 in AS/NZS 4282:2019.
	Ensure all light sources would have a correlated colour temperature of 3 000K or less.
	Ensure streetlights and catwalk lights would be full cut-off fittings with zero tilt.
	Ensure all fixed floodlights would be forward throw luminaries with a maximum upcast of five degrees. Wherever possible the upcast would be zero.
	Ensure lights with diffusing covers or visible bare lamps that emit light above the horizontal plan would not be used on the outside of buildings or structures.
	Ensure where lighting towers are used, they would have a maximum upcast of 5 degrees and use a forward throw distribution.
	Selection and placement of permanent and temporary lights that: Are not directed towards, and therefore do not impact on the vision of motorists using, the Newell Highway. Do not point towards surrounding residences; and Minimise the 'lume' created by the lights.
<b>Hazardous Materials</b>	
	Sulphuric acid, caustic soda, hydrochloric acid, and sodium sulphide: <ul style="list-style-type: none"> <li>• Tanks to be maintained within bunded area designed and constructed in accordance with Section 5.7 of AS 3780-1994 (Bunds and Compounds).</li> </ul>
	Anhydrous ammonia: <ul style="list-style-type: none"> <li>• The storage area would be secured when not in use.</li> <li>• The storage area would be well ventilated.</li> <li>• The storage vessels not exposed to direct sunlight, sparks or flame.</li> <li>• The storage vessels would be securely closed when not in use.</li> </ul>
	Aluminium powder: <ul style="list-style-type: none"> <li>• The storage area would be kept cool, dry and well ventilated and out of direct sunlight.</li> <li>• The storage tank would be kept away from sources of heat or ignition and out of direct sunlight.</li> <li>• The following materials would not be kept near the storage tank: <ul style="list-style-type: none"> <li>– Strong oxidising agents.</li> <li>– Water.</li> <li>– Acids.</li> </ul> </li> </ul>





**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Hazardous Materials (Cont'd)</b>	
	<p>All other reagents would be transported, stored, handled and used in accordance with the relevant Material Safety Data Sheet for that material.</p> <p>In order to prevent the escape of liquid materials, the following measures would be taken.</p> <ul style="list-style-type: none"> <li>• All chemicals would be stored within concrete bunded areas.</li> <li>• Tanker deliveries would occur over sealed areas with kerbing and drainage design preventing any runoff to the environment if a spill occurs.</li> <li>• Spill kits would be provided as appropriate, enabling recovery of small quantities of spilt materials.</li> </ul> <p>Long-term or continuous emissions that may arise from plant operations would be addressed via an Environment Protection Licence (EPL) and occupational health and safety management systems.</p>
Hazardous material transport	<p>Road tanker transport (DG Class 8) - HCl (33 wt%), NaOH (50%)</p> <ul style="list-style-type: none"> <li>• Tanker/vehicle design standards as per the ADG (AS 2809). Thin walled tanker, puncture may occur in a vehicle accident.</li> <li>• Excess flow valves on tanker Driver training and ADG licensing.</li> <li>• Route specific risk assessment as part of transporter compliance with the ADG.</li> <li>• Driver emergency response procedures</li> </ul> <p>Road tanker transport Anhydrous ammonia (DG Class 2.3)</p> <ul style="list-style-type: none"> <li>• Tanker/vehicle design standards as per the ADG (AS2809). Ammonia tankers have thick walls as they are pressure vessel – difficult to puncture, very unlikely unless a high energy impact (such a train impact or tanker rollover).</li> <li>• Excess flow valves on tanker Driver training and ADG licensing.</li> <li>• Route specific risk assessment as part of transporter compliance with the ADG.</li> <li>• Driver emergency response procedures.</li> </ul> <p>Store all chemicals within concrete bunded areas or within appropriate self-bunded containers.</p> <p>Complete all tanker deliveries over sealed areas with kerbing and drainage design preventing any runoff to the environment if a spill occurs.</p> <p>Provide spill kits as appropriate, enabling recovery of small quantities of spilt materials.</p> <p>Consult with Dubbo Local Emergency Management Committee and engage with Cumboogle and Benolong brigades.</p> <p>Prepare and implement a Bushfire Mitigation Plan which will include:</p> <ul style="list-style-type: none"> <li>• establishment of hazard reduction and land management activities in order to manage fuel loads within the Project Site (while also managing for conservation of biodiversity);</li> <li>• consideration of appropriate areas for burns, grazing or mechanical hazard reduction would be focused on protecting AZL infrastructure and neighbouring properties; and</li> <li>• formation of first response and patrol strategies would be included to enable appropriate land management for mitigating the spread of bushfires.</li> </ul>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Hazardous Materials (Cont'd)</b>	
Hazardous material transport (Cont'd)	Discuss boundary management with the RFS, identify appropriate methods to reduce the potential for a fire to leave the Project Site and include in Bushfire Mitigation Plan.
	Maintain an Asset Protection Zone (APZ) of at least 50m around the open cut.
	Monitor fuel loads within the APZ and reduce as required (in accordance with the Bushfire Mitigation Plan).
	Maintain the internal haul road to ensure safe access and egress from the open cut in the event evacuation is called.
	Maintain accessibility to the water infrastructure within the Processing Plant Area for management of ember attack on the buildings.
	Provide training to site personnel in relation to specific fire fighting tasks and procedures
	Develop Emergency and Evacuation Management Procedures.
	(In the event of a local bush fire event that threatens the safety of personnel), require all personnel within the affected area to assemble at the designated Emergency Assembly Area and complete a head count.
	Ensure refuelling is undertaken within designated fuel bays or within cleared area of the Project Site.
	Ensure vehicles are turned off during refuelling.
	Ensure no smoking policy is enforced in designated areas of the Project Site.
	Ensure fire extinguishers are maintained within site vehicles and refuelling areas.
	Ensure a focus on housekeeping by ASM (Holdings) management.
	Ensure that a water cart is available to assist in extinguishing any fire ignited.
	Establish appropriate maintenance of mechanical equipment that is being used in the natural landscape, i.e. slashers, mowers, belt driven machinery, etc.
	Establish hot work protocols for welding, grinding, oxy work on tenure, including availability of portable water and a lookout for potential ignitions.
	Monitor equipment with exhaust stacks capable of throwing embers.
	Monitor for lightning strikes on tenure after dry electrical storms.
	Minimise the use petrol/diesel vehicles in long grass during hot and dry periods.
	Erect Give Way signs at the exit of the Site to Toongi Road.
Liaise with Dubbo Traffic Committee and erect appropriate signage at intersection of Toongi and The Springs Roads.	
Advise all truck drivers of the potential conflict between Proposal-related traffic and the general public.	
Prepare and require contracted truck drivers (or Company representatives) to sign a <i>Driver's Code of Conduct</i> identifying minimum standards for driver behaviour.	
Implement a comprehensive <i>Transport Management Plan</i> for construction and Project operation.	
Consult with the relevant government agencies with respect to specifications of the 90m ventilation stack and implement any required visual or other identifiers, e.g. flashing light.	



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Socio-Economic Setting</b>	
Social and community	<p>Engage the community surrounding the Project in regular dialogue in relation to the proposed and ongoing operation of the Project and maintain an “open door” policy for any member of the community who wishes to discuss any aspect of the Project.</p> <p>Proactively and regularly consult with those residents most likely to be adversely impacted by the Proposal.</p> <p>Continue to support community organisations, groups and events, as appropriate, and review any request by a community organisation for support or assistance throughout the life of the Project.</p> <p>Consult with residences adjoining the Toongji-Dubbo Rail Line to ensure that all reasonable expectations related to local amenity are met, e.g. fencing or no fencing of the rail easement along Margaret Crescent.</p> <p>Implement a comprehensive and targeted environmental monitoring program, provide the local community with access to the results of monitoring and use these results, in consultation with the local community, to improve environmental performance at the Project Site.</p> <p>Form and maintain a Community Consultative Committee (CCC), including representative members of the local community and Dubbo City Council. The CCC would be an important forum for reviewing and discussing environmental monitoring and performance, and discussing possible improvements that could be made to operations to improve environmental (and social) performance).</p> <p>Regularly brief the CCC on activities within the Project Site and seek feedback in relation to Proposal-related impacts whether real or perceived. In addition, seek advice in relation to the most appropriate manner in which to provide assistance to the community in an effective, fair and equitable manner.</p> <p>Advertise and maintain a community complaints telephone line.</p>
Employment and training	<p>Give preference when engaging new employees, where practicable, to candidates who live within the Dubbo Local Government Area over candidates with equivalent experience and qualifications based elsewhere and ensure that the mining and other contractors do so as well. The Applicant has set a target of 80% of the start-up workforce to be drawn from the Dubbo and surrounding LGAs.</p> <p>Encourage the involvement of the local Aboriginal community in the workforce.</p> <p>Encourage and support participation of locally based employees and contractors in appropriate training or education programs that would provide skills and qualifications that may be of use throughout and following completion of the Project.</p>
Economic Contribution and development	<p>Give preference, where practicable, to suppliers of equipment, services or consumables located within the Dubbo Local Government Area.</p> <p>Assist community members and others, as appropriate, to establish complementary businesses in the vicinity of the Proposal where those businesses would provide a benefit to the community through increased economic activity or development.</p> <p>Asist Dubbo City Council to promote and encourage economic development that would continue beyond the life of the Project in the area surrounding the Project Site.</p>



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

<b>Environmental Aspect</b>	<b>Management and Mitigation Measure</b>
<b>Socio-Economic Setting (Cont'd)</b>	
Economic Contribution and development (Cont'd)	Enter into an agreement with Dubbo City Council, e.g. a Voluntary Planning Agreement, to provide a fair and reasonable contribution to any increase in management or maintenance costs of local services and infrastructure incurred as a consequence of the Project.
Infrastructure and services	Ensure that infrastructure and services installed for the Proposal, including the gas pipeline, electricity transmission line, appropriate buildings and hardstand areas, remain available for alternative uses following completion of the Proposal (provided that such uses are consistent with the final land uses identified in this document or any subsequent approval).
	Encourage and support, in consultation with the local community, the provision of services to the community (through a VPA). These may include health, education, transportation and other services.
Agricultural lands	Manage Project Site drainage as described and discussed in Section 4.5.4.2 of EIS (RWC, 2013) so as to minimise any changes to downstream water quantity, quality and flooding regime.
	Maintain agricultural operations on land not required for active mining or biodiversity offsetting purposes.
	Continue to appropriately manage weeds, pests and bush fire risks on land held by the Applicant in consultation with surrounding landowners.
	Undertake final landform construction and rehabilitation as nominated in Section 2.17 of EIS (RWC, 2013) (so as to return all but 1 200ha of the Project Site to agricultural production post-Project).
	Ensure that the land capability of those sections of the final landform to be used for agricultural purposes is similar to the current land capability. Any agricultural land that forms part of the final landform would be more heavily treed than it is at present due to proposed biodiversity and screen plantings.
General	Adhere to all operating conditions, e.g. restrictions on hours of operation and the required standard of facility.
	Prepare and make available detailed indicative illustrations of the proposed infrastructure and other facilities to be constructed on the Project Site.
	Implement the recommendations provided in each of the specialist assessments of the Project.
<b>Waste</b>	
	Maintain a register of the types and quantities of wastes produced on the Project Site.
	Design and maintain storage areas to contain spillages.
	Segregate and retain recyclable and non-recyclable waste in designated storage areas prior to removal from the Project Site.
	Keep the Project Site in a clean and tidy condition.
	Ensure waste is regularly removed from the Project Site by a licensed contractor.
	Classify all wastes to be disposed of in accordance with the NSW Waste Classification Guidelines. Restricted or hazardous wastes would not leave the Project Site without obtaining prior EPA approval.
	Clean used bulky bags, drums and pallets within the relevant covered and bunded storage areas in accordance with the product MSDS or relevant Australian Standard.
	Complete a visual (or other required) inspection to confirm any remnant reagent has been removed.
	Remove waste materials from the Project Site by licensed waste removal contractor



**Table A2.1 (Cont'd)**  
**Updated Table of Mitigation Measures**

Environmental Aspect	Management and Mitigation Measure
<b>Environmental Management Systems</b>	
	<p>Incorporate the environmental procedures in an on-site management system.</p> <p>Prepare or update the following monitoring programs, management plans and protocols.</p> <ul style="list-style-type: none"> <li>• Environmental Monitoring Program.</li> <li>• Dose Assessment Monitoring Program.</li> <li>• Environmental Radiation Monitoring Program.</li> </ul> <ul style="list-style-type: none"> <li>• Mining Operations Plan (or equivalent).</li> <li>• Integrated Land Management Plan.</li> <li>• Noise Management Plan (incorporating and Noise Monitoring Program).</li> <li>• Blast Management Plan (incorporating and Blast Monitoring Program).</li> <li>• Air Quality Management Plan (incorporating and Air Quality Monitoring Program).</li> <li>• Water Management Plan: including:                             <ul style="list-style-type: none"> <li>– Groundwater Management Plan (including a Groundwater Monitoring Program);</li> <li>– Surface Water Management Plan (including a Site Water Balance, Erosion &amp; Sediment Control Plan(s) and Surface Water Monitoring Program); and</li> <li>– Water Reuse Management Plan;</li> <li>– Residue Storage Facility Management Plan (including a Cell and Liner Construction Protocol, Liner Integrity Testing Protocol, Leak Detection Response Strategy and Salt Harvesting Protocol); and</li> <li>– Surface and Ground Water Response Plan.</li> </ul> </li> <li>• Aboriginal Cultural Heritage Management Plan.</li> <li>• Care Agreement (for management of artefacts).</li> <li>• Construction Traffic Management Plan.</li> <li>• Transport Management Plan.</li> <li>• Pink-tailed Worm-lizard Plan of Management.</li> <li>• Vegetation Clearing Protocol.</li> </ul> <ul style="list-style-type: none"> <li>• Cell and Liner Construction Protocol.</li> <li>• Liner Integrity Testing Protocol.</li> <li>• Leak Detection Response Strategy.</li> <li>• Salt Harvesting Protocol.</li> <li>• Bushfire Mitigation Plan.</li> </ul> <p>Incorporate relevant environmental data / information in <i>Annual Reviews</i>.</p>
<p>Black Text = Original EIS (RWC 2013a) including revisions under the Response to Submissions (RWC, 2013b). Blue Text = MOD 1 (the proposed modification).</p>	



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