Environmental Impact Statement Assessment Report under the *Environmental Protection Act 1994*

for the Elimatta Project
proposed by Taroom Coal Pty Ltd

Prepared by: Statewide Environmental Assessments, Department of Environment and Heritage Protection

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1 Introduction

This report provides an evaluation of the environmental impact statement (EIS) process pursuant to Chapter 3 of the *Environmental Protection Act 1994* (EP Act) for the Elimatta Project (the project) proposed by Taroom Coal Proprietary Limited (Taroom Coal), a wholly owned subsidiary of Northern Energy Corporation Limited (NEC).

Taroom Coal is seeking approval to establish a green field open-cut thermal coal mine project, south-west of Taroom in Southern Queensland, within the Western Downs Regional Council area.

The EIS process was initiated by an application made by the Taroom Coal on 15 June 2009 for an Environmental Authority (EA) (Mining Activities) for a Non-code Compliant Level 1 mining project. On 26 June 2009 the former Department of Environment and Resource Management (DERM), now the Department of Environment and Heritage Protection (EHP) decided that the application would be assessed as a Non-code Compliant Level 1 mining project and an EIS would be required.

On 1 May 2008, the Commonwealth decided (EPBC Referral Number 2008/4130) that the proposed action was not a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

EHP as the administering authority has coordinated the EIS process for the project under the EP Act. This assessment report has been prepared pursuant to sections 58 and 59 of the EP Act. Section 58 of the EP Act lists the criteria that EHP must consider when preparing an EIS assessment report and section 59 states that the content of the report must:

- address the adequacy of the EIS in addressing the final terms of reference (TOR)
- address the adequacy of the environmental management plan (EM plan)
- make recommendations about the suitability of the project
- recommend any conditions on which any approval required for the project may be given
- contain another matter prescribed under a regulation.

This report summarises the key issues associated with the potentially adverse and beneficial environmental, economic and social impacts of the project. It discusses the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project. It notes those issues of particular concern that were either unresolved or require specific conditions in order for the project to proceed.

The giving of this report to Taroom Coal will complete the EIS process under the EP Act.

2 Project description

The project is for development of a greenfield open-cut coal mine producing up to 8.2 million tonnes per year (Mt/yr) run-of-mine (ROM) coal to produce 5Mt/yr of thermal coal for export.

Taroom Coal proposes to commence construction and mine development activities early in 2017 and would complete the construction stage of the project some 22-24 months later. Open cut-mining and coal processing are planned to commence in 2019, and would continue for approximately 32 years. The whole of project life including, construction through to decommissioning is estimated at 40 years.

The project is sited over three Mining Lease Applications (MLA) (MLA50254, MLA50270 and MLA50271) covering approximately 3975 hectares (ha). The main elements of the project would include:

- open-cut pit areas (MLA50254) over approximately 2287ha
- out-of-pit stockpiling of spoil over approximately 183ha
- a series of water storage dams over approximately 57ha
- two final voids would remain at the end of mine life covering approximately 380ha
- construction and operation of a coal handling and preparation plant (CHPP), rail load-out facility and associated mine infrastructure, including tailings storage facilities (TSF) and accommodation village over approximately 339ha (MLA50270)
- transport and services corridor for the transportation of ROM coal from the pit to the CHPP using trucks on a dedicated haul road (ML50271)
- development of a new 36 kilometre (km) ‘common user’ rail line and service corridor, to be known as the Western Surat Link (WSL) rail and services corridor, to connect the project to the planned Surat Basin Rail (SBR), north of Wandoan
- diversion of Horse Creek within MLA50254

- relocation of Perretts Road from within MLA50254 and a number of temporary public road closures, realignments and upgrades adjacent to the MLAs and the WSL rail and services corridor
- progressive rehabilitation during operations until final rehabilitation at the mine decommissioning stage.

The common user rail line and service corridor would be required for the transport of product coal to port facilities at Gladstone and for routing of power and water supply infrastructure to the mine. The EIS included two possible alignments for connection to MLA50270 at the western end of the WSL rail and services corridor, only one option is intended to be developed. The preferred option would be dependent on other potential rail users.

The total project area is approximately 4460ha which includes the MLA areas and the WSL rail and services corridor.

At full production the project would employ approximately 300 full-time staff.

2.1 Location

The project is located in the Surat Basin, approximately 45km south-west of Taroom and 380km north-west of Brisbane within the upper catchment of the Fitzroy Basin, approximately 45km upstream of the Dawson River and wholly within the Western Downs Regional Council (WDRC) local authority area.

2.2 Mine and rail infrastructure

The EIS considered a number of options to support mine infrastructure and concluded that the most feasible option would be to locate the mine infrastructure area (MIA), CHPP and accommodation village on MLA 50270 to minimise sterilisation of the identified coal resource. During the construction stage of the project temporary office buildings would also be located on the MIA.

Civil and earthworks would involve clearing vegetation for infrastructure construction including:

- the MIA (including CHPP and rail load-out facility) on MLA 50270
- the accommodation camp site on MLA 50270
- spoil dumps, Horse Creek diversion and pit areas on MLA 50254
- the TSF areas on MLA 50270
- road and infrastructure corridors on MLAs 50254, 50270 and 50271.

The EIS stated that earthworks associated with construction of the WSL rail and services corridor would initially include site set out and pegging, vegetation and land clearing, and ground improvement measures. This would then be followed by bulk earthworks which would require major cut and fill operations and the winning of suitable construction material for use in the railway embankment using dozers, scrapers and truck and shovel operations. The EIS also stated that Nathan Road and Leichhardt Highway crossings would require significant earthworks. The EIS provided indicative batter slopes (1V:3H) and associated earthwork volumes for the rail alignment design. Actual slopes and earthwork volumes are expected to vary based on the material encountered with cutting or materials being used within the embankment.

The infrastructure to support the mining operations would include:

- an administration office complex including training rooms, meeting rooms, crib facilities and bathhouse
- heavy mining machinery equipment workshop including maintenance bays, tyre bays, local stores area and offices
- drum store for storing drums and containers of specialty oils, hydrocarbons and flammable liquids
- emergency vehicle shed to garage emergency vehicles and store emergency equipment and supplies
- fire training area for fire training, located adjacent to raw/firewater storage tanks
- bus shelter including covered standing space and pathways
- fuel and oil facility for diesel, oil lubricants and coolants delivery and storage
- heavy and light vehicle wash facilities
- on-site accommodation facilities.

Fuel and oil facilities would include tanks for:

- 7 x 150,000L horizontal diesel fuel
- 1 x 35,000L hydraulic oil
- 1 x 35,000L engine oil

- 1 x 35,000L waste oil
- 1 x 20,000L transmission oil
- 1 x 15,000L gear oil
- 1 x 15,000L final drive oil
- 1 x 15,000L premixed coolant
- 1 x 10,000L waste coolant
- 2 x 150,000L vertical fuel storage tanks
- 2 x 25,000L oil storage tanks.

Refuelling, hardstand and wash bay area design would direct any contaminated surface water runoff to sumps for the recovery and treatment of waste materials.

The ROM coal would be transported from the pit area by dump trucks and either dumped directly into a 500 tonne (t) ROM hopper at the CHPP or stockpiled at 3 x 20,000t dumps. The EIS provided a detailed description of the CHPP and its operation. ROM coal would be processed at the CHPP located on MLA 50270 in the MIA. At full production, the CHPP would process up to 8.2Mt/yr of ROM coal whilst operating for 7,000 hours/yr to produce 5Mt/yr of thermal coal. Product coal from the CHPP would be conveyed to two separate product stockpiles with a 50,000-100,000t capacity. From the stockpiles, coal would then be conveyed to a 250t train load-out bin. Product coal would be transported on 11,000t capacity trains, via the proposed rail connections, to the Wiggins Island Coal Export Terminal (WICET) at Gladstone for export.

2.3 Tenures and tenements

The EIS provided real property descriptions and cadastral boundaries of properties underlying the project (MLA50254, MLA50270 and MLA50271) and the WSL rail and services corridor. The EIS stated that that the project and associated infrastructure would potentially affect 33 land parcels, six regional council roads, two stock routes and one State road. The EIS stated that the majority of properties underlying the project site are freehold and three parcels are leasehold. A camping and water reserve on ML50254, held as a Reserve by Trustees (currently Minister for Natural Resources and Mines as the Minister responsible for administering the *Land Act 1994*), would be affected by the project.

The EIS stated that five petroleum tenements are adjacent to or underlie the project area. Provisions under the *Mineral Resources Act 1989* (MR Act) require that the ML applicant make reasonable attempts to consult with the petroleum tenement holders and enter into a coordination arrangement that would facilitate the coordinated future development of both coal and petroleum resources. The EIS stated that Taroom Coal has been negotiating a Co-Development Agreement and its attendant Coordination Arrangement protocol with the relevant petroleum tenement holders since mid-2009. However the EIS did not provide an update of the status of those negotiations. The MR Act coal seam gas provisions do not apply to the project transport corridor MLA 50271 as the MLA would be for transportation purpose under section 316 of the MR Act, subject to section 318AY of the MR Act.

The EIS stated that mining tenure over the MLA areas would be sought under provisions of the MR Act while tenure over, or acquisition of, the land required to develop the WSL rail and services corridor would be available via a number of options. The EIS stated that the options are:

- compulsorily acquire the land pursuant to the *State Development and Public Works Organisation Act 1971* (SDPWO Act), including by the approval of the corridor as a 'private infrastructure facility'
- acquire the land under the *Transport Infrastructure Act 1994* (TI Act)
- obtain registered easements over the land.

The EIS also investigated options:

- private acquisition of the land
- mining tenure under the MR Act.

It concluded that these later options may prove difficult to implement.

The EIS did not identify a preferred tenure or acquisition of land option for pursuing to development of the WSL rail and services corridor.

2.4 Resource base and mine life

The EIS stated that the project mine plan was designed to extract all of the economically viable resource to the limits of the MLA50254 tenure boundary to the east and south-east over a planned operational mine life exceeding 32 years.

The EIS stated that coal resources were estimated in accordance with the Joint Ore Reserves Committee (JORC) Code and estimated the total *in-situ* coal resource was 259Mt. The depth of the coal varied from an estimated 161Mt at a depth of less than 50m, 95Mt between 50m and 100m depth and 4Mt at a depth greater than 100m but less than 150m.

The EIS stated that no known resources would be sterilised by the proposed mining activities.

The EIS proposed that mine operations would target the lowest strip ratio (approximately 20m of overburden) of coal in the initial years of the project, then move to other areas of increased strip ratio.

2.5 Mining methods and equipment

Vegetation clearing and stripping of up to 300mm of topsoil and subsoil would be undertaken before civil works. Topsoil and subsoil would be stockpiled and stored in separate stockpiles, shaped to reduce erosion, for later use in rehabilitation works.

The initial stage of installation of the MIA and accommodation village would be completed then earth moving equipment would excavate areas for the open-cut pit, spoil dumps, TSFs and internal transport corridors. Subsequent stages of the construction program would involve the development of remaining infrastructure including, the WSL rail and services corridor, water infrastructure, CHPP, accommodation village, roads and other associated infrastructure.

Mine operations would be continual (365 days per year and 24 hours per day) employing an estimated 300 people. All mining would be open-cut by drill and blast methods with a fleet of excavators and trucks to transfer waste rock to dumps and coal to the CHPP for processing along a dedicated haul road. Equipment would be diesel-powered earthmoving equipment including excavators, haul trucks, front end loaders, overburden drills, dozers, graders, water trucks, service trucks and light vehicles and buses.

Blasting would be conducted within relevant Queensland guidelines and the blasting procedures would be progressively refined as mining in the pits advanced.

The CHPP would process 8.2Mt/yr of ROM coal to produce an average 5Mt/yr of product coal. Overburden and interburden would be placed in both in-pit and out-of-pit spoil dumps. Processing through the CHPP would involve crushing, screening and washing to separate the coal from waste materials. Fine waste rejects would be partially dewatered, and when thickened pumped to dedicated TSFs for disposal. Recovered water would be recycled to the processing plant. Coarse rejects would be disposed in spoil dumps.

2.6 Creek diversion

The EIS stated that Horse Creek posed a significant surface constraint for mining activities in MLA 50254. Horse Creek is a tributary of the Dawson River and traverses the project from south to north. Horse Creek is defined as a 'watercourse' under the *Water Act 2000* and meanders centrally through MLA50254 and to the east of MLAs 50271 and 50270. Horse Creek has a significant catchment area including 539km^2 upstream of the mine, increasing to 746km^2 by the downstream boundary of the mine site. During a 1:50 year flood event Horse Creek breaks its banks and spills onto an approximately 1km wide flood plain.

The EIS stated that Horse Creek would have to be diverted around the mining operations to allow full exploitation of all coal resources. The EIS noted that the shallowest coal resource was underneath Horse Creek and that these resources would be targeted in the early stages. The EIS described the mining sequence and included a temporary and permanent diversion of Horse Creek. The mining sequence is described further in section 2.7 of this report.

The EIS stated that the diversion of Horse Creek would occur in four stages with the temporary diversions expected to be in place for less than three years and the final permanent diversion established within six years of mining commencing. The EIS stated that the final diversion would be constructed partly through placed spoil/fill and the overall plan would allow approximately 25–30 years for:

- monitoring the performance and stability of the diversion
- monitoring channel development
- making any necessary repairs to the diversion
- developing vegetation
- minimising of erosion and sediment runoff.

This is prior to the diversion being confirmed as a long-term stable landform before the end of mine operations.

The EIS stated the Horse Creek diversion functional design was undertaken in accordance with the DNRM Manual titled Works that interfere with water in a watercourse: watercourse diversions and considered the following outcomes as the basis for an EA approval:

- watercourse diversions incorporate natural features (including geomorphic and vegetation) present in the landscape and local watercourses
- watercourse diversions maintain the existing hydrologic characteristics of surface water and groundwater systems
- hydraulic characteristics of the watercourse diversion are comparable with other regional watercourses and are suitable for the region in which the diversion is located
- watercourse diversions maintain a sediment transport, and water quality regime that allows the diversion to be self-sustaining and not result in material or serious environmental harm to upstream and downstream reaches
- watercourse diversions and associated structures maintain stability and functionality and are appropriate for all substrate conditions they encounter.

The EIS summarised the comparison between the natural features of Horse Creek and the final creek diversion landform as follows:

- the diversion is shorter: Horse Creek valley length is approximately 9.52km long and stream length 11.45km, compared to the diversion valley length approximately 7.25km and stream length 8.15km
- the average grade of the diversion is steeper: Horse Creek average grade being replaced is 0.00114m/m, the diversion would be 0.00158m/m
- the diversion is straighter: Horse Creek stream sinuosity is approximately 1.2, the diversion sinuosity would be 1.12
- the diversion would have a narrower floodplain
- calculated flow characteristics of the diversion are higher than for Horse Creek for all flows due to the significantly steeper bed grade and narrower floodplain.

The EIS stated that the revegetation objectives and strategies for the temporary and permanent diversions were developed to meet the specific operational requirements for each stage of the diversion project. Further details regarding rehabilitation are discussed in section 4.22 of this report.

2.7 Mine sequencing

The EIS stated that the mine plan was designed to extract all of the economically viable coal resource with the limits of MLA50254, that mine sequencing was estimated for more than 32 years and that processing of stockpiles would continue beyond the estimated mine life.

The EIS stated that the mine schedule chose to mine the coal resources in the central part of ML50254 first based on their low strip ratio. The relatively shallow depth of first coal, under approximately 20m of overburden, would require only a short period of time to establish an initial box cut, working face and working room to mine the coal resource. The amount of mine equipment employed throughout the project would vary, including based on strip ratio and the number of active working sections.

The EIS stated that the mine plan would allow for mining of all coal to the MLA's south and east boundaries, subject to profitability and market conditions later in the mine life.

Initial out-of-pit spoil dumps would be located in a cleared zone to the north and a high strip ratio area to the southwest.

The EIS estimated that from initial operations it would take approximately 36 months to ramp up to the full processing rate of approximately 8.2Mt/yr of ROM coal.

The EIS presented staged plans showing the coal face positions and the sequence of operations for Years 1, 2, 3, 4, 5, 8, 10, 15, 20 and End of Mining. The plans showed the physical extent of excavations, location of stockpiles of topsoil and overburden, proposed progressive backfilling of excavations, water management infrastructure and the area disturbed at each major stage of the project. Infrastructure developments within MLA50270 and MLA50271 would be completely developed prior to the commencement of mining operations and are further discussed in section 2.2 of this report.

2.8 Waste management

2.8.1 Waste rock

The EIS stated that excavated waste rock (overburden and interburden material extracted to get to the coal) would be made up of sandstone, siltstone, claystone, and mudstone rock and it would be disposed of into:

- two out-of-pit dumps: one in the south-western corner and one in the northern section of the southern mining lease area (MLA50254)

- the in-pit space behind the mining void, after the initial box-cut becomes available.

The out-of-pit spoil dumps would be constructed in 15m lifts to a maximum height of 50-70m above the natural ground level. Their walls would have a maximum final slope of 1V:6H and the new landform would cover approximately 183ha. The EIS stated that the outer slope geometry, adjacent drainage and proposed surface treatment would ensure adequate geotechnical stability and safe accessibility, while minimising the catchment and erosion potential of the slope.

According to the mine plan 1,152,535,104 bank cubic metre (bcm) (i.e. a cubic metre of rock or material *in situ* before it is excavated) of waste rock material would be excavated for the project. When excavated, the waste volume is expected to swell by a factor of 1.05–1.3. Due to that swelling effect, in-pit dumps would be elevated above the natural surface level to a maximum height of 40-50m. The in-pit waste rock dump final landform slope and lift height design parameters would be the same as those for out-of-pit dumps.

The EIS stated that waste rock, including overburden, interburden, floor and ceiling material, washery waste and coal would not likely be acid producing nor release significant salinity, metals or metalloids. It concluded therefore that special handling or management measures such as mine material segregation, selective placement and engineered covers for acid rock drainage (ARD) or neutral drainage control would not be required.

The EIS did note that overburden and interburden would be sodic and dispersive and be subject to surface crusting and high erosion rates if placed in the surface of spoil dumps or exposed directly to rainfall. Management measures proposed therefore included preferential placement of spoil material with sodic and dispersion potential away from dump surface areas. In particular, the EIS committed that stripped subsoil clay texture or heavier soils, or any dispersive soil, would not be mixed with topsoil for reuse and that dump surface materials or materials used in engineered structures (i.e. TSFs) would be treated with gypsum or lime if erosion could not be controlled.

On closure the two waste rock dump out-of-pit final landforms would project 50-70m above the natural ground surface and they would be designed to be water shedding, with rock lined drains directing surface flows to sediment dams to manage surface runoff

2.8.2 Tailings storage facility

The EIS stated that the tailings dams would be designed and constructed in accordance with the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland and would have sufficient capacity to store all the waste produced by the project.

The EIS stated that coarse rejects would be transported from the CHPP to the rejects stacking conveyor that would transport the material to a rejects bunker located on the ROM pad. Rejects discharged to the bunker would be taken by truck to the spoil dump for disposal. Fine rejects would be thickened then pumped along twin 1.8km pipelines to the TSFs for disposal. Tailings return water would be pumped to the industrial water dam for reuse.

The EIS stated that fine tailings from the CHPP would be initially deposited into two surface TSFs and from around Year 10, once mining was completed within the northern void, the residual void would thereafter be used as a tailings dam to dispose fine rejects (Tailings Dam Pit (TDP)). The EIS noted that the disposal of tailings into the two surface TSFs would be cycled intermittently in lifts of approximately 1m to allow consolidation/drying of tailings, to improve their shear strength and lower the overall rate of fill of the TSFs. Supernatant water from surface TSFs would be recycled back to the CHPP.

The EIS stated that the two proposed TSFs would have capacities of 11.6 and 9.9 million m^3 which would include a final freeboard of 2m for temporary stormwater storage and future rehabilitation purposes. Together the TSFs would accommodate approximately 16 years of projected tailings production. The EIS stated that the surface TSF containment walls would be designed, constructed and supervised by a suitably qualified, experienced and Registered Geotechnical Engineer and built in a series of stages of variable height to a maximum of 16m above the natural ground level. The slope ratio of their wall surfaces would be 1V:3H for erosion and stability. The TSFs would be capped (slope ratio of 1V:100H) and their surface rehabilitated.

The proposed in-pit TDP has a modelled capacity of 38.3 million m^3 and once available would be used for tailings disposal until the end of mine life in Year 32. At that time it would have a final landform level approximately 11m below ground level. The EIS stated that this would mean that the tailings would therefore be deposited into more porous weathered natural material which is estimated to be at about 25m below ground. The EIS concluded that the clay-rich nature of the pit walls would minimise tailings leachate seeping through the pit walls. The EIS proposes that on site clay would be a suitable liner for the surface TSFs.

The EIS described the risks associated with the TSFs as including rise in surrounding groundwater, potential seepage, decreased groundwater quality and geotechnical stability of bund walls. It proposed a groundwater monitoring program, including leakage detection system to manage potential hazards and risks. The EIS also stated that any release from surface TSFs that is unable to be contained within the ML boundary would flow into Horse Creek and impact on downstream environmental and social values.

2.8.3 General waste

The EIS adequately addressed the management of general and recycled waste generated by the project. The EIS noted that the preferred option was for general mine wastes that could not be recycled or reused to be removed from site by a licenced contractor and appropriately disposed of at suitably licenced landfill facilities. However, the EIS also stated that some general mine waste would be disposed of into the TSFs.

2.8.4 Regulated waste

The EIS adequately addressed the management of regulated waste generated by the project. All regulated waste generated by the project would be segregated, stored and managed in accordance with relevant legislation and then collected by an appropriately licensed contractor and either disposed of or recycled at a licensed waste management facilities.

2.8.5 Mine water management, supply and storage

The EIS adequately addressed the mine water management system including water usage, supply, storage, management and required approvals.

The EIS stated that approximately 800 Megalitres per year (ML/yr) of raw water would be required during the construction stage of the project, based on 200ML/yr for dust suppression, 500ML/yr for earthworks moisture adjustment, 80ML/yr for potable water and 20ML/yr for concrete mixing.

The EIS calculated the maximum water usage demands for the project would be 3,566 ML/yr in Year 20 including:

- 87ML/yr for potable water demands
- 2,300ML/yr for CHPP make up water demands
- 293ML/yr for dust suppression water demands (north water fill point)
- 886ML/yr for dust suppression water demands (south water fill point).

The EIS stated that the project's water supply would be sourced from connection to SunWater Limited's water distribution network; this would include a dedicated pipeline within the WSL rail and services corridor. The expected water supply would initially be treated groundwater from CSG dewatering operations and could later include a supply from Nathan Dam if that were completed. The EIS made no assessment of the reliability of any external water supply other than to state that details of sourcing the external water supply would be the responsibility of SunWater as the commercial water supplier.

The EIS stated that the externally supplied water would be pumped to a raw water dam within the MIA and it would be suitable for use in the CHPP and for dust suppression on the mine site. The external water supply is expected to have total dissolved solids (TDS) in the order of 200mg/L and salinity (electrical conductivity (EC)) of 300µS/cm.

The EIS stated that the potable water demands would require on-site treatment of the raw water to meet appropriate standards for human consumption. A water filtration system was proposed rather than a reverse osmosis (RO) plant, however, the EIS did not provide detail of the design of the plant nor any associated waste streams.

The EIS stated that it was not feasible to provide a water supply option for the mine site which is 100% reliable for all water usage demands, under all possible climate conditions. The EIS concluded that that the required sizes of the raw water dams required to achieve 100% reliability for all water usage demands, under all possible climate conditions, would be too expensive. Consequently, to manage this shortfall the EIS water management strategy was to ensure that the potable and CHPP water demands were provided with 100% reliability, but that the water supply would not be available for dust suppression in some scenarios. For example the EIS stated that for some points on the mine dust suppression water would be inadequate for between 23-200 days per year. It was not clarified what this lack of water meant for air emission management.

The EIS water management strategy described management measures to minimise the potential impact on downstream watercourses and environmental values.

2.8.6 Sewage treatment

The EIS stated that a minimum of a 50 equivalent person capacity sewage treatment plant (STP) would be required to treat the project's effluent from the proposed accommodation village, MIA and CHPP. The EIS provided sufficient information on the STP design for the purpose of the EIS assessment. The STP would be designed to achieve Class A effluent quality and consist of a permanent module with capacity of 135kL/day and a temporary module with capacity of 50kL/day during the construction phase of the project. The treatment plant is anticipated to produce approximately 240L/capita/day during peak operation. Temporary storage facilities for effluent, such as portaloos, would be required at major construction site and WSL rail and services corridor construction site camps.

These would be scheduled to be replaced every 2–3 days for disposal at an authorised off-site sewage treatment plant.

The EIS stated that the treated effluent would be monitored for pH, BOD, TSS, N, P, faecal coliforms and E-coli prior to being irrigated via low height sprays at a 133m^2 designated effluent irrigation area. An effluent disposal system would be implemented to ensure that spray drift does not occur to any sensitive or commercial place and no surface runoff from the effluent disposal area takes place. The area would be fenced-off, sign-posted, and would exclude entry of unauthorised persons or livestock.

2.9 Rehabilitation and decommissioning

Rehabilitation of disturbed areas would be carried out progressively throughout the life of the project. The stated objective of the rehabilitation strategy is to return areas affected by mining activities to a stable, non-eroding, and safe condition with biologically sustainable ecosystems, requiring minimum long-term management. The EIS proposed that post-mining land use should be reinstated to the previous pre-mining land use on mine site (i.e. low intensity grazing) except for residual voids where lower land value is expected at the end of mine life. A mine closure plan was not developed as part of the EIS. The EIS included a commitment to develop a mine closure plan that included the specifics of rehabilitation and decommissioning. However this would be provided during the operational stage of the project.

2.9.1 Final voids

The EIS identified that, at mine closure, at least two final voids of approximately 230ha and 150ha would remain in the south-eastern and south-western parts of MLA50254. The EIS stated that, in addition, depending on the volume of tailings placed in the in-pit TSF, there could be a third final void. The EIS stated that final voids would only have direct rainfall inputs which would accumulate in the void with groundwater. Surface water would be prevented from entering the voids by installation of interceptor drainage channels and drains directing surface water flows away. As part of the final creek diversion, levees would be constructed along the eastern side, southern side, and part of the western side of the south-western mining void. The EIS stated that the levees would be built from competent material, including rock armouring, to provide hard erosion protection until vegetation could provide adequate stabilisation protection; this was stated as sufficient to prevent inundation of the void by flood water from up to a probable maximum flood (PMF) event.

The EIS noted the risk of large volumes of surface water leaking from the diverted Horse Creek channel through the placed mining spoil and then into the final voids. The south-western final would be located approximately 700m from the diverted Horse Creek channel and the eastern void approximately 3500m. Consequently, the EIS noted that the diversion channel would be designed and constructed to minimise the potential for leakage into the underlying spoil material. This would require the selection of competent bedding material which is relatively impermeable for the diversion channel bed and suitable construction techniques applied to achieve reliable compaction of that bedding material to minimise any potential leakage.

The EIS estimated that water levels in the final voids would not stabilise for about 750 years post mining.

The EIS stated that safety bund walls would be constructed around each final void from suitable rock or the voids would otherwise be fenced, depending on final landform, to limit access to people, wildlife and livestock. The safety bund would be constructed in accordance with the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, including with a minimum height of 2m and be located at least 10m beyond the area potentially affected by any instability of the pit edge. Clearly the final voids would result in a lower land use value than existed prior to mining.

The EIS did not adequately discuss the expected long-term water quality of the final voids, however did provide an estimate of the predicted water level below the final formed landform ground level, the time period required for the water level in the voids to reach equilibrium and how this compares to the pre-mining groundwater level. The EM plan would be required to be updated to include further information on water quality characteristics (e.g. modelled end-of-mine TDS) for the residual voids.

2.10 Transport

The project is centrally located between the Leichhardt Highway and the Roma-Taroom Road. Access to the mine site from these major transport corridors is via a network of local roads. The existing State and local road network is used for a variety of purposes including general traffic for private and commercial purposes and movement of agricultural and farm equipment and stock.

During the project's projected 24 month construction period, heavy road transport vehicles would transport sand, gravel and crushed rock from local quarries to the project site along with bitumen, cement, pre-cast concrete

structures, pre-fabricated buildings, structural steel and reinforcing and oversized specialised and miscellaneous items. The EIS estimated approximately 26,344 truckloads of plant and bulk material would be transported to the project site from Brisbane, Gladstone and from within the local area.

During operations road transport would be required to move materials such as diesel fuel, explosives, mine products, supplies and mine workers to and from the site.

Transport infrastructure used during the operation stage of the project would include:

- the local rood network managed by WDRC including Nathan, Booral, Grosmont, Perretts, Kabunga, Goldens, Ryals and Bundi Roads
- State Controlled Road (SCR) Network managed by the Department of Transport and Main Roads (DTMR) including Roma-Taroom and Jackson-Wandoan Roads, Leichhardt, Warrego and Burnett Highways
- rail networks including the proposed West Surat Link (WSL) and Surat Basin Rail Project, and Aurizon Central Queensland Coal Network Moura System and Aldoga Connection
- airports including at Taroom, Maryborough and Hervey Bay
- port facilities including the WICET at Gladstone.

For the project to be fully developed, it would require temporary road closures, new sections of road, road-rail interfaces and road relocations within and adjacent to the MLA's and along the WSL rail and services corridor.

The mine service road network would be constructed during the construction stage to form heavy vehicle ROM coal haul roads and light vehicle mine service roads.

The EIS stated that Perretts Road is a significant surface constraint to mining and that design and construction approval from the DTMR and WDRC would be required for the public road relocations and closures to proceed.

Construction of the WSL rail and services corridor would require alteration of the existing road network, including one crossing on the Leichhardt Highway and five crossings at Nathan, Booral, Grosmont, Kabunga and Perretts Roads. Detailed crossing locations were not provided in the EIS as they would be subject to further rail alignment development and approvals from the DTMR and WDRC.

The EIS noted that construction of the WSL rail and services corridor would require alteration of an existing travelling stock route crossing (AAP14857) and 17 private landholder and public crossings. Commitments in the EIS included that crossings would be designed to allow for vehicles, oversized farm machinery and stock movement via either underpasses or bridges at rail line level. Clearances for rail over road crossings would allow for oversized vehicles such as those used for loading houses and mine equipment.

All final upgrades would be designed in accordance with DTMR and WDRC guidelines and requirements. The EIS committed to providing the necessary information to DTMR and WDRC in the detailed design stage of the project.

The EIS estimated that during operations an average of four train movements would be required each day, two trains to WICET at Gladstone and two back to the mine. The EIS anticipated that third parties would also use the WSL rail and services corridor to transport their coal to port. The EIS committed to minimise coal dust emissions from rail wagons by profiling the surface and sealing it with a polymer coating at the rail load-out facility.

2.11 Energy

The EIS stated that during the early construction phase, the project's on-site power needs (MIA, accommodation village and STP) would be provided by mobile diesel generators. The EIS estimated that approximately 759 MegaWatt hours (MWh) per month would be needed at that time. Mobile generators would be subsequently replaced with a permanent grid connection to either the Wandoan or Wandoan South substations.

At full production, during the operational phase, electrical power demand for the accommodation village, CHPP, MIA, water management system and train load-out facility was estimated at 17,000MWh per year.

The permanent power supply to the project would be via a 66 kilovolt (kV) high voltage connection. The EIS stated that the Wandoan South substation is the preferred option based on initial advice from Ergon Energy and that some mobile generator units would remain on-site as back-up for emergency use.

The approvals, regulation and potential impacts of the permanent connection to the mine site were discussed in the EIS.

2.12 Workforce and accommodation

The project would employ a peak construction and commissioning workforce of approximately 500 employees. It would then scale down to an operational workforce of approximately 300 full-time staff at full production, with the potential for additional employees during major operations and special tasks. The construction period shift rotation

proposed is a 10 days on, 4 days off, 10 hour shift roster with the bulk of works taking place during daylight hours. The operational workforce would work a shift rotation of two 12 hour shifts per day, rotating seven days on then seven days off all year round.

The EIS stated that the project's employment strategy was developed on a Fly-In Fly-Out (FIFO) basis and that 95% of the workforce would be sourced and transported on chartered flights to Taroom airport, or an alternative unspecified transport hub, from the Fraser Coast Region and from there bussed-in bussed-out (BIBO) to the mine site. The EIS stated that the 5% of the workforce would be sourced from within the local and wider Wandoan-Taroom WDRC region. These workers would likely travel daily in private vehicles to the mine site, from local towns within an approximate 1 hour drive of the project area.

The accommodation village for the project would be located on the northern MLA50270 approximately 1.7km north of the MIA and CHPP. The village would initially service the construction workforce for a 22-24 month period before being converted to a full operational village. The majority of the construction workforce would be accommodated in the initial 300 bed village, increasing during the project life to accommodate workforce increases, and mine maintenance operations such as CHPP shut down. The village would be constructed using mostly relocatable buildings that would be manufactured offsite.

The EIS stated that no overnight accommodation facilities would be required during the construction of the WSL rail and services corridor. The WSL rail and services corridor construction workforce would be located within the mine accommodation village and BIBO to the construction camp or alternatively accommodated at third party owned and operated accommodation facilities in the Wandoan and Taroom area.

3 The EIS process

3.1 Timeline of the EIS process

On 31 March 2008 the project was referred to the Australia Government to determine whether the proposed action would need assessment and approval under the Commonwealth EPBC Act. On 1 May 2008, the Commonwealth decided (EPBC 2008/4130) that the proposed action was not a controlled action under the EPBC Act.

On 15 June 2009 Taroom Coal applied to the (then) DERM, now the EHP for an EA (Mining Activities) for a Non-code Compliant Level 1 mining project. On 26 June 2009 EHP decided that the application would be assessed as a Non-code Compliant Level 1 mining project and an EIS would be required. Taroom Coal was advised on 29 June 2009 to submit a draft TOR which would commence the EIS process. Consequently, this EIS assessment process is covered under the transitional arrangements under the *Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012*.

On 30 September 2009 EHP received a copy of the draft TOR, an updated Initial Advice Statement (IAS) dated September 2009 and list of interested and affected persons. EHP prepared the draft TOR notice under section 42(1) for public notification on 24 October 2009. On 22 October 2009 Taroom Coal formally requested a withdrawal of the draft TOR, stating that the withdrawal was due to unforseen changes in the timing of a mining lease application for the project.

On 29 October 2009 EHP received a resubmitted draft TOR, IAS and list of interested and affected persons which recommenced the EIS process. On 18 November 2009 EHP notified Taroom Coal of its decision to publish the draft TOR in: The Brisbane Courier-Mail and Toowoomba Chronicle on Saturday 21 November 2009; and the Chinchilla News and Murilla Advertiser on Thursday 26 November 2009. Copies of the draft TOR were circulated to all advisory bodies. The comment period for the draft TOR was from Monday 23 November 2009 until close of business on Tuesday 19 January 2010.

EHP received comments on the draft TOR from six advisory bodies and stakeholders during the comment period and three other comments after the comment period. All comments, including one from EHP, were forwarded to Taroom Coal on 3 February 2010. On 22 February 2010 Taroom Coal requested, and EHP agreed to, a longer period to respond to comments received on the draft TOR. Taroom Coal responded to the comments on 24 March 2010 and EHP published the final TOR on 23 April 2010, taking into account all comments and Taroom Coal's response to those comments.

On 16 April 2012 Taroom Coal submitted an EIS for EHP's review and decision under section 49(1) of the EP Act whether to allow the EIS to proceed to the notification stage. On initial review EHP advised Taroom Coal that critical elements were missing from the EIS. Consequently, on 14 May 2010 Taroom Coal requested that EHP extend its decision period by eight months before considering the EIS and deciding whether to allow it to proceed. At that time Taroom Coal also sought a longer period of eight months for its submission of the EIS under section 47(1)(b) of the EP Act. On 15 May 2012 EHP decided to extend the period under section 49(1) of the EP Act until 16 January 2013 on the condition that Taroom Coal makes its amendments to the EIS by 4 December 2012. EHP's

reason for the extension was to allow time for:

- Taroom Coal to amend the EIS to adequately address the final TOR, in particular by providing additional information about the WSL rail and services corridor
- EHP to consider the amended EIS and to make a decision on whether the EIS may proceed under section 49(1) of the EP Act.

An initially incomplete revised EIS was submitted to EHP for review on 29 November 2012 and the complete revised EIS was provided to EHP on 30 November 2012. On 7 January 2013 EHP decided that the submitted EIS with the required updates could proceed to public notification and that the submission period would be from 8 February 2012 to 21 March 2012. Taroom Coal published the EIS notice in The Brisbane Courier-Mail on 2 February 2012 and the Chinchilla News on 7 February 2012. On 8 February 2012 the EHP website noted the start of the submission period for the EIS.

On 15 February 2013 EHP received an incomplete statutory declaration from Taroom Coal for the purposes of section 53 of the EP Act. That declaration did not include the addresses of each interested and affected person to whom the EIS notice was given, nor the date the EIS notice was provided to them. On 19 February 2013 Taroom Coal resubmitted another statutory declaration which included the address of, and the date the EIS notice was provided to each interested and affected person.

Twenty eight submissions on the EIS were received by EHP, including four that, despite being received outside the comment period, were accepted as properly made submissions. EHP provided those and its own submission to Taroom Coal on 5 April 2013 and advised Taroom Coal that it's response to all submissions and relevant amendments to the EIS was due on or before 6 May 2013.

Submitters included 18 State government departments and agencies, the Banana Shire Council, Western Downs Region Council, Skills Queensland, The Fitzroy Basin Association Inc., Wildlife Preservation Society of Queensland, Powerlink Queensland, Ergon Energy, Aurizon, Xstrata Coal Queensland Pty Ltd and a landholder.

On 2 May 2013 Taroom Coal sought an extension of time within which to make the response to submissions. On 6 May 2013 Taroom Coal was granted until 28 April 2014 within which to submit the response to submissions and an amended or replaced EIS.

On 28 April 2014 Taroom Coal submitted an amended EIS responding to submissions and an EIS amendment notice as required under section 66 of the EP Act.

On 26 May 2012, under section 56A of the EP Act, EHP decided that the submitted EIS could proceed to the assessment report phase. A notice of that decision was given to Taroom Coal on 10 June 2012.

This assessment report is the final action and giving it to Taroom Coal completes the EIS process.

3.2 Approvals

Table 1 - Project approvals

Approval	Legislation (Administering Authority)
Environmental Protection Regulation 2008, activities that would otherwise be ERAs Schedule 2 Chemical storage (ERA 8), Fuel burning (ERA 15), Extractive and screening activities (ERA 16), Mineral processing (ERA 31), Crushing, milling, grinding or screening (ERA 33), Bulk material handling (ERA 50), Regulated waste storage (ERA 56), Waste disposal (ERA 60), Sewage treatment (ERA 63) Schedule 2A Mining black coal Offset management plan	*Environmental Protection Act 1994* (Department of Environment and Heritage Protection)
Permit for clearing remnant vegetation. WSL rail	*Vegetation Management Act 1999* (Department of

Approval	Legislation (Administering Authority)
and services corridor	Natural Resources and Mines)
The project requires leases to be approved for mining lease application 50254, 50270 and 50271	*Mineral Resources Act 1989* (Department of Natural Resource and Mines)
Strategic cropping land approval – trigger mapping identified that ML has potential SCL – Validation application identified the land is within a Management Area	*Regional Planning Interests Act 2013* (RPI Act) (commenced on 13 June 2014) (Department of State Development, Infrastructure and Planning / Department of Natural Resource and Mines) Section 96 of the RPI Act repeals the *Strategic Cropping Land Act 2011*(SCL Act).There are transitional provisions in the RPI Act for the repealed SCL Act: • transitional provisions begin at section 97 (definitions) • section 98 - validation applications not yet decided will, at the commencement of the RPI Act, continue to be dealt with and decided on under the SCL Act.
Water licences (taking or interfering with water, other than diversion of a defined watercourse)	*Water Act 2000* (Department of Natural Resource and Mines) Section 20 of the *Water Act 2000* states under General authorisations: (4) A person may interfere with water if - (a) the interference is a diversion of a watercourse and is associated with a resource activity; and (b) the impacts of the interference were assessed as part of a grant of an environmental authority for the resource activity; and (c) the environmental authority was granted with a condition about the diversion of the watercourse. (5) In this section - resource activity see the *Environmental Protection Act 1994*, section 107.
Interfere with forest products or quarry material – WSL rail and services corridor	*Forestry Act 1959* (Department of Agriculture, Fisheries and Forestry)
Infrastructure on unallocated State Land or reserves - Reserve for traveling stock includes: camping and water reserve, pasture reserve and trucking reserve	*Land Act 1994* (Department of Natural Resources and Mines)
Road diversion/infrastructure approvals	*Transport Infrastructure Act 1994* (Department of Transport and Mains Roads) *Local Government Act 2013* (Western Downs Regional Council)

Approval	Legislation (Administering Authority)
Camping reserve (on MLA) and stock route crossings on WSL rail and services corridor	*Land Protection (Pest and Stock Route Management) Act 2002* (Department of Agriculture Fisheries and Forestry)
Permits for the clearing of protected plants, to take wildlife and damage mitigation permit	*Nature Conservation Act 1992* (Department of Environment and Heritage)
Road diversions and development of the WSL rail and services corridor	*Transport Infrastructure Act 1994* (Department of Transport and Main Roads)
Use, possession, storage, transportation of explosives	*Explosives Act 1999* (Department of Natural Resources and Mines)
Operational works approval for the construction or raising of a waterway barrier works outside the MLA. Other assessable development for which a development application is required for the WSL rail and services corridor	*Sustainable Planning Act 2009* (Department of State Development, Infrastructure and Planning) *Fisheries Act 1994* (Department of Agriculture Fisheries and Forestry)
WSL rail and services corridor tenure or land acquisition options: a. compulsorily acquire the land pursuant to the *State Development and Public Works Organisation Act 1971*, including by the approval of the corridor as obtaining a declaration of 'private infrastructure facility' b. acquire the land under *the Transport Infrastructure Act 1994* c. obtain registered easements over the land. d. private acquisition of the land e. mining tenure under the *Mineral Resources Act 1989*	*State Development and Public Works Organisation Act 1971* *Transport Infrastructure Act 1994* *Mineral Resources Act 1989*

Note: *Table 1 does not necessarily list all possible legislative approvals that may be required.*

3.2.1 Mineral Resources Act 1989

An exploration permit issued under chapter 4 of the *Mineral Resources Act 1989*, allows the holder to undertake exploration activities on the permit land. Exploration permits act also as a prerequisite for acquiring higher forms of tenure. Taroom Coal holds mining lease applications (MLA) over the proposed mine area, namely for mining lease application 50254, 50270 and 50271. To implement the project these applications would require approval.

3.2.2 Environmental Protection Act 1994

The conduct of proposed project activities within the MLA would require an EA under chapter 5 of the EP Act. This approval would cover mining and the activities listed as environmentally relevant activities (ERA) under schedules 2 and 2A of the Environmental Protection Regulation 2008 (EP Reg) that are directly associated with, or facilitate or support, the mining activities. Relevant ERAs for the project include: Mining black coal; Chemical storage (ERA 8); Fuel burning (ERA 15); Extractive and screening activities (ERA 16); Mineral processing (ERA 31); Crushing, milling, grinding or screening (ERA 33); Bulk material handling (ERA 50); Regulated waste storage (ERA 56); Waste disposal (ERA 60); and Sewage treatment (ERA 63).

The EIS identified and listed the following notifiable activities under Schedule 3 of the EP Act that would apply to

the project:

- Notifiable Activity 24, Mine wastes

  (a) storing hazardous mine or exploration wastes, including, for example, tailings dams, overburden or waste rock dumps containing hazardous contaminants; or

  (b) exploring for, or mining or processing, minerals in a way that exposes faces, or releases groundwater, containing hazardous contaminants.

The EIS also identified that Notifiable Activity 22, Livestock dip or spray race operations - operating a livestock dip or spray race facility has occurred on Lot 38 on AB188 and that contaminated soil was identified. The land was subsequently listed on Environmental Management Register (EMR) on 28 August 2012. The EM plan should be updated to ensure the identified contaminated land is clearly delineated, contamination remediated and/or management strategies proposed to ensure the risks to human health and the environment with regard to contaminated land matters are adequately managed during construction and operational phases of the project.

The project would be required to provide notification to the EMR for all notifiable activities and the identified notifiable activities should be clearly identified and listed in the EM plan. Any notifiable activity, as defined under Schedule 3 of the EP Act would be a relevant mining activity if it is directly associated with, or supports or facilitates, the mining or processing of coal on the project's tenures. For potential contaminated land on-site (e.g. landfill), Taroom Coal is required to address the following:

- any disturbance or work associated with contaminated land (including hazardous contaminants and notifiable activities) should be undertaken in consultation with a suitably qualified person in accordance with section 564 of the EP Act and management should be in accordance with provisions under part 8 Contaminated Land of the EP Act
- should Taroom Coal become aware of any contaminant present on-site, they have an obligation under section 371 of the EP Act to notify EHP as the administering authority
- the administering authority should be advised of any notifiable activity occurring on the MLA
- if it is confirmed that land has been contaminated, regardless of whether or not a notifiable activity is occurring, EHP should be advised in accordance with section 371 of the EP Act.

At the time of the preparation of the EIS a water licence to interfere under the *Water Act 2000* was required for the diversion of Horse Creek. However, this authorisation is currently being transitioned to the EP Act. The assessment of the diversion has been undertaken on the basis that this change would be in place by the time the draft EA is notified.

3.2.3 Water Act 2000

The *Water Act 2000* provides for the sustainable management of water and other resources and the establishment and operation of water authorities. The act enables the granting of various water licences and permits.

The EIS stated that Taroom Coal is not seeking a water allocation from the Fitzroy Basin under the Water Resource (Fitzroy Basin) Plan 2011 rather it is seeking to source its external water supply through an agreement with SunWater. The EIS stated that ownership of the water entitlement and the associated rights to supply would remain with SunWater.

However, a water licence under the *Water Act 2000* would be required to take or interfere with groundwater for pit dewatering purposes for the project.

The EIS stated that Raw Water Dams RW2, RW3 and RW4 would take overland flow as they are required to prevent runoff from overflowing into the operating pits. The EIS stated that they would have a design capacity of no more than 50ML and they would therefore not trigger the taking of overland flow criteria in the Water Resource (Fitzroy Basin) Plan 2011.

3.2.4 Aboriginal Cultural Heritage Act 2003

A cultural heritage management plan (CHMP) would be required under the *Aboriginal Cultural Heritage Act 2003* (ACH Act) prior to approvals being issued for the project. The EIS stated that a CHMP between Taroom Coal and the Traditional Owners, the Iman #2 People was approved under Part 7 of the ACH Act on 13 February 2014, and that details of the plan are included on the Cultural Heritage Register maintained by the Cultural Heritage Unit of the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA). The EIS stated that, in accordance with the CHMP, Taroom Coal intends to engage the Iman #2 People to conduct cultural heritage surveys over the project site and infrastructure areas ahead of any disturbance. Taroom Coal committed to manage any potential impact to Indigenous cultural heritage values in accordance with the CHMP.

3.2.5 Nature Conservation Act 1992

Taroom Coal would need to comply with the *Nature Conservation Act 1992* (NC Act), particularly in regard to obtaining the following approvals for the project:

- where there is a requirement for the clearing of plants protected under the NC Act, clearing of protected plants must only occur in accordance with an exemption under the NC Act.
- where activities may cause disturbance to animal breeding places, Taroom Coal must prepare a species management program and obtain approval from EHP.
- a spotter catcher employed by the project must be in possession of a rehabilitation permit (spotter catcher endorsement) for managing fauna during clearing activities
- if it is necessary to remove animals posing a threat to human health or property, a damage mitigation permit would be required.

3.2.6 Queensland Heritage Act 1992

The EIS stated that a Non-Indigenous Cultural Heritage Assessment was undertaken to identify and assess the nature and significance of cultural heritage within the project area. From a Non-Indigenous cultural heritage perspective surveys of the project site found low levels of local European cultural heritage significance, representing the cattle industry, transport and communication, closer settlement patterns dating from the 1950s and the mixed cultivation industry. In accordance with the *Queensland Heritage Act 1992*, Taroom Coal would need to notify EHP if an archaeological artefact is discovered and provide information on the location and description of the discovery. A Historical Heritage Management Plan (HHMP) was provided in the EIS and included procedures for reporting discoveries of artefacts and burials and recommendations for handling impacted heritage values potentially impacted by the project.

3.2.7 Transport Infrastructure Act 1994

To ensure compliance with the *Transport Infrastructure Act 1994* and *Transport Operations (Road Use Management) Act 1995* Taroom Coal would need to consult with the DTMR on all matters concerning:

- road impacts assessments
- road-use management plans
- investigation of potential road safety hot spots.

Taroom Coal would need to apply for permits for over-dimension loads and road corridor permits. Section 4.15 of this assessment report provides further information on transport related approvals.

3.3 Consultation program

3.3.1 Public consultation

Taroom Coal undertook the statutory requirements for advertising the TOR, EIS and notices to interested and affected parties. The EIS carried out a social impact assessment (SIA) to collect and analyse information about key social and cultural issues, population change and communities and social relationships that are likely to occur as a direct or indirect result of the project. Information collected for the SIA was through a desktop review and direct consultation and engagement with individuals, affected and interested persons, key community leaders, organisations, stakeholders and local and State government representatives by:

- organising and conducting face-to-face meetings and information sessions
- preparing and distributing a postal questionnaire to affected and interested community members to identify priority community issues that may affect the project
- producing a questions and answers document in response to feedback to ensure consistency when communicating with stakeholders
- producing an information package, including mailing a fact sheet to affected landholders and stakeholders
- presenting to gatherings of stakeholders and other interested groups
- facilitating Landholder Agreements.

Taroom Coal organised face-to-face meetings with affected landholders and key community members in December 2011 and further community information sessions were held in Wandoan and Taroom in February 2012.

During the public submission period of the EIS, Taroom Coal conducted briefings on the project for State government advisory agencies in Brisbane, Toowoomba and Rockhampton in late February and early March 2013. A regional advisory body briefing session and site visit were scheduled for 5 March 2013 but were cancelled due to poor weather.

The EIS listed the stakeholders, engagements completed including stakeholders, landholders and number of community members consulted and the resources applied. The EIS stated that the issues raised were then responded to in follow up sessions and regular newsletter circulated locally and to interested persons. A summary of stakeholders key issues raised during the pre EIS consultation program was provided in the EIS. The issues included, dust, clearing, rehabilitation, traffic, noise, water, light, blasting, cultural heritage, employment, training and community and economic impacts. Those issues were also subsequently discussed in the relevant sections of the EIS.

3.3.2 Advisory bodies

EHP invited a range of organisations to assist in its assessment of the TOR and EIS by participating as members of the EIS advisory body including (original names per 2009):

- Department of Communities
- Department of Infrastructure and Planning
- Department of Employment, Economic Development and Innovation
- Department of Transport and Main Roads
- Department of Education and Training
- Department of Emergency Services
- Department of Public Works
- Department of Tourism, Regional Development and Training
- Queensland Health
- Queensland Police Service
- Queensland Treasury
- QR National
- Skills Queensland
- Western Downs Regional Council
- Ergon Energy
- Powerlink Queensland
- Fitzroy Basin Association Inc.
- Wildlife Preservation Society Queensland Inc.
- Construction, Forestry, Mining & Energy Union

State Government changes

During the EIS process, a significant number of those parties were restructured and or changed names and in accordance with the Public Service Departmental Arrangements Notice (No.1) 2012, the changes noted in Table 1 became effective on 3 April 2012 to the Queensland Government Departments referred to in this report.

Table 1 Changes to Queensland Government Departments

New Department (as of 3 April 2012)	Previous Department(s) / Amalgamations
Department of State Development, Infrastructure and Planning	Department of Employment, Economic Development and Innovation
Queensland Treasury and Trade	Queensland Treasury / Department of Employment, Economic Development and Innovation
Department of Science, Information Technology, Innovation and the Arts	Department of Employment, Economic Development and Innovation / Department of Housing and Public Works / Department of Environment and Resource Management
Department of Natural Resources and Mines	Department of Employment, Economic Development and Innovation / Department of Environment and Resource Management
Department of Agriculture, Fisheries and Forestry	Department of Employment, Economic Development and Innovation / Department of Environment and Resource Management
Department of Environment and Heritage Protection	Department of Environment and Resource

	Management
Department of National Parks, Recreation, Sport and Racing	Department of Environment and Resource Management
Department of Aboriginal and Torres Strait Islander and Multicultural Affairs	Department of Environment and Resource Management
Department of Education, Training and Employment	Department of Education and Training
Department of Housing and Public Works	Department of Communities
Department of Communities, Child Safety and Disability Services	Department of Communities

3.3.3 Public notification

In accordance with the statutory requirements, public notices of the draft TOR and EIS and public comment periods were published in the Brisbane Courier Mail, Toowoomba Chronicle, Chinchilla News, Murilla Advertiser and on EHP's website.

The draft TOR and EIS were placed on public display at the following locations during their respective public comment and submission periods:

- EHP website (draft TOR only)
- EHP, Customer Service Centre, 400 George Street, Brisbane
- EHP, 173 Hume Street, Toowoomba
- Wandoan Library, 6 Henderson Road, Wandoan
- Dalby Library, 107 Drayton Street, Dalby
- New Hope Corporation Office, 3/22 Magnolia Drive, Brookwater.

3.4 Matters considered in the EIS assessment report

Section 58 of the EP Act requires that an EIS assessment report consider the following matters:

- the final TOR for the EIS
- the submitted EIS (including Taroom Coal's response to submissions and replacement of the original EIS and EM plan dated April 2014)
- all properly made submissions and any other submissions accepted by the chief executive
- the standard criteria
- another matter prescribed under a regulation.

These matters are addressed in the following subsections.

3.4.1 The final TOR

The final TOR published on 23 April 2010 were considered when preparing this EIS assessment report. Although compiled to include all the likely significant issues the TOR stated that if other significant matters arose during the preparation of the EIS then such issues should be fully included in the EIS. All such matters have been considered in the EIS assessment report.

In deciding to allow the EIS to proceed to the preparation of an assessment report, EHP was required to consider the submitted EIS documents and determine if the information provided in this documentation adequately met the requirements of the TOR.

3.4.2 The submitted EIS

The submitted EIS was considered when preparing this report, it comprised:

- the EIS dated November 2012 that was made available for public submissions on 8 February 2013
- properly made submissions

- the response to submissions and the replaced EIS dated April 2014 including a draft EM plan that were received by EHP on 28 April 2014.

3.4.3 Properly made submissions

EHP accepted 27 submissions on the EIS from the following organisations:

- Aurizon
- Banana Shire Council
- Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
- Department of Agriculture, Fisheries and Forestry
- Department of Communities, Child Safety and Disability Services
- Department of Community Safety
- Department of Energy and Water Supply
- Department of Education, Training and Employment (Infrastructure Strategy)
- Department of Education, Training and Employment (Skills and Employment)
- Department of Local Government, Community Recovery and Resilience
- Department of Housing and Public Works
- Department of National Parks, Recreation, Sport and Racing
- Department of Natural Resources and Mines
- Department of State Development, Infrastructure and Planning
- Department of Tourism, Major Events, Small Business and the Commonwealth Games
- Department of Transport and Main Roads
- Ergon Energy
- Fitzroy Basin Association
- Office of the Coordinator-General
- Powerlink Queensland
- Queensland Health
- Queensland Police Service
- Queensland Treasury and Trade.
- Skills Queensland
- Western Downs Regional Council
- Wildlife Preservation Society of Queensland, Upper Dawson Branch
- Xstrata Coal Queensland.

One submission from the public was also received and EHP made its own submission on the EIS.

All submitters were also given the opportunity to provide a follow-up response to EHP on the suitability of Taroom Coal's response to their submissions. All submissions and other comments made by submitters were considered when preparing this EIS assessment report.

3.4.4 The standard criteria

Section 58 of the EP Act requires that, among other matters, the standard criteria listed in Schedule 3 of the EP Act must be considered when preparing the EIS assessment report. The standard criteria are:

a. the principles of ecologically sustainable development as set out in the National Strategy for Ecologically Sustainable Development
b. any applicable environmental protection policy
c. any applicable Commonwealth, State or local government plans, standards, agreements or requirements
d. any applicable environmental impact study, assessment or report
e. the character, resilience and values of the receiving environment
f. all submissions made by the applicant and submitters
g. the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows
    I. an environmental authority
    II. a transitional environmental program
    III. an environmental protection order
    IV. a disposal permit
    V. a development approval
h. the financial implications of the requirements under an instrument, or proposed instrument; mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument
i. the public interest
j. any applicable site management plan

k. any relevant integrated environmental management system or proposed integrated environmental management system
l. any other matter prescribed under a regulation.

EHP considered the standard criteria when assessing the project.

3.4.5 Environment Protection and Biodiversity Conservation Act 1999

On 28 March 2008, Taroom Coal referred the project to the (then) Commonwealth Department of Sustainability, Environment, Water, Population and Communities for consideration on the project's likelihood to cause a significant impact on Matters of National Environmental Significance (MNES) in accordance with the EPBC Act (EPBC Referral Number: 2008/4130). On 1 May 2008, the delegate of the Commonwealth Minister determined that the proposed project was not a controlled action and would not require assessment nor approval under the EPBC Act.

Water was introduced as a new MNES in 2013, however that amendment does not apply to actions that the Minister has already determined not a controlled action. Consequently, the project was not subject to the new water trigger either.

4 Adequacy of the EIS

This section of the assessment report discusses in more detail the adequacy of the EIS, taking into account key matters of concern identified in the EIS and particularly those of significant concern raised in submissions. The level of detail of the assessment takes some account of the significance of the potential impacts of the project, particularly having regard to the affected environmental values. Where possible, outstanding matters that need further assessment prior to statutory decisions are identified, particularly to address State policy and legislative requirements.

The following aspects are now addressed for each topic:

- a brief outline of the assessment methodology
- a brief outline of the environmental values identified
- an overview of impacts identified in the EIS documents, as well as the adequacy of the assessment
- an overview of the avoidance, minimisation and management measures proposed, as well as their adequacy
- an evaluation of how adequately Taroom Coal has responded to significant issues raised in public and agency submissions on the EIS
- summary of the overall adequacy of the EIS section, including any outstanding issues identified and any recommendations to address these issues. Recommendations are listed as either EM plan requirements or as general recommendations that Taroom Coal should address.

4.1 Introduction

The EIS provided an adequate introduction to the project, its objectives and scope. The various sections are adequately set out and guidance about the structure of the EIS was provided.

4.2 Project need and alternatives

This section of the EIS adequately described the project need and alternatives in the context of the TOR. It briefly outlined the project's related social, community, economic and environmental benefits and costs, which were addressed in more detail in later sections of the EIS.

The positive and negative impacts, appropriate mitigation and management measures and environmental protection commitments proposed by Taroom Coal were addressed in later sections of the EIS.

Alternatives were considered and discussed and included consideration of alternative mining methods. The advantages of the preferred open-cut method were highlighted in the context of the proximity of the identified coal deposit to the surface, while noting that deeper coal seams are currently considered uneconomic. The EIS stated that concept and feasibility studies also considered options for:

- alternate scale of mine operations (3Mt/yr to 7Mt/yr of product coal)
- mining methods (dragline and/or truck and shovel)
- mining sequencing (east to west or shallower to deeper)
- reconfiguration of the pit lay-out and mining direction based on geology and geometry of the coal deposit
- redesign of the retiming of the staged diversion of Horse Creek
- ROM coal processing

- coal product handling, including transporting product coal via road or conveyor to the proposed SBR connection
- rail infrastructure alignment and connection
- port facilities, logistics and capacity
- design, location and extent of out-of-pit spoil dumps
- coarse and fine reject disposal (TSFs), including co-disposal
- location and layout of the MIA, CHPP and water management system
- water supply
- alignment of the creek diversion
- sourcing workforce and location, layout and requirements of the accommodation village
- on-site stand-alone diesel fuel generation and grid connected power supply.

The EIS did not address the potential impacts from the power infrastructure corridor route nor propose alternate options. It stated that the power infrastructure corridor impact assessment, approvals and regulation would be undertaken separately to this EIS.

4.3 Impact assessment approach

The impact assessment approach in the EIS documentation was typically presented for each key matter in the TOR as follows:

- legislative and policy context
- assessment method
- environmental protection objectives
- existing environment and environmental values
- issues and potential impacts
- avoidance, mitigation and management measures
- residual impacts
- inspection and monitoring requirements.

4.4 Regulatory approvals

The methodology and objectives of the EIS process, key approvals required for the project and relevant policies, guidelines, planning policies and planning schemes to be considered in assessing and regulating the project were adequately described in the EIS. These are summarised in section 3.2 of this report.

4.5 Consultation

The consultation carried out by Taroom Coal as part of the EIS preparation, including its objectives, activities undertaken, stakeholders consulted, stakeholder issues and the way in which these issues were addressed was adequately described in the EIS. A summary of the key issues raised during the consultation program and specific responses to the 29 public and agency submissions, including EIS updates where Taroom Coal considered it necessary, were provided in the EIS. A summary of the consultation process undertaken by Taroom Coal as part of the EIS process is summarised in section 3.3 of this report. Matters raised in submissions that have not been adequately resolved have been identified in the relevant sections of this report and collated at section 6.

4.6 Description of the project

The EIS adequately described the location, scope, scale and schedule for the project works. An adequate discussion on all aspects of the project was provided, including: the resource base, construction, proposed mining activities and handling, processing and disposal of mine wastes, operations, workforce accommodation and rehabilitation and decommissioning. Aspects of the project that were not addressed in the EIS include water supply and electricity supply alignment route.

A summary of the project is provided in section 2 of this report.

4.7 Climate

4.7.1 Existing values

The local and regional climatic conditions in the vicinity of the project area and climatic extremes in relation to natural and other hazards were adequately described and identified in section 4 of the EIS. The EIS used local (Taroom Post Office weather station) and regional (Bureau of Meteorology) weather station data to describe

monthly and annual averages of weather parameters such as rainfall, wind and evaporation.

Climate information and in particular regional rainfall patterns, air temperature, wind direction and speed were used in relevant sections of the EIS, for example air and noise, to underpin predictions about the impacts of the project as well as inform mitigation and management measures. The potential impacts of climatic extremes on hazards and risks were adequately described in the EIS. Hazard and risk are discussed further in section 4.21 of this assessment report.

The EIS described the climate of the site as subtropical continental and subject to hot summers (average maximum of 33.6 degrees Celsius (°C)) and cold winters (average minimum 5.1°C). Regional average annual rainfall is approximately 676mm, falling mainly during the summer wet season from November to February (average of 87.9mm per month) and dry season winter rainfall from April to September (average 34.9mm per month). Wind direction in the mornings is predominately from the north, but also the east and south, and predominately from a south-east direction in the afternoons.

Evaporation data presented in the EIS was not locally derived but sourced from about 110km away at the Narayen Research Station. Average annual evaporation was estimated at 1807mm; approximately 2.7 times the average annual average rainfall. The EIS stated that the impact of tropical cyclones would be minimal given the location of the site; rather it is more likely to be subject to intense thunderstorms and heavy rainfall events.

The effects of drought on the project were addressed in the EIS. High evaporation rates, variable seasonal rainfall and in particular the failure of the wet season to deliver significant rainfall could pose problems for available surface water supplies of the mine site. The project does not propose to be reliant on the collection of rainfall for construction and operational mine use purposes, rather it proposes to secure a water supply by connection to SunWater's external water supply distribution network.

While no on-site historical flood data was presented in the EIS, historical flood records from the Fitzroy River catchment area and significant flood events from flows in the Dawson River were presented in the EIS. Mine site flood models were used to determine flood events following heavy rainfall events within the upstream catchment of Horse Creek.

4.7.2 Impacts

The EIS concluded that the principal climatic risks to the project were the effect of variable seasonal rainfall and flooding events on site water management and the principal climate driven management actions were to prevent the release of unauthorised contaminants from the site, appropriate design for flood protection and the effect of wind on dust and noise. Climatic aspects that could affect the potential for environmental impacts and risks and the management of operations at the site were primarily addressed in the water resources and hazards and risk sections of the EIS.

Significant potential impacts identified included risk of flooding of Horse Creek, operation of the diversion and flood immunity of the MIA, TSFs, active operating pits and final voids.

The EIS provided a satisfactory assessment of the influence of climate on potential impacts arising from the project as a result of climate change using data published from the (then) Queensland Office of Climate Change. The EIS stated that the WDRC area is likely to experience a decline in rainfall (annual rain fall is expected to decrease by between 4% and 7% based on modelled low and high emission scenarios by 2050), increased temperatures (between 1.2°C to 2°C based on modelled low and high emission scenarios by 2050), increased rates of evaporation and more frequent extreme weather scenarios (based on a high emissions scenario, an increase in annual potential precipitation of up to 9% is predicted with the best estimate being 7%).

The EIS considered the project area would be subject to a low to moderate bushfire risk because of extensive clearing of the site for cattle grazing; fires are generally expected to be grass fires during periods of drought.

4.7.3 Avoidance, mitigation and management measures

The modelled PMF level was considered in the EIS as the mitigation bench mark for the southern MLA50254 to avoid inundation of active pits and final voids. According to the EIS elements of the staged Horse Creek diversion, in particular flood levees, would be constructed to protect operating mine pit areas, and in the longer term would be required to protect the final voids after mining. Infrastructure located within the northern MLA would be designed to achieve immunity from an average recurrence interval (ARI) 1 in 100 year flood event.

4.7.4 Conclusions and recommendations

The EIS adequately described the local climate and how it could affect the potential for environmental impacts and the management of operations at the site. The EIS identified the risks associated with the inundation of active mine pits and long-term protection of the residual voids from flood flows along Horse Creek. Provided the proposed flood

protection mitigation measures (i.e. levees) and the staged Horse Creek diversion are designed and constructed to appropriate engineering standards to meet the specified outcomes, the proposed protection measures should be acceptable.

4.8 Air

4.8.1 Existing values

The EIS provided adequate information on air quality objectives and goals to protect air environmental values. The EIS stated that the air quality environmental values to be protected by the project were based on the Environmental Protection Policy (Air) 2008 (EPP Air) including protection of the following:

- the health and biodiversity of ecosystems
- human health and wellbeing
- the aesthetics of the environment, including the appearance of buildings, structures and other property
- agricultural use of the environment.

The project would be located about 45km south-west of Taroom and approximately 380km north-west of Brisbane in a sparsely populated rural area. The EIS described the existing air quality at the project site as good with localised or periodic degradation of air quality by dust from vehicle traffic on unsealed roads, dust and smoke from bushfires and controlled burns. The EIS did not mention that dust generated from dust storms during drought periods may also impact on air quality values. The EIS identified 60 sensitive receptors in the vicinity of the project area and the WSL rail and services corridor. The closest sensitive receptor was identified approximately 1000m from the mine site and 60m from the WSL rail and services corridor.

The EIS stated that the project would result in the emission of fine particulates, which could be assessed in terms of total suspended particulate matter (TSP), particulate matter with equivalent aerodynamic diameters of 10µm or less (PM_{10}), and particles with equivalent aerodynamic diameters of 2.5µm and less ($PM_{2.5}$). These particulates would mainly be generated as fugitive dust emissions from open-cut mining operations.

In the absence of suitable background air quality data from the project site, the EIS stated that background air quality levels were based on other similar locations in central Queensland, such as Dysart and Charters Towers and these levels were considered to be a reasonable estimate of existing air quality in the project area.

Meteorology for the site was simulated using The Air Pollution Model (TAPM). Monitoring data from Toowoomba for nitrogen dioxide (NO_2) and TSP were used in modelling, while dust deposition data were sourced from Wandoan, Dysart and Charters Towers. The EIS modelled air quality along the proposed WSL rail and services corridor using the Cal3QHCR air quality dispersion model.

4.8.2 Impacts

The EIS stated that it adopted industry-standard methods for the assessment of air quality impacts, used conservative assumptions or inputs to address data deficiencies and provided a generally reliable basis for assessing impacts on air quality. Air quality impacts from the project were assessed on the basis of estimations of emissions from project activities under typical operating conditions in combination with dispersion modelling of emissions relative to the identified sensitive receptors within the local area.

The EIS stated that emissions from the combustion of diesel fuel would produce sulphur dioxide (SO_2), NO_2, and trace quantities of volatile organic compounds (VOC). However the EIS stated that emissions of dust from construction, mining, haulage and processing activities as well as stockpiles and spoil dumps, NO_2 and carbon monoxide (CO) would be the major sources of air quality impacts from the project.

The key sources of emissions to air identified in the EIS from the project would include:

- fugitive exhaust emissions including carbon dioxide (CO_2), CO, SO_2, NO_2, VOC and PM_{10} from diesel locomotives, mining vehicles, heavy earthmoving mining equipment and electricity generators
- dust emissions from:
    - drilling, blasting, extracting and grading an estimated 1.1 billion bcm of overburden and interburden
    - transporting and stockpiling waste rock, fill material and coal in the construction and operational stages
    - construction equipment
    - transport of coal product via rail
    - crushing, processing and stockpiling of coal product
    - wind erosion from stockpiles and waste rock emplacement areas
    - vehicle movements on unsealed haul roads.

The EIS presented air quality results using the CALPUFF airborne pollutant dispersion model to estimate ground

level concentrations and depositions of pollutants.

The air pollutant impacts from the project were assessed against the frequently used dust deposition limit of 120mg/m^2/day and the EPP Air goals.

The Cal3QHCR air quality dispersion results indicated that during construction of the WSL rail and services corridor and operational stage coal train emissions (diesel exhaust and coal dust) dust deposition fallout would be short-term and within EPP Air goals at sensitive receptor locations.

The EIS provided sufficient information on emissions associated with the diesel fuelled electricity generation for the construction stage of the project.

The EIS concluded that maximum 24-hour average PM_{10} ground level concentrations from construction and operation activities would not be compliant with the EPP Air objectives in all years at two sensitive receptors and one sensitive receptor in Year 27 of operations. In addition, the EIS stated that maximum 24-hour average $PM_{2.5}$ concentrations would be exceeded at one sensitive receptor in Year 27 of operations.

Two of these sensitive receptors are located on the project site within the MLAs, are owned by Taroom Coal and unoccupied, while the third is currently unoccupied. The EIS stated that should at any stage the third sensitive receptor be occupied, Taroom Coal would consider applying air quality mitigation measures.

The EIS stated that the air quality assessment modelling of the WSL rail and services corridor demonstrated compliance with air quality objectives in accordance with EPP Air goals.

The EIS stated that a cumulative impact assessment of air quality impacts from adjoining projects (i.e. Glencore Coal Queensland Pty Ltd's Wandoan Coal Project and the Elimatta Project) and the WSL rail and services corridor indicated that short and long-term impacts would be compliant with EPP Air air quality objectives at all sensitive receptors and that the proposed 50m buffer for the WSL rail and services corridor would be sufficient to protect the air quality at sensitive receptors.

4.8.3 Avoidance, mitigation and management measures

The EIS concluded that while emissions from the combustion of diesel fuel would produce SO_2, NO_2, and trace quantities of VOCs, the emissions of dust from construction and mining operations, NO_2 and CO were the major sources of air quality impacts from the project. Notwithstanding the exceedances noted at sensitive receptors located on the MLAs, the EIS concluded that emissions from the project would comply with air quality guidelines for TSP, PM_{10}, $PM_{2.5}$, NO_2 and CO. The project would be required to meet EHP's limit of 120mg/m^2/day for dust deposition at sensitive receptors.

An Air Quality Management Plan, including a coal dust management plan (CDMP) for the project's construction and operational stages has not been finalised in the EIS. However Taroom Coal has committed to a range of control strategies and mitigation measures in the EIS and EM plan to manage dust and gaseous emissions from the project including:

- a register of dust complaints would be maintained on site
- all complaints about dust would be investigated and appropriate action taken to reduce dust nuisance including recording a summary of the investigations completed and any management actions taken and the status of the concern
- dust suppression by regular water spraying (i.e. water sprinkling of ROM stockpiles and internal unsealed haul roads to reduce dust generation)
- compaction of the mine construction site to minimise the area of exposed soil that may generate dust
- limit vegetation and soil clearing to active mine areas to minimise the amount of exposed soil that may generate dust at any one time
- progressive rehabilitation and revegetation of disturbed areas would occur with the aim to reduce wind generated dust
- limited vehicle speed within infrastructure areas and mine access roads to minimise dust generation
- regular maintenance of vehicles, heavy earthmoving equipment and dust suppression equipment
- notification of nearby residents 48 hours prior to undertaking major railway maintenance activities
- implementation of a residential buffer zone of 50m either side of the WSL rail and services corridor
- implementation of a 15m buffer (cropping land exclusion zone) from the WSL rail and services corridor to minimise dust deposition on vegetation
- veneering and profiling of loaded coal wagons at the CHPP to reduce dust lift-off from moving trains
- monitoring of life of mine dust deposition and daily predictions of meteorological conditions for use in a dust forecasting system
- ongoing air quality monitoring to ensure compliance with EPP Air objectives and to determine potential nuisance impacts
- reporting regularly to ensure dust suppression measures are effective

- developing and implementing an adaptive air quality management system that would include further mitigation strategies following air quality monitoring and research of contemporary dust minimisation strategies during the life of the project
- implementing a proactive stakeholder engagement program with landholders and near neighbours providing advice on suitable measures that should be undertaken to maintain healthy buffers between crops and the proposed WSL rail and services corridor
- auditing of the air quality management plan to monitor the performance of dust control measures during coal transport.

4.8.4 Outstanding issues

The EIS addressed most aspects specified by the TOR. However, it is not clear from the EIS why different background air quality concentrations were used in the assessment for the mine site and WSL rail and services corridor when it is noted that the mine and proposed railway components of the project are located in the same region. The EIS noted that the background values are:

- coal mine background concentrations:

  PM_{10} = 20µg/m^3, TSP = 25µg/m^3 and dust deposition = 67mg/m^2/day

- WSL rail and services corridor background concentrations:

  PM_{10} = 23µg/m^3 TSP = 30µg/m^3 and dust deposition = 40mg/m^2/day.

It is not clear how dust deposition from the coal train line was estimated in the EIS. In particular, how the loss over path-length concentration values were converted to loss within zones and dust deposition fallout when the EIS stated that it was calculated using the difference in concentrations based on predicted annual average TSP concentrations with and without dust deposition.

The model should be revised including appropriate referencing to demonstrate the accuracy of this method for predicting dust deposition for the near field receptors.

4.8.5 Conclusions and recommendations

The EIS has adequately established that the main air quality concern is the emission of fine particulates from various project sources, including construction, mining, haulage and processing activities. While some inconsistencies in modelling inputs have been noted, the EIS concluded that two sensitive receptors are likely to be exposed to exceedances of EPP Air objectives. Sensitive receptor 14 located near the WSL rail and services corridor would need specific attention in relation to particulate emissions during construction.

It is recommended that documentation in the EM plan be revised for construction and operation of the mine and the WSL rail and services corridor to provide:

- updated air quality modelling using consistent and justified input parameters
- specification of monitoring and priority mitigation measures to ensure compliance with applicable air quality objectives at sensitive receptors.

Recommended conditions for management of air emissions are provided in Appendix 1.

4.9 Greenhouse gas emissions

4.9.1 Existing values

The EIS included a satisfactory assessment of potential greenhouse gas (GHG) emissions using estimated data for mine operations and GHG emission factors published by the former Commonwealth Department of Climate Change.

4.9.2 Impacts

The direct and indirect GHG emissions generated from the project would include:

- fuel (diesel) burning in heavy mining earthmoving equipment, light vehicles, locomotives at the mine site and WSL rail and services corridor
- diesel fuel burning for power generation during the construction and operations stages of the project (including WSL rail and services corridor)
- use of explosives (combustion of Ammonium Nitrate Fuel Oil) for blasting for the development of the open cut mine including initial box cut
- methane emissions (fugitive) from coal seam gas

- on-site electricity consumption from purchased electricity.

The total annual emissions for mine operations were assessed in the EIS as being 314.1 kilotonnes (kt) of carbon dioxide equivalent per year (kt CO_2-e/yr). These emissions were reported as equivalent to 0.006% of Australian emissions for 2008.

The total annual emissions for construction and operational stages of the WSL rail and services corridor were assessed in the EIS as being 19.388kt CO_2-e/yr and 15.572kt CO_2-e/yr respectively. These emissions were reported in the EIS as 0.005% (construction) and 0.035 % (operation) of the Australian emissions for 2008.

The EIS included a satisfactory assessment of potential impacts due to climate change using data published from the (then) Queensland Office of Climate Change. This topic is further discussed in section 4.7 of this report.

4.9.3 Avoidance, mitigation and management measures

The EIS stated that Taroom Coal is committed to adopting and implementing best practice measures and policies to reduce GHG emissions over the life of the project.

The EIS identified management objectives to reduce GHG emissions including:

- use of load and haul truck equipment fleet with fuel efficient diesel engines
- design and construction of the project best practice technologies, including energy efficient indoor and outdoor lighting, use of timers and or motion sensors on air-conditioning units, and installation of ceiling fans in common areas of the accommodation village
- fitting insulation in all ceiling and wall spaces in the accommodation village
- setting GHG intensity targets for each major processing or mining activity
- measuring, monitoring, auditing, reviewing and reporting the effectiveness of GHG reduction strategies and identifying further opportunities to improve the efficiency of energy use on site.

The EIS prepared an energy and greenhouse gas management plan that set out strategies for optimising energy efficiency and complying with external obligations (e.g. under the Commonwealth's *National Greenhouse and Energy Reporting Act 2007*) associated with energy use and GHG emissions.

4.9.4 Outstanding issues

The EIS did not propose any offset opportunities for the project's GHG emissions, as had been required by the TOR. This is not considered a significant issue because of changing Commonwealth and State policy.

4.9.5 Conclusions and recommendations

The EIS adequately address the impact of the contribution of the project to GHG emissions.

4.10 Land

4.10.1 Existing values

The EIS described those aspects of the site and project related to the existing and proposed qualities and characteristics of the land including the landscape, topography, Indigenous cultural heritage, land use tenure and values of the project site, WSL rail and services corridor and surrounding local area.

The EIS described the topography of the mine site and WSL rail and services corridor as similar and typical of the surrounding region. The mine site has an average elevation of 250m Australian Height Datum (AHD), with very gentle to moderate undulating hills, dissected by Horse Creek and its tributaries. A hill rising to 292m is the highest natural landform on the northern MLA50270, while the lowest existing landform (228m) feature is a small alluvial plain adjacent to Nine Mile Creek. The topography within the WSL rail and services is also gently undulating rises and low hills, dissected by drainage lines with narrow, alluvial plains including Horse and other creeks and tributaries.

The EIS provided an adequate soils and land suitability assessment of the mine site, surrounds and WSL rail and services corridor. The EIS stated that six soil management units were identified on the mine site and WSL rail and services corridor. The EIS stated that the dominant land use within the project area is low to medium intensity beef cattle grazing on native and introduced pasture grasses, along with some dryland broadacre forage cropping and local transport of goods and services on roads. The EIS stated that cropping in the area is limited by soil nutrient deficiencies, plant available water capacity and erosion potential (i.e. sodic and dispersive surface soil characteristics), and that no land within the WSL rail and services corridor was assessed as suitable for rainfed cropping. An area of State land (113ha on Lot 43 on AB222) is designated as a camping reserve and contributes to the stock route network and a further stock route (AAP14857) transects the proposed WSL rail and services

corridor.

4.10.2 Impacts

The project would result in significant land disturbance resulting in changes to the local topography and surface water drainage patterns on the project site. Approximately 4460ha of land would be directly disturbed by clearing for the project. A range of above ground infrastructure would be constructed and would influence the visual amenity and landscape character of the mine and WSL rail and services corridor. Topsoil would be removed from construction surfaces to build the haul road, MIA building foundations and initial box cut and stored in appropriately managed stockpiles for rehabilitation purposes. All rehabilitated areas would aim to provide a stable landform. The steep TSF containment wall slope angles (i.e.1V:3H or 33.33%) and the final voids that would make-up approximately 380ha would be unsuitable for cattle grazing due to the steepness of residual slopes. The EIS stated that approximately 9 million m^3 of topsoil would be stripped and available for re-use in post-mining rehabilitation over the life of the project. The EIS stated that five of the six soil management units over the project area demonstrate sodic and dispersive characteristics and would be subject to erosion unless effectively managed on site. Progressive and final rehabilitation measures would aim to provide stable final landforms supported by native and pasture grass species to support grazing post-mining. The EIS stated that the Horse Creek alluvium soil management unit (covering 837ha) would contribute about half of the required topsoil for rehabilitation purposes on the mine site.

Land Suitability Classes 3, 4 and 5 (for beef cattle grazing) and 4 and 5 (for broadacre cropping) were identified on the proposed project site. Good Quality Agricultural Land (GQAL) mapping identified Class A (Crop land) on the site. The EIS, however, concluded that the mapping overstated the values and quality of the land as an agricultural resource and concluded, from its own assessment, that no Class A and minimal Class B (Limited crop land) were identified on site. The EIS stated that the most common land classification on the site was Class C (Pasture land) suitable only for improved (Class C1) or native pastures (Class C2). Furthermore, the EIS concluded that the mine area is not considered likely to have an impact on any major resources of GQAL crop land within the central western region of Queensland.

Land Suitability Classes 3, 4 and 5 (for beef cattle grazing) and 4 and 5 (for broadacre cropping) were identified within the proposed WSL rail and services corridor. GQAL mapping identified Class A (Crop land) and Class B (Limited crop land) on the WSL rail and services corridor. The EIS stated that from its own land suitability assessment 95% of land within the WSL rail and services corridor was Class B or C1 and is therefore considered GQAL. Some 5% of the WSL rail and services corridor was identified as shallow rocky sand and loam soils that are not considered GQAL. The EIS considered that the GQAL mapping overstated the values and quality of the land as an agricultural resource and the land within the WSL rail and services corridor would be mostly suitable for improved pasture and not cropping.

The EIS undertook a preliminary assessment of potential Strategic Cropping Land (SCL) under the *Strategic Cropping Land Act 2011* and identified 2715.8ha within the MLA areas as SCL. During the EIS process no formal validation application was made to DNRM in accordance with the *Strategic Cropping Land Act 2011* (now incorporated in the *Regional Planning Interests Act 2014* (RPI Act)) to confirm the status of the 2715.8ha mapped as potential SCL. The EIS also identified that all of the WSL rail and services corridor was within the Western Cropping Zone SCL trigger mapping area and was therefore potential SCL.

Construction of the WSL rail and services corridor would sever existing land titles, disrupt cattle movement across the corridor and stock access to watering points. The project proposes to establish underpasses for stock and farm machinery movements and establish alternative watering points in consultation with affected landholders.

The EIS stated that the WSL rail and services corridor is proposed to be retained post-mining as an infrastructure of beneficial use for proposed surrounding resource projects and land users.

In summary, the EIS stated that the potential impacts on land from the project would include:

- sterilisation of coal resources (at depths greater than 150m)
- land instability from construction of raised landforms (e.g. TSFs and out-of-pit dumps covering at least 183ha) and final voids (covering approximately 380ha)
- land clearing resulting in: a reduction in habitat for flora and fauna; loss of or alterations to areas of cultural heritage significance or nature conservation; topsoil removal including loss, compaction and viability; soil erosion; unauthorised vegetation clearing; a reduction in pre-mine land suitability
- land contamination: a risk of spillage of chemicals, fuels, or stormwater runoff from coal processing, tailings, process water, concentrate or windblown dust from the mining and processing area
- spills from the TSF or other contaminated water storages
- effluent from the STPs
- leachate and windblown rubbish from the waste disposal site
- acid mine drainage waste rock materials brought to the surface

- visual amenity impacts associated with mine infrastructure
- increased erosion of disturbed land
- disruption to agricultural activities
- exposure of saline subsoil.

4.10.3 Avoidance, mitigation and management measures

The project would result in the permanent alienation of approximately 380ha of grazing land (the final void areas) from the pre-mining land use. In addition approximately 317ha of unsuitable steep slopes and tops of the TSF containment areas, retained water storages and roads that would remain at the end of the mine operations. The EIS stated that all available mine disturbed land would be rehabilitated. The EIS stated that all rehabilitated areas would aim to provide stable, gently undulating free draining landforms, with a self-sustaining pasture vegetation cover at end of mine life. The EIS did not identify if there would be a loss of grazing from the otherwise suitable areas on the tops of the TSFs, given that the containment wall slopes are likely to be too steep to allow stock access to the level tops. Unless treated, that barrier would further limit grazing on significant areas of otherwise suitable land. The EIS stated the project would not be returned for the land use of nature conservation as this inconsistent designation would contrast the pre-mining land use.

DNRM advice on the EIS stated that the proposed spoil dumps batter slopes of 1V:6H (i.e. 16.67%) may be too steep given the identified sodic and dispersive characteristics of the waste rock material and significant erosion potential. DNRM advice suggested that dump slope angles of 1V:12H (i.e. 8.33%) would be more appropriate. In response, Taroom Coal committed to a further review out-of-pit waste rock dump slope angles with the view potential flattening of the angle to ensure slope stability and achieve rehabilitation outcomes. EHP notes the Australian Coal Association Research Program (ACARP) Final Report titled Development of Rehabilitation Completion Criteria for Native Ecosystem Establishment on Coal Mines in the Bowen Basin (May 2004) recommends slopes to be kept to less than 1V:8H (i.e. 12%). The revised EM plan would need to be updated to ensure the stability of waste rock dumps slope angles would achieve the proposed rehabilitation and water quality outcomes.

The EIS stated that management strategies to minimise disturbance to land would include:

- minimising the amount of land cleared at any one time
- progressive rehabilitation of all disturbed land to reduce erosion and dust emissions in accordance with the Plan of Operations for the project
- soil erosion control strategies
- topsoil stripping and stockpiling management.

The EIS stated that the WSL rail and services corridor would impact on existing farm/agricultural soil conservation works such as soil contour banks, sediment trap dams and grassed waterways. The EIS stated that new soil erosion works would be constructed to replace disturbed structures to mitigate soil erosion in consultation with adjoining landholders.

The EIS stated that the project MLA areas overlie an established Exploration Permit for Petroleum (EPP) held by BG International (Aus.) Pty Ltd. Taroom Coal is currently negotiating a Co-Development Agreement with the petroleum tenement holder and an attendant coordination arrangement for the entire project. Provided the parties are able to reach a suitable agreement, this would ensure no significant gas reserves would be sterilised as a result of the project.

4.10.4 Outstanding issues

DNRM advised that trigger mapping confirms that the project impacts potential SCL. DNRM advised that this would need to be addressed under the requirements of the RPI Act.

The revised EM plan would need to be updated to ensure the stability of waste rock dumps slope angles would achieve the proposed rehabilitation outcomes.

It is recommended that Taroom Coal continue to liaise with the Planning Services, South Region DNRM and EHP to discuss and resolve these outstanding issues.

4.10.5 Conclusions and recommendations

The project would result in significant land disturbance and interrupt existing cattle grazing on the mine site over the life of the mine. The rehabilitation aim for the majority of the site is to reinstate a land condition similar to the pre-mining land use of low intensity cattle grazing. Riparian vegetation and habitats would be re-established along the full length of the permanent Horse Creek diversion consistent with the specified outcomes for the diversion. Confirmation of the rehabilitation success of the mine site and creek diversion would be assessed at the end-of-mine life. The WSL rail and services corridor would sever existing land titles and disrupt cattle movement across

the corridor and stock access to existing watering points. Rail underpasses would be constructed to allow safe access for stock and farm machinery and new stock water points would be provided in consultation with affected landholders. The WSL rail and services corridor would be retained post-mining for other planned resource project and land users.

Recommended land management conditions are provided in Appendix 1.

4.10.6 Resource utilisation

The EIS adequately described the extent of the coal resource, defined the resource base and production schedule and mining sequence and stated that the mine plan and design were developed to ensure that no coal resource was sterilised by the project. The EIS stated that in future coal reserves identified at depths below 150m not targeted by this project may still be accessible in future.

4.11 Waste management

4.11.1 Existing values

The EIS stated that the relevant environmental values to be considered for waste management of the project include:

- the life, health and wellbeing of people
- the diversity of ecological processes and associated ecosystems
- land use capability.

The project is located in a rural area with cattle grazing as the principal land use. The EIS stated that the ecological, community and land use values applying to the project are directly affected by mining and petroleum development activities.

4.11.2 Impacts

The EIS stated that solid, liquid and atmospheric wastes would be generated during construction, operations and decommissioning stages. These waste streams have the potential to impact on environmental, social and community values if they are not suitably managed. The EIS identified that the project's major sources of waste with the potential to cause impacts include:

- land, surface water and groundwater contamination from:
  - landfill leachate runoff/seepage
  - mine waste that may produce poor quality, contaminated runoff or seepage from overburden, spoil dumps, TSFs and contaminated water storages
  - sewerage effluent
- excavated waste rock and overburden from the pits and MIA (approximately 1.1 billion bcm over the life of the mine)
- course rejects and fine tailings (approximately 81.5Mt of dry plant rejects for the life of the mine) as waste by-products from the CHPP process
- liquid waste including waste oil, solvents and grease
- regulated wastes including, hydrocarbon contaminated wastes and materials, batteries, tyres, oils and oil drums, flammable liquids, lubricants, grease, potable water treatment plant residues
- chemical wastes including emulsions and coolants, cleaning chemicals, paints and resins, vehicle wash down waters and detergents and solvents from workshop activities
- litter and windblown rubbish from the waste disposal site
- GHG emissions from burning fuels, coal dust, TSP, PM_{10}, $PM_{2.5}$ and metals contained in fugitive dust and gaseous odour emissions
- general waste including, timber, trees and other vegetation from land clearing, non-biodegradable material, packaging material, green waste and domestic waste.

The EIS identified that the inappropriate management and disposal of wastes could lead to the contamination of land and water with potential adverse impacts on human, environment and ecosystem health.

Sewage effluent at the accommodation village would be treated by two packaged STPs designed to produce Class A effluent, one a permanent STP with capacity of 135kl/day and a temporary STP with capacity of 50kl/day. At peak operation the permanent STP would produce approximately 240L/capita/day.

The EIS provided a suitable waste inventory of predicted wastes and details of waste types, estimated quantities and project design features and processes relevant to waste management. The EIS estimated project waste would be:

- total suspended particulate matter:
    - MLAs: 4,600,981kg/yr
    - WSL rail and services corridor operation: 473t/yr
- PM_{10}:
    - MLAs: 1,377,865kg/yr
    - WSL rail and services corridor operation: 172t/yr
- $PM_{2.5}$:
    - project area:149,657kg/yr
- greenhouse gas:
    - MLAs: 314.1kt CO_2-e/yr
    - WSL rail and services corridor operation:15.877kt CO_2-e/yr
    - WSL rail and services corridor construction: 19.388kt CO_2-e/yr
- tailings and coarse rejects: 81,423Mt of dry plant rejects
- excavated waste: 1,152,535,104bcm
- domestic waste: 225t/yr
- sewerage and grey water: 13ML/yr
- waste oil, waste solvents, grease, batteries, scrap steel: 50-100t/yr
- tyres: 439t/yr.

The EIS noted significant quantities of hard waste would be generated at decommissioning including, general waste, concrete, steel, timber, tyres, chemical and fuel storages, workshops, CHPP, accommodation units, offices, administration buildings, ablutions and recreational buildings, gas and water pipelines, and conveyors. These decommissioning wastes and building structures would be demolished and scrap materials would be sold, recycled, sent to landfill or removed from site. Roads would remain at the end of mine life at the discretion and agreement of the landholder. The EIS stated that should site or access roads not be needed post decommissioning the concrete or bitumen base at creek crossings would be removed and the area would be ripped, topsoiled and revegetated.

The EIS noted that the project would require waste disposal on site including: landfill for hard waste, an STP for sewage, two out-of-pit spoil dumps approximately 50-70m high, in-pit spoil dumps 40-50m high and three TSFs 16m high.

The EIS stated that the overburden and interburden material would be removed to two out-of-pit dumps during the construction of the initial box cut and early years of mining. These spoil dumps would be located in the south-west corner and in the northern section of southern MLA50254. As mining progresses and space becomes available in the mine pits, excavated waste would be used to partially backfill the remaining voids. The EIS stated that two final voids of 380ha size would remain at the end of mine life.

The EIS stated that waste characterisation indicated that the overburden and interburden, floor, ceiling, washery waste and coal materials are unlikely to be acid producing or release high salinity, metals or metalloids, and would not require special handling (such as mine material segregation, selective placement and engineered covers) for acid rock drainage or neutral drainage control, and therefore no acid mine drainage is expected from the generated waste materials.

The EIS stated that sodicity testing results of the overburden and interburden shows the material exhibits sodic and dispersive characteristics and would be subject to surface crusting and high erosion rates if dumped in the surface area of waste emplacement dumps and exposed directly to rainfall.

According to the EIS, from the CHPP approximately 1.2Mt/yr of tailings and fine reject coal wash tailings, rejects and dewatered fine rejects would be pumped and deposited into the two out-of-pit TSFs until the northern void in-pit TSF becomes operational. This waste is likely to be non-acid forming and have significant excess acid buffering capacity.

4.11.3 Avoidance, mitigation and management measures

The EIS committed to incorporating a program of best practice waste management. It committed for the life of the project to investigate and implement cleaner production processes and opportunities and waste minimisation programs to manage waste generated by the project. The project would manage waste in accordance with the waste management hierarchy (i.e. avoidance, re-use, recycling, waste to energy and disposal) and relevant legislation.

The EIS stated that accumulated waste hydrocarbons and contaminants would be managed as a regulated waste. If approved, the project would be required to incorporate a waste tracking system for any trackable waste in accordance with the regulatory requirement and applicable Australian standards to ensure any regulated waste would be removed off-site by an appropriately licensed contractor and disposed of to an approved disposal facility able to accept that waste.

The EIS stated that the landfill, if required, would be designed and constructed in accordance with EHP Guideline Landfill Siting, Design, Operation and Rehabilitation.

The EIS stated that both STPs would be designed to produce Class A effluent in accordance with EHP's Planning Guidelines for Water Supply and Sewerage and the Queensland Water Recycling Guidelines. Effluent would be disposed of on-site via irrigation sprays to a designated minimum area of 133m^2. The EIS stated to mitigate the risk of contamination from the release of treated effluent the effluent irrigation area would be fenced and would install more than the recommended number of low pressure spray nozzles to ensure no runoff from the site occurs.

The EIS stated that solvents and oils would be stored and managed in accordance with relevant Australian Standards in order to minimise contamination and hazards.

The EIS stated the preferred hierarchy of waste management for the project was avoid, minimise, reuse, recycle, energy recovery and disposal.

Taroom Coal committed to:

- implementing an ongoing monitoring program to confirm that excavated waste rock was low salinity and low risk of acid mine drainage as presented in the EIS
- ongoing testing to determine the full distribution and extent of sodic and dispersive materials in the overburden and interburden materials
- preferential placement of spoil with known sodic and or dispersion potential away from dump surface areas, and that dump surface materials would be treated with of gypsum or lime or use other mitigation methods such as use of jute mesh and compost blankets to control potential erosion.

The EIS stated that the final landform design of out-of-pit and in-pit dumps would achieve a stable and safe slope to minimise erosion. Contoured slopes with rock lined drains would be constructed to shed water, minimise infiltration and control erosion. Final landform slopes would be rehabilitated.

The two out-of-pit TSFs containment walls would be a maximum of 16m high with a slope angle of 1V:3H (i.e. 33.33%). Containment wall surfaces would be rock armoured for erosion protection and control and the soil content would provide a suitable medium to establish a vegetation cover for rehabilitation purposes. Excess rainfall runoff from remediated TSF surface areas would be directed to purpose-built drains flowing to sediment dams to avoid water flowing freely over containment wall slopes thereby minimising the potential impacts and erosion of the structure.

The EIS stated that modelling suggests that the in-pit TSF would be filled to capacity at the end of mine life and would be available for rehabilitation. Otherwise a third residual void would remain. The EIS stated that an estimated 2.0m engineered separation cover over the tailings would be required in the base of the tailings filled void. Specific surface treatment would be required to provide a suitable cover to support vegetation.

The EIS stated that the TSFs were assessed as 'significant consequence' dams and would be constructed by embankments. The TSFs would be designed and constructed in accordance with the Tailings Management Guideline of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, Australian National Committee on Large Dams Guidelines (1999 and 2012) and the EHP Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (EHP, 2012b).

The EIS also described additional mitigation and control strategies including:

- directing clean rainfall runoff around the surface TSFs and pits
- construction of flood levees along the mining lease boundaries to protect against flooding from the old Horse Creek during the first five years of operation, prior to the final diversion of the creek
- deposition of tailings away from the containment wall
- minimising the rate of rise of the tailings to allow efficient settling out of suspended fines, and recycling supernatant back to the CHPP to assist consolidation and desiccation
- regular monitoring and inspections of containment walls including surveys and installation of suitable instrumentation to monitor the structures, seepage and groundwater quality
- construction of bunds and temporary storage ponds along the tailings pipeline route to contain spilled tailings in the event of pipeline failure
- treatment of sewage effluent to Class A quality.

4.11.4 Outstanding issues

A mine closure plan (MCP) is not fully developed, as it does not specifically address waste minimisation and disposal at the decommissioning stage. This matter should be addressed in a revised EM plan.

The EIS did not provide a Waste Management Plan (WMP) but committed to developing it. It is recommended that the WMP be developed and implemented prior to construction commencing on the project site.

If approved, the project should maintain a register of all chemicals stored at the project site including the storage and handling of all flammable and combustible liquids in accordance with relevant Standards.

4.11.4.1 Conclusions and recommendations

The waste management approach is consistent with industry practices and was addressed in sufficient detail by the EIS. It is recommend that the MCP specifically address waste minimisation and disposal for the decommissioning stage of the project and that a WMP be developed and implemented prior to construction commencing on the project site.

Recommended waste management conditions have been provided in Appendix 1.

4.12 Surface water

4.12.1 Existing values

The project is located in the Fitzroy River catchment. Horse Creek is the main watercourse which flows through the mine site, flowing from south to north. Horse Creek is described as an ephemeral tributary waterway that flows following rainfall events and then joins Juandah Creek approximately 20km downstream of the project site. Stream flows in these watercourses are highly variable with flows most likely to occur during the period from December to March. Juandah Creek, Mud Creek, Spring Creek and Horse Creek are the four major watercourses that traverse the WSL rail and services corridor.

The EIS stated that environmental values of surface waters in the local catchment have been characterised by significant changes to the land use of the catchment. Extensive and widespread vegetation clearing within the catchment has occurred due to past and current agricultural use. It concluded that the aquatic ecosystem was a moderately disturbed system.

The EIS listed the surface water environmental values and water quality objectives for waterways in the project area including aquatic ecosystem values, agricultural stock watering and crop irrigation values. It noted that the nearest downstream water entitlement was for stock and irrigation purposes and approximately 20km downstream of the mine site on Juandah Creek close to the Horse Creek confluence.

The EIS did not use the 75th percentile reference data for salinity to derive local water quality objectives as recommended by the Queensland Water Quality Guidelines 2009. Nor did it fulfil quality and quantity requirements as per the reference based guideline approach. The default water quality objective for salinity that should therefore apply to this project is the scheduled water quality objectives for the Upper Dawson. This water quality objective should be used because local water quality data collected as part of a baseline study for the EIS did not fulfil data quality and quantity requirements.

The EIS did not adequately account for the potential variability of salinity with flow or seasonality. This information is useful in understanding the variability in the regional salinity levels, which are known to be strongly affected by flow. Flows in Horse Creek would be different from those in the Dawson River and the EIS did not discuss how the flow salinity relationships determined in the Dawson River may relate to Horse Creek. An extrapolation from Dawson River flows back to expected flows in Horse Creek would have provided an improved interpretation of the data presented in the EIS.

The EIS stated that one large water body is located directly adjacent and downstream to the southern ML50254. This palustrine wetland is classified on EHP's WetlandMaps database as a referable wetland or Wetland Protection Area (WPA) and is mapped as a Great Barrier Reef Catchment wetland of High Ecological Significance (HES). The EIS adequately described changes in water levels in the wetland, however, it did not state the significance in the increases in water level in the wetland, in terms of ecological outcomes for the wetland. Any proposed water release conditions would need to take into consideration instream flows when Horse Creek (into which discharge from RP3 and RP2 would occur) and the wetland are connected.

The EIS provided the results of one ecological (riparian vegetation) and one water quality survey conducted during the dry season. That survey effort is considered inadequate to accurately describe the characteristics and values of the wetland. The EIS, without appropriate evidence stated that the characteristics of the wetland were not typical of a wetland of high ecological significance. Further survey work (riparian, aquatic, water quality) would be required to appropriately describe the wetland, particularly, during the periods where the wetland contains water.

The EIS did not provide adequate information on water flow in Horse Creek at the time of sampling for the aquatic ecology surveys. Measuring water flow rate at each sampling site during future aquatic ecology or water quality surveys is required. This information is essential for assessing characteristics and values, and for interpreting the data collected as there are strong relationships between aquatic ecosystem health and flow conditions and certain water quality parameters and flow.

The EIS and EM plan did not adequately describe all potential mine affected water release points and sources. The EIS and EM plan stated that salinity levels in sediment dams are predicted to be low and median total dissolved solids (TDS) concentrations of 1,194mg/L, 1,566mg/L and 1,220 mg/L for sediment dams 1, 2 and 3, respectively. Given these concentrations they should be listed as mine affected water release points and sources. Furthermore, the EIS noted that a raw water dam has a proposed controlled release point and indicates high total dissolved solids (629mg/L) level when compared to 80th percentile background of Horse Creek (250mg/L). The EIS did not provide sufficient information to determine whether water from the raw water dam could be released to Horse Creek.

4.12.2 Impacts

There is a potential for significant impacts to surface water quality and aquatic ecosystem health from the project if appropriate measures are not in place to prevent or reduce those impacts. The EIS did not adequately address all sensitive surface receptors that could be impacted by the mine or rail and services corridor (construction, operation or decommissioning) such as the palustrine wetland located off Horse Creek adjacent to MLA50254 or any semi-permanent or permanent waterholes downstream of the mine site. The release of mine affected water during low and no flow periods (i.e. when there is no or limited dilution of mine discharge) would need to be restricted to good water quality only (i.e. water that achieves water quality objectives at end-of-pipe) in order to protect the environmental values of Horse Creek. Any mine or sediment affected water released during high flow events could be of lower quality than water released during low flow periods, but would still need to be sufficiently diluted so as to protect environmental values in the wetland, which is connected to Horse Creek during rainfall periods, and is identified as one of the nearest sensitive receptors to mine affected water release. Any release of mine affected water would also need to account for semi-permanent or permanent waterholes downstream of the mine discharge.

The project proposes to divert clean water from undisturbed parts of the catchment around the project in order to minimise the amount of surface runoff impacted by mining operations. The SunWater supplied recycled water supply allocation and, some on-site collected and recycled mine impacted water would be stored in proposed mine water storages to meet the water requirements for mine operations.

Potential impacts as a result of the diversion of Horse Creek and overland flow would need to be closely monitored, particularly in the palustrine wetland just off Horse Creek adjacent to MLA50254. Modelling results indicated potential changes to water levels in the wetland from changes to runoff and water flows from the mine catchment.

Flood protection measures including rock mulching and levees would be constructed to protect the working pits and waste rock dumps from flood events during mine operations. PMF was used to assess the flood immunity of the active and final voids. The EIS included a commitment to protect final voids from the PMF level at the end of mine life. The EIS stated that infrastructure areas within the northern MLA50270 would be designed to achieve a 100 year ARI flood immunity to mitigate the risk of flooding.

The EIS noted the potential for erosion and sediment mobilisation were identified as risks to surface water quality. The main project activities identified that would have the potential to increase sedimentation in surface water included the construction and operational stage infrastructure including MIA, CHPP, TSF's, out-of-pit spoil dumps, accommodation village and Horse Creek diversion and levees. The highest risk period would be during land clearing and topsoil stripping, impacting on land stability and before mitigation measures were applied to infrastructure areas to stabilise and minimise erosion sediment mobilisation. Mitigation measures were proposed including minimising land clearing and construction of contour banks and sediment detention basins.

The ephemeral Horse Creek, a tributary of Juandah Creek that joins into the Dawson River, flows centrally through the southern MLA50254 in a north-east direction from south to north. The EIS has identified the watercourse as a significant restraint to mining activities. A staged diversion of the creek is proposed, allowing for mining of coal from beneath the creek bed. The diversion would be constructed over four stages and completed within the first six years of mining operations. The EIS summarised impacts on the natural features of Horse Creek and the final creek diversion landform as follows:

- the diversion is shorter: Horse Creek valley length is approximately 9.52km long and stream length 11.45km, compared to the diversion valley length approximately 7.25km and stream length 8.15km
- the average grade of the diversion is steeper: Horse Creek average grade being replaced is 0.00114m/m, the diversion would be 0.00158m/m
- the diversion is straighter: Horse Creek stream sinuosity is approximately 1.2, the diversion sinuosity would be 1.12
- the diversion would have a narrower floodplain
- calculated flow characteristics of the diversion are higher than for Horse Creek for all flows due to the significantly steeper bed grade and narrower floodplain.

According to the EIS the watercourse diversion design has considered the geomorphologic, hydrologic and ecological components of a watercourse as well as its hydraulic and engineering components. Taroom Coal's

management strategy is that the creek diversion would be in operation for at least 25 years to allow the geomorphic, hydraulic and ecological function and performance of the diverted creek channel to be monitored and make any repairs that may be required before the end of mine life.

The Horse Creek diversion design, operation and monitoring is expected to be based on current engineering practice and other relevant guiding principles from past research such as the Australian Coal Association Research Program (ACARP) Projects – Stream Diversions within the Bowen Basin. The Horse Creek diversion should be designed and operated to ensure that it is stable, self-sustaining and does not impact on the adjoining upstream and downstream reaches of the existing watercourse.

4.12.3 Avoidance, mitigation and management measures

The EIS and EM plan provided general statements on objectives of mitigation measures for surface water impacts.

The EIS water management strategy described management measures to minimise the potential impact on downstream watercourses and environmental values, including:

- limit the mine disturbance landform and pit foot print at any one time
- capture all groundwater and contaminated runoff from operating pits and MIA and pump to dedicated mine water storages
- ensure all mine water storages including tailings dams were appropriately sized to accommodate fine tailing and rejects and contaminated mine affected waters
- separation of clean and mine-affected waters
- reinstate disturbed landforms to allow:
    - finished surface slopes that would minimise erosion and runoff
    - construction of localised sediment capture dams
    - rehabilitation and revegetation of disturbed areas to develop a stabilised vegetative cover
- controlled release of mine affected water in accordance with EA conditions
- re-use and recycling of water to satisfy mine water demands, such as potable water, CHPP and dust suppression.

The EIS identified the residual significance of impacts, following the implementation of avoidance, mitigation and management measures. All residual impacts were assessed as having low residual significance, with the exception of the operation of the TSF wall stability and failure (moderate to high), spoil dump slope stability (moderate) which could lead to contamination of surface water and stream bed sediment quality through contaminated TSF wall failure and subsequent discharge of tailings and other contaminants downstream. The EIS stated that the mitigation measures proposed to reduce the occurrence of identified hazardous risk would be implemented and updated over the project life.

The EIS did not fully assess surface water quality in Horse Creek and the watercourses intersected by the WSL rail and services corridor. The EIS did not provide sufficient information on the full range of potential impacts including data on contaminants, particularly metals from mine affected water and the potential impacts on the palustrine wetland located adjacent to MLA50254. Taroom Coal should further investigate and assess through a thorough hazard assessment, other chemicals of potential concern and monitor end-of-pipe and receiving environment monitoring of metals, metalloids, halogens (fluoride) and hydrocarbons.

The EIS was unclear on the criteria used to decide the spatial extent (10km) of the receiving environment monitoring program (REMP). Furthermore, the receiving water quality should be compared with water quality objectives and upstream or unimpacted site data rather than the prescribed EA contaminant release limits, which are designed to take a mixing zone into account.

The EM plan flow release triggers would be better informed by a suitable risk assessment. In setting the release conditions Taroom Coal must consider sensitive receptors downstream of the release such as the wetland (when it is connected to Horse Creek), as well as any semi-permanent or permanent waterholes and users.

The EIS did not adequately discuss the expected long-term water quality of the final voids, however it did provide an estimate of the predicted water level below the final formed landform ground level, the time period required for the water level in the voids to reach equilibrium and how this compares to the pre-mining groundwater level. The EM plan would be required to be updated to include further information on water quality characteristics (e.g. modelled end-of-mine TDS) for the residual voids.

Taroom Coal committed to install stream monitoring stations on Horse Creek – a reference site and a site downstream of the project area, to monitor surface water flows. Monitoring would occur in conjunction with a wider surface water monitoring program and inspection regime for the project. The project would be required to implement a receiving environment monitoring program consistent with the conditions of the EA approval. Site water quality data would be used to prepare local water quality objectives in accordance with the Queensland Water Quality Guidelines (DERM, 2009) and to protect the approved environmental values.

The EIS stated that sediment generation and mobilisation to watercourses would be minimised through design features and sequencing of construction activities, in particular for the TSF and waste rock dumps. For example, mine infrastructure would be constructed such that it becomes internally draining as soon as possible.

Sediment detention dams would be constructed to collect runoff to minimise mobilised sediment to receiving waters e.g. from out-of-pit spoil dumps, MIA and TSF. Suitable sediment and erosion control measures were described in the EIS to manage the potential impacts from land clearing, stripping and ground disturbance.

The EIS stated that erosion risk would be minimised through appropriate revegetation and stabilisation measures. Flooding modelling identified risks to operational pits and the final voids. The EIS stated that the risk would be mitigated through design measures such as the construction of levees and rock armouring for the relevant sections of the Horse Creek diversion. These commitments are consistent with the stated performance outcomes for the diversion.

According to the EIS the Horse Creek diversion functional design was undertaken in accordance with the Manual – Works that interfere with water in a watercourse: watercourse diversions (Consultation Draft) (DNRM 2013). According to the EIS the diversion would be designed, constructed, operated and maintained according to an engineering standard appropriate to meet the following outcomes:

- incorporate natural features (including geomorphic and vegetation) present in the landscape and in local watercourses
- maintain the existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse diversion is located
- maintain the hydraulic characteristics of the permanent watercourse diversion that are comparable with other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance
- maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream reaches
- maintain stability and functionality and are appropriate for all substrate conditions they encounter.

DNRM considers that the information provided is sufficient to identify the potential risks associated with developing the proposed watercourse diversion (including a functional design). Responsibility for ensuring the accurate assessment, documentation of the design and the adequate performance of watercourse diversion rests with the holder of the EA and its consultants (i.e. the suitably qualified and experienced person (SQEP)). In deciding to issue an EA the administering authority will rely on the certification(s) given by the SQEP. EHP would require a Design Plan certified as appropriate for achieving relevant conditions of the EA before commencing construction of the creek diversion.

4.12.4 Outstanding issues

The EIS did not provide detailed information on the full range of potential impacts including data on contaminants, particularly metals from mine affected water and the potential impacts on the referable wetland adjacent to MLA50254. Taroom Coal should further investigate and assess through a through hazard assessment other chemicals of potential concern and commit to monitor end-of-pipe discharge of metals, metalloids, halogens (fluoride) and hydrocarbons.

Further survey work (riparian, aquatic, water quality) would be required to appropriately describe the wetland, particularly, during the periods when the wetland contains water.

The EM plan should be refined to more accurately reflect proposed mine affected water release limits and trigger values. In particular the EM plan did propose release limit for turbidity, and the EC release limit should be removed as there are flow triggered release limits for this water quality indicator.

The EM plan would require amendment including:

- referable wetland
  - impact to wetland from mine affected water releases to Horse Creek
  - impact of predicted water level changes (increase and decrease)
  - propose a monitoring program (ecosystem health) for the wetland
- mine affected water releases:
  - provide details of site accessibility during periods of high rainfall and capacity to effect releases during this period
- sediment dams – to be included as mine affected water release points because of predicted TDS levels.

The water management plan for the project would need to be amended prior to the issue of a draft EA. A water management plan should identify sound water management practices for the operation of the mine including:

- clearly identify all potential impacts

- minimise the potential risks of contaminants being released to the environment
- include water quality monitoring for all storages, release points and receiving waters.

4.12.5 Conclusions and recommendations

The EIS concluded that impacts of mobilisation of sediment and contaminants to the receiving environment would be minimal with the proposed implementation of management measures. However, the EM plan should be revised and updated to include sufficient information on the full range of potential impacts including:

- data on contaminants, particularly metals from mine affected water and the potential impacts on the referable wetland adjacent to MLA50254
- site accessibility during high rainfall events
- potential impacts including changes to water levels and monitoring of the wetland
- all mine affected water release points.

Taroom Coal should further investigate and assess through a thorough hazard assessment other chemicals of potential concern and the need for end-of-pipe and receiving environment monitoring of metals, metalloids, halogens (fluoride) and hydrocarbons.

4.13 Groundwater

4.13.1 Existing values

The removal of overburden and coal seams would require the localised dewatering of aquifers. The EIS assessed and modelled the groundwater resource of the project and surrounding area to predict changes in groundwater quality and quantity and the potential impacts of dewatering on local and regional groundwater values.

The EIS identified three aquifer systems in the project area would be potentially impacted by the project including:

- sedimentary aquifers of the GAB
  - contained within the confined Hutton Sandstone formation, a depth of about 825m, providing high yields of good quality water
  - Precipice Sandstones formations, at a depth of about 400m, providing reasonable to high yields and good quality water
- relatively permeable coal seam aquifers of the Juandah Coal Measures
- unconsolidated alluvial sediments.

The EIS stated that groundwater recharge to coal seam aquifers is from infiltration of incident rainfall and via intersection of the coal seam outcrops or shallow overburden with surface water sources.

The EIS did not measure recharge volume of the shallow alluvial aquifers or sandstone beds of the GAB but concluded that due to the relatively low annual rainfall, high evaporation rates and low permeability overburden, recharge at the mine site is considered to be very low.

The EIS did not undertake groundwater monitoring of the GAB Hutton Sandstone or Precipice Sandstone aquifers. It stated that these aquifers provide the main source of water for the area. The EIS identified deep water bores in the landholder census including the Wandoan Town Bores and other community bores (Juandah, Bimbadeen and Grosmont Bores). Landowners and the grazing industry throughout the district maintain a high level of dependence on these deep aquifers.

The EIS measured groundwater levels and flow direction within constructed bores. Results indicated that flows generally reflect the surface topography with groundwater flow from south to north.

The EIS stated that groundwater quality in the overburden and coal seam aquifers are generally poor, varying from brackish to saline brine. EC was generally lower within the alluvial deposits and typically higher in the Walloon Coal Measures. The EIS concluded that groundwater in the overburden and coal seams was not suitable for drinking and was generally more suited for stock watering purposes and that no known users of groundwater were identified for industrial or recreational purposes within the project area.

The EIS stated that as groundwater quality is generally brackish to saline and that it is unlikely that any vegetation is dependent on this groundwater and no natural springs were found or observed in the project area.

Stygofauna and subterranean ecological values are described in section 4.14 of this report.

4.13.2 Impacts

The potential impacts to groundwater from the project identified by the EIS include:

- dewatering during mining may result in drawdown and depressurisation of the sedimentary aquifers of the GAB, Juandah Coal Measures and unconsolidated alluvial sediments
- groundwater contamination from chemical and hydrocarbon spills, overburden and reject material, stormwater/process water dams, the TSFs and sewage effluent
- significant reduction in the extent of Stygofauna habitat within the Horse Creek alluvium from draw down and removal of the aquifer.

The EIS assessed and modelled the groundwater resource of the project and surrounding area to predict changes in groundwater quality and quantity, standing water levels and the potential impacts of dewatering on the local and regional groundwater values. The EIS concluded that mine dewatering operations would reduce both water-table levels and groundwater flows.

The aquifers that would be impacted by mining are those associated with the coal seams of the Juandah Coal Measure and the alluvial aquifers of Horse Creek. The EIS stated that the GAB aquifers (contained within the Hutton and Precipice Sandstones formations on the project site) are located at significant depth below the proposed mining to not be impacted.

The EIS stated that the Horse Creek diversion would have a negligible impact on groundwater resources due to the lack of alluvial sediments and shallow, connected aquifers in the area of the proposed diversion. The EIS stated that aquifers underlying the coal measures receive limited recharge contribution from existing alluvial sediments within the project area along Horse Creek. The EIS concluded that groundwater did not contribute to Horse Creek baseflow in its existing alignment and it is unlikely that groundwater would contribute to the baseflow of the proposed diversion.

The EIS stated that groundwater inflow into active mining operations would occur directly from the mined coal seams. It also stated that the expected groundwater inflow (seepage) to the pits would be relatively low. Estimated modelled inflow volumes are predicted to be less than 1ML/day for the northern and western pits and up to 2.5ML/day for south-eastern open-cut pit.

Groundwater seepage, direct rainfall and evaporation would contribute to the final water levels in the voids. Pit voids would remain a groundwater sink post-mining and groundwater and rainfall inflows would cause a lake to form within the final pit voids. The EIS groundwater modelling concluded that void water levels would not stabilise until approximately 750 years after the end of mine life. The EIS did not forecast the probable water quality of the final voids. Water quality in the residual voids would be expected to deteriorate (become hypersaline) over time due to high evaporation rates, low rainfall and the ongoing input of saline groundwater.

The EIS assessed the cumulative groundwater impacts of the proposed adjacent Wandoan Coal Mine Project mining at the same time as the Elimatta Project. Post mining, the modelling indicated the zone of the depressurisation generated by both mining projects would continue to expand as groundwater flows back into and refills the pits. Modelling in the EIS indicated that the zones of depressurisation generated by both projects join up and create a narrow zone to the north-east of the project site where cumulative impacts may persist for up to several decades post-mining. The EIS concluded that due to the uncertainties regarding aquifer properties and faulting in undisturbed areas, the groundwater model developed for the project would be reviewed after ten years of mining to determine if the predicted zone of depressurisation and impacts are accurate. The EIS stated that this review and recalibration of the groundwater model would be undertaken as required by the conditions of the project's Water Licence under the *Water Act 2000*.

The water from mine dewatering, including groundwater inflows would be stored in the raw water dams for use in mining operations. Taroom Coal would require an approval under the *Water Act 2000* to take or interfere with water through mine dewatering operations.

The EIS stated that the proposed excavations for the WSL rail and services corridor alignment are unlikely to intersect the water table and are unlikely to be at risk from groundwater seepage. The EIS concluded that as the cuttings traverse areas of high topography, any water would naturally drain along the surface towards the creeks or percolate to the water table aquifer.

The EIS stated that as groundwater quality is generally brackish to saline it concluded that it is unlikely that any vegetation is dependent on this groundwater and no natural springs were found or observed in the project area.

4.13.3 Avoidance, mitigation and management measures

The EIS stated that impacts of the project on groundwater include drawdown of aquifers associated with mining and the potential for seepage of contaminants to the aquifers from waste dumps, TSFs or accidental spills.

The EIS stated that semi-permanent environmental monitoring devices are located throughout the Project site, including groundwater monitoring bores. New monitor bores would be commissioned and others decommissioned as mining progresses.

The EIS stated that specific monitoring of the surface TSFs would be required to ensure the stability of the wall is maintained. Regular inspections would be required and instrumentation, including survey monuments, piezometers and boreholes for sampling groundwater for water quality testing, would be installed and regularly monitored.

The EIS included a range of mitigation and management measures to minimise the potential impact on groundwater resources including:

- bunding all chemical storage and handling areas to contain accidental spills
- loading and unloading bulk petroleum products in a designated area and incorporating spillage management features into the design
- monitoring a network of groundwater monitoring bores on a regular basis
- development of a deep bore monitoring program
- effective capture of all saline groundwater and runoff intercepted by the mining pits during operations while ensuring the minimal extraction of groundwater necessary to safely undertake mining to avoid over abstraction that could lead to lower than expected groundwater levels.

The EIS concluded that management strategies to mitigate groundwater impacts and are sufficient to protect the existing groundwater resource environmental values.

A groundwater monitoring program (GMP) was not provided in the EIS. Taroom Coal committed to prepare a groundwater monitor program which would:

- collect baseline and background data prior to mining, during operation and after mine closure
- provide a means of early detection and management of groundwater related impacts
- assess the progress of de-watering due to bores and seepage into the mine pit to inform the mines water supply and storage management
- identify any seepage from dams, spoil and stockpile areas
- identify any changes in groundwater quality as a result of de-watering or seepage from dams, spoil and stockpile areas to check for acid rock drainage generation and assess the performance of management strategies
- provide data for review of the groundwater model
- satisfy regulatory reporting requirements under the *Water Act 2000*.

The GMP should also include details of the following:

- the location of groundwater monitoring sites and the location of aquifers the sites are monitoring
- the frequency at which sampling would be undertaken
- the groundwater contaminant trigger values
- the groundwater monitoring reporting requirements
- the management measures to effectively mitigate and mange potential impacts on aquifers and existing groundwater users.

4.13.4 Outstanding issues

The EIS did not suitably assess and report on all aspects of groundwater water quality that may be affected by the project. Information on groundwater quality that includes the full range of potential contaminants would support a hazard assessment for potential ground contamination of the coal seam aquifers of the Juandah Coal Measures and unconsolidated alluvial sediments. Monitoring could inform the hazard assessment for surface water (i.e. where groundwater inflows are transferred to water storage dams and may be subject to controlled release to Horse Creek).

The EIS did not provide quantified estimate of the expected groundwater inflow to the pits, only qualified estimates.

4.13.5 Conclusions and recommendations

The EM plan should be revised and updated to include a groundwater monitoring program that would identify the full range of potential contaminants for groundwater. This information would allow Taroom Coal to assess the effectiveness of proposed water management strategies for protecting water quality values. The groundwater model should be recalibrated to confirm aquifer properties, any faulting and impacts on groundwater users. Taroom Coal should also commit to make good arrangements for groundwater users potentially impacted by the project.

4.14 Ecology

4.14.1 Biodiversity values

4.14.1.1 Overview

The EIS stated that the majority of the vegetation within the project area has been extensively modified as a consequence of past clearing for beef grazing activities, resulting in the loss of, or significant alteration to, the majority of vegetation communities including the displacement of native species and the homogeneity of the grass layer. Consequently, only small remnants of native vegetation remain along roads, creeks and elsewhere in fragmented patches. Watercourses within the project area act as linear, well-connected ecological corridors with habitat values. The EIS stated that Non-Remnant Grassland covers an area of 3741.8ha (93.1%) within the project area, is a dominant landscape feature and is of low nature conservation value. Exotic plant species such as Buffel Grass have been introduced for cattle grazing on the project site. Three declared weed species and five pest animals were recorded in the study area.

4.14.1.2 Mine site – flora values

The EIS stated that eight vegetation communities made up of 187 flora species were identified on the mine site, on the basis of both desktop studies and field surveys. The EIS stated that no flora species of conservation significance were identified on the project site and 34 species were identified as introduced.

The EIS drew upon the Brigalow Belt Biodiversity Planning Assessment (BPA) to assess the environmental values of the project areas. BPA mapping identified a vegetation corridor along Horse Creek and a small patch of remnant Brigalow on the eastern boundary of the southern MLA. The vegetation along Horse Creek also contains areas of State biodiversity significance (Endangered REs) and Regional biodiversity significance (Of Concern REs). The ecosystem value of parts of these areas is ranked as being very high in a bioregional context. The BPA identified the vegetation along Horse Creek and on the eastern boundary of the southern MLA as wildlife refugia.

The EIS identified that of the eight vegetation communities, six communities were classed as remnant vegetation. The Queensland Herbarium RE classifications for each of the described remnants are:

- Blue Gum Riparian Woodland (RE 11.3.25, listed as 'Least Concern' under the VM Act but as 'Of Concern' under the EHP Biodiversity Status; covering 16.39ha representing 0.4% of the MLA areas)
- Blue Gum Riparian Woodland with Interspersed Poplar Box community (RE 11.3.25 and 11.3.2, Poplar Box community is listed as 'Of Concern' under the VM Act and the EHP Biodiversity Status; covering 187.9ha representing 4.7% of the MLA areas)
- Brigalow Open Forest (RE 11.9.5, listed as 'Endangered' under the VM Act and the EHP Biodiversity Status, is included the Brigalow Woodlands' Threatened Ecological Community listed under the EPBC Act; covering 25.9ha, representing 0.6% of the MLA areas)
- Brigalow Open Forest with Associated Poplar Box (RE 11.9.10, is listed as 'Of Concern' under the VM Act and as 'Endangered' under the EHP Biodiversity Status; cover 12.1ha representing 0.3% of the MLA areas)
- Poplar Box and Cypress Pine Open Forest (RE 11.10.11, listed as 'Least Concern' under the VM Act but as 'No Concern at present' under the EHP Biodiversity Status; 5.6ha representing approximately 0.1% of the MLA areas)
- Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions (REs 11.3.2 and 11.3.2b, is listed as 'Of Concern' under the VM Act and the EHP Biodiversity Status; covering 31.3ha and 1.2ha occurs east and outside of the MLA areas).

In addition to the extensive Non-Remnant Grassland, there is 28.2ha of Regrowth Vegetation (comprising 0.7%) within the MLA areas.

The EIS identified four areas of Category B Environmentally Sensitive Areas (ESA) under the EP Act as Endangered Regional Ecosystems (ERE) in the south-western corner and north of the southern MLA50254. Parts of Horse Creek located adjacent to the eastern boundary of the MLA areas were also mapped as Category B – ERE.

The EIS reported that one vegetation community (Brigalow and/or Belah Open Forest) found on the MLAs was listed as 'endangered' under the EHP Biodiversity Status and the *Vegetation Management Act 1999* and is also included within the Brigalow (*Acacia harpophylla* dominant and co-dominant) woodlands Threatened Ecological Community listed under the EPBC Act.

Three communities; Blue Gum Riparian Woodland with interspersed Poplar Box; Brigalow Open Forest with associated Poplar Box; Blue Gum Palustrine Wetland/Poplar Box Wetland in Drainage Depressions, are listed as

'Of Concern' under the *Vegetation Management Act 1999* (VM Act).

While desktop searches identified the potential for species of conservation significance to occur within the MLA areas, the EIS stated that these species were not detected in targeted searches. The EIS concluded that: 'As the Project site has been extensively cleared and grazed, it is considered unlikely to provide suitable habitat for most threatened species'.

4.14.1.3 Mine site – fauna values

The EIS stated that 120 vertebrate fauna species were identified on the proposed MLA areas, including nine amphibians (including one exotic species), 13 reptiles, 24 mammals (including 10 exotic species) and 72 birds.

The EIS stated that one species of cultural significance, that is the Echidna (*Tachyglossus aculeatus*), as well as the Little Pied Bat (*Chalinolobus picatus*) a micro-bat species of conservation significance that is listed as 'Near Threatened' under the Nature Conservation Wildlife Regulation 2006, were recorded on the project site.

The EIS stated that two bird species, the Whistling Kite (*Haliastur sphenurus*) and the Sacred Kingfisher (*Todiramphus sanctus*), listed as Marine under the EPBC Act were recorded on MLA areas. The EIS stated that these bird species are highly mobile and commonly found throughout mainland Australia.

4.14.1.4 WSL rail and services corridor – flora values

The EIS stated that the WSL rail and services corridor traverses three vegetation corridors that are identified in the BPA. These vegetation corridors contain areas of State and Regional biodiversity significance including 'Of Concern' REs and one area of 'Endangered' RE. The EIS stated that while these REs are mostly of High or Very High conservation value, they are poorly conserved.

The EIS identified eight vegetation communities within the WSL rail and services corridor, including six remnant communities four of which are of conservation significance, specifically:

- Poplar Box Open Woodland with Brigalow/Belah Elements on Undulating Hill Slopes (RE 11.9.10 - listed as 'Endangered' under the EHP Biodiversity Status and 'Of Concern' under the VM Act)
- Brigalow and/or Belah Dominant Woodland (RE 11.9.5 - listed as 'Endangered' under the VM Act and the EHP Biodiversity Status)
- Poplar Box Woodland with Brigalow/Belah Elements on Alluvial Plains (dominant RE 11.3.2 - listed as 'Of Concern' under the EHP Biodiversity Status and VM Act; and sub-dominant RE 11.3.17 - listed as 'Endangered' under the EHP Biodiversity Status)
- Myall Dominant Woodland (RE 11.9.6 - listed as 'Endangered' under the VM Act and the EHP Biodiversity Status and corresponds with the EPBC listed Endangered Ecological Community 'Brigalow (*Acacia harpophylla*) dominant and co-dominant').

Two remnant communities that are not of particular floristic significance, but which can provide important fauna habitat for birds and reptiles were found within the WSL rail and services corridor. They are:

- River Red Gum/Blue Gum Riparian Woodland (RE 11.3.25) which forms linear strands along watercourses including Horse Creek
- Silver-leaved Ironbark Open Woodland on Undulating Hill Slopes (RE 11.9.2 – listed as 'Least Concern' under the VM Act and as 'No Concern at Present' under the EHP Biodiversity Status).

The EIS also identified two non-remnant communities within the WSL rail and service corridor. They were Derived Native and Mixed Exotic-Native Grassland and Regrowth Vegetation, which are not listed under the VM Act, EHP Biodiversity Status or the EPBC Act.

The EIS identified three areas of Category B – EREs that would intersect the proposed WSL rail and services corridor. These areas correspond with vegetation associated with Horse Creek, Juandah Creek and the stock route to the east of Juandah Creek.

A total of 125 flora species were identified within the eight vegetation communities found in the WSL rail and services corridor. One flora species, Yarran (*Acacia melvillei*), is listed as being regionally significant.

No threatened plant species were identified on the WSL rail and services corridor during the various surveys undertaken. Twenty-seven exotic plants were identified including three declared weed species including Prickly Pear (*Opuntia stricta*), Velvety Tree Pear (*Opuntia tomentosa*) and Harrisia Cactus (*Harrisia martini*).

4.14.1.5 WSL rail and services corridor – fauna values

The EIS stated that 136 vertebrate terrestrial fauna species were observed on along the proposed WSL rail and services corridor, including 10 amphibian species, 11 reptiles, 24 mammal species and 91 bird species.

The EIS stated that one bat species of conservation significance (Little Pied Bat (*Chalinolobus picatus*)) was

recorded within the WSL rail and services corridor and two bird species (Black-necked Stork (*Ephippiorhynchys asiaticus*) and Cotton Pygmy-goose (*Nettapus coromondaliensis*)) were recorded immediately adjacent to the WSL rail and services corridor. These species of conservation significance are listed as 'Near Threatened' under the *Nature Conservation Act 1992* (NC Act). The two waterbird species are likely to utilise the habitat with in WSL rail and services corridor.

The EIS also identified suitable habitat along the WSL rail and services corridor area for the Rough Collared Frog (*Cyclorana verrucosa*), listed as 'Vulnerable' under the NC Act. The potential for the Golden-tailed Gecko (*Strophurus taenicauda*) and Brigalow Scaly-Foot (*Paradelma orientalis*) and six other reptiles listed under the NC Act and/or the EPBC Act to occur along the corridor was also noted.

The EIS also noted evidence of the regionally significant Yellow-bellied Glider (southern subspecies) (*Petaurus australis australis*) in the form of scarring on Red Gums and identified the common Brush-tailed Possum (*Trichosurus vulpecula*), listed as a high priority taxon within the southern Brigalow Belt Bioregion.

The EIS stated that under the EPBC Act one listed Migratory species (Eastern Great Egret (*Ardea modesta*)) and one listed Marine species (Whistling Kite (*Haliastur sphenurus*)) were recorded within the WSL rail and services corridor.

The EIS stated that ten introduced fauna species were recorded within the MLA areas and WSL rail and services corridor. Of the ten pest species, five are declared pest animals including the Feral Cat (*Felis catus*), Feral Pig (*Sus scrofa*), European Rabbit (*Oryctolagus cuniculus*), European Fox (*Vulpes vulpes*) and Feral Dog and or Dingo (*Canis familiaris*).

4.14.1.6 Road corridor – flora and fauna values

The flora and fauna values for the road diversions were not adequately described in the EIS and no flora and fauna field survey work for the proposed road diversions were undertaken. The assessment presented in the EIS relied on evaluation of database searches. No validation or ground-truthing was undertaken despite the desktop assessment identifying the potential for 'Endangered', 'Vulnerable' and 'Near Threatened' species under the NC Act and 'Vulnerable', 'Endangered' and 'Marine' species under the EPBC Act to occur.

4.14.1.7 Mine site - aquatic ecology values

The EIS stated that three lacustrine wetlands and five palustrine wetlands including one large palustrine water body located near to Horse Creek downstream of the southern ML50254 occur on or adjacent to the project site. The large palustrine wetland, identified above as 'Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions', is classified on the EHP WetlandMaps database as a referable wetland or Wetland Protection Area (WPA) and is mapped as a Great Barrier Reef Catchment wetland of High Ecological Significance (HES). The EIS stated that the characteristics of this wetland were not considered typical of a wetland of high ecological significance. However, this conclusion is unsupported as the wetland was not surveyed during the wet season to fully characterise the wetland characteristics and values of the site.

The project area experiences variable rainfall patterns and is characterised by highly ephemeral waterways. Aquatic ecology field surveys and assessment were undertaken and reported in the EIS. Aquatic surveys recorded a relatively diverse assemblage of macroinvertebrates (15 families and two sub families from the Insecta class; four orders from the Crustacea class; one order from class Arachnidae) and a low abundance and diversity of native fish species ((Spangled Perch (*Leiopotherapon unicolour*), Glass Perch (*Ambassis agassizi*) and Rainbow Fish (*Melanotaenia splendida*)).

4.14.1.8 WSL rail services corridor - aquatic ecology values

The EIS stated that the WSL rail and services corridor would intersect watercourses, creeks, tributaries, drainage channels, lacustrine and palustrine wetlands. The EIS stated that waterways intersected by the WSL rail and services corridor ranged from ephemeral to semi-permanent. Riparian vegetation occurs along some of the waterways and where it has been cleared, this has contributed to local watercourse erosion and weed infestation.

The EIS identified 26 macroinvertebrate taxa including Diving Beetles (Coleoptera: Dytiscidae) and Bloodworms (Diptera: Chironominae), Marsh Beetles (Coleoptera: Scirtidae), Mosquito Wrigglers (Diptera: Culicidae), Baetids (Ephemeroptera: Baetidae), Water Boatmen (Hemiptera: Corixidae) and Water Striders (Hemiptera: Veliidae) along the WSL rail and services corridor. Four fish species including Agassiz's Glassfish (*Ambassis agassizii*), Empire Gudgeon (*Hypseleotris compressa*), Midgely's Carp Gudgeon (Hypseleotris sp.) and Spangled Perch (*Leiopotherapon unicolor*) were found along the WSL rail and services corridor, with Horse Creek exhibiting the greatest diversity of aquatic vertebrates. The EIS recorded Crustacean species including the Common Yabby (*Cherax destructor*), Orange-fingered Yabby (*Cherax depressus*) and a Juvenile Yabby (Cherax sp.) along the WSL rail and services corridor. The Common Yabby (*Cherax destructor*) was recorded in high abundance.

The EIS identified four obligate groundwater species (stygobites) mainly in the Quaternary alluvium deposits

including three previously undescribed species of Crustacea and two Copepods within the mine area including:

- *Bathynellidae* sp. (order Syncarida)
- *Dussartcyclops* sp. (subclass Copepoda)
- *Parastenocaris* sp. (subclass Copepoda)
- *Dussartstenocaris* sp. (subclass Copepoda).

The EIS stated that two of the stygobite species (*Parastenocaris* sp. and *Dussartstenocaris* sp.) were recorded outside the project area; however two species (*Bathynellidae* sp. and *Dussartcyclops* sp.) were only recorded inside the project area.

The EIS considered it likely that, assuming connectivity of the groundwater habitat within the Horse Creek alluvial aquifer, the distribution of the other two stygobitic species would also extend outside the proposed area of impact both upstream, downstream and along the course of the Horse Creek alluvial aquifer.

4.14.2 Impacts

4.14.2.1 Mine, road and rail corridor impacts - flora

The EIS provided a high-level assessment of potential impacts on flora arising from the proposed works. The following impacts are identified:

- the EIS acknowledges that land clearing and mining activities may reduce and fragment the current extent of vegetation communities and available habitat for native flora species on the MLA areas, including areas identified by the BPA as State and Regionally significant with High to Very High bioregional Ecosystem Value
- notwithstanding that the project area and WSL rail and services corridor have been substantially cleared for grazing and related uses, there are substantial remnants that would be directly affected by the proposed works. The clearing of the MLA areas including the relocation of a section of Horse Creek would result in the loss of more than 200ha of Blue Gum Riparian Woodland (with or without Interspersed Poplar Box). The significance of this loss arises from both the local habitat values and the importance of riparian remnants and aquatic habitats as wildlife corridors. As a consequence, impacts due to the mine as well as the WSL rail and services corridor would cause fragmentation of key habitat links that are identified in the BPA and also recognised as endangered regional ecosystems (ERE)
- the project would also impact on a significant area of Endangered Brigalow Open Forest
- while some of the most affected remnant vegetation communities have been substantially affected by grazing and weed invasion, and hence have limited habitat value in terms of conservation of individual flora species, they retain substantial value in terms of fauna habitat
- there is potential for a substantial indirect impact on the extensive Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions to the east and outside of the southern MLA area, due to long-term changes to the flow regime and water quality in Horse Creek as well as changes in the quality and quantity of overland flow from adjoining areas
- while the EIS noted that the vegetation communities directly affected by project works occur elsewhere in the region, with varying extents of conservation within the protected area estate of the Taroom Downs subregion, there is little consideration in the EIS as to what the cumulative impacts of resource projects in the region could be on the vegetation communities
- project activities have the potential to cause a variety of offsite impacts on flora, including the spread of weeds, dust and contaminants, erosion and siltation, as well as increased fire risk and microclimatic changes
- the rail and services corridor would impact on an area Yarran (*Acacia melvillei*) a bioregionally significant wattle species.

4.14.2.2 Mine, road and rail corridor impacts - fauna

While a number of surveys of flora and fauna were conducted under varying seasonal conditions for the EIS, limited detail on fauna occurrences and potential impacts is provided in the EIS. In addition to direct loss of fauna habitat due to clearing, key threats to fauna identified in the EIS include:

- death or injury of fauna as a direct result of construction activities
- interference with fauna movement patterns and breeding places
- noise and lighting disturbance of fauna, especially at the MIA, CHPP, active mining areas, rail loading and turning area
- erosion and siltation of waterways
- increased population numbers of pest animals.

The EIS suggested that two bird species of conservation significance that occur near the project area (i.e. the Black-necked Stork and Cotton Pygmy-goose) are unlikely to be significantly affected because of their large

ranges, locally dispersive behaviour and the limited availability of suitable aquatic habitat within the project area. The EIS acknowledged that the locally resident Whistling Kite is vulnerable to mortality from scavenging off road kill, but suggests that the project is unlikely to have a significant impact on the regional population because of the widespread availability of breeding habitat in the area as well as the extensive range of the species.

The EIS noted that the WSL rail and services corridor would remove a small area of suitable riparian habitat for the Eastern Great Egret, Whistling Kite and Little Pied Bat. It further noted that habitat suitable for the South-eastern Long-eared Bat exists both within and outside the project site and is well connected through the Horse Creek riparian corridor. The EIS concluded that the project would impact on approximately 7% of the potentially suitable habitat for the South-eastern Long-eared Bat within the broader region, however claimed without suitable justification that this was unlikely to form important habitat for the species.

4.14.2.3 Mine, road and rail corridor impacts - aquatic

While aquatic taxa have been surveyed, the EIS does not provide a clear characterisation of the aquatic ecology of potentially affected waterways and wetlands. While the general types of impacts that may result from the project are identified in the EIS, a detailed assessment of potential impacts has not been provided. General potential impacts that are identified include:

- clearing within riparian zones leading to habitat fragmentation and weed invasion
- the diversion of Horse Creek would result in fragmentation of a valuable wildlife corridor, especially affecting smaller terrestrial species and potentially impede the movement of some fish species, unless a wholly successful hydrological and ecological restoration is achieved
- development of the WSL rail and services corridor would involve the clearing of small areas of waterway REs including habitat from three riparian corridors of recognised refugia value, two of which are recognised in the BPA as of State and Regional Significance
- clearing of large trees within riparian zones may impact on the Little Pied Bat, which roosts in tree hollows near water
- surface runoff in the vicinity of the WSL rail and services corridor, as well as from access roads, would have potential to generate local erosion and sediment input to waterways
- any releases of mine affected water, particularly if contaminated or with altered physio-chemical characteristics or involving excessive flows, could affect water quality and hence aquatic ecosystem functions
- sediment-laden runoff causing elevated turbidity and thereby affecting light penetration as well as possible nutrient release, and leading to changes in aquatic plant ecology and invertebrate populations, especially of less mobile fauna
- reduction of aquatic invertebrate diversity and abundance associated with aquatic habitat changes may in turn contribute to reduced populations of vertebrates utilising aquatic habitats
- rail bridges and culverts associated with construction of the WSL rail and services corridor could alter natural flow conditions and impede fish passage, particularly in the short-term
- creation of artificial ponds due to construction works could provide suitable breeding habitats for Cane Toads.

The EIS stated that the large palustrine wetland located adjacent to MLA50254 and near to Horse Creek would be vulnerable to off-site and project impacts. Flood modelling for the EIS indicated that some changes to inundation regimes are expected.

The EIS noted that Stygofauna are poorly known both taxonomically and ecologically and that although there are likely to be a reduction in the populations of Stygofauna species in the impact zone, this is unlikely to be to such a great extent to cause a long-term and continuous decline in Stygofauna populations provided further survey work and assessment confirms connectivity of the Stygofauna groundwater habitat outside the area of impact both upstream, downstream and along the course of the Horse Creek alluvium.

4.14.2.4 Avoidance, mitigation and management measures

The EIS provided a very high-level statement of proposed avoidance, mitigation and management measures with respect to ecology impacts:

- minimising vegetation clearance to the extent consistent with safe and efficient operation, while retaining remnant vegetation along the WSL rail and services corridor alignment, particularly at creek crossings, bioregional corridors and stock routes
- providing vegetation offsets in accordance with policy requirements (see section 4.14.5)
- implementing appropriate erosion and sediment control practices
- undertaking effective rehabilitation of disturbed areas, using appropriate, locally endemic native species, favouring species that would encourage the return of native fauna
- where practicable, retaining and reinstating coarse woody debris to provide micro-habitat, including for

threatened Brigalow reptile species
- restoring habitat corridors between remaining and replanted patches of vegetation where possible, and in particular rehabilitation of the Horse Creek diversion is intended to restore connectivity, functionality and intactness values relative to Baseline BioCondition surveys that have been conducted
- designing the Horse Creek diversion to support the hydrological and ecological functioning of Horse Creek as well as the large palustrine wetland
- designing rail bridges and culverts associated with the WSL rail and services corridor to minimise impacts on fish passage, habitat values and natural flows
- controlling the discharge of waters from the mine site in accordance with the Model Mining Conditions for Coal Mines in the Fitzroy Basin
- avoiding the creation of permanent shallow water areas in the vicinity of infrastructure that might provide habitat for Cane Toads
- applying appropriate management strategies to control the occurrence of pest fauna and weed species, in accordance with statutory requirements
- applying speed limits on the MLA areas that would reduce the risk of collisions with fauna
- monitoring of water quality, sediment quality, stream flow, riparian vegetation and macroinvertebrates would be undertaken as part of a Receiving Environment Monitoring Program to detect environmental changes potentially resulting from the project, including within the large palustrine wetland off Horse Creek; monitoring would be conducted within 10km downstream of project release points
- restricting the access of wildlife to the TSFs and final voids through fencing and safety bund walls.

4.14.3 Outstanding issues

The EIS has addressed the matters relating to ecological impacts set out in the TOR but it is deficient in detail, clarity and integration in describing potential impacts. This is especially so in relation to impacts on terrestrial and aquatic ecosystems (and their interaction), as well as the regional context of cumulative pressures and the conservation status of affected species and ecosystems. The EM plan should be revised to fully address the potential impacts on flora and fauna and aquatic ecosystem and health values and develop suitable and effective management measures to mitigate the potential impacts. Further assessment of the potential impacts on the following fauna and their habitats is warranted:

- Little Pied Bat and South-eastern Long-eared Bat, especially in the context of habitat corridors
- Rough Collared Frog, Golden-tailed Gecko, Brigalow Scaly-Foot and other listed reptiles that may be present along the WSL rail and services corridor
- listed reptile species in Brigalow vegetation communities
- stygofauna in alluvium and groundwater.

While the avoidance, mitigation and management measures for ecological impacts put forward in the EIS (and summarised above) are generally appropriate, greater specificity is needed prior to project approval in relation to:

- objectives, environmental performance criteria, accountabilities and compliance incentives (e.g. financial security) for the rehabilitation and maintenance of Horse Creek in both the diverted and downstream sections, as well as for the maintenance of the ecological values of waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works
- salvage of fish that might be affected by the diversion of Horse Creek.

Development of species management programs (SMP) for all listed threatened fauna species affected by project works (e.g. Little Pied Bat and South-eastern Long-eared Bat) would be required in accordance with the requirements of the Nature Conservation (Wildlife Management) Regulation 2006.

4.14.4 Conclusions and recommendations

While the mine site and WSL rail and services corridor have been largely cleared of native vegetation, remnant vegetation in the project area retains important ecological values, especially along Horse Creek and other waterways and associated wetlands. These values have been broadly characterised in the EIS but further detail is needed.

It is recommended that EM plan be updated to include:

- management plan(s) that incorporate objectives, performance criteria, accountabilities and compliance incentives for:
    - the rehabilitation and maintenance of Horse Creek in both the diverted and downstream sections, as well as for the maintenance of the ecological values of waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works
    - the rehabilitation and maintenance of terrestrial ecosystems to enhance fauna habitat values
- the need for species management programs (SMP) for listed threatened fauna species that would be

affected by project works.

4.14.5 Biodiversity offsets

4.14.5.1 Environmental offset plan

A specific offset plan was not developed as part of the EIS although an environmental offset strategy was provided as an appendix to the EIS. Taroom Coal has committed to providing a refined environmental offset strategy. The offsets would be required to be provided in accordance with the requirements of the Queensland Environmental Offsets Policy.

4.14.5.2 Outstanding issues

The environmental offset strategy proposed in the EIS did not provide sufficient information to identify and quantify all matters of State environmental significant (MSES) values. The Environmental Offset Strategy lacked specific detail including:

- whether the delivery of the offset strategy would be staged or as a single direct offset
- whether the offset strategy as presented covers the entire project or whether separate plans would be developed for each stage
- delivery timeframes
- connectivity values of riparian vegetation.

Since the EIS was submitted to EHP, a new framework for environmental offsets in Queensland commenced with the introduction of the *Environmental Offsets Act 2014* (Offsets Act). The Offsets Act was passed with amendments on 22 May 2014 and commenced on 1 July 2014. It is supported by the Environmental Offsets Regulation 2014, the Queensland Environmental Offsets Policy and the Financial Settlement Offset Calculation Methodology. Proponents can elect to provide either a proponent-driven offset or a final settlement offset, or some combination of these two.

Offset requirements for the project would now need to be determined in accordance with the Queensland Environmental Offsets Policy. Offset delivery plans would need to be agreed for relevant parts of the project, which might involve separate plans for the MLA area, road realignment and for the WSL rail and services corridor.

4.14.5.3 Conclusions and recommendations

The environmental offset strategy proposed is not adequate. Offsets required would be in accordance with the Queensland Environmental Offsets Policy and would be regulated through conditions of an EA for the mining lease. Offsets would also be required for any significant residual impact on MSES.

Recommended EA offset conditions are provided in Appendix 1.

4.15 Transport

4.15.1 Existing values

The project is located about 25km west of the Leichhardt Highway (Hwy) and 33km east of the Roma-Taroom Road, and may be accessed from either of these major transport routes via the local road network.

Project traffic is expected to access the State Controlled Road (SCR) network at three existing intersections at:

- Jackson-Wandoan Road/Bundi Road
- Leichhardt Hwy/Booral Road
- Roma-Taroom Road/Canal Clifford Road.

The Leichhardt Hwy is a major State Strategic Road linking southern and central Queensland.

The existing rail network in the region comprises both the Moura System operated by Aurizon, which connects Moura to Gladstone, and the Western System of the Queensland Rail Network, which extends from Quilpie to Rosewood and north to Wandoan. The various proposals for coal development in the Surat Basin have led to recognition of the need to link the Western and Moura Systems. The Surat Basin Rail Project would connect the Western System near Wandoan to the Moura System near Banana, and would provide multi-user open access enabling export of coal and freight through the Port of Gladstone, as an alternative to the capacity-constrained Port of Brisbane.

Whereas Surat Basin Rail Pty Ltd is the proponent for the Surat Basin Rail Project, the WSL rail and services corridor is to be developed for Taroom Coal by Northern Energy Corporation Ltd. The Wiggins Island Coal Export Terminal is being developed in Gladstone by a consortium of existing and potential coal exporters.

Taroom Aerodrome, located 22km south of Taroom, is owned and operated by the Banana Shire Council. Other, larger regional airfields may also play a role in FIFO transport for the project but were not specified in the EIS.

4.15.2 Impacts

4.15.2.1 Road impacts

During the expected 24-month construction period, an estimated 26,344 truckloads of plant and bulk material would be transported to the project site, either from the local area or from Brisbane. Most loads (98%) would be raw materials sourced from local quarries, particularly crushed rock, gravel and sand as well as railway ballast. Taroom Coal proposes to source materials from:

- Warrians Quarry (Boral) located about 100km southwest of the mine site at Euthulla
- Knob Hill Quarry (Ostwald Bros) located about 120km northeast of the mine site at Bungaban.

However, according to the EIS both Boral and Ostwald Bros. are exploring development opportunities for quarries in the region to supply the construction needs of this and other projects.

During the operational phase, expected to exceed 32 years, regular deliveries of fuel, explosives, tyres, perishables and other goods would be required. The project would require in excess of 1000 deliveries of diesel per year and up to 900 deliveries of other dangerous goods per year.

The EIS described the specific routes to be used for the transport of materials to the site during the construction and operations phases. Materials would be transported by road to the site using a mix of vehicles, including three-axle and four-axle trucks, B doubles, semi-trailer and road trains.

A number of public, formed roads across and around the proposed mine would be directly affected by the project, through temporary and permanent closures, relocation and new sections of roads adjacent to the MLA. The redesign of the local road network to facilitate the mine operations would disrupt existing road users and traffic movement until works are complete. Local roads which would be directly affected by the project include:

- the section of Perretts Roads between Bundi Road and Ryals Road would be relocated from the southern MLA to an alignment to the east outside the MLA, and part of the existing alignment of Perretts Road between Ryals Road and Cattle Camp Road be upgraded
- part of Ryals Road across Horse Creek to Perretts Roads be upgraded
- Cattle Camp Road be upgraded
- Goldens Road be closed to facilitate development of the mine haul road
- a section of new road, linking Goldens Road to Cattle Camp Road, be developed to maintain access between the western side of the MLA areas and Perretts Roads.

According to the EIS, the proposed public road developments have been designed in accordance with the relevant AUSTROADS Guides and would be constructed as unsealed gravel roads with imported base and sub-base material. Perretts Roads has a design speed of 50km/hr while the other roads have a design speed of 40km/hr.

A Road Impact Assessment (RIA) was undertaken for the EIS, in accordance with the Guidelines for Assessment of Road Impacts of Development (GARID), and as required by the TOR. In the RIA a traffic impact assessment and a pavement impact assessment were prepared for the construction and representative operational years.

During construction, only the Roma-Taroom Road was found to be subject to a significant increase in traffic (more than 5%) above background levels, attributed to the carriage of materials from local quarries to the site. However, the EIS stated that despite the increase in traffic ranging from 5.9 to 17%, no change in the level of service (i.e. free flowing traffic) would result during either the construction or operational periods.

In terms of pavement impact assessment, it was found that project-related increases in equivalent standard axle (ESA) loads during construction, i.e. relative to forecast background ESA loads, would only exceed the specified 5% threshold on segments of the Leichhardt Highway (Hwy) and the Roma-Taroom Road. None of the roads investigated showed a significant increase in ESA levels during the operational period. According to the EIS, the results of analysis indicate that the reduction on pavement life would not exceed one year on any of the road segments forming the study area, and therefore no rehabilitation contributions would be required. However, maintenance cost contributions in relation to pavement impacts on the Leichhardt Hwy and the Roma-Taroom Road due to the project have been estimated to be in excess of $1 million on the basis of the 'Fitzroy methodology'.

Significant impacts on the local road network are expected, in terms of both traffic and ESAs, notably including the route from Ostwald Bros Quarry during the construction period, and on Perretts Road and Bundi Road during the operational period. Impacts on interchanges between local roads and the SCR network from project vehicle movements have also been assessed. Major impacts on the Roma-Taroom Road/Canal Clifford Road, Leichhardt Hwy/Nathan Road and Leichhardt Hwy/Booral Road intersections are expected during the construction period. The

EIS proposed that the need for upgrading of intersections, in particular along the Leichhardt Hwy, Jackson-Wandoan Road and the Roma-Taroom Road, be addressed during the detailed design stage for the project.

The EIS noted that the proposed Glencore Wandoan Coal Project to the east of the project would entail extensive changes to the local road network, and hence cumulative impacts would need to be considered in due course particularly for transport safety management. The EIS acknowledged that issues related to movement of hazardous materials and the potential for interaction with school bus routes would need further consideration.

4.15.2.2 Rail impacts

During the development of the WSL rail and services corridor, it would be necessary to establish suitable crossings at the Leichhardt Hwy and five local roads, as well as occupational crossings within private properties and stock crossings. It is proposed that the crossing of the Leichhardt Hwy and four local roads would be grade separated as road over rail. It is also proposed to construct an access track along the length of the WSL rail and services corridor to facilitate the movement of construction vehicles.

During the operational phase, for the expected average production rate of 5Mtpa, rail transport of the coal is expected to require 1.17 trains per day, each with 5 diesel locomotives hauling 140 wagons of 106 gross tonnes each. Coal would be transported initially via the WSL rail and services corridor and then the Surat Basin Rail link, connecting with the Moura System and onwards to the Port of Gladstone. It is not expected that the daily train movements for the project would negatively impact on the rail network. Similarly, since the project has been factored into planning for the Wiggins Island Coal Export Terminal, if this port project proceeds, the project would not negatively impact on other port facility users.

The EIS acknowledged that rail might be used for the delivery of some operational supplies originating in Rockhampton or Brisbane, but noted that this scenario has not been assessed in order to focus on the worst case road-based scenario.

4.15.2.3 Airfield impacts

During the construction and operational phases, locally sourced staff would be transported to the mine site by mini-bus and or van transfers. However, most (95%) of the project workforce is expected to travel from the Fraser Coast on a FIFO basis to an airfield within the Taroom area via Dash 8 or similar aircraft. While airports on the Fraser Coast have adequate capacity to cater for increased FIFO demand, the options of either upgrading of the Taroom airstrip or developing a greenfield airfield at Wandoan are being considered by Taroom Coal. An aligned approach with Glencore Coal Queensland is expected.

4.15.2.4 Stock route impacts

Parts of the State's Stock Route Network (SRN) overlap with the project area, including a Camping Reserve within the southern MLA and a designated Stock Route which the WSL rail and services corridor transects. While the loss of the Camping Reserve would be mitigated by alternative reserves in the area, continuity of the Stock Route would require appropriate stock crossings to be established, probably on a grade-separated basis.

4.15.3 Avoidance, mitigation and management measures

The EIS concluded that significant impacts on the SCR road network would be limited to the Leichhardt Hwy near Wandoan township and the Roma-Taroom Road. It noted that the specific requirements for mitigation and compensation would need to be resolved with DTMR. Similarly, the EIS stated that 'while the impact to local roads has not been quantified, negotiations will be undertaken with the WDRC to reach a suitable agreement which will include, where required, provisions for any necessary upgrades and on-going maintenance and rehabilitation.'

In response to several submissions about cumulative impacts, a draft Road Use Management Plan (RUMP) has been developed—though not part of the EIS—to identify objectives and strategies to mitigate and manage traffic risks and road impacts for the SCR, local roads and other roads including site roads. It is proposed that the RUMP would be finalised in negotiation with DTMR and WDRC prior to the start of construction of the project and remain a 'living' operational document in response to the evolving needs of the project and interacting projects. In accordance with the draft RUMP, it is intended that detailed Traffic Management Plans would be developed for road reserve crossings along the WSL rail and services corridor.

While submissions from the WDRC and Banana Shire Council called for detailed impact assessments, a RUMP for local roads and an Infrastructure Agreement with WDRC. Taroom Coal responded that its intended approach, as outlined above, would be appropriate.

4.15.4 Outstanding issues

Overall, the EIS has adequately addressed the TOR with respect to transport impacts.

DTMR has responded to the final EIS by expressing its general satisfaction with Taroom Coal's responses to issues previously raised by DTMR. At the same time DTMR has stressed the need for timely action on several matters before significant project traffic occurs, namely: a final RIA based on appropriate traffic data, including a revised pavement impact assessment, further intersection analysis, a refined RUMP, development of Traffic Management Plans, and further measures to address driver fatigue. Importantly, DTMR is not satisfied with the level of assessment and response to road safety risks from project traffic, particularly in the context of intersections that may be used for trucks hauling material from quarries. Taroom Coal's has committed to undertake further assessment and mitigation measures to address transport-related issues raised by DTMR.

4.15.5 Conclusions and recommendations

The EIS has provided an adequate assessment of transport impacts subject to further action to address the matters identified by DTMR.

Further consultation with DTMR is required during detailed mine planning and well-prior to the commencement of construction.

Recommended road traffic conditions provided by DTMR are provided in Appendix 1, Attachment C.

4.16 Noise and vibration

4.16.1 Existing values

The EIS identified the environmental values to be protected with respect to noise, in accordance with the Environmental Protection Policy (Noise) (EPP Noise), as being the protection of: the health and biodiversity of ecosystems, human health and well-being and the amenity of the community. In terms of human receptors, the EIS identified 54 sensitive receptors that could be affected by noise from the project.

Background noise monitoring was undertaken in February 2008 at five locations surrounding the MLAs, and to the south of the WSL rail and services corridor rail loop. High maximum noise levels of up to 71dB(A) were recorded but were attributed to insects and other natural sources, rather than anthropogenic sources, and were characterised as being 'typical of the summer noise environment'. Background noise levels, determined on the basis of the minL90dB(A) measure, were much lower being in the range of 22 to 30+dB(A) during the day. Noting the seasonal influence, the EIS suggested that in winter the background noise level during the day, evening and night would be 25dB(A) minL90 or less.

4.16.2 Impacts

The EIS has considered appropriate noise limits for mining operations in the context of the EHP ecoAccess Guidelines Planning for Noise Control. It proposed that a night-time noise limit of 35dB(A) Leq,adj,T be applied to the project, on the basis of achieving an internal sleep disturbance criterion of 30dB(A). A day-time and evening noise limit of 40dB(A) Leq,adj,T is proposed, in order to enable the EHP objective of 35dB(A) to be achieved inside dwellings. The EIS noise consultant suggests that application of the latter criterion would also enable the 50 dB(A) Lmax limit for sleep disturbance to be met.

Noise modelling for the mine operations considered outcomes under various metrological conditions as well as with both standard and noise-attenuated equipment. Attention focused on sensitive receptors that could be subject to noise levels in excess of proposed limits. The two worst affected sensitive receptors are located within the project MLAs areas and are understood to have been acquired by Taroom Coal and would be unoccupied during mining.

Noise limits are expected to be achieved at several sensitive receptors off the mining leases under neutral weather conditions, but exceedances of night-time limits could occur under adverse weather conditions. One residence on Bundi Road near the southern MLA could be subject to excessive noise under some conditions. Use of noise-attenuated equipment is proposed to limit exceedances.

The EIS combined available noise estimates for the Wandoan project with modelling for the project to identify the potential for cumulative exceedances at sensitive receptors. In addition to one residence within the northern MLA, two residences within the Wandoan Coal Project MLA could be affected. While the EIS notes that two underground mines have been proposed in adjoining areas, the respective EISs have yet to be lodged and hence it has not been possible to consider further cumulative impacts.

For the WSL rail and services corridor, in the absence of statutory noise criteria for construction activities, the EIS put forward criteria derived from the EPP Noise for construction activities. Construction is proposed only to occur during the day, when a limit of 50dB(A) Leq would apply. Operational noise criteria for residences adjacent to the WSL rail and services corridor are proposed to be taken from the Queensland Rail Code of Practice – Railway Noise Management (2007), which comprise a weighted 24-hour equivalent measure of

65dB(A) Leq(24hr) and a maximum level of 87dB(A) Lmax (interpreted as the arithmetic average of the highest 15 maximum noise measurements per 24 hour period).

In view of the potential for night-time noise levels to cause sleep disturbance, it is appropriate to also consider appropriate night-time noise criteria. The noise limits for the WSL rail and services corridor are based on the Queensland Rail Code of Practice – Railway Noise Management (2007). In the context of new rail developments, the New South Wales (NSW) Rail Infrastructure Noise Guideline (2013) sets a useful night-time 'trigger' of 55dB(A) Leq(9hr) and a 80dB(A) Lmax 'trigger' for single events, in terms of requiring 'feasible and reasonable mitigation measures' to be considered. EHP recommends that the NSW EPA guideline be applied. These limits are needed to protect amenity values at all sensitive receptors. With reference to the NSW EPA derived limits, it is recommended that Taroom Coal re-run the noise modelling. The reasoning is that the EIS modelling indicated that one residence (ID14: Lot 41 on CP857459) would receive noise above the criteria. Given the differing parameters in the NSW guideline, it may be that other sensitive receivers would receive noise above the modelled noise levels. It is recommended that the EM plan provide appropriate mitigation measures for Lot 41 on CP857459 and others if modelling proves necessary.

The impacts of operation of the WSL rail and services corridor were modelled on the basis of noise calibration measurements from passing coal trains near Chinchilla. Two rail usage scenarios were modelled, based on use of the WSL rail and services corridor for the mine only (5Mt/yr, 1.35 trains a day, 330 days a year) and its use for the mine as well as other mines (30Mt/yr, 8.2 trains a day). The model suggested that the noise criteria under the Code of Practice – Railway Noise Management could be achieved in both scenarios, although the most exposed receptor – located only 60m from the railway centreline-would be impacted above the 87dB(A) Lmax criterion.

A separation of 600m of rail construction activities from sensitive receptors is expected to be needed in order to comply with the proposed noise objectives. Five residences fall within this distance of the current rail alignment. However, any impacts would be limited to the daytime and would affect individual receivers for only between four and six weeks. The EIS also noted that where the rail line is constructed in cut or otherwise shielded from sensitive receptors, the noise levels could be lower than modelled estimates, while an elevated alignment could raise the noise level marginally.

For impacts of ground vibration and airblast, the EIS has used standard formulae to estimate the separation distances needed for compliance with relevant blasting standards. On the basis of blasting parameters provided by Taroom Coal, compliance with peak particle velocity limits (5mm/s) for ground vibration is anticipated at 800m distance. Since the nearest dwelling is approximately 1km from the proposed pit, there is a reasonable prospect that compliance could be achieved in practice. On the basis of indicative blasting parameters provided by Taroom Coal, the general limit of 115dB(A) would be achieved at a separation of 1.2km while a separation of 1.8km would be needed to ensure compliance with the maximum limit of 120dB(A). The EIS noted the need for 'the blasting parameters to be designed accordingly' and to achieve compliance suggested that this would be possible, though any practical implications were not identified.

4.16.3 Avoidance, mitigation and management measures

The EIS indicated that it is likely that noise-attenuated equipment would need to be used for mining operations as well as rail construction to avoid exceedances, however this would need to be confirmed.

Taroom Coal commits to conducting periodic noise monitoring 'as required, at the worst affected sensitive receivers throughout the mine life', as well as to conduct additional noise monitoring if noise complaints are received. Noise mitigation measures are to be investigated (e.g. further attenuation or restrictions on mobile equipment) where noise limits are exceeded.

The EIS acknowledged that one residence near the rail centre line would be subject to a high level of operational noise, the proposal that an 'agreeable solution between the property owner and the proponent be explored' with respect to mitigation measures is insufficient to resolve this. Noise mitigation and management is needed for residences within the 600m buffer for rail construction.

The EIS proposed that vibration and airblast monitoring during initial blasts would be used to ensure that blast parameters comply with applicable standards. If this proves problematic, it is possible that acquisition of some additional residences would be necessary.

4.16.4 Outstanding issues

The EIS provided a generally satisfactory response to the TOR, describing existing environmental values and potential impacts for to noise and vibration. The major uncertainty is the potential cumulative impacts that could arise from multiple mine developments in the area, including use of the WSL rail and services corridor.

One submitter challenged the credibility of the EIS assessment of the noise impacts of the railway operations and called for an independent review. It is accepted here that the noise assessment at the current level of design for the

WSL rail and services corridor can only be regarded as preliminary and some refinement of applicable noise criteria is needed. Importantly, if mutually satisfactory agreements with any significantly affected landholders cannot be achieved then independent expert assistance may be needed to resolve appropriate mitigation responses.

Overall, the EIS lacks specificity on how the achievement of objectives for noise and vibration would be monitored, audited and managed, although it does propose that the EA for the project require compliance with the appropriate noise standards.

4.16.5 Conclusions and recommendations

With a few qualifications, the EIS has provided an adequate assessment of noise and vibration impacts arising from the project, especially having regard to unavoidable uncertainties with respect to cumulative impacts from multiple mine developments in the area.

It is recommended that:

- an EA for development and operation of the WSL rail and services corridor incorporate night-time noise limits that are reflective of the NSW limits of 55dB(A) Leq(9 hr) and 80dB(A)Lmax
- documentation in support of required EAs must provide satisfactory proposals for:
  - resolving mitigation measures to address any likely potential or observed exceedances of noise or airblast limits at sensitive receptors, including in the context of possible future expansions of rail operations using the WSL rail and services corridor
  - monitoring, auditing and managing noise and airblast performance.

Recommended noise and vibration EA conditions have been provided in Appendix 1.

4.17 Economics

4.17.1 Existing values

The EIS recognised that the Western Downs is a long-established agricultural area. It identified the role of Wandoan in serving the surrounding wheat and cattle industries, including as a major cattle trucking centre. At the same time, the EIS observed that oil, gas and coal exploration and exploitation would be key drivers of economic growth in this region in the future. It noted that there are currently more than 47 existing, planned or proposed resource production projects in the Western Downs local government area. However, the feasibility of any future coal projects in the region is seen to be contingent on the Surat Basin Rail connection and the Wiggin Island Coal Export terminal being established.

4.17.2 Impacts

The EIS stated that during construction of mine facilities and railway the project would contribute $725 million to the Gross State Product (GSP). During the expected mine life of 32 plus years, it is forecast that it would contribute $564 million annually to the State's GSP. In terms of discounted, net present value, taking account of the attributed non-market value of environmental impacts, the project is expected to deliver $1.92 billion in net economic benefits. Associated regional economic impacts are expected to include increases in regional economic activity, income and population, as well as creating employment opportunities in the Wide Bay region.

While local business would have an opportunity to provide services to the project, these opportunities would be limited in as much as the workforce is to be largely accommodated on-site. The only stakeholder group identified as subject to negative economic impacts is the local graziers who would forego income from grazing on the project site.

The EIS further stated that the State Government is not expected to be exposed to costs associated with new required regional infrastructure, which would be paid for by the private developers. More specifically, it stated that 'no significant impact on regional road infrastructure is expected'.

4.17.3 Avoidance, mitigation and management measures

In the context of neutral impacts on public infrastructure as well as expected positive economic impacts in the region, no mitigation actions are seen to be necessary.

4.17.4 Outstanding issues

In general, the EIS has adequately addressed the TOR with respect to economic impacts. Some aspects that have not been clearly addressed are the potential for indirect costs affecting local landholders, incremental costs

associated with local services provision and road maintenance.

4.17.5 Conclusions and recommendations

The EIS has provided an adequate assessment of economic impacts raised in the TOR subject to clarification of the outstanding issues identified above.

4.18 Social

4.18.1 Existing values

The EIS has largely relied on available statistical data to describe the broad profile of the nearest townships of Wandoan and Taroom as well as the wider regional community, in order to characterise the existing social environment within which the project is proposed. There is much reliance on a combination of general observations about rural communities and broad outcomes of consultation with local stakeholders to qualitatively characterise the social context. The strong priority given to family and friendship networks and a quiet rural lifestyle is highlighted. Little specific information is provided about local landholders, although their affinity with the land in their holdings and the area is noted.

The EIS noted that the populations of Wandoan and Taroom have declined over last 10 years, but comprised 654 and 1093 people respectively at the 2011 Census. Across the region, the demographic profile is distinguished by a relatively low representation of 15-34 year-olds and a high representation of middle-aged adults. As the population has declined and there has been an out-migration of younger persons, there has been a corresponding fall in the level of participation in sporting clubs and community organisations, affecting their viability.

A high proportion of people in the two towns were born in Australia and hence there is relatively low ethnic diversity. The proportion of Indigenous persons is below the State average in Wandoan but equal to the State average in Taroom. Consistent with the high levels of socio-economic disadvantage in the region, education and income levels in Wandoan and Taroom are relatively low, although there is also low unemployment.

While home ownership rates have historically been high in Wandoan and Taroom, the EIS noted that there are an increasing number of rental properties in response to demand from resources sector. In early 2012 about 30% of houses in Wandoan were privately rented. The EIS stated that although rents had been low, they have recently begun to escalate. Moreover, high property sales in Wandoan over past three years have led to a dearth of available houses; while there have been dramatic increases in median land and house prices in both Wandoan and Taroom since 2006. As Wandoan is surrounded by Crown land, there is limited scope for new housing development.

4.18.2 Impacts

The EIS assumed that the construction workforce of about 500 people would all reside in the mine accommodation village, while a majority of the approximately 300 people in the operational workforce would also reside in the village. The workforce residing in the mine village would be FIFO on a 10/4 day roster. The EIS also assumed that only a limited number of staff, possibly with families, would reside in the local townships. An associated implication is that the project would not have a significant impact on local community and health services. However, especially if a high proportion of staff members do relocate with their families, some increased pressure on local services seems likely. This could be positive in terms of the viability of local schools. In contrast, existing childcare services are at capacity in Wandoan and non-existent in Taroom.

The EIS acknowledged that there is likely to be a substantial demand for short-term accommodation in the townships during both the construction and operational phases, potentially in combination with demand arising from other, overlapping resource projects. In the WDRC local government area, 67.5% of non-resident workers resided in camps.

While the EIS suggested that the project would not cause significant changes on residential occupancy patterns in Wandoan and Taroom, it also acknowledged that the cumulative effects of resource projects and associated property speculation are significantly impacting on the availability and affordability of accommodation in the area. It is recognised that the probable effect of reduced housing availability and affordability is to force some local people to relocate.

The project workforce is expected to be predominantly young and 95% male during construction phase, while more females and families are expected during the operational phase. Only about 5% of employees are expected to be sourced locally. Taroom Coal expects to draw their project workforce largely from the Fraser Coast area, because of both its strong presence in Wide Bay-Burnett area and the high unemployment levels in the Fraser Coast area. Taroom Coal proposes to offer a number of traineeships and apprenticeships to attract unskilled and semi-skilled

employees. The EIS notes that 'experience in other mining regions has shown that demand for skilled tradespersons in the resources sector has impacted negatively on other industry sectors, as people move across to mining jobs …', but on the other hand, 'the equal opportunity policies practiced by the resources industry will also provide more job and training opportunities for women'.

The EIS draws upon a review by the Australian Centre of Excellence for Local Government of the impact of FIFO and Drive-In Drive-Out (DIDO). Some of the issues identified include:

- difficulties in planning, supplying and pricing the supply of infrastructure and services where a high proportion of the population is FIFO and DIDO
- increased vehicle traffic
- housing shortages and high rents
- increased lifestyle and safety impacts
- long-term loss of social capital in rural and regional communities.

There are also positive impacts including boosting local economies of rural and regional towns such that they can function as places of origin or 'home' communities for a FIFO workforce.

The EIS reports the concerns of some local residents about increased crime rates resulting from influxes of resources personnel. However, statistics cited in the EIS indicate that levels of crime and traffic offences have fluctuated in Wandoan and Taroom in recent years. Contradicting this, a submission from the Queensland Police Service suggests that an increase in local crime is attributable to resource projects. Taroom Coal has responded that it would apply strict protocols to minimise antisocial behaviour by employees.

Local police have expressed concerns about the safety hazards associated with increased traffic volumes from the project, as well as speed and fatigue on major highways, in the context of poor road conditions.

As well as having potential impacts on the receiving communities, FIFO practices also have implications for the workers involved and their families. According to the EIS:

'Like any additional stress on family life or relationships, FIFO can magnify existing social problems at home or in some cases help to hide them, only for the problems to reappear at a later date. On the positive side, FIFO enables people to take advantage of better wages and conditions in the mining industry, without the need for family to change houses or schools or to form new social networks.'

The EIS emphasised the potential for cumulative social impacts from a number of resource and infrastructure projects that would potentially utilise housing, infrastructure and community services in Wandoan and Taroom, while noting that many of these projects are still in an evaluation stage:

'Local community leaders have indicated their concern about the management of cumulative impacts … and community members are apprehensive that if proponents do not collaborate for the benefit of the region, a piecemeal approach will be taken, resulting in little benefit for Wandoan, Taroom and their surrounds. Many residents in the Miles-Wandoan and Banana Statistical Areas can see positive potential in the planned coal mines and coal seam gas projects but want the proponents to give something back to their communities in the form of better infrastructure and services, as well as sustainable jobs and business opportunities.'

While noting submissions calling for further attention to be given to cumulative impacts, Taroom Coal's response stresses the uncertainty regarding the timing of the project proceeding as well as for other projects in the vicinity that could entail cumulative impacts.

The EIS commented that the majority of directly affected landholders are concerned about the projects' potential impact on their land value, due to noise and dust as well as diminished visual amenity. The EIS noted that directly affected landholders are the most likely group to experience psychological stress, possibly including a 'palpable sense of dislocation and loss when they perceive changes to their local environment as harmful'. The EIS noted that:

'Community consultation revealed that a number of landholders were anxious about their future and frustrated about delays, uncertainty and 'their lives being kept on hold', as various proponents make decisions about project viability. Specific stated concerns that have the potential to create personal mental stress and anxiety include:

- displacement of families from the district
- the need to relocate businesses (cattle fattening) elsewhere
- retirement plans disrupted; loss of income, decreased property value
- increased local housing costs (and decreased availability)
- road safety risks for residents and their families
- noise, vibration, dust, lighting and visual amenity impacts
- destruction of good grazing and cropping land.'

4.18.3 Avoidance, mitigation and management measures

A draft Social Impact Management Plan (SIMP) was prepared in conjunction with the EIS. While this is no longer a requirement under the Social Impact Assessment Guideline (2013), the associated mitigation and management strategies are still relevant. The EIS provided a table of 'mitigation or opportunity strategies' to address identified social impacts. Although the status or priority of individual strategies as either commitments or possible opportunities is not made clear. Some key strategies appear to be:

- implementation of the EM plan
- a project-specific Workforce Accommodation Strategy
- a Land-Access Management Plan to reduce impacts on adjoining landholdings
- a Community Investment Program
- a Traffic Management Plan.

An enquiries and complaints management process is identified as a key commitment. Taroom Coal proposes to substantially rely on monitoring and evaluation of community perception surveys as well as reporting of enquiries and complaints to determine the effectiveness of actions designed to deliver positive outcomes for affected communities. It committed in the EIS to work with stakeholders to 'finalise a mutually agreeable monitoring and evaluation process' within six months of project start-up.

The EM plan prepared for the project refers to the draft SIMP, which highlights the intended appointment of a Community Relations Coordinator who, with Project Management, is to engage with local councils, State agencies and other stakeholders to facilitate collaborative responses to project-related issues.

Taroom Coal responded to a submission from the Department of Housing and Public Works by clarifying that the Workforce Accommodation Strategy would detail how Taroom Coal would engage with stakeholders and potential partners in addressing cumulative impacts on housing. Further changes were not deemed necessary in response to submissions from Department of State Development, Infrastructure and Planning (DSDIP), Queensland Police Service and Queensland Health that expressed reservations about the adequacy of the assessment of and response to housing issues. The EIS responded to a submission from DSDIP by clarifying how positive outcomes would be achieved by affected communities including through the Community Investment Program.

A submission from the WDRC has called for the project to contribute to the augmentation of local infrastructure and services; Taroom Coal has responded by highlighting both the potential contribution to discrete infrastructure from its Community Investment Program and the role of the State's Royalties for the Regions program.

4.18.4 Outstanding issues

The EIS has broadly addressed the TOR, with some gaps, noting the reduced expectations that apply under the 2013 Social Impact Assessment Guideline. Its main limitation is that it does not present a systematic assessment of potential social impacts or examine relevant scenarios in depth. For example, the EIS does not examine different scenarios in terms of the implications of different proportions of workers, staff and contractors residing in the mine village, rental or purchased accommodation, or short-term accommodation in the townships. Nor is there a clear assessment of project impacts of the distinct stages identified by the TOR.

As noted above, limited information is provided on potential impacts affecting local landholders. In general the evidence base for the qualitative assessment of impacts is not well described. While a commitment to ongoing consultation with stakeholders is made, the likely effectiveness of this is not clear and a mechanism to resolve disputes with stakeholders is not provided.

4.18.5 Conclusions and recommendations

The EIS has provided an adequate assessment of social impacts subject to clarification of Taroom Coal's commitments, in particular to measures to:

- facilitate resolution of any concerns of or disputes with local landholders, in particular to protect their amenity, well-being and productive use of land
- develop a Workforce Accommodation Strategy in conjunction with stakeholders to address the potential for cumulative impacts on local accommodation markets during the project life cycle.

4.19 Cultural heritage

4.19.1 Indigenous cultural heritage

4.19.1.1 Values

There is currently an active Native Title application over an area including the project site and the WSL rail and services corridor by the Iman #2 People. A Cultural Heritage Management Plan (CHMP) is required for the project before an EA can be issued. A CHMP prepared by Taroom Coal was approved in February 2014.

4.19.1.2 Conclusions and recommendations

The EIS has provided a satisfactory response to the TOR for Indigenous cultural heritage.

4.19.2 Non-Indigenous cultural heritage

4.19.2.1 Values

The EIS outlined the history of 'frontier' European settlement in the Taroom-Wandoan area, including the associated displacement of the Indigenous population, the development of roads and rails and the period of 'closer settlement'.

A search of relevant statutory registers, i.e. including the Queensland Heritage Register and the former Taroom and Murilla Shire Council planning schemes, found no listed sites or places of non-Indigenous cultural heritage significance within either the MLA area or the WSL rail and services corridor. Field surveys undertaken for the EIS located 20 sites of low local significance, including earthen dams, homesteads, and other vestiges of telegraph lines, farming and stock routes. While there is some potential for further sites to be found, these are likely to relate to pastoral activities. The EIS noted the contribution of the identified sites to the cultural landscapes of the cattle industry, mixed cultivation, closer settlement, as well as transport and communication.

4.19.2.2 Impacts

The 14 non-Indigenous cultural heritage sites identified within the MLA are expected to require removal as part of the project. However, there would be some scope to avoid sites within the WSL rail and services corridor. Three of the MLA area sites were deemed to warrant further recording before their removal.

4.19.2.3 Avoidance, mitigation and management measures

In relation to non-Indigenous cultural heritage, it is proposed to avoid cultural heritage sites where practicable and otherwise to implement a Historical Heritage Management Plan (HHMP) to guide the identification and management of sites. A HHMP has been developed for the project, as required under the TOR; it is included as an appendix to the EIS. It incorporates procedures for reporting discoveries of artefacts and burials, which would assist compliance with the *Queensland Heritage Act 1992*.

4.19.2.4 Outstanding issues

The EIS has provided a satisfactory response to the TOR with respect to non-Indigenous cultural heritage.

4.19.2.5 Conclusions and recommendations

The HHMP provides an appropriate framework for managing impacts on non-Indigenous cultural heritage.

Three of the MLA area sites were deemed to warrant further recording before their removal.

4.20 Landscapes and visual amenity

4.20.1 Existing values

The project site is located within a rural landscape within which remnant vegetation has been largely cleared since the mid twentieth century. Open grasslands and improved pastures now predominate, with sparse patches of remnant vegetation. The primary land use of the surrounding area is low intensity cattle grazing and cropping. The topography of the area, formed on clayey sediments, consists of very gently to moderately undulating hills rising 20m to 30m above the surrounding landscape, dissected by Horse Creek and its tributaries and their alluvial and riparian corridors.

The WSL rail and services corridor comprises flat grazing land with occasional gentle undulating hills, which have a cover of introduced grassland with scattered remnant vegetation.

There are no outstanding landscape features or notable scenic viewpoints in the vicinity of the project area. The Leichardt Hwy is, however, a significant tourist and transport route in close proximity to the mine site and crosses the proposed WSL rail and services corridor.

According to the EIS, 'visual values have been assessed … in terms of the extent … and significance of the changed skyline as perceived from places of residence, work and recreation, from transport routes, … during all stages of the project as it relates to the surrounding landscape'.

4.20.2 Impacts

The visually important components of the project include: the progressive development of the mine pit and spoil dumps, continuous mining units which feed a mobile conveyor system to transport coal and waste, the CHPP, the 36km WSL rail and services corridor to transport processed coal, the diversion of a section of Horse Creek, and the diversion of Perretts Roads to the east and south of the pit.

The EIS identified existing landscape conditions that could give rise to significant impacts as the presence of residences in close proximity to project works, remnant woodland vegetation with a relatively intact appearance, and riparian vegetation. While mining would entail the removal of some woodland and riparian vegetation, this would have limited visibility from public roads or thoroughfares. Residents are therefore identified as the most sensitive receptors.

The EIS acknowledged that the final mining void would create a large depression and water body which are uncharacteristic of the area, but suggested that the final void would only be visible in the immediate proximity and would not affect the broader landscape character, in part due to the low bund that is to surround the void and to be rehabilitated. Similarly, the suggestion is made that the permanent diversion of Horse Creek would result in a minimal impact on landscape character once the waterway is revegetated with local flora species.

The visual assessment for the EIS has chiefly relied on photographic perspectives from a modest number of viewpoints, mainly from road sides selected on the basis that they are representative or within the line-of-sight of the project. There are no markedly elevated viewpoints overlooking the project site. The EIS suggested that vegetation around the site and on existing properties as well as topographic screening are the key factors reducing the potential for visual impacts.

According to the EIS, the receptors most likely to be exposed to visual amenity impacts are residences located close to the mine site and WSL rail and services corridor and road users on Perretts Road. There are 13 residences within 1km of the WSL rail and services corridor and another 19 between 1km and 3km, but only 2 and 8 within equivalent distances from project activities within the MLAs. Impacts on these receptors are rated as being of moderate significance.

The EIS suggested that road users would be exposed intermittently to visual intrusions from the project, particularly within 1km from the MLA boundary and that tourists and local road users with a high sensitivity or expectation with respect to visual amenity are not a significant component of road users.

The EIS commented that many of the existing roads surrounding the project site have only a small number of users and their exposure to mining related activities would only be intermittent. The impacts of new roads constructed for the project are also expected to be mitigated by their low vertical profile and the limited disturbance involved.

The EIS suggests that the WSL rail and services corridor is likely to be visible from residences in the vicinity of Perretts Road where it approaches Cattle Downs Road and on Kabunga Road where it approaches the WSL rail and services corridor. The visual impact of rail infrastructure and operations is likely to be most significant for residences within 1km, although scattered vegetation and uneven topography provide some screening. A school is located along the WSL rail and services corridor, about 20km from the proposed project site and approximately 1000m from the proposed WSL rail and services corridor, but visual screening is provided by a gentle ridgeline and scattered vegetation. The EIS suggested that at the eastern end of the WSL rail and services corridor, the proximity of sensitive receptors to the Surat Basin Rail (SBR) may desensitise them to the development of the WSL rail and services corridor. While the Leichhardt Hwy has a high number of 'short term or intermittent receivers', the EIS considered that the WSL rail and services corridor would have limited impacts on the visual amenity of highway users.

Because of their visual prominence, the spoil dumps in the southern MLA50254 would be potentially visible at residences at separations over 1km. The out-of-pit dumps are expected to be a maximum 70m above natural level, while in-pit spoil dumps may reach between 40m and 60m above the natural surface. Although visual impacts in the surrounding area would increase as extractive operations and the spoil dumps develop, they are screened to varying degrees by topography and existing vegetation. According to the EIS, out-of-pit spoil dumps have been located where landscape aspects provide buffering of visual impacts. The spoil dumps would mainly be visible when looking east and west towards the northern portion of the southern MLA50254. Residences and road users to the east have some vegetation buffering along Ryals Road, but those to the west have only sparse buffering as the

landscape is predominantly non-remnant grassland.

While the diversion of Horse Creek would involve a major visual change to its physical form there would be limited visual exposure to the creek once Perretts Road is realigned. The transport corridor joining the northern and southern MLAs would be visible from Perretts Road and, in places with minimal vegetation buffering, along Ryals Road. Although no static mine infrastructure is proposed within the transport corridor, there would be visual intrusion by the large machinery used continually to transport ROM coal.

According to the EIS, the MIA within the northern MLA50270 would potentially be visible from Goldens and Perretts Road, although existing vegetation would provide some visual buffering. Some areas of elevated topography looking south-west towards the northern MLA would provide some views of the mining infrastructure. However, the MIA is not expected to have a significant impact as it is not close to surrounding residences. While the TSFs may be visible from residences to the west of the northern MLA50270, they are not expected to exceed 16m in height and are expected to blend in with the existing landscape once revegetated with local species. The EIS recognises that artificial lighting at night, primarily within the MIA, could affect residences within 1km of the mine.

4.20.3 Avoidance, mitigation and management measures

The EIS indicated that the siting of the spoil dumps has taken some account of landscape aspects that obscure external views. There is a strong recognition of the importance of retaining existing vegetation surrounding the project site to reduce potential visual impacts as well as for further screening through planting of sections of the project boundary, particularly on the western side of the southern MLA50254. In view of the extended duration of the project, early plantings and regeneration would have some potential to screen mining activities after about 10 years, as the area of impact expands. The EIS also identifies progressive rehabilitation and then revegetation of the spoil dumps with local species as key strategies to reduce visual and landscape impacts.

While rehabilitation of created landforms would reduce the duration and magnitude of impacts on visual values, the presence of an extensive water-filled void and the success of rehabilitation of final landforms would be the key influences on long-term impacts.

In relation to the potential exposure of residents to night lighting, the EIS proposes the use of some combination of directional lighting, lighting hoods and vegetative screening to mitigate impacts on individual receptors within 1km of the project and in direct line of sight of light sources.

4.20.4 Outstanding issues

The EIS has not identified specific priorities for vegetation planting and regeneration to achieve optimal visual screening at sensitive receptors. A methodology for this should be addressed in the final EM plan.

The EIS acknowledged, but did not consider in any depth, the potential impact on visual amenity of fugitive dust. Effective strategies to control dust are needed because of its health, nuisance and visual amenity impacts and should be updated in the final EM plan.

4.20.5 Conclusions and recommendations

The EIS has provided an adequate though somewhat general response to the TOR with respect to the assessment of existing values and impacts on landscape character and visual amenity.

As the EIS noted, there are a number of exploration and mining leases surrounding the project. While it is suggested that other coal mining in the region could ‘desensitise certain viewers to the project’, the cumulative impact of landscape disruption from different mines also has the potential to affect landscape quality and visual amenity at a regional scale. However, at a local level, the potential development of mines to the east and west of the project site could reduce the number of residents overlooking or otherwise exposed to the site.

It is recommended that the final EM plan include specific actions to further develop vegetation buffers to mitigate visual amenity impacts at any residences within 1km of the mine boundary and WSL rail and services corridor, as well as more distant sensitive receptors with particular exposure to visual intrusion from the project.

4.21 Hazard and risk

4.21.1 Existing values

In accordance with the TOR, the EIS has assessed the environmental values related to people and property that could be affected by any hazardous materials and activities associated with the project.

4.21.2 Impacts

Hazards associated with project activities have been identified as part of the EIS. Man-made hazards associated with the operational phase include aspects such as transport, dangerous goods storage, blasting and waste disposal.

The associated risks from project activities during the construction, operational and rehabilitation and closure stages have been qualitatively assessed, including whether any significant risks would remain after project design factors and mitigation measures are considered. The evaluation of risks has had regard to their environmental, legal, public and media attention and financial consequences, although the EIS focuses on the risk of environmental impacts. Risks arising from normal operating practices and accidents, emergencies and natural disasters have been considered.

The EIS stated that although 60 properties are sensitive receptors within the vicinity of the project, only eight of these are expected to be impacted by air or noise emissions from operations within the MLA areas, only one would be significantly impacted by operation of the WSL rail and services corridor and five may be impacted by construction of the WSL rail and services corridor.

The potential impacts of climatic extremes on hazards and risks were adequately described in the EIS. In particular natural hazards such as droughts flooding, cyclones, bushfires, landslides and anthropogenic hazards on surrounding land uses during the construction, operation and decommission stages of the project were adequately considered in the EIS. Natural hazards have also been considered, of which floods are the primary concern. Flood modelling of the northern MLA indicated that flood depths for a 100 year ARI event would not exceed 2m, and hence mine infrastructure has been designed to address this risk.

4.21.3 Avoidance, mitigation and management measures

While the potential risk that erosion, dust and noise arising from various project activities could affect people living locally was variously rated as being between 'low' and 'extreme', once mitigation measures were taken into account all related risks were reduced to 'low'. For example, vegetation clearance and topsoil stripping during the construction phase could entail 'extreme' risks, but limitation of work to daylight hours, haul road watering and speed limits are said to reduce the risk to 'low'.

After risk control strategies were taken into account, seven sources of risk associated with the TSFs that had been rated as 'extreme' still retained a 'high' rating. These relate to the potential for both overflow and wall failure of the TSFs, and involve potential impacts of contamination of land, surface water and groundwater as well as community property damage. The unmitigated risk of wall failure was seen to be 'possible' and to involve 'catastrophic' impacts. Actions, including an engineered design incorporating a spillway, appropriate operational procedures, and regular inspections including annual inspections by an engineer, were identified as reducing both the magnitude of impacts and their likelihood.

Several hazards also retained a 'moderate' risk rating after mitigation was applied, including pit stability, acid mine drainage from spoil dumps and TSFs, and tailings pipeline rupture.

The EIS proposes that mitigation measures to reduce the occurrence of hazardous activities would be incorporated into a Safety and Health Management System, which would be progressively updated.

Levees are proposed to be constructed to mitigate the risk of flooding of the mine void relative to the estimated probable maximum flood level within the Horse Creek catchment.

4.21.4 Outstanding issues

The EIS provided an adequate assessment of project hazards at the current stage of project design, in response to the TOR. While other sections of the EIS provide further details on matters such as air quality and noise, further detail on some other aspects would be needed before the project proceeds, including the design for long-term management of the TSFs and the on-site management of chemicals and waste.

The conclusion in the relevant appendix to the EIS that 'the application of further mitigation strategies is unlikely to reduce the risk ranking further' for the TSFs is not compelling, in light of both the limited detail provided in the current risk assessment and the extent of the residual risk. The potential for contingency measures as well as management of long-term risks need more attention.

4.21.5 Conclusions and recommendations

The EIS has provided an adequate assessment of hazards and risks in relation to people and property, subject to addressing the outstanding issues identified above.

4.22 Rehabilitation and decommissioning

4.22.1 Approach

The EIS stated that rehabilitation strategies and methods for the Project have been developed in accordance with the Guideline 18: Rehabilitation Requirements for Mining Projects (DERM, 2011) and having regard to other relevant technical and best practice guidance. The Guideline 18: Rehabilitation Requirements for Mining Projects sets out a generic six-level hierarchy of actions for rehabilitation of mining sites in order to prevent or minimise environmental harm. The EIS concluded that reinstatement of a 'natural' ecosystem and achievement of an outcome higher economic value than the previous land use are generally impractical options. The key exception is the intention to establish riparian habitats along the length of the Horse Creek diversion. Over most of the site, Taroom Coal's efforts would be primarily directed towards reinstatement of the previous land use, i.e. low to medium intensity cattle grazing. At the same time, it is recognised that for some areas such as the final voids it would only be feasible to achieve a land use of lower value. This latter option is intended to avoid the unacceptable outcomes of leaving the site either in an unusable condition or with a potential to generate environmental harm.

The EIS stated that the goals of rehabilitation are to return the project site to a condition that is: safe to humans and wildlife; non-polluting; stable; and able to sustain the agreed post-mining land use. These goals are seen to enable long-term maintenance of essential ecological processes for the site.

In order to implement the rehabilitation goals, Taroom Coal divided the mine site into six mine domains based on land management units with similar characteristics, i.e. the final voids, exploration areas, dams, diversions, infrastructure, and waste disposal. Specific rehabilitation objectives and associated rehabilitation indicators and completion criteria have been developed for each mine domain. Confirmation of rehabilitation success would make use of 'analogue' monitoring sites that are representative of pre-mining ecosystems, including for riparian habitat along Horse Creek and native and improved pastures in the area.

The EIS assumed the WSL rail and services corridor infrastructure would be retained after decommissioning of the mine site, on the basis of its expected utility for other resource developers and users. Hence rehabilitation of the WSL rail and services corridor need not be considered until its decommissioning is a likely prospect.

4.22.2 Impacts

Taroom Coal has committed to progressive rehabilitation of the mine site as areas become available for rehabilitation, in order to minimise the overall extent of disturbance at any point in time. Identified benefits include minimising erosion, dust, ecological impacts of clearing as well as visual amenity impacts.

4.22.3 Mitigation and management measures

Rehabilitation of disturbed areas would initially involve surface contouring to resemble the original local topography, with spoil dumps shaped to resemble low hills, and to minimise erosion and maximise water retention. Ripping of the surface and topsoil spreading are then to occur, i.e. prior to the establishment of vegetation. Areas to be rehabilitated are to be seeded with appropriate plant species known to occur in the local area to achieve proposed future land use as well as the local habitat conditions. Species that would encourage the return of native fauna would be favoured.

The EIS provided details on the specific rehabilitation techniques to be applied in individual mine domains. With the exception of alluvium along Horse Creek, the soils of the project site are considered to have limitations for stripping, stockpiling and rehabilitation, i.e. in terms of their nutrient status and depth, and hence the ability of stockpiled topsoils to maintain soil biota and a viable seed bank. The EIS stated that the Horse Creek alluvium soil management unit (covering 837ha) would contribute about half of the required topsoil for rehabilitation purposes on the mine site. The proposed rehabilitation techniques respond to these limitations. The EIS highlighted that the permanent Horse Creek diversion would be in place within six years of mining commencing and hence there would be 'ample opportunity … to monitor the performance of the channel development' prior to the mine closure. Equally, there would be an opportunity to monitor and address the success of re-establishment of self-sustaining riparian vegetation and restoration of habitat connectivity with the remaining portions of Horse Creek.

A submission from Fitzroy Basin Association Inc., (FBA) called for the project to source seed from endemic flora species of local provenance to ensure the areas being rehabilitated reflect as closely as possible the surrounding vegetation. Taroom Coal committed to revegetation of the site using appropriate flora specimens which are known to occur in the local area. FBA recommended that that a seed collection program be undertaken before clearing takes place. Should appropriate sources of seed not be found, then additional seed could be sourced from neighbouring properties. FBA also suggested that tube stock grown from locally-occurring specimens should be used to accelerate revegetation efforts and improving the rate of establishment of rehabilitated areas.

The EIS proposed that both progressive maintenance and failure mitigation maintenance would be carried out. The

former involves planned measures for repairs after initial rehabilitation works, whereas the latter approach is to be applied when rehabilitation objectives are not being achieved and may be necessary for some years after decommissioning.

The EM plan proposed EA conditions including performance criteria for rehabilitation, including for: stable landforms and their land suitability; residual voids and the quality of enclosed water; and the design, integrity and water quality of regulated dams.

4.22.4 Outstanding issues

The EIS provided an adequate response to the TOR rehabilitation and decommissioning for the current stage of project design.

In terms of submissions on the finalised EIS, DNRM has not raised concerns regarding the proposed approach to rehabilitation, while EHP has noted a residual concern that the proposal to only partially backfill the Western Void would depend on a flood protection levee along the Horse Creek diversion. EHP requested further information on the potential to backfill the Western Void to the PMF level.

The identification of rehabilitation indicators and completion criteria in the EIS, as well as proposed conditions for the EA, recognise the need in due course for safety and/or geotechnical assessments of potentially hazardous final landforms as well as contaminated land assessments of parts of the project area that have been subject to notifiable activities or are likely to contain contaminated land.

4.22.5 Conclusions and recommendations

The EIS provided a comprehensive outline of the intended approach to rehabilitation and decommissioning of the mine site. The exclusion of the WSL rail and services corridor at this stage from consideration of rehabilitation and decommissioning requirements is accepted.

Recommended rehabilitation and decommissioning EA conditions have been provided in Appendix 1.

5 Adequacy of the Environmental Management Plan

The environmental management plan (EM plan) for the project was provided with the EIS and updated with supplementary information during the EIS assessment process. For the purposes of this report EHP expects Taroom Coal to consider the outstanding issues outlined in this report and make the necessary amendments to the EM plan prior to submitting the amended EM plan to EHP for final assessment. The EM plan stated that it was prepared in accordance with the former section 203 of the EP Act. At this stage the draft EM plan is not complete nor adequate for the purposes of section 203 of the EP Act and an amended EM plan would need to be assessed by EHP after the EIS process is completed and would need to adequately address the content requirements of the former section 203 of the EP Act, prior to EHP finalising the conditions of the draft EA.

The conditioning requirements for the draft EA are set out in further detail in Appendix 1.

The EM plan generally included the expected range of information on the proposal including:

- tenure description
- the operational aspects and rehabilitation proposed
- consultation
- notifiable activities
- approvals
- environmental values of the site
- potential impacts
- management strategies
- proposed conditions.

The EM plan was proposed for the combined operation of the mine and the proposed WSL rail and services corridor expansion. The EM plan, in conjunction with the EIS main reports, did provide sufficient information to describe the impacts of the proposal and the means of managing and minimising those impacts and was therefore suitable for this EIS process.

Many of the outstanding matters identified in this report are focused on resolving aspects of the EM plan, consequently the EM plan will require significant changes before it is suitable and before a decision could be made to grant an EA for the project. Guidance on the content of an EM plan is available at the former section 203 of the EP Act and in departmental guidelines.

6 Outstanding matters

The project is located in a region that has been historically used for grazing and mixed cropping and is now subject to various coal mining and petroleum and gas proposals. As a result, while the region has already been subject to major ecological changes from pre-settlement conditions, it is now subject to further major environmental changes– in terms of topography, hydrology, ecology, land use, infrastructure and local amenity and the social profile and well-being of the community.

The implementation of individual projects such as the Elimatta Project would need to address both their potential for immediate impacts on local environments and their longer-term implications for a sustainable regional landscape.

The EIS has broadly addressed the TOR but is deficient in detail on some important aspects needed to provide a sound basis for project implementation, within the framework of a final EM plan and EA. Key aspects Taroom Coal would need to take into consideration in the planning and implementation of the project, including detailed design, identified in this assessment report, are:

1. The potential quality and flow rates of surface water discharges from the mine site during the construction, operational and post-closure phases, under varying seasonal and climatic conditions, as well as proposed management strategies and their likely effectiveness.

   Specific attention needs to be given to:

   - a water management plan for the mine site
   - the potential concentrations of contaminants and physio-chemical parameters under different seasonal and rainfall conditions, and the impact on Horse Creek and the downstream wetland
   - the applicability of the Model Mining Conditions for the Fitzroy River Basin in protecting the environmental values of Horse Creek and wetlands
   - the design and effectiveness of the Receiving Environment Monitoring Program.

   The risks to surface water and associated environmental values from both the possible failure of the TSF walls and the on-site management of chemicals and wastes need further attention for the design of facilities, contingency measures and management of long-term risks.

2. The risks to groundwater and associated environmental values (including Stygofauna) arising from project interference with both shallow aquifers in Quaternary unconsolidated alluvium and deeper aquifers in the Juandah Coal measures and the Hutton and Precipice Sandstone formations, as well as the proposed risk mitigation strategies.

   The potential for cumulative impacts arising from other coal mining projects needs to be further assessed and monitored, and progressively evaluated to guide implementation of the EM plan.

3. The potential exposure of ‘at risk’ sensitive receptors to exceedances of relevant air quality, noise and airblast criteria during construction or operation of the mine and WSL rail and services corridor, including cumulative impact pressures, and strategies for resolving appropriate risk mitigation.

   The potential risks associated with the Horse Creek diversion, including erosion, sedimentation, seepage and flood.

   Assessments of potential impacts need to be refined on the basis of updated input information to ensure a consistent and credible approach.

   Further attention needs to be given to specifying how:

   - mitigation measures are to be resolved for particular sensitive receptors that are exposed to likely or observed exceedances
   - project performance would be monitored, audited and managed
   - processes to resolve any concerns of or disputes with local landholders, in particular to protect their amenity, well-being and productive use of land
   - vegetation buffers are to be either established or augmented to maintain the visual amenity of affected sensitive receptors.

4. The potential for significant ecological impacts and effective management measures for:
   - remnants of regional ecosystems that are significant in a bioregional context and either are poorly represented in the protected area estate or could be significantly affected by the cumulative impacts of different mining projects in the region
   - aquatic ecology values in both the diverted and downstream sections of Horse Creek, as well as waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works

- listed threatened fauna species whose habitat could be affected by the mine or WSL rail and services corridor works, including the Little Pied Bat, South-eastern Long-eared Bat, Rough Collared Frog, Golden-tailed Gecko and Brigalow Scaly-Foot.

5. Cumulative pressures on infrastructure and housing particularly for:
   - upgrading and/or enhanced maintenance of local roads and intersections with State-controlled roads
   - an Accommodation Strategy for short and long-term accommodation needs.

6. A strategic plan for mine closure and decommissioning that incorporates clear performance objectives and assessment criteria for:
   - landform and soil stability, in the context of geotechnical and safety assessments
   - runoff control and discharges to waterways, including in the context of contaminated land assessments
   - hydrological, geomorphic and ecological function of the Horse Creek diversion and other affected waterways and wetlands (i.e. encompassing both engineering and ecological health aspects), especially for the proposed use of alluvium from Horse Creek for rehabilitation of other areas
   - management of potentially sodic or dispersive saline overburden and waste rock materials and the management of those materials as part of the creek diversion
   - water quality in the residual mine voids
   - rehabilitation strategies and methods, including for medium-term maintenance, to support sustainable post-closure land uses of:
     - grazing over the majority of the mine site
     - cropping, where practicable in the context of Strategic Cropping Land
     - habitat, including links between remnant habitats.

The following matters identified in this assessment report would also need to be addressed in a revised EM plan:

- development and submission of a blast monitoring program, commitment to be made in revised EM plan
- development and submission of a water management plan, commitment to be made in revised EM plan
- development and submission of an erosion and sediment control plan, commitment to be made in revised EM plan
- development and submission of a waste management plan
- the proposed conditions contained in the EM plan as they relate to regulated dams and levees should be replaced with those conditions contained in the EHP Guideline (EM634) Structures which are dams or levees constructed as part of environmentally relevant activities
- details of the design of the waste rock dumps and rehabilitated landform that would be stable, non-eroding under grazing conditions (the preferred post mine land use)
- the noise limits for the WSL rail and services corridor are based on the Queensland Rail Code of Practice – Railway Noise Management (2007). EHP recommends that the New South Wales (NSW) Environmental Protection Authority (EPA) Rail Infrastructure Noise Guideline (2013) be applied. Refer to guideline Table 1, Airborne heavy rail noise trigger levels for residential use, new rail line development. These limits are needed to protect amenity values at all sensitive receptors. With reference to the NSW EPA derived limits, it is recommended that Taroom Coal re-run the noise modelling. The reasoning is that the EIS modelling indicated that one residence (ID14: Lot 41 on CP857459) would receive noise above the criteria. Given the differing parameters in the NSW guideline, it may be that other sensitive receivers would receive noise above the modelled noise levels. It is recommended that the EM plan provide appropriate mitigation measures for Lot 41 on CP857459 and others if modelling proves necessary.

7 Recommended conditions of approval

Throughout this EIS process a number of environmental impacts and relevant mitigation measures have been identified. Where the EIS has shown that such impacts are likely and where legislation, policy or guidelines dictate, some activities associated with the project would need to be constrained to achieve acceptable environmental outcomes through conditions of approval. In the absence of detail about a particular matter the EIS has made certain commitments to achieve suitable outcomes.

7.1 Environmental Protection Act 1994

Outstanding matters that need to be addressed under the EP Act include the completion of the EM plan. These requirements are described in section 6 of this report.

To suitably implement the project and as required under section 59 of the EP Act, this report includes a set of recommended conditions for approval at Appendix 1.

The conditions are not considered complete nor finalised and are provided for consideration in developing final conditions if an environmental authority is granted for the project. They are based largely on EHP's model mining conditions and are provided for consideration in developing draft EA conditions for the project under the EP Act. The administering authority will decide specific conditions that are necessary, desirable and considered appropriate by the delegate when the decision is made.

7.2 Water Act 2000

The *Water Act 2000* provides for the sustainable management of water and other resources and the establishment and operation of water authorities.

The mine water from mine dewatering, including groundwater inflows would be stored in the raw water dams for use in mining operations. A water licence (taking or interfering with water, other than diversion of a defined watercourse) under the *Water Act 2000* would be required to take or interfere with groundwater for pit dewatering purposes for the project.

At the time of the preparation of the EIS a water licence to interfere under the *Water Act 2000* was required for the creek diversion. However this authorisation is currently being transitioned to the EA. The conditions recommended here are consistent with the outcomes considered as part of the EIS process, however specific wording may change as a result of legislative differences between the *Water Act 2000* and the EP Act and the status of the DNRM guideline as draft at the time of the EIS production.

7.3 Nature Conservation Act 1992

A clearing application must be made for plants that are listed as 'endangered', 'vulnerable' or 'near threatened' (EVNT), unless otherwise authorised under the protected plant exemption.

Section 332(1) of the Nature Conservation (Wildlife Management) Regulation 2006 states that a person must not, without a reasonable excuse, tamper with an animal breeding place that is being used by a protected animal to incubate or rear the animal's offspring. This includes 'least concern' wildlife. It does not apply to a person removing or otherwise tampering with the breeding place if:

- the removal or tampering is part of an approved species management program for animals of the same species or
- the person holds a damage mitigation permit for the animal and the permit authorises the removal or tampering.

7.4 Queensland Environmental Offsets Policy 2014

Taroom Coal has committed to provide offsets in accordance with the policy in place at the time of offset delivery. Any offsets proposal must be developed in accordance with the Queensland Environmental Offset Policy. The policy is to compensate for unavoidable negative environmental impacts resulting from an activity or a development. On 1 July 2014, a new environmental offsets framework was introduced in Queensland. The new framework streamlines environmental offsets by providing an outcome-based approach to offsets.

The new policy provides greater flexibility in relation to how offsets can be delivered including:

- financial settlement
- land-based offsets
- offsets delivered as actions in a Direct Benefit Management Plan.

Or a combination of these approaches where offset conditions specify staged offsets can also be delivered.

An offset plan needs to be developed and implemented to address the objectives of State legislation and policy requirements for environmental offsets. This strategy should be included in a revised EM plan for the project.

7.5 Fisheries Act 1994

DAFF submission on the EIS noted that there would be road and waterway crossings along the alignment of the WSL rail and services corridor. Fisheries Queensland's self-assessable codes, guidelines and fact sheet for waterway barrier works would apply to the WSL rail and services corridor alignment. The codes are to be considered for works within waterways which trigger a waterway barrier works approval under the *Sustainable Planning Act 2009*. DAFF also recommends that Taroom Coal consider the codes as guidelines for works within natural waterways within the boundaries of the MLA.

The following Fisheries Queensland's self-assessable codes, guidelines and fact sheet for waterway barrier works

that would apply to the WSL rail and services corridor include:

- DAFF Code for self-assessable development – WWBW01 Minor Waterway Barrier Works Part 1; low impact dams and weirs, January 2013
- DAFF Code for self-assessable development - WWBW01 Minor Waterway Barrier Works Part 3; culvert crossings, April 2013
- DAFF Code for self-assessable development – WWBW01 Minor Waterway Barrier Works Part 4; bed level crossings, April 2013.

7.6 Transport Infrastructure Act 1994

As outlined in section 3.2 of this report and discussed within section 4.4 of this report, a number of licences and permits for works within the state-controlled road network associated with the transport route and intersection upgrades under the *Transport Infrastructure Act 1994* would be necessary for the project. Furthermore, excess mass, over-dimensional loads or non-standard vehicle movements on state-controlled roads would require a permit under the *Transport Operations (Road Use Management) Act 1995* (TO (RUM).

To maintain the ongoing safety, condition and efficiency of the State-controlled road network and in accordance with the objectives and provisions of the *Transport Infrastructure Act 1994*, the TO(RUM) and other relevant legislation, policies and guidelines, Taroom Coal must address the outstanding matters, before DTMR would support the project proceeding. Once further design and construction details of the project including traffic generation become available, Taroom Coal is required to finalise the road impact assessment (RIA), road-use management plan (RMP) and any traffic management plan(s) (TMP) to clearly identify and undertake any necessary improvement works, rehabilitation and maintenance and road-use management strategies to mitigate the impacts of project traffic.

It is recommended that Taroom Coal continue to liaise with DTMR's Planning Management Section to discuss and resolve the outstanding issues. DTMR has advised that a RIA, RMP, TMP and any necessary permits for excess mass or over-dimensional loads would be required prior to the commencement of project traffic.

In order to address outstanding issues, Taroom Coal is required to prepare in consultation with DTMR and prior to the commencement of project traffic the following:

- provide an updated RIA based on finalised estimates, e.g. when choice of quarries is known
- update the draft RMP including the summary spreadsheet of RMP commitments previously provided by DTMR
- provide the Pavement Impact Assessment (PIA) using DTMR's methodology especially for quarry traffic during the construction phase
  further assessment and proposals for any required mitigation to address the potential increased road safety risks from project traffic especially during the construction phase. Further reviews of any road safety 'hotspots' such as intersections of State-controlled with local roads along key transport routes need to be undertaken in consultation with regional DTMR contacts, before commencement of project traffic.

Recommended road and rail transport related conditions are provided in Appendix 1, Attachment C.

8 Suitability of the project

The department has considered the submitted EIS, all submissions and the standard criteria. The project is assessed here as being suitable, noting that the recommendations of this EIS assessment report should be fully implemented and provided the EM plan is refined and completed in the manner directed in this report and the subsequent environmental authority, if granted, being conditioned suitably to implement the specific environmental protection commitments set out in the EIS and summarised in this EIS assessment report.

Consequently, the project is considered suitable to proceed to the next stage of the approval process.

Approved by

Philip Rowland	18 July 2014
Signature	Date

Philip Rowland
A/Director, Statewide Environmental Assessments
Department of Environment and Heritage Protection

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Appendix 1

Proposed environmental authority conditions

Schedule A - General

A1 This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.

A2 The holder of this environmental authority must:

a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority

b) maintain such measures, plant and equipment in a proper and efficient condition

c) operate such measures, plant and equipment in a proper and efficient manner

d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.

Monitoring

A3 Except where specified otherwise in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than 5 years.

Financial assurance

A4 The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.

A5 The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.

Risk management

A6 The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, by 3 months from date the environmental authority takes effect.

Notification of emergencies, incidents and exceptions

A7 The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.

A8 Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following:

a) results and interpretation of any samples taken and analysed

b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm

c) proposed actions to prevent a recurrence of the emergency or incident.

Complaints

A9 The holder of this environmental authority must record all environmental complaints received about the mining activities including:

a) name, address and contact number for of the complainant

b) time and date of complaint

c) reasons for the complaint

d) investigations undertaken

e) conclusions formed

f) actions taken to resolve the complaint

g) any abatement measures implemented

h) person responsible for resolving the complaint.

A10 The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.

Third-party reporting

A11 The holder of this environmental authority must:

a) within 1 year of the commencement of this environmental authority, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority

b) obtain further such reports at regular intervals, not exceeding 3 yearly intervals, from the completion of the report referred to above; and

c) provide each report to the administering authority within 90 days of its completion.

Schedule B - Air

Dust and particulate matter monitoring

B1 The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place:

a) Dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1

Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method.

b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than 5 exceedances recorded each year, when monitored in accordance with the most recent version of either:

1. Australian Standard AS3580.9.6 Methods of sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet; or
2. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} low volume sampler – Gravimetric method.

c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method.

Schedule C - Waste management

C1 Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.

C2 The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.

Tailings disposal

C3 Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for:

a) containment of tailings

b) the management of seepage and leachates both during operation and the foreseeable future

c) the control of fugitive emissions to air

d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings

e) maintaining records of the relative locations of any other waste stored within the tailings

f) rehabilitation strategy

g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

Schedule D - Noise

Noise limits

D1 The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the criteria in **Table D1 – Noise limits** to be exceeded at a sensitive place or commercial place.

Table D1 – Noise limits

Noise Limits for Activities on the Mining Lease Leq,adj,T (T= 15 minutes to 1 hour), dB(A)*		
Daytime 7am – 6pm	**Evening 6pm – 10pm**	**Night-time 10pm – 7am**
40	40	35

Notes: *To be achieved under the majority of adverse meteorological conditions

Airblast overpressure nuisance

D2 The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in **Table D2 – Blasting noise limits** to be exceeded at a sensitive place or commercial place.

Table D2 – Blasting noise limits

Blasting noise limits	Sensitive or commercial Blasting noise limits
	7am to 6pm
Airblast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 bB (Linear) Peak at any time
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time

Monitoring and reporting

D3 Noise monitoring and recording must include the following descriptor characteristics and matters:

a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins)

b) background noise LA90

c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels

d) atmospheric conditions including temperature, relative humidity and wind speed and directions

e) effects due to any extraneous factors such as traffic noise

f) location, date and time of monitoring

g) if the complaint concerns low frequency noise, Max LpLIN,T and one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.

Schedule E – Groundwater

Monitoring and reporting

E1 All determinations of groundwater quality and biological monitoring must be performed by an appropriately qualified person.

E2 Groundwater quality and levels must be monitored at the locations and frequencies defined in **Table – E1 Groundwater monitoring locations and frequency** and for quality characteristics identified in **Table E2 - Groundwater quality triggers and limits**.

E3 If quality characteristics of groundwater from compliance bores identified in **Table E1 - Groundwater monitoring locations and frequency** exceed any of the trigger levels stated in **Table E3 - Groundwater contaminant trigger levels**, the holder of this environmental authority must compare the compliance monitoring bore results to the reference bore results and complete an investigation in accordance with the ANZECC and ARMCANZ 2000.

E4 Results of monitoring of groundwater from compliance bores identified in **Table E1 - Groundwater monitoring locations and frequency** must not exceed any of the limits defined in **Table E2 - Groundwater quality triggers and limits**.

Table E1 - Groundwater monitoring locations and frequency

Monitoring Point	Lithology / Aquifer Monitored	Location (MGA94 – Zone 55)		Surface RL (m)[3]	Monitoring Frequency
		Easting (m)	Northing (m)		
MB1A	Walloon Coal Measures	760997	7120002	TBA	Six monthly
MB1B	Alluvium	761001	7120001	TBA	Six monthly
MB2	Walloon Coal Measures	760367	7117880	TBA	Six monthly
MB3A	Walloon Coal Measures	763091	7117998	TBA	Six monthly
MB3B	Horse Creek Alluvium	763093	7118002	TBA	Six monthly
MB4A	Walloon Coal Measures	760348	7116954	TBA	Six monthly
MB4B	Horse Creek Alluvium	760351	7116954	TBA	Six monthly
MB5	Walloon Coal Measures	762400	7116429	TBA	Six monthly
MB6	Walloon Coal Measures	761432	7114842	TBA	Six monthly
MB7A	Walloon Coal Measures	760017	7115207	TBA	Six monthly
MB7B	Horse Creek Alluvium	760020	7115206	TBA	Six monthly
MB8A	Walloon Coal Measures	759277	7112983	TBA	Six monthly
MB8B	Horse Creek Alluvium	759278	7112979	TBA	Six monthly
MB9	Walloon Coal Measures	761753	7112704	TBA	Six monthly
MB10	Walloon Coal Measures	763543	7115939	TBA	Six monthly
MB11	Walloon Coal Measures	763493	7113179	TBA	Six monthly
MB12	Walloon Coal Measures	759272	7115706	TBA	Six monthly
MB13[1]	Alluvium	765191	7124165	TBA	Six monthly
MB14[1]	Horse Creek Alluvium	765229	7123665	TBA	Six monthly
MB15[1]	Horse Creek Alluvium	764461	7122489	TBA	Six monthly
MB16[1]	Horse Creek Alluvium	756901	7102939	TBA	Six monthly
MB17[1]	Alluvium	763008	7125369	TBA	Six monthly
MB18[1]	Horse Creek Alluvium	758802	7109229	TBA	Six monthly

Monitoring Point	Lithology / Aquifer Monitored	Location (MGA94 – Zone 55)		Surface RL (m)[3]	Monitoring Frequency
		Easting (m)	Northing (m)		
MB19[1]	Horse Creek Alluvium	758487	7107668	TBA	Six monthly
RN58968[2]	Hutton and Precipice Sandstone	757387	7123967	TBA	Six monthly
RN58285[2]	Hutton and Precipice Sandstone	667389	706954	TBA	Six monthly
RN58306[2]	Hutton and Precipice Sandstone	761758	7131366	TBA	Six monthly

1 - Coordinates determined using hand held GPS – surveyed coordinates pending

2 - Deep groundwater monitoring bores not indicated on Figure (TBA). Monitoring is not required where a bore has been removed as a direct result of the mining activity

3 - RL must be measured to the nearest 5cm from the top of the bore casing

Table E2 - Groundwater quality triggers and limits

Parameter[1]	Units	Minimum	Maximum	Limit type
pH	pH	6	9	Range
TDS	mg/L	N/A	4000 or 95th percentile of reference data whichever is higher	Maximum
Sulphate	mg/L	N/A	1000 or 95th percentile of reference data whichever is higher	Maximum
Aluminium	mg/L	N/A	5 or 95th percentile of reference data whichever is higher	Maximum
Arsenic	mg/L	N/A	0.5 or 95th percentile of reference data whichever is higher	Maximum
Boron	mg/L	N/A	5 or 95th percentile of reference data whichever is higher	Maximum
Cadmium	mg/L	N/A	0.01 or 95th percentile of reference data whichever is higher	Maximum
Chromium	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Cobalt	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum

Parameter[1]	Units	Minimum	Maximum	Limit type
Copper	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Fluoride	mg/L	N/A	2 or 95th percentile of reference data whichever is higher	Maximum
Lead	mg/L	N/A	0.1 or 95th percentile of reference data whichever is higher	Maximum
Mercury	mg/L	N/A	0.002 or 95th percentile of reference data whichever is higher	Maximum
Molybdenum	mg/L	N/A	0.15 or 95th percentile of reference data whichever is higher	Maximum
Nickel	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Selenium	mg/L	N/A	0.02 or 95th percentile of reference data whichever is higher	Maximum
Zinc	mg/L	N/A	20 or 95th percentile of reference data whichever is higher	Maximum

1 – Contaminant limits based on ANZECC (2000) Livestock drinking water quality and are analysed as Total Metals (unfiltered).

Table E3 - Groundwater contaminant trigger levels

Parameter	Units	Minimum	Maximum	Trigger type
pH[1]	pH	6.0	8.0	Range
TDS[2]	mg/L	N/A	3200	Maximum
Sulphate[2]	mg/L	N/A	800	Maximum
Aluminium[2]	mg/L	N/A	4	Maximum
Arsenic[2]	mg/L	N/A	0.4	Maximum
Boron[2]	mg/L	N/A	4	Maximum
Cadmium[2]	mg/L	N/A	0.008	Maximum
Chromium[2]	mg/L	N/A	0.8	Maximum
Cobalt[2]	mg/L	N/A	0.8	Maximum
Copper[2]	mg/L	N/A	0.8	Maximum
Fluoride[2]	mg/L	N/A	1.6	Maximum
Lead[2]	mg/L	N/A	0.08	Maximum
Manganese[3]	mg/L	N/A	1.9	Maximum
Mercury[2]	mg/L	N/A	0.0016	Maximum
Molybdenum[2]	mg/L	N/A	0.12	Maximum
Nickel[2]	mg/L	N/A	0.8	Maximum
Selenium[2]	mg/L	N/A	0.016	Maximum
Zinc[2]	mg/L	N/A	16	Maximum

1 - *Contaminant trigger limits are based on Table 3.3.4 and 3.3.5 of Aquatic Ecosystems ANZECC (2000)*

2 - Contaminant trigger limits are based on 80% of the contaminant limits defined in the ANZECC (2000) Livestock Drinking Water and are to be analysed as Total Metals (unfiltered)

3 – reference TBA

Bore construction and maintenance and decommissioning.

E5 The construction, maintenance and management of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.

Schedule F - Water (Fitzroy model conditions)

Contaminant release

F1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.

F2 Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** and depicted in Figure 1 (TBA) attached to this environmental authority.

F3 The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F28 is permitted.

Table F1 - Mine affected water release points, sources and receiving water

Release Point (RP)	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
Dam EV1 RP	TBA	TBA	Dam EV1	Within dam	Horse Creek
Dam EV2 RP	TBA	TBA	Dam EV2	Within dam	Horse Creek
Dam EV3 RP	TBA	TBA	Dam EV3	Within dam	Horse Creek
Dam EV4 RP	TBA	TBA	Dam EV4	Within dam	Horse Creek
Dam SD1 RP	TBA	TBA	Dam SD1	Within dam	Horse Creek
Dam SD2 RP	TBA	TBA	Dam SD2	Within dam	Horse Creek
Dam SD3 RP	TBA	TBA	Dam SD3	Within dam	Horse Creek

Note – Sediment dams SD1, SD2 and SD3 are to be included in Table F1 for the following reasons: sediment dams form part of the Water Management System with controlled releases to Horse Creek, and have identified potential high salinity levels

F4 The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in (Table 5.51) **Table F2 - Mine affected water release limits** when measured at the monitoring points specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** for each quality characteristic.

Table F2 - Mine affected water release limits

Quality Characteristic	Release Limits	Monitoring frequency	Comment
Electrical conductivity (µs/cm)	Horse Creek <700	Daily during the release, with first sample taken within the first 2 hours of the release	
pH (pH unit)	6.5-9.0	Daily during the release, with first sample taken within the first 2 hours of the release	
Turbidity (NTU)	TBA	Daily during the release, with first sample taken within the first 2 hours of the release	Turbidity is required to assess ecosystems impacts and can provide instantaneous results
Suspended solids (mg/l)	700	Daily during the release, with first sample taken within the first 2 hours of the release	Suspended solids are required to measure the performance of sediment and erosion control measures
Sulphate SO_4 (mg/l)	250	Daily during the release, with first sample taken within the first 2 hours of the release	Drinking water environmental values from NHMRC 2006 or ANZECC guidelines

F5 The release of mine affected water to waters from the release points must be monitored at the locations specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** for each quality characteristic and at the frequency specified in **Table F2 - Mine affected water release limits** and **Table F3 - Release contaminant trigger investigation levels, potential contaminants**.

Note: the administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response in the event condition F5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.

Table F3 - Release contaminant trigger investigation levels, potential contaminants

Quality Characteristic	Trigger Levels (μg/l)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	*For aquatic ecosystem protection, based on SMD guideline*	Commencement of release and thereafter weekly during release
Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	4	*For aquatic ecosystem protection, based on SMD guideline*	
Mercury	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	*For aquatic ecosystem protection, based on SMD guideline*	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	2.8	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	

Quality Characteristic	Trigger Levels (µg/l)	Comment on Trigger Level	Monitoring Frequency
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	

Notes:

1. *All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.*
2. *The quality characteristics required to be monitored as per **Table F3 - Release contaminant trigger investigation levels, potential contaminants** can be reviewed once the results of 2 years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from **Table F3 - Release contaminant trigger investigation levels, potential contaminants** by amendment.*
3. *SMD – slightly moderately disturbed level of protection; guideline refers ANZECC & ARMCANZ (2000).*
4. *LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.*

F6 If quality characteristics of the release exceed any of the trigger levels specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** during a release event, the environmental authority holder must compare the down-stream results in the receiving waters to the trigger values specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** and:

a) where the trigger values are not exceeded then no action is to be taken; or

b) where the down-stream results exceed the trigger values specified **Table F3 - Release contaminant trigger investigation levels, potential contaminants** for any quality characteristic, compare the results of the down-stream site to the data from background monitoring sites and

1. if the result is less than the background monitoring site data, then no action is to be taken; or
2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 90 days of receiving the result , outlining

(i) details of the investigations carried out

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 b)2 of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

F7 If an exceedance in accordance with condition F6 b)2 is identified, the holder of the environmental authority must notify the administering authority in writing within 24 hours of receiving the result.

Mine Affected Water Release Events

F8 The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in **Table F4 - Mine affected water release during flow events**.

F9 Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in **Table F4 - Mine affected water release during flow events** for the release point(s) specified in **Table F1 - Mine affected water release points, sources and receiving waters**.

F10 The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in **Table F4 - Mine affected water release during flow events** when measured at the monitoring points specified in **Table F1 - Mine affected water release points, sources and receiving waters**.

Note: The release influence period is the period during which the downstream monitoring points are influenced by mine affected water releases and includes both the duration of release and any lag time between release point/s and downstream monitoring points.

Table F4 - Mine affected water release during flow events

Receiving waters	Release Point (RP)	Gauging station	Gauging Station (MGA94-Z55)	Receiving Waters Flow Recording Frequency	Receiving Waters Flow Criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical Conductivity and Sulphate Release Limits
Horse Creek	Dam EV1 RP Dam EV2 RP Dam EV3 RP Dam EV4 RP Dam SD1 RP Dam SD2 RP Dam SD3 RP	SM1	Easting 759214 Northing 7112663	Continuous (minimum daily)	Low Flow >1.0 m^3/s for a period of 28 days after natural flow events that exceed 1.0 m^3/s	0.6 m^3/s	Electrical conductivity <400 µs/cm Sulphate (SO_4) 250 mg/L
					Medium Flow >1.0 m^3/s	0.6 m^3/s	Electrical conductivity <1500 µs/cm Sulphate (SO_4) 250 mg/L
					Medium Flow >2.0 m^3/s	0.4 m^3/s	Electrical conductivity <3500 µs/cm Sulphate (SO_4) 250 mg/L
					High Flow >4.0 m^3/s	0.2 m^3/s	Electrical conductivity <8000 µs/cm Sulphate (SO_4) 250 mg/L

F11 The daily quantity of mine affected water released from each release point must be measured and recorded.

F12 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Notification of Release Event

F13 The environmental authority holder must notify the administering authority as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information:

a) release commencement date/time

b) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume)

c) release point/s

d) release rate

e) release salinity

f) receiving water/s including the natural flow rate.

Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email or facsimile.

F14 The environmental authority holder must notify the administering authority as soon as practicable and nominally no later than 24 hours after cessation of a release event of the cessation of a release notified under Condition F13 and within 28 days provide the following information in writing:

a) release cessation date/time

b) natural flow rate in receiving water

c) volume of water released

d) details regarding the compliance of the release with the conditions of Department Interest; Water of this environmental authority (i.e. contaminant limits, natural flow, discharge volume)

e) all in-situ water quality monitoring results

f) any other matters pertinent to the water release event.

Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F13 and F14, provided the relevant details of the release are included within the notification provided in accordance with conditions F13 and F14.

Notification of Release Event Exeedance

F15 If the release limits defined in **Table F2 - Mine affected water release limits** are exceeded, the holder of the environmental authority must notify the administering authority within 24 hours of receiving the results.

F16 The environmental authority holder must, within 28 days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority detailing:

a) the reason for the release

b) the location of the release

c) the total volume of the release and which (if any) part of this volume was non-compliant

d) the total duration of the release and which (if any) part of this period was non-compliant

e) all water quality monitoring results (including all laboratory analyses)

f) identification of any environmental harm as a result of the non-compliance

g) all calculations

h) any other matters pertinent to the water release event.

Receiving Environment Monitoring and Contaminant Trigger Levels

F17 The quality of the receiving waters must be monitored at the locations specified in **Table F6 - Receiving water upstream background sites and down-stream monitoring points** for each quality characteristic and at the monitoring frequency stated in **Table F5 - Receiving waters contaminant trigger levels**.

Table F5 - Receiving waters contaminant trigger levels

Quality Characteristic	Units	Trigger Level	Trigger Type	Monitoring Frequency
pH	pH units	6.5-9.0	Range	Daily during the release
Electrical Conductivity (µS/cm)	µS/cm	750 - 1000[2]	Range	
Suspended solids (mg/l)	mg/L	30[3]	Maximum	
Sulphate[1] (SO_4^{2-}) (mg/l)	mg/L	1000	Maximum	

1 - Trigger level based on ANZECC (2000) stock water quality guidelines.

2 - In-stream EC triggers based on Model Water Conditions for Coal Mines in the Fitzroy Basin (EHP 2013)

3 - Trigger level based on EPP (Water) WQOs for Aquatic Ecosystems.

Table F6 - Receiving water monitoring points

Monitoring Point	Type	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
SM1	Background / Impact	759214	7112663
SM2	Background	760166	7117140
SM3	Background / Impact	763163	7118127
SM4	Background / Impact	764382	7122044
SM5	Background / Impact	765474	7123777
SM6	Background / Impact	765432	7124455

F18 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in **Table F5 - Receiving waters contaminant trigger levels** during a release event the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or

b) where the down-stream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining

1. details of the investigations carried out
2. actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F18 b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

F19 All determinations of water quality and biological monitoring must be performed by an appropriately qualified person.

Receiving Environment Monitoring Program (REMP)

F20 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site. For the purposes of the REMP, the receiving environment is the waters of Horse Creek, the palustrine wetland and connected or surrounding waterways within 10km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

F21 A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administrating authority upon request.

F22 A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and made available on request to the administrating authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Water reuse

F23 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the consent of the third party).

Annual Water Monitoring Reporting

F24 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format:

a) the date on which the sample was taken

b) the time at which the sample was taken

c) the monitoring point at which the sample was taken

d) the measured or estimated daily quantity of mine affected water released from all release points

e) the release flow rate at the time of sampling for each release point

f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority

g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Water Management Plan

F25 A Water Management Plan must be developed by an appropriately qualified person and implemented.

Stormwater and Water sediment controls

F26 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

F27 Stormwater, other than mine affected water, is permitted to be released to waters from:

a) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F26

b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F25, for the purpose of ensuring water does not become mine affected water.

Schedule G - Sewage treatment

G1 The treated sewage effluent is permitted to be released to land in compliance with the release limits stated in **Table G1 - Contaminant release limits to land.**

Table G1 - Contaminant release limits to land

Contaminant	Release Limits	Units	Limit type	Frequency
5 day Biochemical oxygen demand (BOD)	20	mg/l	Maximum	Monthly
Total suspended solids	30	mg/l	Maximum	Monthly
Nitrogen	30	mg/l	Maximum	Monthly
Phosphorus	15	mg/l	Maximum	Monthly
pH	6.5 – 9.0	pH units	Range	Monthly
E-coli	1000	Organisms/ 100ml	Maximum	Monthly

G2 Treated sewage effluent may only be released to land in accordance with the conditions of this approval at the following locations:

a) within the nominated area east of the accommodation village access road on MLA50270

b) other land for the purpose of dust suppression and/or firefighting.

G3 The application of treated effluent to land must be carried out in a manner such that:

a) vegetation is not damaged

b) there is no surface ponding of effluent

c) there is no run-off of effluent.

G4 If areas irrigated with effluent are accessible to employees or the general public, prominent signage must be provided advising that effluent is present and care should be taken to avoid consuming or otherwise coming into unprotected contact with the effluent.

G5 All sewage effluent released to land must be monitored at the frequency and for the parameters specified in **Table G1 - Contaminant release limits to land**.

G6 The daily volume of effluent release to land must be measured and records kept of the volumes of effluent released.

G7 When circumstances prevent the irrigation or beneficial reuse of treated sewage effluent such as during or following rain events, waters must be directed to a wet weather storage or alternative measures must be taken to store/lawfully dispose of effluent.

G8 A minimum area of 133 m^2 of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial reuse of treated sewage effluent.

G9 Odours or airborne contaminants which are noxious or offensive or otherwise unreasonably disruptive to public amenity or safety must not cause nuisance to any sensitive place or commercial place.

Schedule H - Land and rehabilitation

H1 All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Table H1 and Table H2.

H2 Rehabilitation must commence progressively in accordance with the plan of operations.

Table H1 - Final Land Use and Rehabilitation Approval Schedule

Domain	Mine areas included	Total area (ha)	Location	Pre-Mining		Post-Mining	
				Land use	Suitability Class	Land use	Suitability Class
Final void	Final voids	230	ML50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
	In-pit Tailings Storage Facility (TDP)	150	ML50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
Exploration	Exploration areas	40	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Dams	Environmental Dam – EV1	2	ML50254	Low intensity cattle grazing	4	Low intensity cattle grazing	4
	Environmental Dam – EV2	10	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3 – 4
	Environmental Dam – EV3	4	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Environmental Dam – EV4	15	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Sediment Dam – SD1	5	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3
	Sediment Dam – SD2	5	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3
	Sediment Dam – SD3	6	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Raw Water Dam – RW1	10	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Diversion	Horse Creek Diversion	160	ML50254	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 - 4
Infrastructure	Workshop and Offices	35	ML50270	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 – 4
	Chemical / Fuel Storages						
	Sewage Treatment						

Domain	Mine areas included	Total area (ha)	Location	Pre-Mining		Post-Mining	
				Land use	Suitability Class	Land use	Suitability Class
	Plant						
	CHPP						
	Light Vehicle Access Roads	15	ML50254, ML50270, ML50271	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 - 4
	Rail Loadout Facility	2	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Haul Roads	40	ML50254, ML50270, ML50271	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Mining Village	10	ML50270	Low intensity cattle grazing	3	Low intensity cattle grazing	3 - 4
	Rail and Services Corridor and Rail Balloon Loop*	216	ML50270, Rail and Services Corridor	Low intensity grazing; minor areas of unsuitable land	3 – 5	N/A**	N/A**
	Conveyor Trace	1	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Topsoil Stockpiles	20	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
Waste Disposal	In-pit Spoil Dumps	1820	ML50254	Low intensity cattle grazing	3 - 4	TBA	TBA
	Out-of-pit Spoil Dumps	200	ML50254	Low intensity cattle grazing	3 - 4	TBA	TBA
	Surface Tailings Storage Facilities (TDN & TDNA)	317	ML50270	Low intensity cattle grazing	3 - 4	TBA	TBA

** - Assumed maximum disturbance width of 60m within 100m corridor*

*** - Assumed that the Rail and Services Corridor infrastructure will be retained post decommissioning of the Elimatta Project as it will continue to offer a significant benefit to resource developers, other land users and the general public.*

Residual Voids

H3 Residual voids must comply with the Landform Design criteria in Table H2.

Table H2 – Landform Design

Disturbance Type		Slope (Ratio)
Residual Voids	Void Wall Competent Rock Maximum Slope	1V : 0.5H
	Void Wall Incompetent Rock Maximum Slope	1V : 1H
Surface Tailings Storage Facilities (TDN & TDNA)	Top	1V : 100H
	Walls	TBA
Spoil Dumps		TBA

Note: The final slope (ratio) of final TSFs and spoil dumps requires consideration of sodic / dispersive soils, geotechnical slope stability, and post-mining land use (Table H1)

H4 Water quality in mining voids and final voids must be monitored at the locations and frequencies defined in Table H3 and for the parameters detailed in Table H4.

H5 In the event that water quality within the mining voids or final voids does not comply with the contaminant limits defined in Table H4, measures must be implemented to prevent access by all livestock and minimise access by fauna to the void.

Table H3 – Void Monitoring Locations and Frequency

Monitoring Point	Monitoring Frequency
Northern Pit	Annually
Void East	Annually
Void West	Annually

Note – monitoring to occur subsequent to pit development only – Once the northern pit receives fine tailings rejects material, it is thereafter referred to as Dam TDP, a dam containing hazardous waste, and the conditions in Table H3 and H4 are no longer applicable.

Table H4 – Void Water Quality Limits

Parameter	Units	Limit	Trigger Type
pH	pH	6 – 9	Range
TDS	mg/l	4,000	Maximum
Aluminium	mg/l	5	Maximum
Arsenic	mg/l	0.5	Maximum

Parameter	Units	Limit	Trigger Type
Boron	mg/l	5	Maximum
Cadmium	mg/l	0.02	Maximum
Chromium	mg/l	1	Maximum
Cobalt	mg/l	1	Maximum
Copper	mg/l	1	Maximum
Fluoride	mg/l	2.5	Maximum
Lead	mg/l	0.1	Maximum
Mercury	mg/l	0.002	Maximum
Molybdenum	mg/l	0.15	Maximum
Nickel	mg/l	1	Maximum
Sulphate	mg/l	1,000	Maximum
Selenium	mg/l	0.02	Maximum
Zinc	mg/l	20	Maximum

Regulated Dams

Note: This schedule of conditions for Regulated Dams (below) is to be updated in the revised EM Plan to be consistent with Attachment A - Conditions for regulated dams and levees.

H6 The following regulated dams are to be constructed and used in accordance with Table H5.

Table H5 – Size and Purpose of Regulated Dams

Hazardous Dam	Maximum Storage Volume (ML)	Maximum Surface Area (ha)	Overall Storage Depth (m)	Depth Above Ground Level (m)	Purpose of Dam
Dam EV1	50	1.1	7.5	3	Receive pit water dewatered from Pit N
Dam EV2	600	6.5	7.5	5	Receive pit water dewatered from Pits E1 and E2
Dam EV3	200	1.9	7.5	4	Receive pit water dewatered from Pit W
Dam EV4	380	10.1	7	7	Receives runoff from the Mine Industrial Area
Dam TDN	13,060	129	19	19	Receives fine tailings rejects output from the CHPP
Dam TDNA	11,770	111	23	23	Receives fine tailings rejects output from the

Hazardous Dam	Maximum Storage Volume (ML)	Maximum Surface Area (ha)	Overall Storage Depth (m)	Depth Above Ground Level (m)	Purpose of Dam
					CHPP
Dam TDP	51,700	145	65	0	Receives fine tailings rejects output from the CHPP

H7 Regulated dams are to be located within the control points defined in Table H6

Table H6 – Location of Regulated Dams

Location	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
Dam EV1	761379	7120037
	761938	7120002
	761902	7119775
	761421	7119889
Dam EV2	762511	7117979
	763098	7117993
	763147	7117618
	762503	7117632
Dam EV3	758577	7114541
	758988	7114428
	759066	7114095
	758556	7114173
Dam EV4	764463	7124748
	764682	7124734
	764753	7123178
	763883	7122428
	763812	7123723
Dam TDN	762111	7125239
	764081	7125307
	764024	7123698
	762097	7123730
Dam TDNA	762162	7127390
	763614	7127263
	763622	7125371

Location	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
	762127	7125144
Dam TDP	760339	7120034
	761976	7120002
	761945	7118654
	760321	7118640

H8 The spillway for any regulated dam constructed and operated within the operational land must be designed and maintained to withstand the peak flow from the spillway critical design storm defined in Table H7.

H9 The design storage allowance on 1 November of each year for any regulated dam constructed or operated within the operational land must comply with Table H7.

Table H7 – Storage Design for Regulated Dams

Hazardous Dam	Design Storage Allowance	Spillway Critical Design Storm	Mandatory Reporting Level
Dam EV1	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV2	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV3	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV4	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDN	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDNA	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDP	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event

H10 Water quality in dams containing regulated waste must be monitored at the locations and frequencies defined in Table H8 and for the parameters detailed in Table H9.

H11 In the event that water quality within the dams containing regulated waste does not comply with the contaminant limits defined in Table H8, implement measures to prevent access by all livestock and minimise access by fauna.

Table H8 – Regulated Dam Monitoring Locations and Frequency

Monitoring Point	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)	Monitoring Frequency
Dam EV1	TBA	TBA	Annually
Dam EV2	TBA	TBA	Annually
Dam EV3	TBA	TBA	Annually
Dam EV4	TBA	TBA	Annually
Dam TDN	TBA	TBA	Annually
Dam TDNA	TBA	TBA	Annually
Dam TDP	TBA	TBA	Annually

Table H9 – Regulated Dam Water Quality Limits

Parameter	Units	Limit	Trigger Type
pH	pH	4 - 9	Range
Electrical conductivity	µs/cm	5,970	Maximum
Aluminium	mg/l	5	Maximum
Arsenic	mg/l	0.5	Maximum
Cadmium	mg/l	0.01	Maximum
Cobalt	mg/l	1	Maximum
Copper	mg/l	1	Maximum
Fluoride	mg/l	2	Maximum
Lead	mg/l	0.1	Maximum
Nickel	mg/l	1	Maximum
Sulphate (SO_4)	mg/l	1,000	Maximum
Zinc	mg/l	20	Maximum

Note: Contaminant limits based on ANZECC (2000) Livestock Drinking Water and are to be analysed as Total Metals (unfiltered). pH range based on ANZECC & ARMCANZ (2000)

Regulated Dams – Annual Inspection and Report

H12 Regulated dams containing hazardous waste shall be inspected by a suitable qualified and experienced person in accordance with the conditions of this environmental authority.

H13 The annual inspection must be conducted no later than 1 November each year, or at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.

H14 At each inspection the condition of each regulated dam must be assessed, including the structural, geotechnical and hydraulic adequacy of the dam and the adequacy of the works with respect to dam safety.

H15 At each inspection the adequacy of the available storage against the design storage allowance must be assessed and a mandatory reporting level must be determined and marked on each regulated dam.

H16 For each inspection two copies of a report certified by a suitable qualified and experienced person, including any recommendations to ensure the integrity of each regulated dam, must be provided to the administering authority within 28 days of the inspection.

Decommissioning of Regulated Dams

H17 Regulated dams must not be abandoned and must be decommissioned to a situation where water can no longer be stored in dams. The dams and their contained waste(s) must be stable, thereafter the dams are no longer dams and they become landforms on the operational land and must comply with the rehabilitation requirements of this environmental authority.

H18 Decommissioning activities for dams must be documented in detail in the plan of operations under which the activities are to occur. Where the detailed documentation is not already contained in the Design Plan for the dam, the detailed documentation is considered to be an amendment to the design plan and must be submitted to the administering authority as a proposed amendment to the regulated dam design.

Infrastructure

H19 All infrastructure constructed by or for the environmental authority holder during the mining activity, including water storage structures, must be removed from the site prior to mining lease surrender except where agreed to in writing by the post mining landowner/holder.

Note - This is not applicable where the landowner/holder is also the environmental authority holder.

Contaminated Land

H20 Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.

H21 Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition H2.

Biodiversity offsets

H22 The authority holder may carry out the prescribed activity in stages and deliver an environmental offset for each stage of the activity, with the total extent of impact on prescribed environmental matters across the life of all stages of the prescribed activity to not exceed:

a) Insert matters and extent

H23 Before the authority holder starts any part of the prescribed activity mentioned in Condition H22, the holder must:

a) elect, by notice in the approved form given to the administering agency, to deliver the offset condition for each stage of the staged activity by:

1. A proponent-driven offset; or
2. A financial settlement offset; or
3. A combination of a proponent-driven offset and a financial settlement offset

b) agree with the administering agency about the delivery of the offset condition for the stage of the staged activity though both parties endorsing an 'agreed delivery arrangement'.

H24 To the extent that the notice of election for a stage under Condition H23 involves a proponent-driven offset, the notice must be accompanied by an offset delivery plan that meets the requirements of s18 of the *Environmental Offsets Act 2014*.

H25 To the extent that the 'agreed delivery arrangement' for a stage:

a) requires the authority holder to deliver a proponent-driven offset, the authority holder must comply with the agreed delivery arrangement, including the agreed offset delivery plan; and

b) requires the authority holder to deliver a financial settlement offset, the authority holder must pay the amount:

1. required by, and in the way stated in, the agreed delivery arrangement to the department; and
2. before the authority holder starts any part of the prescribed activity to which the offset condition relates.

H26 An analysis of the anticipated extent of impact on the prescribed environmental matters for a stage is to:

a) accompany the notice of election for that stage

b) be agreed to by the administering authority before the notice of election for that stage is provided to the department

c) be agreed to by the administering authority before the notice of election for that stage is agreed to by the department

H27 The authority holder must not carry out any prescribed activity in a legally secured offset area if:

a) a delivery or management plan or agreement (however described under the *Environmental Offsets Act 2014* or another Act) to all or part of the offset area; and

b) carrying out the prescribed activity will delay, hamper or stop the delivery of the conservation outcome for a prescribed environmental matter as stated in the delivery or management plan or agreement.

Schedule I – Watercourse Diversions

Permanent Watercourse Diversions

I1 Permanent diversions, or the re-establishment of a pre-existing watercourse where a temporary watercourse diversion is being replaced, must be designed and constructed to:

a) incorporate natural features (including geomorphic and vegetation) present in the landscape and in local watercourses

b) maintain the existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse is located

c) maintain the hydraulic characteristics of the watercourse diversion that are comparable with other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance

d) maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream reaches.

e) maintain stability and functionality and are appropriate for all substrate conditions they encounter.

Temporary Diversions

I2 Temporary diversions must be designed and constructed to:

a) Maintain the existing hydrologic characteristics of surface water systems for the area in which the watercourse diversion is located

b) Maintain the hydraulic characteristics of the watercourse diversion that are comparable with other local watercourses and are suitable for the region in which the diversion is located. Where structures that require on-going maintenance are used, they must not compromise the stability and performance of the temporary watercourse diversion and adjoining watercourses.

c) Maintain sediment transport and water quality regimes that minimise any impacts to upstream and downstream reaches.

d) Maintain stability and functionality and are appropriate for all substrate conditions they encounter.

Design Plan – All Diversions

I3 A certified Design Plan that achieves Condition I1 for permanent diversions and Condition I2 for temporary diversions must be submitted to the administering authority before commencing construction of the diversion.

I4 The design plan for any temporary or permanent watercourse diversion must be conceptually consistent with the functional design/s that formed a part of the application documents for this authority.

Construction and Operation – All Diversions

I5 A set of 'as constructed' drawings and specifications, together with certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority within 60 business days form the completion of construction, or re-establishment, of the watercourse diversions, These drawings and specifications must state:

a) That the 'as constructed' drawings and specifications meet the original intent of the design plan for the watercourse diversion; and

b) Construction of the watercourse diversion is in accordance with the design plan.

Monitoring and Inspections – All Diversions

I6 The watercourse diversion must be inspected by a suitable qualified and experienced person who must prepare an inspection report in accordance with the operation and monitoring plan contained within the certified design plan. The timing and frequency of inspections must be in accordance with those specified in the operation and monitoring plan contained within the certified design plan.

Note: inspection requirements included in the operation and monitoring plan do not prevent the authority holder undertaking additional inspections.

I7 The holder must, within 20 business days of preparing an inspection report in accordance with the operation and monitoring plan, provide the administering authority:

a) The recommendations section of the inspection report; and

b) If applicable, a report on any actions being taken in response to those recommendations.

If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Register – All Diversions

I8 The details of watercourse diversions authorised under an environmental authority must be recorded on the Register of Watercourse Diversions kept by the holder of the environmental authority and an electronic copy provided to the administering authority on request. It is the responsibility of the holder of the authority to ensure and Register of Watercourse Diversions is accurately maintained.

End of conditions

Definitions

Words and phrases used throughout the environmental authority are defined below. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the EP Act 1994 or subordinate legislation, the definition in the EP Act or subordinate legislation must be used.

'acid rock drainage' means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.

'airblast overpressure' means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

'background', with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

'certification', 'certifying' or **'certified'** by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

a) exactly what is being certified and the precise nature of that certification;

b) the relevant legislative, regulatory and technical criteria on which the certification has been based;

c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

'blasting' means the use of explosive materials to fracture:

a) rock, coal and other minerals for later recovery; or

b) structural components or other items to facilitate removal from a site or for reuse.

'chemical' means:

a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and *Veterinary Chemicals Code Act 1994* (Commonwealth); or

b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or

c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;

d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth; or

e) any substance used as, or intended for use as:

(i) a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or

(ii) a surface active agent, including, for example, soap or related detergent; or

(iii) a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or

(iv) a fertiliser for agricultural, horticultural or garden use; or

(v) a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or

(vi) manufacture of plastic or synthetic rubber.

'commercial place' means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.

'construction' or **'constructed'** in relation to a regulated structure includes building a new regulated structure and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

'disturbance' of land includes:

a) compacting, removing, covering, exposing or stockpiling of earth;

b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion;

c) carrying out mining within a watercourse, waterway, wetland or lake;

d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls;

e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or

f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of 'disturbance':

a) areas off lease (e.g. roads or tracks which provide access to the mining lease);

b) areas previously disturbed which have achieved the rehabilitation outcomes;

c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);

d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner.

e) disturbance that pre-existed the grant of the tenure.

'EC' means electrical conductivity.

‘effluent’ treated waste water released from sewage treatment plants.

‘hazard category’ means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in ‘Manual for Assessing Hazard Categories and Hydraulic Performance of Dams’.

‘infrastructure’ means water storage dams, levees,, roads and tracks, buildings and other structures built for the purpose of the mining activity.

‘land’ in the ‘land schedule’ of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the *Environmental Protection Act 1994*. For the purposes of the *Acts Interpretation Act 1954*, it is expressly noted that the term ‘land’ in this environmental authority relates to physical land and not to interests in land.

‘land use’ –means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

‘leachate’ means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

‘licensed place’ means the mining activities carried out at the mining tenements detailed in Table # (page #) of this environmental authority.

‘m’ means metres.

‘mine affected water’:

a) means the following types of water:
   i) pit water, tailings dam water, processing plant water;
   ii) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity;
   iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
   iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
   v) groundwater from the mine’s dewatering activities;
   vi) a mix of mine affected water (under any of paragraphs i)-v) and other water.

b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:
   i) land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or
   ii) land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
      a. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;

b. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or

iii) both.

'measures' includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

'NATA' means National Association of Testing Authorities, Australia.

'natural flow' means the flow of water through waters caused by nature.

'non polluting' means having no adverse impacts upon the receiving environment.

'peak particle velocity (ppv)' means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s).

'protected area' means – a protected area under the *Nature Conservation Act 1992*; or

a) a marine park under the *Marine Parks Act 1992*; or

b) a World Heritage Area.

'receiving environment' in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

a) a watercourse;

b) groundwater; and

c) an area of land that is not specified in Schedule # – Table # (Authorised Activities) of this environmental authority.

The term does not include land that is specified in Schedule # – Table # (Authorised Activities) of this environmental authority.

'receiving waters' means the waters into which this environmental authority authorises releases of mine affected water.

'rehabilitation' the process of reshaping and revegetating land to restore it to a stable landform

'release event' means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.

'RL' means reduced level, relative to mean sea level as distinct from depths to water.

'representative' means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

'saline drainage' The movement of waters, contaminated with salts, as a result of the mining activity.

'sensitive place' means:

a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or

b) a motel, hotel or hostel; or

c) an educational institution; or

d) a medical centre or hospital; or

e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or

f) a public park or gardens.

Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under *Nature Conservation Act 1992* as a critical habitat or an area of major interest, marine park under *Marine Parks Act 2004*, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

'the Act' means the *Environmental Protection Act 1994*.

'µS/cm' means micro siemens per centimetre.

'watercourse' has the same meaning given in the *Water Act 2000*.

'water quality' means the chemical, physical and biological condition of water.

'waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), storm water channel, storm water drain, and groundwater and any part thereof.

Attachment A

Conditions for regulated dams and levees

Reference: *Structures which are dams or levees constructed as part of environmentally relevant activities* (EHP, 2014); *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EHP, 2014).

Note: The EM Plan is to be revised to incorporate the conditions referred to below.

All structures

Assessment of consequence category

A1 The consequence category of any structure must be assessed by a suitable qualified and experienced person in accordance with the *Manual for Assessing Categories and Hydraulic Performance of Structures* (EM635) at the following times:

a) Prior to the design and construction of the structure, if it is not an existing structure; or

b) If it is an existing structure, prior to the adoption of this schedule; or

c) Prior to any change in its purpose or the nature of its stored contents.

A2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence for more than one structure.

A3 Certification must be provided by the suitable qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

Design and construction of a regulated structure

A4 Condition A5 to A9 inclusive do not apply to existing structures

A5 All regulated structures must be designed by and constructed under the supervision of a suitable qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

A6 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitable qualified person for the design and the design plan and the associated operating procedures in compliance with the relevant condition of this authority.

A7 Certification must be provided by the suitable qualified and experienced person who oversees the preparation of the design plan set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635), and must be recorded in the Regulated Dams/Levees register.

A8 Regulated structures must:

a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635);

b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

1. floodwaters from entering the regulated dam from any watercourse or drainage line:; and

2. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

c) (only for regulated dams associated with a failure to contain seepage) have the floor and sides of the dam designed and constructed to prevent of minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.

A9 Certification by the suitable qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure and state that:

a) The 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;

b) Construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

A10 Operation of a regulated structure, except for and existing structure, is prohibited unless the holder has submitted to the administering authority:

a) One paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (TBA)

b) A set of 'as constructed' drawings and specifications, and

c) Certification of those 'as constructed drawings and specifications' in accordance with condition (TBA), and

d) Where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan;

e) The requirements of this authority relating to the construction of the regulated structure have been met;

f) The holder has entered the details required under this authority into a Register of Regulated Dams; and

g) There is a current operational plan for the regulated structures.

A11 For existing structures that are regulated structures:

a) Where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purposes of sharing DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and

b) There must be a current operational plan for the existing structures.

A12 Each regulated structure just be maintained and operated for the duration of its operational life until decommissioned and rehabilitated in a manner that is consistent with the current operational plan and if applicable the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

A13 Conditions A14 to A17 inclusive apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

A14 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of the dam it is clearly observable.

A15 The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

A16 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence on any unauthorised discharges from the regulated dam.

A17 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

A18 The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

A19 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume) to meet the Design Storage Allowance (DSA) volume of the dam (or network of linked containment systems).

A20 The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment system) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

A21 The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

A22 Each regulated dam must be inspected each calendar year by a suitable qualified and experienced person.

A23 At each inspection the condition and adequacy of all components of the regulated structure must be assessed and a suitable qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.

A24 The suitable qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

A25 The holder must:

a) Within 20 business days of receipt of the annual inspection report provide to the administering authority:

    1. The recommendations section of the anneal inspection report; and

    2. If applicable, any actions being taken in response to those recommendations; and

b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this information to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

A26 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to and Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and rehabilitation (refer explanatory notes to item 7)

A27 Dams must not be abandoned but be either:

a) Decommissioned and rehabilitated to achieve compliance with condition (TBA); or

b) Be left in-situ for a beneficial use(s) provided that:

1. It no longer contains contaminants that will migrate into the environment; and

2. It contains water of a quality that is demonstrated to be suitable for the intended beneficial use(s); and

3. The administrating authority, the holder of the environmental authority and the landholder agree in writing that the dam will be used by the landholder following cessation of the resource activity.

A28 After decommissioning, all significantly disturbed land caused by carrying out of the resource activity must be rehabilitated to meet the final acceptance criteria:

a) The landform is safe for humans and fauna;

b) The landform is stable with no subsidence of erosion gullies for at least three (3) years;

c) Any contaminated land (e.g. contaminated soils) is remediated and rehabilitated;

d) Not allowing for acid mine drainage; or

e) There is no ongoing contamination to waters (including groundwater);

f) Rehabilitation is undertaken in a manner that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the *Instructions for the treatment and management of acid sulfate soils* (2001);

g) All significantly disturbed land is reinstated to the pre-disturbed suitability class;

h) For land that is not being cultivated by the landholder:

1. Groundcover, that is not a declared pest species is established and self-sustaining;

2. Vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining; and

3. The maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out of the resource activity.

i) For land that is cultivated by the landowner, cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of resource activities being completed.

Register of Regulated Dams

A29 A Register of Regulated Dams must be established and maintained by the holder for each regulated dam

A30 The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.

A31 The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition A10 and A11 has been achieved.

A32 The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.

A33 All entries in the Register of Regulated Dams must be approved by the chief executive offices for the holder of this authority, or the delegate, as being accurate and correct.

A34 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Definitions (for regulated dams and levees)

Affected person is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life can be put at risk due to dwellings or workplaces being in the path of a dam break flood.
Annual inspection report means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

a) against recommendations contained in previous annual inspections reports;

b) against recognised dam safety deficiency indicators;

c) for changes in circumstances potentially leading to a change in consequence category;

d) for conformance with the conditions of this authority;

e) for conformance with the 'as constructed' drawings;

f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);

g) for evidence of conformance with the current operational plan.

Annual exceedance probability or AEP the probability that at least one event in excess of a particular magnitude will occur in any given year.
Assessed or **assessment** by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

a) exactly what has been assessed and the precise nature of that determination;

b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;

c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria

Associated works in relation to a dam, means:

a) operations of any kind and all things constructed, erected or installed for that dam; and

b) any land used for those operations.

Authority means an environmental authority or a development approval.
Certification means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
Certifying, **certify or certified** have a corresponding meaning as 'certification'
Construction or constructed in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.
Consequence in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
Consequence category means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
Dam means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and **associated works**.

Dam crest volume means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
Design plan is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.
Design storage allowance or DSA means an available volume, estimated in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an **annual exceedance probability** (AEP) specified in that Manual.
Designer for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.
Development approval means a development approval under the *Integrated Planning Act 1997* or the *Sustainable Planning Act 2009* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.
Emergency action plan means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
Existing structure means a structure that was in existence prior to the adoption of this schedule of conditions under the authority.
Extreme Storm Storage – means a storm storage allowance determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority
Flowable substance means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.
Holder means:

a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or

b) where this document is a development approval, any person who is the registered operator for that development approval.

Hydraulic performance means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
Levee means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of **water** or **flowable substances** at any other times.
Low consequence dam means any dam that is not a high or significant consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*; and
Mandatory reporting level or MRL means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.
Manual means the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.
Modification or modifying (see definition of 'construction')
Operational plan includes:

a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);

b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

Register of Regulated Dams includes**:**

a) Date of entry in the register;

b) Name of the dam, its purpose and intended/actual contents;

c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635);

d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;

e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;

f) For the regulated dam, other than in relation to any levees –

i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area
iii. Dam crest volume (megalitres);
iv. Spillway crest level (metres AHD).
v. Maximum operating level (metres AHD);
vi. Storage rating table of stored volume versus level (metres AHD);
vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);
viii. Mandatory reporting level (metres AHD);

g) The design plan title and reference relevant to the dam;

h) The date construction was certified as compliant with the design plan;

i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;

j) Details of the composition and construction of any liner;

k) The system for the detection of any leakage through the floor and sides of the dam;

l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;

m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;

n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

Regulated dam means any dam in the significant or high consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.
Regulated structure includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.
Residual drilling material means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
Structure means dam or levee.
Spillway means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.
Suitably qualified and experienced person in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience:

a) for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design.

b) for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.

System design plan means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

Void means any constructed, open excavation in the ground.
Watercourse has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means a river, creek or stream in which water flows permanently or intermittently—

a) in a natural channel, whether artificially improved or not; or

b) in an artificial channel that has changed the course of the watercourse.

Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

Waters includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
Water year means the 12-month period from 1 July to 30 June.

Wet season means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

Attachment B

Conditions – WSL rail and services corridor

Noise

Table 1 – Noise limits

Noise Limits – Rail noise trigger levels dB(A) for residential land use	
Day **(7am – 10pm)**	**Night** **(10pm – 7am)**
60 L_{Aeq} (15h) 80 L_{Amax}	55 L_{Aeq} (9h) 80 L_{Amax}
80 dB(A), assessed as a single event maximum sound pressure level (Lmax)	

Note: EHP recommends that the New South Wales (NSW) Environmental Protection Authority (EPA) Rail Infrastructure Noise Guideline (2013) be applied. Refer to guideline Table 1, Airborne heavy rail noise trigger levels for residential use – new rail line development. These limits are needed to protect amenity values at all sensitive receptors.

Attachment C

Standard Requirements under the *Transport Infrastructure Act 1994*

Outcome to be achieved:

At all times and for each stage of the project, the proponent must maintain the safety, condition and efficiency of state-controlled roads.

Road impact assessment and road-use management plan

To demonstrate compliance with the above outcome requirement, the proponent, in consultation with the Department of Transport and Main Roads (DTMR), must:

(a) Prepare a road impact assessment (RIA) for the project to describe impacts on the safety, condition and efficiency of state-controlled and local roads. The RIA must:

(i) be developed in accordance with the DTMR *Guidelines for Assessment of Road impacts of Development (2006)* (GARID)[1] and include a completed DTMR 'Transport Generation proforma'[2] detailing project-related traffic and transport generation information or as otherwise agreed in writing with DTMR,

(ii) use DTMR's *Pavement Impact Assessment tools*[3] or such other method or tools as agreed in writing with DTMR,

(iii) clearly indicate where detailed estimates are not available and document the assumptions and methodologies that have been previously agreed in writing with DTMR, prior to RIA finalisation,

(iv) detail the final impact mitigation proposals, including any contributions to road works/maintenance and summarising key road-use management strategies, specifically at intersections of State-controlled and local roads :

(v) mitigation strategies be approved in writing by DTMR no later than six (6) months prior to the commencement of significant construction works[4], or as otherwise agreed between the proponent and DTMR.

(b) Update the road-use management plan (RMP) for all stages of the project. The RMP must:

(i) be developed in accordance with DTMR's *Guide to Preparing a Road-use Management Plan*[5], with a view to also optimising project logistics and minimising road-based trips on all state-controlled and local roads,

(ii) include a table[6] listing RMP commitments and provide confirmation that all works and road-use management strategies have been designed and/or will be undertaken in accordance with all relevant DTMR standards, manuals and practices[7], and

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[1] Available at http://www.tmr.qld.gov.au/business-industry/Technical -standards-publications.aspx

[2] Available from Planning Management Section, Brisbane.

[3] Available from DTMR Regional Offices.

[4] Significant construction works means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project.

[5] Available from DTMR Regional Offices or Planning Management Section, Brisbane.

[6] Available from DTMR Regional Offices or Planning Management Section, Brisbane.

[7] Available at: http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications.aspx

(iii) be approved in writing by DTMR no later than six (6) months prior to the commencement of significant construction works, or as otherwise agreed between the proponent and DTMR.

(c) Prior to the commencement of significant project-related construction works, the proponent must upgrade any necessary intersection/accesses and undertake any other required works and other impact mitigation strategies as required by the RIA and RMP in state-controlled road reserves, in accordance with the current TMR road planning and policies and standards, unless otherwise agreed in writing with the TMR.

(d) Provide to the relevant DTMR Regional offices "as constructed" plans of the pipeline/s within the state-controlled road corridor.

DTMR is designated as the agency responsible for this recommendation.

Permits, approvals and traffic management plans relating to state-controlled roads – Advice Only

The proponent is responsible for obtaining the relevant licenses and permits for the works required above, for example, under the *Transport Infrastructure Act (Qld) 1994* for works and project facilities/infrastructure within the state-controlled road corridor. To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three (3) months prior to the commencement of significant construction works or project-related traffic, or such other period agreed in writing with DTMR:

(a) submit detailed drawings of any works required to mitigate the impacts of project-related traffic for DTMR review and approval,
(b) consult with DTMR Downs South West Region specifically regarding the detailed design of the pipeline within state-controlled road reserves and maintenance access requirements for the pipeline within/from state-controlled roads including any permanent and temporary accesses,
(c) obtain all relevant licenses and permits required under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor (s33 for road works approval, s62 for approval of location of vehicular accesses to state-controlled roads and s50 for any structures or activities to be located or carried out in a state-controlled road corridor),
(d) obtain a conditional non-objection letter under sections 79 and 80 of the *Transport Infrastructure Act 1994* for public utility plant within the state-controlled road corridor,
(e) prepare a Heavy Vehicle Haulage Management Plan for any excess mass or over-dimensional loads for all phases of the project in consultation with DTMR's Heavy Vehicles Road Operation Program Office, the Queensland Police Service and the relevant LGA, and
(f) prepare Traffic Management Plan/s (TMP) in accordance with DTMR's *Guide to preparing a Traffic Management Plan*[8]. A TMP must be prepared and implemented during the construction and commissioning of each site where road works are to be undertaken, including site access points, road intersections or other works undertaken in the state-controlled road corridor.

Agreements relating to railway corridor – Advice Only

To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three (3) months prior to the commencement of construction, submit applications to Queensland Rail as the railway manager for relevant agreements required under the *Transport Infrastructure Act 1994* for any works that constitute "interfering with a railway". Information about the application is available on the Queensland Rail website (http://www.queenslandrail.com.au/NetworkServices/ThirdPartyCorridorAccess/Pages/ThirdPartyCorridorAccess.aspx).

Please note that, during the design of the project, the proponent should notify Queensland Rail of any project-related impact on known or potential areas containing protected plant species under Commonwealth and State legislation within the rail corridor.

[8] Available from TMR Regional Offices of Planning Management Section, Brisbane.