The Coordinator-General

South Galilee Coal Project:

Coordinator-General's evaluation report on the environmental impact statement

December 2014

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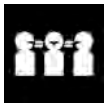

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Synopsis

This report evaluates the potential impacts of the South Galilee Coal Project (the project). It has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act).

The project has been proposed by joint venture partners AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd, a subsidiary of Bandanna Energy Limited (hereafter referred to jointly as the proponent). AMCI is the manager of the joint venture and has prepared the environmental impact statement (EIS).

The project includes the development of a 17 million tonnes per annum (Mtpa) open-cut and underground thermal coal mine and associated infrastructure in the southern Galilee Basin. It is situated near the township of Alpha within the Barcaldine Regional Council (BRC) Local Government Area on mining lease application 70453.

The project will require an estimated A$4.2 billion capital investment and is expected to create 1600 jobs during the two-year construction phase of the project and 1288 operational jobs for the 33 year mine life.

Development of the project to full scale will rely on the proponent obtaining access to external rail, power and water infrastructure. An approximately 70 km rail corridor will be required to connect to the Galilee Basin State Development Area (SDA) common use rail line to enable coal to be exported through the Port of Abbot Point. Plans for electricity and water supply are subject to further negotiations with infrastructure providers for the full-scale project.

In evaluating the EIS, I have considered all EIS documentation, issues raised in submissions during the public consultation periods, the additional information to the EIS (AEIS), information and advice I have received from state government agencies, BRC, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) and the Australian Government Department of the Environment (DE).

The following provides an overview of the main issues arising from my evaluation.

Matters of national environmental significance (MNES)

Threatened species and ecological communities

The project will impact on one threatened ecological community—Brigalow, and habitat for five threatened fauna species likely to occur in the project area—the ornamental snake, squatter pigeon (southern), Dunmall's snake, black-throated finch and the yakka skink. No threatened aquatic or terrestrial flora species is considered likely to occur in the project area.

Project components have been positioned to avoid impacts to Brigalow as far as possible, with clearing limited to 8.81 hectares (ha). Project construction will also

require the clearing of listed threatened species habitat for the open-cut mine and project infrastructure including:

- 25.54 ha of potential ornamental snake habitat
- 592.68 ha of potential squatter pigeon (southern) habitat
- 1080.19 ha of potential Dunmall's snake habitat
- 144.39 ha of potential black-throated finch (southern) habitat
- 800.73 ha of potential yakka skink habitat.

Subsidence may also impact on habitat for these species and communities, and both direct clearing and subsidence impacts have been included in the proponent's proposed biodiversity offset strategy.

Migratory birds

Two migratory bird species were identified within the project area—the rainbow bee-eater and the eastern great egret. These species may be impacted by clearing of potential foraging areas and loss of water sources. However, the project is not expected to substantially impact either species and the proposed project offset area contains breeding and feeding habitat suitable for these species.

Groundwater impacts

Water supply and water quality

Groundwater is used for stock watering and human consumption in the area surrounding the project, particularly at Alpha town. The proponent's modelling predicts that drawdown due to the project at most nearby bores would be less than 0.1m. Within the area of drawdown in and around the mining area, 38 registered bores would potentially be affected by greater than 1m drawdown, although none of these potentially affected bores supply water to Alpha town.

The proponent has committed to establishing make good arrangements with potentially affected groundwater users, including BRC regarding potential impacts on the bore water supply to Alpha town. The arrangements would provide an alternative water supply from an external source if groundwater supplies are materially impacted by the mine. The proponent has also committed to investigate and maintain a register of all groundwater-based complaints.

The proponent has identified a set of management measures to prevent contamination of groundwater supplies. These measures will be further defined during the project's detailed design phase and will be included in the environmental management plan (EM Plan) that has to be completed before an environmental authority (EA) can be issued. To ensure that risks to groundwater are monitored and effectively managed, I have recommended conditions for the proponent to develop and implement a groundwater monitoring and management program, final void water monitoring and management plan and a subsidence management plan prior to the commencement of mining.

Under the *Water Act 2000*, the Department of Natural Resources and Mines has the authority to ensure that any water licence issued for mine dewatering for the project

contains ‘make good’ provisions. Impacts on landowner groundwater supplies will be addressed as part of a consultative process with the affected landowners. I have recommended a condition that, prior to commencing mining activities, the proponent must develop a detailed plan to guarantee the long-term security of water for all current groundwater users predicted to be affected by the project, including Alpha town.

Great Artesian Basin

The project is located 15–20 km from the lower boundary of the Great Artesian Basin (GAB) and is separated from the GAB by the Rewan Formation, a rock layer with limited permeability. Impacts on the GAB are considered to be unlikely, but more detailed modelling and extensive groundwater monitoring during the life of the project are required to confirm this.

Consistent with other Galilee Basin projects, I have recommended to the Commonwealth Minister for the Environment conditions to be imposed requiring the development of a Rewan Formation Connectivity Research Plan as part of any future approval of this project. I have also recommended a condition requiring the proponent to develop and implement a Groundwater Management and Monitoring Plan to ensure it collects and shares appropriate groundwater data prior to and during project operations.

Surface water impacts

Surface water flow

Surface water flow would be altered in the vicinity of the mine site as a result of on-site water harvesting, a reduction in the catchment area of the Sapling and Tallarenha Creeks, subsidence and reduced streamflow caused by mine-affected water being captured in dams and evaporation from project dams capturing rainfall runoff. The proponent has made modifications to the project during the EIS process to avoid or mitigate impacts on surface water flow such as removing the original proposal to divert Sapling Creek. The proponent has committed to implementing a mine–site water management system (MWMS) and construct a clean water diversion channel to divert water around the active mining areas to manage surface water flow in the vicinity of the project site.

During the detailed design stage, the proponent has to complete a baseline monitoring program and will be required to provide information on water flow and monitoring points in a revised EM Plan prior to the finalisation of the EA for the project.

I require the proponent to provide more information on the site water balance model before the draft EA is finalised. This information is to include the site water balance calculations for quantity of runoff, the final MWMS, and the timing, location and quality of water discharges.

Surface water quality

Potential surface water quality impacts will be managed by the proponent to prevent ecological and landholder impacts on Tallarenha, Sapling, Dead Horse and Saltbush Creeks, that ultimately flow through the Belyando and Suttor Rivers, and discharge

through the Burdekin Falls Dam to the coast. Unless mitigated, untreated and uncontrolled releases from the contaminated water dams have the potential to affect human and livestock health and environmental values downstream.

The proponent has committed to managing impacts to surface water quality by minimising the need for mine-affected water to be released from the project area and preventing uncontrolled releases; managing disturbed catchments, contaminated water sources and contaminating processes through the MWMS; and diverting clean water runoff from undisturbed catchments around the active mining area. Furthermore, the proponent will undertake baseline and ongoing surface water quality monitoring to monitor the potential impacts of the project and inform mitigation measures.

I require the proponent to finalise the proposed management measures for discharges of potentially contaminated water from the mine's water management system and update the EM Plan before the project's EA is finalised.

The implementation of appropriate management measures for surface water quality will be regulated through the EA for the project. I have stated conditions for the project to limit contaminant release, require water quality monitoring and provide a suite of conditions relating to regulated structures. Further conditions will be stipulated in the project's final EA.

Flooding around the mine site and off-lease infrastructure corridor

Without mitigation, the mining development may cause some flooding impacts on neighbouring land and on the mine's operation.

To prevent flooding of project infrastructure and mining operations the proponent has proposed measures on the mining lease, including construction of a drainage channel around the open-cut operations and 30m wide drainage channels linking underground mining subsidence contours. A flood levee is proposed that will prevent flooding of the mine during the maximum probable flood event. I require the proposed levees in the drainage channel to have adequate long-term stability, particularly with regard to the levees needed to protect the final void from capturing surface water flow or flood waters after mining ends. These levees are to be left as permanent landscape features and need to be designed and constructed to prevent long-term erosion and failure.

With mitigation measures in place, modelling indicated that flooding associated with the infrastructure corridor embankment is not expected to result in significant changes in water level, velocity and duration at homesteads and related infrastructure upstream of the infrastructure corridor. As with other Galilee projects, I have imposed conditions requiring the proponent to adhere to limits for the extent of inundation, afflux, culvert exit velocities and inundation times and consult with land and asset owners regarding the potential impacts and management of flooding caused by the infrastructure corridor and railway.

Regional impacts on surface and groundwater

Given the location of the project near other proposed coal mines and the lack of existing data on water resources in the region, I recognise the importance of identifying the likely extent of the combined impacts of all Galilee Basin projects' potential impacts

on groundwater, surface water flow, environmental values and groundwater–surface water interactions.

Consistent with other approved Galilee Basin projects, I have made recommendations to state agencies to ensure the monitoring and assessment of regional water resources and the development of a regional water balance model, local water quality objectives and a regional water monitoring and assessment program for the Galilee Basin. This will assist with research and data availability on groundwater impacts from Galilee Basin projects.

Matters of state environmental significance

Impacts of the project on flora and fauna of state significance could result from the clearing of approximately 3690 ha of vegetation for open-cut mining and 885 ha for associated infrastructure, including the 70 km rail infrastructure corridor. A further 4570 ha of the project area may be affected by subsidence from underground mining.

Flora species identified on the project site include three threatened or near-threatened flora species listed under the *Nature Conservation Act 1992*—the round-leaved heath myrtle, the large-podded trefoil and *Eleocharis blakean*. Vegetation clearing will also affect the habitat of five vulnerable or near-threatened fauna species confirmed to exist in the project area—the brigalow scaly foot lizard, the little pied bat, ornamental snake, Dunmall's Snake and the square-tailed kite, and two species likely to occur in the project area—the cotton pygmy goose and the yakka skink.

The proponent has developed control measures in the draft EM Plan and committed to minimise impacts on flora and fauna through mitigation measures such as staged clearing, weed management, translocating flora species of significance, progressive rehabilitation and the use of fauna spotters to relocate fauna species of significance.

I am satisfied that these measures can minimise risks to flora and fauna and, where any significant residual impacts remain, that values could be offset. I have also made recommendations for pre-clearance surveys and the development of threatened species management and mitigation measures to maximise the ongoing protection and long-term conservation of threatened species.

Offsets

The proponent has identified residual impacts on matters of national and state environmental significance that could potentially require an offset under the Commonwealth EPBC Act Environmental Offsets Policy or the Queensland Biodiversity Offsets Policy.

The proposed Biodiversity Offsets Plan (BOP) aims to deliver a net gain to all environmental values by securing and managing properties adjacent to the project impact area that have similar environmental values and have been identified as suitable offset areas. The BOP will be developed in line with the objectives of the Galilee Basin Offset Strategy. The BOP identifies the extent of residual impacts on MNES and MSES, the proposed offset areas, details of the property to be acquired and management measures for the matters impacted.

In line with the development of the mine stages, offsets are proposed to be delivered in two phases. Offset areas in two adjacent properties will be procured to provide offsets for the Epsilon stage of the project with further properties to be acquired once the mine is expanded. I am satisfied that suitable biodiversity offsets can be delivered in stages to compensate for environmental impacts of each mining stage to the level of ecological impacts incurred at each stage.

For coordinated projects, the Coordinator-General has the powers necessary to decide state offsets as part of the broad conditioning powers under the SDPWO Act. The Coordinator-General will determine and approve any state offset conditions that are considered necessary to deal with significant residual impacts over and above Australian Government requirements. The Coordinator-General will not require any additional offsets for impacts to matters of state environmental significance if the Australian Government requires an offset for the same values.

I have imposed a condition requiring the proponent to finalise the BOP for the approval of the Coordinator-General that details how the EPBC Act offset requirements will be met and identifies any residual impacts for MSES that could need offsetting. I have also recommended a condition for consideration by the Commonwealth Minister for the Environment requiring the proponent to prepare and submit a Biodiversity Offset Management Plan for approval.

Transport

The project will generate changes to road, rail and air transport demands. I am satisfied that the impacts can be adequately managed. The project will generate additional traffic and require a new intersection on the Capricorn Highway. Rail-under-road grade separation of the Capricorn Highway is required for the rail connection with the Queensland Rail Central Western Rail line and a future connection to common use rail infrastructure within the Galilee Basin SDA connecting the southern Galilee Basin to the Port of Abbot Point. Furthermore, the project will require the Alpha Aerodrome to be upgraded to accommodate transportation of the workforce.

My conditions and recommendations require the proponent to finalise a road impact assessment and develop infrastructure agreements with affected infrastructure owners to ensure that the impacts of this development are appropriately mitigated.

Noise, vibration and air quality

The project must adhere to standards for noise, vibration and air quality at the 11 sensitive receptor locations identified within 19 km of the project, including Alpha town. Mitigation measures may be required for the proponent to meet night-time noise standards at the closest homestead, located 6 km from surface works. All potential impacts must be managed in accordance with my conditions and the proponent's EM Plan.

Land use

Mining will be undertaken on land that is currently used for low intensity cattle grazing. Progressive rehabilitation will be undertaken over the 33 year mine life. The proponent

intends to return the landform to a condition similar to its pre-mining state, unless other beneficial land uses are pre-determined and agreed.

The proponent has committed to the salvage and use of all topsoil suitable for rehabilitation and will have a Topsoil Management Plan. The proponent has also committed to a Rehabilitation Management Plan with performance criteria that will be submitted with the revised EM Plan and conditioned through the mine's EA.

Land will be regarded as successfully rehabilitated when targets for land suitability, land use, landform stability and land contamination have been met. This will result in land rehabilitation to a stable landform with self-sustaining vegetative cover.

The project's infrastructure corridor will intersect one stock route which runs parallel to the Central Western Railway. I have made a recommendation to ensure the proponent maintains the condition and connectivity of this stock route in consultation with affected parties.

Some subsidence is expected from the underground mining. Mitigation measures will be detailed in a Subsidence Management Plan being prepared as a component of the EM Plan and conditioned in the EA.

Social and economic impacts

The project will boost regional and state economies, with capital expenditure expected to be $4.2 billion over the life of the project. Operational expenditure would be approximately $21.7 billion over the 33 year operational mine life. The project could create up to 1600 construction jobs, 1288 operational jobs and 300 decommissioning jobs.

The project is estimated to provide $2.8 billion to $4.9 billion of state royalties and $1.2 billion of Commonwealth royalties over the life of the project, depending on coal price and exchange rate fluctuations.

The social impact assessment (SIA) conducted for the project focused on the Barcaldine Region, with a particular focus on Alpha town (the closest town to the mine site) and directly affected landowners. A second regional study area included Blackall–Tambo, the Central Highlands Regional Council (focusing on Emerald), and Isaac Regional Council.

The SIA identified that social or economic impacts can be appropriately mitigated. Action plans were developed for each of the main social impacts identified in the SIA. The plans address:

- community and stakeholder engagement
- workforce management
- housing and accommodation
- community safety and wellbeing
- regional business development and local content.

Workers will be sourced from population centres throughout Queensland. Locals will be encouraged to apply for positions and if they live within 20 minutes drive of the project site, they will not be required to live on site.

The project could provide increased employment, training and business opportunities and have a net positive social effect on local and regional communities following the implementation of social impact mitigation and management strategies and actions committed to by the proponent.

The proponent has committed to implement the action plans throughout the life of project and work with stakeholders to manage social impacts in a coordinated and effective manner.

Conditions, environmental management plans and proponent commitments

The proponent must manage the impacts of the project in accordance with my conditions and recommendations in Appendices 1-3, the project's Environmental Management Plans (EMPs) and the proponent's commitments at Appendix 5. I require the proponent to fully implement the commitments detailed in the proponent commitment register.

A draft EM Plan for the mine site has been prepared by the proponent and will be revised and finalised during the mine's detailed design phase. The EM Plan will consist of a number of specific sub-plans addressing matters such as dust emissions, water management, subsidence and rehabilitation. The EM Plan will need to be approved under the EP Act before an EA can be issued.

For components of the project located off the mine site, further EMPs will be developed to document proposed impact avoidance, mitigation and management measures. Implementation of these plans will be a requirement of relevant approvals.

Coordinator-General's conclusion

I consider that the environmental impact assessment requirements of the SDPWO Act for the South Galilee Coal project have been met and that sufficient information has been provided to enable a thorough evaluation of the potential environmental impacts of the project.

I conclude that there are significant local, regional and state benefits to be derived from the project and that any adverse environmental impacts can be acceptably avoided, minimised, mitigated, managed or offset through the implementation of the measures and commitments outlined in the EIS documentation. The conditions I have specified in this report have been formulated in order to further manage the predicted impacts associated with the project.

Accordingly, I approve the project to proceed subject to the conditions and recommendations set out in this report and the proponent obtaining all subsequent statutory approvals. In addition, I require the proponent's commitments to be fully implemented.

This report will be provided to the Commonwealth Minister for the Environment pursuant to section 36(2) of the SDPWO Regulation and the bilateral agreement

between the State of Queensland and the Australian Government. The report will inform the assessment and decision by the Minister on the controlled action for the project pursuant to section 133 of the EPBC Act.

A copy of this report will also be provided to the proponent, BRC and relevant state government agencies, and will be made publicly available at **www.dsdip.qld.gov.au**

Barry Broe

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Barry Broe
Coordinator-General

2 December 2014

1. Introduction

This report has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) and additional information to the EIS (AEIS) for the South Galilee Coal Project (the project).

The report:

- summarises the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels
- presents an evaluation of the project, based on information contained in the initial advice statement (IAS), EIS and AEIS, submissions made on the EIS and information and advice from advisory agencies and the Independent Expert Scientific Committee (IESC)
- states conditions and makes recommendations under which the project may proceed
- documents proponent commitments.

2. About the project

2.1 The proponent

The proponents for the South Galilee Coal Project (the project) are joint venture participants AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd (Alpha Coal), a subsidiary of Bandanna Energy Limited. AMCI is the manager of the joint venture.

The AMCI Group was formed in 1986 and is a private global mining investment and trading business. It currently holds significant investments in private and public mining companies in Australia, the United States of America, South Africa, Europe and South America. AMCI has been involved in coal mining projects in Queensland at Coppabella, Moorvale and Carborough Downs.

2.2 Project description

The proposed project is an open-cut and underground thermal coal mine with an estimated project life of 35 years (including 2 years for construction). Over the project life, around 410 million tonnes of thermal coal are to be mined for the export market.

The total project area is approximately 31 000 hectares (ha). The proponent's initial estimate for direct disturbance due to the open-cut mining operation is approximately 3690 ha while the underground mine area will directly disturb approximately 4570 ha. Additionally, infrastructure for the project will cover an area of 885 ha. This figures will be refined during the final design phase. The proponent proposes offsets for a larger impact area of 6370 ha for the open–cut mine and infrastructure, and 5150 ha for the

underground mine. This takes into account impacts beyond the immediate disturbance area.

During construction, the project is expected to employ 1600 people with 1288 employed during operations. Due to the remote location of the site and the small local population, the workforce is proposed to be predominantly fly-in, fly-out (FIFO) apart from a small number of management positions, which will be located in the nearby Alpha township. Local and regional residents will be eligible to apply for employment.

The proponent has proposed a small-scale initial mine development—referred to as the Epsilon stage—which would be developed in the absence of the infrastructure required to support the full-scale mine. During the Epsilon stage the existing Central Western Railway would be utilised and coal exported through Emerald to the Port of Gladstone. Use of the existing rail would require a significant rail upgrade between Alpha and Emerald and the export volume would be approximately three million tonnes per annum (mtpa). Negotiations are continuing with Queensland Rail to progress the Central Western Railway transport option. The rail upgrade is not part of the project assessed in this report.

Expansion of the project to projected peak production of 17 mtpa will rely on obtaining access to one of the proposed rail corridors of the other Galilee Basin coal project proponents, such as the Hancock GVK Alpha project rail alignment or the Waratah Coal Pty Ltd Galilee Coal project rail alignment. This would enable coal to be exported through the Port of Abbot Point. This rail proposal, approximately 70 km to the Hancock GVK Alpha rail project or around 40 km to the Waratah Coal Pty Ltd Galilee Coal rail project, would be subject to further assessment and approval processes following detailed design.

2.2.1 Location

The project is located in the Barcaldine Regional Council (BRC) area, approximately 12 kilometres (km) south-west of the township of Alpha in the Galilee Basin and approximately 180 km west of Emerald in Central Queensland.

The project location and regional context is shown in Figure 2.1.

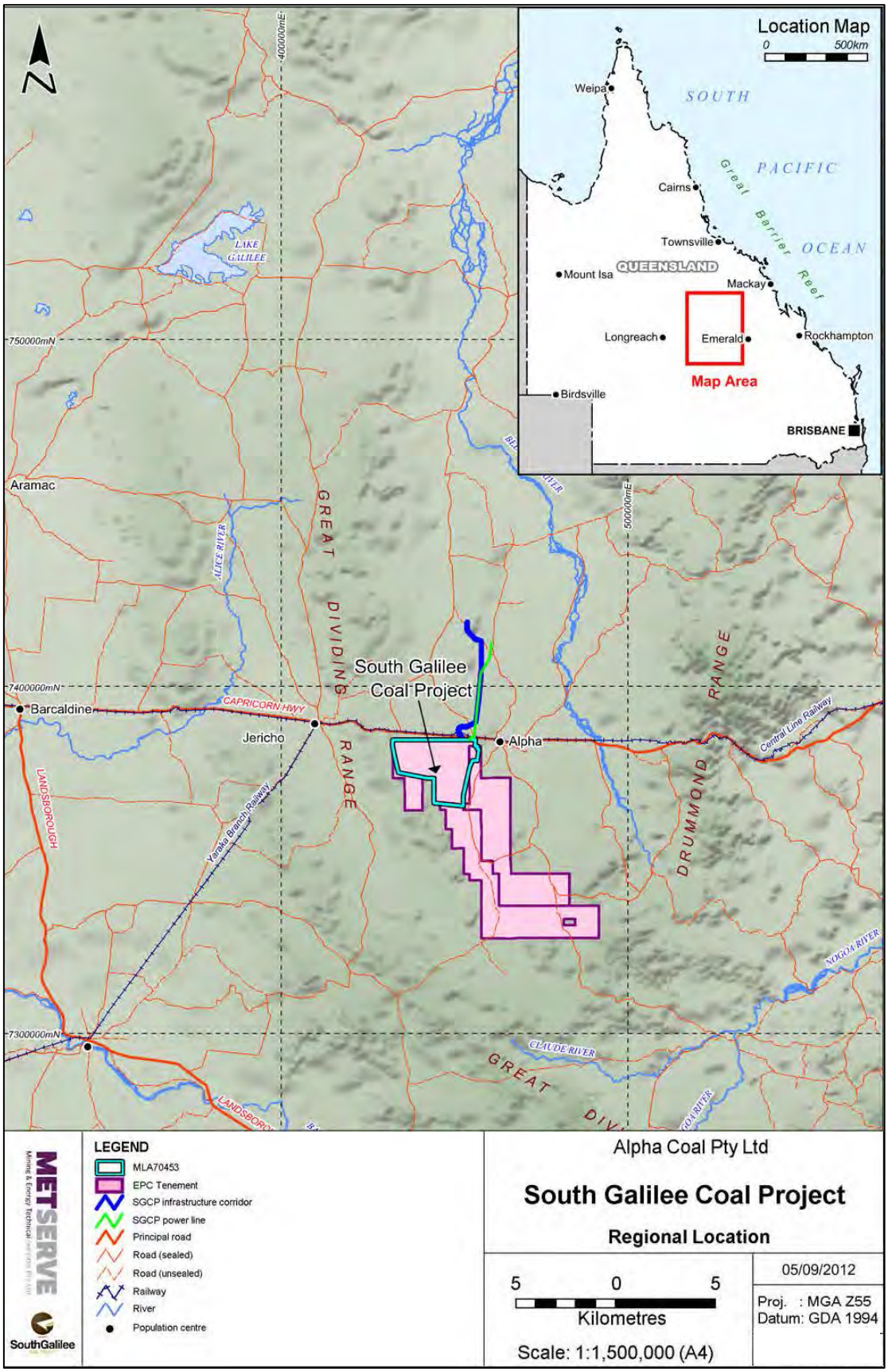

Figure 2.1 Project location

2.2.2 Development stages and project components

Construction

Construction of the project is expected to extend over four stages spanning a twelve-year period. The construction stages comprise:

- Years 1 and 2: Epsilon stage
- Year 4: South Galilee Coal stage 1—open-cut mine
- Year 7: South Galilee Coal stage 2—underground mine commences
- Year 12: South Galilee Coal stage 3—underground mine expansion.

Should rail and water infrastructure not be available by year 4 for the planned commencement of Stage 1, the Epsilon stage will continue with the additional stages deferred until the required infrastructure is in place.

Activities and components required for the Epsilon stage includes:

  - pre-construction activities such as land acquisition and clearing
  - major civil and capital works comprising:
    - accommodation village
    - rail loop and rail spur to connect to existing Central Western Railway
    - initial box cut for the open-cut mine.

For the Epsilon stage, power will be generated on site and the small-scale nature and dry process will not require an external water supply.

Subsequent construction required for South Galilee Coal stages 1, 2 and 3 of the project involves extending the open-cut mining area and constructing the underground mining areas, requiring:

- further land acquisition, land clearing and earthworks
- mine access road, accommodation village access road, other on-site haul roads and light vehicle roads
- external water supply and reticulation infrastructure
- water management infrastructure
- potable water treatment plant
- sewage and wastewater treatment plant
- extension of accommodation village
- power supply, electrical and telecommunications infrastructure
- dragline, dragline pad, other underground mining equipment
- run-of-mine (ROM) dumps and sizing stations
- coal handling and processing plant (CHPP) and associated equipment (e.g. CHPP feed surge bin, thickener, filter building)
- additional rail spur component to connect to the Galilee Basin SDA common use rail line to enable coal to be exported through the Port of Abbot Point (approximately

70 km which would be subject to further assessment and approval processes following detailed design).

- to connect to the Galilee Basin SDA common use rail line to enable coal to be exported through the Port of Abbot Point
- construction access road for rail components
- main infrastructure area (i.e. administration buildings, bath house, workshops, hardstand area, warehouses, vehicle workshops etc.)
- material handling infrastructure (e.g. conveyors, ROM and product stockpiles and associated equipment).

The mine layout shown at Figure 2.2 is based on the proponent's initial estimate of impact areas and will be refined during the final design phase.

Operation

The mine life is estimated at 33 years.

Open-cut mining at the site will involve conventional strip mining using draglines with pre-stripping undertaken by conventional truck and shovel. The waste rock and coal will be extracted in a series of 'strips' running parallel to each other. Each strip is mined then filled and rehabilitated progressively. Key activities include:

- **clearing** prior to the commencement of mining operations, vegetation will be cleared and topsoil will be removed and stockpiled separately for later use in mine rehabilitation
- **drilling and blasting** of overburden material
- **overburden removal** will allow dragline access
- **mine dewatering**.

The underground mining operations will commence in South Galilee Coal stage 2 and will continue for the life of the mine. Underground operations will utilise the longwall mining method. Coal will be extracted in panels 350m wide and up to 5000m in length. The minimum depth of cover will be 140m.

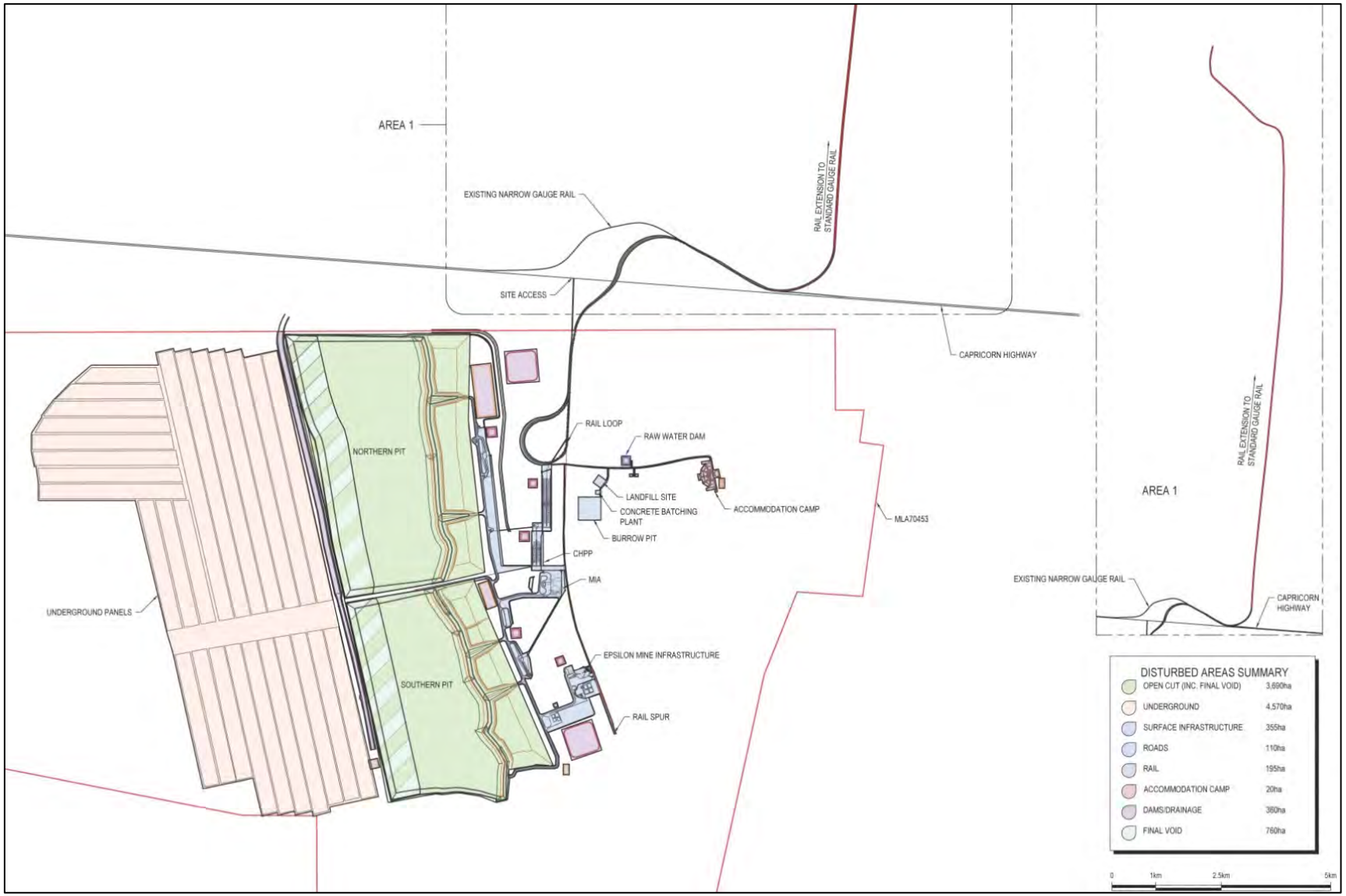

Figure 2.2 Mine layout

Decommissioning

A Mine Closure Plan will be developed in advance of closure and decommissioning. This plan will document how disturbed areas will be rehabilitated to meet closure and relinquishment requirements for the environmental authority and the mining lease. It will be developed in consultation with appropriate stakeholders and regulatory agencies. The objectives of the post-mine land use are to ensure that:

- post-mine areas are self-sustaining and require no ongoing maintenance, while protecting the physical and biological integrity of the surrounding environment after mining activities have ceased
- existing and potential beneficial uses of the area are preserved where practicable after mining activities have ceased.

Waste rock emplacements

The waste rock emplacement facilities will be progressively rehabilitated and decommissioned once the final rehabilitation success criteria have been achieved.

Final void

The final void remaining at the end of the project life will cover approximately 760 ha with a depth of approximately 140m. Management arrangements for the void will be a component of the Mine Closure Plan which will be developed in consultation with appropriate stakeholders and the Department of Environment and Heritage Protection (DEHP).

Mine infrastructure

Contractors will be required to decommission temporary construction plant and equipment in accordance with a Construction Environmental Management Plan.

Project infrastructure will be located on land owned by the proponent. Final landform designs for the infrastructure areas will be based on decommissioning, dismantling and/or disposing of the plant and equipment and re-profiling the base to match the original pre-mining landform where practicable. Contour ripping, topsoiling and revegetation will be undertaken to encourage a vegetative cover. Detailed rehabilitation plans will be developed and refined over the life of the project.

Unless determined to be suitable and requested by the landowner, water storage structures will be removed in a similar manner and rehabilitated to a waterbody or grazing post-mine land use.

2.2.3 External infrastructure requirements

For the project to proceed beyond the Epsilon stage, it requires access to three major infrastructure items—power, water and rail. The project depends on an external infrastructure provider for these. At the time of writing, the provision of these services is subject to negotiations between the proponent and infrastructure providers.

2.2.4 Dependencies and relationships with other projects

This project is one of six large coal mining proposals for the Galilee Basin that have been or are currently the subject of environmental assessment under the SDPWO Act. I have completed assessments, released evaluation reports and approved four of these—the Alpha Coal project (May 2012), Kevin's Corner project (May 2013), Galilee Coal project (August 2013) and the Carmichael Coal Mine and Rail project (May 2014). Three of these projects include rail components. Additionally, the North Galilee Basin Rail project was approved by the Coordinator-General in August 2014. The other mine proposal is China Stone, which is in the EIS preparation stage.

The advancement of the full-scale mine is dependent on the development by other proponents of common use rail infrastructure within the Galilee Basin SDA connecting the southern Galilee Basin to the Port of Abbot Point. The Galilee Basin SDA, located 70 km to the north of the project, was declared by the Coordinator-General to support the development of the Galilee Basin and enable a coordinated approach to developing multi-user common rail infrastructure. The project proponent would be responsible for the construction of the rail connection to the SDA.

2.3 Project rationale

The project is one of a number of proposals aimed at developing the vast thermal coal resources of the State's Galilee Basin to satisfy growing world energy demands—principally in Asia.

The Queensland Government has indicated its strong intention to facilitate development of the Galilee Basin and boost the resources sector—one of the State's four economic pillars important for Queensland's future.

The project would deliver significant economic and social benefits on a regional, state and national scale. It is expected to generate considerable export income for the Australian economy with export revenues of $1.3b–$2.0b per annum or $40.3b to $62.7b over the life of the project.

Commonwealth and state government revenue would also be increased through taxes and royalties of up to $49m–$85m per annum (state) and $2.8b to $4.9b over the project life and $1.2b over the project life (Commonwealth) respectively from the project.

The mine development could boost jobs growth in Central Queensland creating approximately 1600 direct jobs during construction and 1288 permanent employees for the long-term operation of the mine. A flow-through benefit of an additional 4300 indirect jobs is anticipated with the majority of these expected to occur in Queensland. The project will also add value to the regional economy as local suppliers, service providers and contractors participate in the project.

The proponent estimates the capital cost of the project at A$4.2 billion.

3. Environmental impact statement assessment process

3.1 Overview

This section details the steps in the project's EIS assessment process. For a detailed explanation of the EIS process, refer to **www.dsdip.qld.gov.au/cg**

In undertaking this evaluation, I have considered the following:

- IAS
- EIS
- AEIS
- technical reports
- agency advice from several departments including:
  - Department of Environment and Heritage Protection
  - Department of Natural Resources and Mines
  - Australian Government Department of the Environment
- comments and properly made submissions from members of the public on the EIS.

The steps taken in the project's EIS process are documented on the project website at **www.dsdip.qld.gov.au/sgcp**

3.2 Coordinated project declaration

On 26 May 2010, the then Coordinator-General declared the project to be a 'coordinated project' under section 26(1)(a) of the SDPWO Act. This declaration initiated the statutory environmental impact evaluation procedure of Part 4 of the Act, which required the proponent to prepare an EIS for the project.

3.3 Commonwealth assessment

The Commonwealth has accredited the State of Queensland's EIS process, conducted under the SDPWO Act, under a bilateral agreement between the Commonwealth and the Queensland Government. Under the agreement (made under section 45 of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (*EPBC Act)), if a controlled action is a 'coordinated project for which an EIS is required' under the SDPWO Act, certain types of projects do not require assessment under Part 8 of the EPBC Act. The agreement enables the EIS to meet the impact assessment requirements of both Commonwealth and Queensland legislation.

Under Part 4 of the SDPWO Act and section 36 of the *State Development and Public Works Organisation Regulation 2010* (SDPWO Regulation), the Coordinator-General must ensure the assessment report evaluates all relevant impacts that the action has,

will have, or is likely to have, and provide enough information about the action and its relevant impacts to allow the Commonwealth Environment Minister to make an informed decision whether or not to approve the action under the EPBC Act.

The controlled action may be considered for approval under section 133 of the EPBC Act, once the minister has received the Coordinator-General's EIS evaluation report (prepared under section 35 of the SDPWO Act).

On 16 June 2010 the then Commonwealth Minister for Sustainability, Environment, Water, Population and Communities determined that the project is a 'controlled action' under the EPBC Act (EPBC 2010/5496). The relevant controlling provisions under the EPBC Act are:

- sections 18 and 18(a) listed threatened species and ecological communities
- sections 20 and 20(a) migratory species protected under international agreements.

On 17 October 2013, the Commonwealth Environment Minister determined that the project will also impact upon water resources, under sections 24(d) and 24(e)—impacts of coal seam gas development and large coal mining development on water resources.

Section 5 of this report lists each controlling provision under the EPBC Act and explains the extent to which the Queensland Government EIS process addresses the actual or likely impacts of the project on the matters covered by each provision.

3.4 Terms of reference (TOR)

The draft TOR for the EIS for the project was released for public and advisory agency comment from 7 August 2010 to 13 September 2010. Fourteen submissions were received, comprising 12 from advisory agencies, one from a non-government organisation and one from a private submitter.

A final TOR was prepared having regard to submissions received and was issued to the proponent on 30 November 2010.

3.5 Review of the EIS

The EIS, prepared by the proponent, was released for public and agency comment from 20 October 2012 to 3 December 2012.

Twenty-two submissions were received, copies of which were forwarded to the proponent and the then Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).

Table 3.1 summarises the number of public and agency submissions on the EIS.

Advice was also received from SEWPaC in relation to matters of national environmental significance.

Table 3.1 Public and agency comments received on the EIS

Agency	No. submissions	Issues
Queensland Government • Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA) • Department of Community Safety (DCS) • Department of Environment and Heritage Protection (DEHP) • Department of National Parks, Recreation, Sport and Racing • Department of Natural Resources and Mines (DNRM) • Department of Agriculture, Fisheries and Forestry (DAFF) • Department of Transport and Main Roads (DTMR) • Queensland Health • Queensland Police • Queensland Treasury • Department of Housing and Public Works • Skills Queensland • Department of Education, Training and Employment • Department of State Development, Infrastructure and Planning (DSDIP) (2)	**15**	• Indigenous employment and business opportunities • Flood impacts • Emergency planning • Water quality • Adequacy of the Environmental Management Plan • Groundwater • Flooding • Road and traffic information • Air quality • Heavy vehicle movement • Housing impacts • Workforce Management Plan • Social Impact Management Plan • Local Industry Participation Plan
Local government • Barcaldine Regional Council	**1**	• Housing
Private individuals	**6**	• Flooding and erosion • Groundwater • Water quality • Local employment
TOTAL	**22**	

3.6 Additional information to the EIS

On 8 February 2013, I requested that the proponent submit additional information to address:

- groundwater modelling
- Environmental Management Plan content
- flood impacts

- road and traffic impacts
- biodiversity offsets plan.

On 12 May 2014, the proponent submitted the AEIS to address the above issues.

The AEIS was reviewed by relevant agencies and key stakeholders. Comments were provided to further inform my evaluation. I have considered submissions on the EIS and advice on the AEIS in my evaluation of the project.

3.7 Advice from the Independent Expert Scientific Committee

Following the Commonwealth Minister for the Environment's determination that the project would trigger new controlling provisions relating to water, it became mandatory, under Section 131AB of the EPBC Act, for the minister to obtain advice from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) before making any decision on the project.

Queensland is a signatory to the Council of Australian Governments (COAG) National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development (NPA). The NPA requires coal seam gas or large coal mining development proposals undergoing environmental impact assessment that are likely to have a significant impact on water resources to be referred to the IESC.

On 8 July 2014, a joint referral from the Office of the Coordinator-General and the Department of the Environment (DE) was submitted to the IESC. The IESC considered the request for advice at its meeting of 12–13 August 2014 and its advice was provided to DE and I on 14 August 2014 and published on 28 August 2014.

I have considered key aspects of the IESC advice in section 5.7 of this report and outlined my consolidated position on the scope of matters raised in the IESC advice in Appendix 6.

4. Project approvals

4.1 Statutory approvals

Following the release of this evaluation report, the proponent will need to obtain a range of statutory approvals from Australian, state and local government agencies before the project can lawfully proceed. A brief description of the likely approvals or permits, approving agencies and associated legislation is listed in Table 4.1. More information about each approval is provided in the sections below.

Table 4.1 Subsequent approvals likely to be required for the project

Item	Relevant approval	Legislation	Authority
Controlled action	EPBC Approval	Environment Protection and Biodiversity Conservation Act 1999	DE (C'wealth)
Mining and associated activities on the mining lease	Environmental Authority (EA) for mining lease and Environmentally Relevant Activities (ERAs)	Environmental Protection Act 1994 (EP Act)	DEHP
Mining tenure and associated activities on the mining lease	Mine lease application (MLA) for MLA 70453	Mineral Resources Act 1989 (MR Act)	DNRM
Forest products and quarry materials	Interfering with or use of forest products and quarry materials on State lands and certain freehold lands owned by the State	Forestry Act 1959	DAFF
Indigenous cultural heritage (ICH)	Cultural heritage management plans (CHMPs)	Aboriginal Cultural Heritage Act 2003 (ACH Act)	DATSIMA
Dewatering of open-cut pits and underground workings	Water licence	Water Act 2000 (Water Act)	DNRM
Taking and/or diverting overland flow that cannot be undertaken in accordance with the relevant Water Resource Plan	Water licence	Water Act	DNRM
Taking and/or interfering with water in a watercourse, lake or spring	Water licence	Water Act	DNRM
Sourcing and taking water for the rail construction (an activity with a reasonably foreseeable conclusion date)	Water permit	Water Act	DNRM

Item	Relevant approval	Legislation	Authority
Water-related operational works associated with sourcing and taking water for the rail construction (off the mining lease)	Development permit	SP Act	DSDIP/ BRC
Excavation or placement of fill in a watercourse, lake or spring that cannot be undertaken in accordance with the riverine protection permit exemption requirements	Riverine Protection permit	Water Act	DNRM
Impacts to any protected plants for the off-lease rail component	Clearing permit for protected plants	Nature Conservation (Protected Plants) Conservation Plan 2000	DEHP
Possible damage to protected wildlife habitat and/or interfering with breeding places in the off-lease rail component	Species Management Plan/Threatened Species Management Plan or damage mitigation permit	Nature Conservation (Wildlife Management) Regulation 2006	DEHP
Altering stock routes (mine and rail)	Agreement with relevant authorities (DNRM and BRC)	Land Protection (Pest and Stock Route Management) Act 2002	DNRM
Construction of the rail spur Off the mining lease	Operational works (excavation and fill)	SP Act	DSDIP/BRC
Roadworks—state-controlled roads (SCR)	Approval to undertake ancillary works to a SCR	Transport Infrastructure Act 1994 (TI Act)	DTMR
Construction of the rail involving works for SCR	Ancillary works and encroachment, declaration of common areas, approval for construction and maintenance access to SCR	TI Act	DTMR
Development Permits may be required for Material change of use (MCU), operational works and reconfiguring a lot for works outside the mining-lease. Development Permits for building works, plumbing and drainage works may also be required on the mining lease.	MCU	Sustainable Planning Act 2009 Regional Council Planning Scheme	DSDIP/BRC

4.1.1 Australian Government approvals

A decision on the controlled action will be made by the Commonwealth Minister for the Environment under section 133 of the EPBC Act. The minister will use the information in section 5 of this report to make an informed decision whether or not to approve the controlled action under the EPBC Act, and if so, apply conditions to the approval necessary to limit the impact on MNES.

4.1.2 State government approvals

The applicable state-based planning and approvals framework is primarily established by the:

- MR Act which regulates the mining tenures
- EP Act which regulates mining activities and related ERAs on and off the mine site
- SP Act which regulates development off the mining lease.

State Development and Public Works Organisation Act 1971

Under Division 8 of Part 4 of the SDPWO Act, the Coordinator-General has the power to impose conditions for some matters where conditions cannot be applied through approvals under other specified legislation. Imposed conditions are provided in Appendix 3 of this report and relate to:

- offsets
- the proponent's contributions to regional water balance modelling, monitoring, assessment programs and funding
- water bore data
- flood impacts of rail infrastructure
- social impact matters.

Environmental authority

Under the EP Act, an EA is required to carry out a 'mining activity' as defined under section 110 of that Act, including the construction and operation of the portion of the rail line loop located on the mining tenement. The project would involve the following types of mining activities:

- mining under the MR Act
- processing mined materials
- activities directly associated with, or facilitating or supporting the mining and processing activities
- rehabilitation and/or remediation
- actions taken to prevent environmental harm.

As the project's mine design has yet to be finalised, a full set of stated conditions for the draft EA has not been provided. The administering authority (DEHP) will be required to develop further conditions for inclusion in the draft EA in consultation with the proponent. Before the draft EA is completed, the proponent must finalise an

environmental management plan for the mine in accordance with the transitional provisions of the superseded EP Act.

I have included stated conditions in Appendix 1, Section 1 of this report for the draft EA. In accordance with Section 47C of the SDPWO Act, the stated conditions must be included in the draft EA. The stated conditions must also be included in the final EA for the mine. Additional conditions developed by DEHP for inclusion in the final EA must be consistent with the Coordinator-General's stated conditions.

Mining lease application

Mining and associated mining activities undertaken as part of the project will be carried out within MLA 70453.

Before mining commences, a mining lease must be granted pursuant to the MR Act. This grant is subsequent to the issue of the EA for mining activities pursuant to the EP Act.

Environmentally relevant activities

Under the EP Act, an EA issued by DEHP is required to carry out an Environmentally Relevant Activity (ERA). The provisions of the EA (mining activities) will provide authority for any non-mining ERAs (e.g. waste disposal, sewage treatment, mineral processing) that occur on the mining lease, as long as these ERAs support the mining activity.

The proponent is required to make applications for any ERAs that fall outside of the mining activities EA and mining lease areas through the State Assessment and Referral Agency (SARA) process.

Water Act 2000

A water licence will be required for the taking of water from groundwater supply bores. The *Water Act 2000* also requires a water licence to interfere with the flow of water within a watercourse, lake or spring.

Sustainable Planning Act 2009

The *Sustainable Planning Act 2009* (SP Act) does not apply on a mining lease; however, it may apply to project development off the mining lease. The proponent will require a range of development approvals off the mining tenement from local and state assessment managers that are likely to be initiated under the SP Act and lodged through the SARA, including the rail line off the mining tenement. These approvals will also relate to various elements of supporting infrastructure for mining projects such as water supply, pipelines and power supply transmission lines.

4.1.3 Local government approvals

The development of a mining activity for which an EA applies is exempt from assessment against a local government planning scheme under the SP Act and therefore, there are no applicable local government development approvals for activities on the mining lease.

A development approval for an MCU under the SP Act is likely to be required for rail and other corridor infrastructure components of the project located outside the mining lease. A development approval for a MCU under the relevant local planning scheme (SP Act) would be administered by the BRC with state interests coordinated under SARA.

4.2 Environmental management plans

The AEIS provided draft environmental management plans (EMPs) for all components of the project. When finalised, the EMPs will become the key reference documents converting the undertakings and recommendations of the EIS and AEIS into actions and commitments to be implemented during all project phases. The finalised EMPs will include site specific:

- environmental management strategies, actions and procedures to be implemented to mitigate adverse environmental and social impacts
- monitoring, reporting and auditing requirements
- the entity responsible for implementing proposed actions
- timing of actions and reporting
- corrective actions if monitoring indicates that performance requirements have not been met.

The draft EMPs and associated sub-plans will be need to be refined and expanded, during the detailed design phase of the project in consultation with the relevant advisory agencies, incorporating additional project information to ensure environmental impacts are managed appropriately. Effective implementation of the EMPs will satisfy the commitments made by the proponent in the EIS and AEIS. Proponent commitments are listed in Appendix 5 of this report.

For the purpose of approvals required for the project, there are two categories of EMPs:

(a) the EM plan—specifically required under the EP Act for the environmental authority (EA) for mining activities.

(b) Other EMPs—for construction and operation of components of the project that are not subject to the EA including the portion of the rail alignment and other supporting infrastructure outside the mining lease.

The proponent's EMP framework is summarised in Table 4.2.

Table 4.2 Environmental management plan framework proposed in the AEIS

Environmental management plan framework
EM Plan required for the EA for mining activities
• Draft Environmental Management Plan structure – Air Quality Management Plan – Water resources ° Water Management Plan ° Surface Water Management Plan ° Groundwater Management Plan ° Waterways Management Plan ° Erosion and Sediment Control Management Plan • Noise and Vibration Management Plan – Waste management ° Waste Management Plan ° Acid Mine Drainage Management Plan ° Hazardous Materials Waste Management Plan ° Coal Rejects Management Plan ° PAF Management Plan ° Tyre and Rim Management Plan • Rehabilitation and decommissioning – Rehabilitation Management Plan – Decommissioning Management Plan – Mine Closure Plan • Land resources – Topsoil Management Plan – Erosion and Sediment Control Management Plan – Weed and Pest Animal Management Plan • Nature conservation – Biodiversity Offset Management Plan – Conservation Management Plan – Threatened Species Management Plan – Weed and Pest Animal Management Plan
Other EMPs proposed for the project
• Environmental matters- MNES – MNES Management Plan – Migratory Species Management Plan – Threatened Species Management Plan – Biodiversity Offset Management Plan – Water Management Plan – Surface Water Management Plan – Groundwater Management Plan – Waterways Management Plan • Transport – Transport Management Plan

Environmental management plan framework

- Road Users Management Plan
- Safety
  - Risk Management Plan
  - Emergency Response Management Plan
  - Communication Management Plan
  - Dangerous Goods and Hazardous Substances Management Plan
  - Bushfire Management Plan
  - Fire Management Plan
- Community
  - Social Impact Management Plan
  - Community and Stakeholder Engagement Plan
  - Cultural Heritage Management Plan
  - Landholder Management Plan and Land Access Agreements
  - Make Good Agreements
  - Land Acquisition Plan
  - Enquiries and Complaints Management Plan
    - Complaint and Dispute Resolution Procedures, Good Neighbour Policy
- Housing and Accommodation Plan
- Workforce Management Plan
  - Fit for Work (Drug and Alcohol) and (Fatigue Management) Policies
  - Accommodation Village Behaviour Policy
  - FIFO Workforce Family Support Plan, Mining Family Support Group
  - Workforce Quarantining Employees with Communicable Disease
- Local Employment Policy
- Employee Training and Development Plan
- Indigenous Training Programs
- Graduate Support Program
- Traineeship and Apprenticeship Programs
- Local Industry Participation Plan
  - Local Content Plan
  - Procurement Policy

5. Matters of national environmental significance

5.1 Introduction

As described in section 3.3 of this report, the project is eligible for assessment under the bilateral agreement between the Commonwealth and the Queensland Government. The Coordinator-General has conducted an environmental impact statement (EIS) process that meets the requirements of Commonwealth and Queensland legislation. This chapter presents the findings of the Coordinator-General's assessment on matters of national environmental significance (MNES).

5.2 Project assessment and approvals

On 18 May 2010, the proponent referred the project (EPBC 2010/5496) to the then Commonwealth Minister for Environment, Heritage and the Arts, now the Minister for the Environment, for a determination as to whether the project would constitute a 'controlled action' with respect to potential significant impacts on MNES under section 75 of the EPBC Act.

On 16 June 2010, a delegate of the Commonwealth Minister for the Environment determined that the project is a 'controlled action' under the EPBC Act. The relevant controlling provisions under the EPBC Act at that time were:

- sections 18 and 18(a) listed threatened species and communities
- sections 20 and 20(a) listed migratory species.

The EPBC Act was amended in June 2013 to include as an MNES water resources in relation to coal seam gas and large coal mining developments. The *Environment Protection and Biodiversity Conservation Amendment Act 2013* (EPBC Amendment Act) commenced on 22 June 2013 to allow the impacts of proposed coal seam gas and large coal mining developments on water resources to be comprehensively assessed at a national level.

On 17 October 2013, the Commonwealth Minister for the Environment decided that water resources would be a controlling provision for the project under item 23 of Schedule 1 of the EPBC Amendment Act. The new controlling provision under the EPBC Act was sections 24D and 24E—protection of water resources from coal seam gas development and large coal mining development.

On 3 December 2013, the proponent requested a variation to the referred project under section 156A of the EPBC Act. The variation involved the removal of the underground mining under and south of Sapling Creek and removal of the diversions of Sapling Creek, Dead Horse Creek and Tallarenha Creek. The variation was considered likely to lessen the impact to MNES. It reduced the impact on threatened species, migratory birds and surface water as surface disturbance and water course profile changes were considered to be reduced. It was considered that the impact on groundwater would be

reduced as the underground mining footprint is reduced. On 24 December 2013, the Commonwealth accepted the variation to the proposed action under section 156B of the EPBC Act.

This section of the report addresses the requirements of the TOR and Queensland Government's assessment as specified by Schedule 1 of the 'Bilateral agreement between the Commonwealth and the State of Queensland under Section 45 of *the* EPBC Act relating to environmental assessment' and Part 13 of the *State Development and Public Works Organisation Regulation 2010*.

The controlled action will be considered for a decision under section 133 of the EPBC Act as to whether the project can proceed, once the Minister has received the Coordinator-General's EIS evaluation report (prepared under section 35 of the SDPWO Act).

5.3 Description of proposed action

The project consists of three open-cut pits, one underground longwall operation and a mine infrastructure area on the mining lease and an off-lease infrastructure corridor. The proposed project disturbance area footprint includes 3690 ha for the open-cut mining operation, 4570 ha of underground mining area and 885 ha of associated mine infrastructure. These figures will be refined during the detailed design phase. The Biodiversity Offsets Plan (BOP) provides offsets for an impact of 6370 ha for the open cut mine and infrastructure and 5150 ha for the underground mine. The impact predictions in the section are based on those included in the BOP.

The underground operation will utilise the retreating longwall extraction method with panels being 350m wide and up to 5 km in length. Subsidence depressions develop at the surface above underground mines as the roof strata above the mined coal seam progressively collapse to fill the void created by the extraction of coal in the area behind the longwall. Vertical subsidence impact is estimated between 1.5m to 4.2m.

A full project description can be found at section 4 of the project's EIS and sections 1 and 2 of volume 1 of the AEIS. Figure 2.1 and Figure 2.2 in this report show the regional location of the project and the disturbance footprint of the mine layout and infrastructure corridor.

5.4 Listed threatened species and ecological communities (section 18 & 18A)

This section provides an assessment of listed threatened species and communities and the potential impacts of the project.

In deciding whether or not to approve the proposal under the EPBC Act, and what conditions to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with:

- Australia's obligations under:
  - The Biodiversity Convention

  - Convention on the Conservation of Nature in the South Pacific (Apia Convention)
  - Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan or threat abatement plan.

The minister also must, in deciding whether to approve the taking of the action, have regard to any approved conservation advice for the species or community.

The objectives of the Biodiversity Convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources. The convention promotes environmental assessment, such as the EIS process I have coordinated for this project, to avoid and minimise adverse impacts on biological diversity.

I consider that the potential impacts on listed threatened species and communities will be reasonably avoided, minimised and mitigated by the measures committed to by the proponent and recommendations and conditions I have made in this report. Conditions include disturbance limits for the project activities and funding for research to identify measures to manage and mitigate impacts. The proponent has proposed a biodiversity offset plan to compensate for residual impacts. In addition, I have recommended conditions for latter approvals for a biodiversity offset plan and MNES management plans to be developed and implemented. I have recommended a condition in Appendix 2, Section 1, Condition 1 and Condition 2 that the proponent's plans must be consistent with relevant recovery plans, threat abatement plans and conservation advices. With these conditions I consider that the proposed project is not inconsistent with the Biodiversity Convention, CITES or the Apia Convention.

5.4.1 Recovery plans and threat abatement plans

The EPBC Act lists species and communities considered to be threatened. Their recovery is promoted using recovery plans, conservation advice, threat abatement plans and the EPBC Act's assessment and approval provisions. There are two recovery plans and five approved conservation advice documents for species that are known or likely to occur in the project area. There are seven threat abatement plans that list species that occur or are likely to occur in the project area that may be impacted by the threat. The application of the plans and advices for each species are discussed in relevant sections below. The goals of these plans and advices, and the objectives and actions to achieve the goals, are summarised in Appendix 7 of this report. The relevant plans and advice documents for this project are:

Recovery Plans

- *Queensland Brigalow Belt Reptile Recovery Plan 2008-2012* (Richardson, 2006)
- *National Recovery Plan for the Black-throated Finch Southern Subspecies* (Black Throated Finch Recovery Team, 2007)

Conservation advices

- *Brigalow (Acacia harpophylla dominant and co-dominant) ecological community Approved Conservation Advice* (Department of the Environment, 2013)

- *Geophaps scripta scripta (Squatter Pigeon (southern)) Approved Conservation Advice.* (Department of the Environment, 2008)
- Approved Conservation Advice for *Denisonia maculata* (Ornamental Snake) (Department of the Environment 2014)
- Approved Conservation Advice for *Furina dunmalli* (Dunmall's Snake) (Department of the Environment 2014)
- Approved Conservation Advice for *Egernia rugosa* (Yakka Skink) (Department of the Environment 2014)

Threat abatement plans

- *Threat Abatement Plan for Predation by Feral Cats* (Department of Environment, Water, Heritage and the Arts 2008)
- *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs* (Department of Environment, Water, Heritage and the Arts 2005)
- *Threat Abatement Plan for Predation by the European Red Fox* (Department of the Environment, Water, Heritage and the Arts 2008)
- *Threat Abatement Plan for Competition and land degradation by rabbits* (Department of the Environment, Water, Heritage and the Arts 2008)
- *Reduction in impacts of tramp ants on biodiversity in Australia and its territories* (Department of the Environment and Heritage 2006)
- *Threat Abatement Plan for the biological effects, including lethal toxic ingestion, caused by cane toads* (Department of Sustainability, Environment, Water, Population and Communities 2011)
- *Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (Department of Sustainability, Environment, Water, Population and Communities 2012).

5.4.2 Methodology and habitat mapping

Methodology of assessment

A combination of desktop assessments and field surveys were conducted by the proponent to determine existing terrestrial ecological values, including MNES for the project area. The details of the methodology are provided below.

Desktop searches

A desktop assessment of the ecological values of the study area was undertaken in 2010 to inform the EIS. A review of Commonwealth and State databases of relevance to the assessment of matters protected under the EPBC Act included:

- EPBC Act—Protected Matters Search Tool
- DEHP—Wildlife Online database (WildNet)
- Birds Australia—Bird Atlas data
- Queensland Museum—database search

The desktop assessment identified 13 listed threatened fauna species, 6 listed flora species and 3 Threatened Ecological Communities (TECs) as potentially occurring in the project area and within a 50 km buffer beyond the project boundary.

Survey effort

Extensive fauna and flora surveys to ground truth the desktop assessment were undertaken across the project site between March 2009 and November 2012 and under different seasonal conditions (wet season and dry season). The surveys were conducted to provide a thorough assessment of the total biodiversity occurring on site, identify and describe vegetation communities and terrestrial flora and fauna values and to confirm existing regional ecosystem (RE) mapping for the project area.

Field flora surveys were undertaken within the mine survey area in April and October 2009 and within the infrastructure corridor area in May/June and September 2011. Surveys included community–level vegetation assessments and targeted searches on foot for threatened species within specific habitats.

Fauna surveys were conducted within the mine area from 14–19 October 2009, 26 April – 3 May 2010 and 30 October 2012 – 4 November 2012 and within the infrastructure corridor from 18 May – 1 June 2010. Surveys sampled all major fauna habitats present within the project area represented by six broad categories:

- Brigalow woodland on cracking clays
- Eucalypt woodland with grassy ground cover
- Eucalypt woodland with a low mixed shrub layer (including Callitris)
- Eucalypt woodland with spinifex (Triodia spp.) ground cover
- Lancewood woodland on stony soil
- Paperbark woodland.

Field survey timeframes and coverage comprised:

- 11–14 March 2009: Active searches for birds and other fauna during a pilot survey
- 14–19 October 2009 (dry season): Trapping surveys in mine area targeting all fauna groups
- 26 April – 3 May 2010 (wet season): Trapping surveys in mine area targeting all fauna groups
- 18 May – 1 June 2011 (dry season): Trapping surveys in infrastructure area targeting all fauna groups
- 18–21 September 2011: Active searches for birds during vegetation survey
- 30 October 2012 – 4 November 2012: Trapping surveys targeting all fauna groups at three additional sites. Bats were surveyed using harp traps and Anabat recordings at seven additional sites

Field surveys, conducted according to best practice sampling and methodologies. The type and timing of field surveys contributing to the EIS and the AEIS is detailed in Table 5.1. Details of flora and fauna survey methods are in Appendix N of the EIS.

Table 5.1 Summary of field surveys relevant to MNES

Survey method	March 2009 (EIS)	Oct. 2009 (EIS)	Apr. 2010 (EIS)	May 2011 (EIS)	Sept. 2011 (EIS)	Nov. 2012 (AEIS)	Targeted species
Pit-fall buckets	-	150 trap-nights	150 trap-nights	180 trap-nights	-	48 trap – nights	Small snakes, skinks, geckos, legless lizards, dragons, frogs, small rodents and dasyurid mammals
Funnel traps	-	120 trap-nights	120 trap-nights	240 trap-nights	-	72 trap-nights	As per pit-fall buckets, plus larger snakes, goannas and dragons
Elliot traps	-	625 trap-nights	500 trap-nights	584 trap-nights	-	240 trap-nights	Small terrestrial mammals
Harp traps	-	4 nights	4 nights	8 nights	-	3 nights	Microchiropteran bats
Anabat detector	-	60 hours	36 hours	72 hours	-	48 hours	Microchiropteran bats
Spotlighting	-	7.5 person-hours	15 person - hours	6 person -hours	1.5 person -hours	20 peron-hours	Nocturnal reptiles, frogs, arboreal mammals, macropods and nocturnal birds.
Target searches and opportunistic sightings	40 person hours	100 person-hours	100 person - hours	80 person -hours	80 person hours	76 person -hours	Birds, larger mammals, diurnal lizards, large snakes, calling frogs.
Quaternary Flora Survey	567 sites (IC)	272 sites (MLA)	-	-	-	-	Ground-truth vegetation types and confirm the location of vegetation map unit boundaries across the project area.
Secondary Survey Sites	16 Sites	-	-	4 Sites	2 Sites	-	Flora species and vegetation units present within the project area

Aquatic ecology field surveys were conducted in April 2010 and in July 2011. Sampling aimed to survey macroinvertebrates, macrocrustaceans, fish and aquatic macrophyte communities, aquatic habitats and in-situ water quality monitoring.

Aquatic ecology field survey methods included:

- macroinvertebrate sampling (using a sweep net)
- backpack electrofishing
- fyke netting
- seine netting
- bait trapping
- completion of AUSRIVAS habitat assessment field sheets
- monitoring using a multi-parameter water quality meter.

Details of surface aquatic ecology survey methods are in Appendix O of the EIS.

Occurrence of MNES

Likelihood of occurrence

The likelihood of occurrence for individual MNES flora and fauna species was undertaken for the EIS. The likelihood was evaluated using an assessment of habitat requirements and species distribution. Four categories of likelihood of presence were assigned as follows:

- species considered 'unlikely to occur' were those where there are no local (i.e. within the range of the species ability to move/disperse) records of the species and the project site contains no suitable habitat
- species considered 'possible' in the area were those where either
  - suitable habitat or local records were present, or
  - potential habitat was widespread but specific habitat features were absent, and extensive targeted surveys did not reveal the presence of the species, or
  - suitable habitat was present but very limited in extent, and targeted surveys did not reveal presence of the species.
- species determined 'likely to occur' were where there were both local records and suitable habitat for the species.
- species listed as "recorded" in the project area.

Threatened species and communities not addressed as MNES

Protected matters not included in the assessment are the koala (*Phascolarctos cinereus*), the brigalow scaly foot (*Paradelma orientalis*) and wattle shrub (*Acacia ramiflora)*. The koala was listed as vulnerable under the EPBC Act after the project was designated a controlled action. Accordingly, koala impacts do not need to be assessed for this project. The fauna surveys conducted confirmed koalas in the project area. The EIS estimates that 3582 ha of koala habitat will be removed by the project. The koala has been assessed as a bioregional significant species under the NC Act in section 6.1.2 of this report, rather than a MNES. The brigalow scaly foot and *Acacia ramiflora* were included in the EIS and assessed as threatened species under the EPBC Act by the proponent. These species were removed from the threatened species list under the EPBC Act on 29 April 2013 and 2 April 2014, respectively. As these species are no longer listed as threatened under the EPBC Act there is no requirement to address these as MNES under the EPBC Act in this assessment.

5.4.3 Threatened ecological communities

Desktop assessments indicated listed Threatened Ecological Communities (TECs) under the EPBC Act considered to be potentially present within the project area are:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC)—endangered
- Natural Grasslands in the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC)—endangered
- Weeping Myall Woodlands—endangered.

Field surveys were undertaken in the mine survey area, including MLA 70453, the infrastructure corridor and a buffer area. The surveys confirmed that the Natural Grasslands TEC and Weeping Myall Woodlands were not present and that 576 ha of Brigalow TEC was present in the survey area.

Brigalow

Description

The Brigalow (*Acacia harpophylla dominant and co-dominant*) TEC was nationally listed under the EPBC Act as endangered on 4 April 2001 and remnant and regrowth forms of this community are protected under the EPBC Act. This ecological community was listed because it had severely declined (to approximately 10 per cent of its former area) following extensive clearing in both Queensland and New South Wales for agricultural use. Threats to the remaining Brigalow TEC include factors that may further reduce its extent or cause a decline in condition. Threats and risks include clearing, fire, weeds, feral animals, inappropriate grazing and climate change.

The Brigalow TEC consists of dense shrublands or woodlands of *A. harpophylla,* usually with a diverse mid-storey of softwood species, and occasionally emergent eucalypts. Under the EPBC Act, regrowth that is 15 years old is included within the Brigalow TEC, because it generally possesses a structure and species composition similar to remnant Brigalow TEC.

Survey results

Two REs listed as Brigalow TEC occur in remnant form within the MLA and infrastructure corridor areas within the larger field survey area. The REs observed within these areas are:

- RE 11.3.1—*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains (145 ha)
- RE 11.4.8—*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (36 ha).

Project impacts

The project components have been positioned to avoid impacts to the Brigalow TEC in the MLA and infrastructure corridor, except for 8.81 ha of remnant Brigalow which will be cleared in the proposed infrastructure corridor, and an additional 1.92 ha which is growing above proposed longwall panels located on the western edge of the underground mine.

A total of 8.32 ha of RE 11.4.8 and 0.49 ha of RE 11.3.1 will be cleared for the project. Both of these are Brigalow communities within the same regional-scale broad vegetation group 25a: open-forests to woodlands dominated by *A. harpophylla* sometimes with *C. cristata* on heavy clay soils.

Conservation advice, recovery plans and threat abatement plans

There is no recovery plan for the Brigalow TEC. The *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community*

lists the threats to the community as clearing, introduction of buffel grass increasing the risk of fire, invasion of weeds including introduced grasses, succulents and climbing weeds, feral animals destroying young plants and disturbing soil. The proponent has committed to implement mitigation measures to address these threats.

The Brigalow community was listed as endangered on the basis of extensive clearing. Most remnants of the community now occur as fragments. It is desirable to establish connectivity between remnants and associated vegetation to promote the conservation of faunal values in the ecological community. The conservation advice contains priority actions to protect and conserve remnant and regrowth areas and conduct research to understand how to restore and reclaim degraded Brigalow communities. I have recommended a condition of approval for a contribution to a pool of funds to facilitate the development and implementation of research programs to manage the impacts on EPBC Act listed communities. The program must be consistent with the relevant conservation advice including the *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community.*

Mitigation measures

The proponent has committed to mitigation measures to minimise the impact on remnant Brigalow TEC near impact areas including:

- minimising or avoiding land clearing, where practicable
- where it is not practicable to avoid land clearing then undertaking vegetation clearing in accordance with mitigation measures aimed to minimise the potential impacts on protected species and communities including establishing buffer zones around areas of Brigalow TEC where clearing is adjacent to these areas
- rehabilitating disturbance areas throughout the life of the project in accordance with a Rehabilitation Management Plan (RMP)
- monitoring reference sites to allow a comparison of the development and success of the rehabilitation against a control to indicate the condition of surrounding un-mined areas that the rehabilitated disturbance area will aim to replicate
- periodic monitoring of rehabilitation areas by independent, suitably qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas
- assessing plant establishment, growth, diversity and cover
- conducting annual reviews of monitoring data to assess trends in the selected parameters in the rehabilitation area and monitoring program effectiveness to demonstrate progress towards a stable non-polluting, safe and self-sustaining ecosystem
- preparing and implementing a Mine Rehabilitation and Closure Plan to direct land rehabilitation during and after the operational life of the mine
- re-establishing vegetation cover with a view to creating self-sustaining ecosystems similar to surrounding ecosystems
- ensuring proponent employees and contractors are made aware of environmental obligations and compliance requirements through the site induction program.

I note that the proponent's EM Plan requires the preparation of a RMP to manage and monitor progressive rehabilitation to a stable landform with self-sustaining vegetation cover and ecosystems similar to surrounding ecosystems with only native species used for revegetation. Conditions need to be included in the final draft EA that will detail rehabilitation objectives, timing and performance criteria for each of the mine rehabilitation domains.

Offset

The proponent's proposed offset approach is to locate Brigalow TEC offsets with equivalent REs within parts of the project area that are not identified for development. The proponent has committed to the South Galilee Coal Project Biodiversity Offsets Plan (SGCP BOP). The BOP is discussed further in section 5.6 of this report.

The proponent proposes to protect Brigalow TEC within the offset area through a nature refuge agreement secured under the Queensland's NC Act. The proponent's proposed offset area contains 171.08 ha of remnant Brigalow based on the proponent's field-verified RE mapping. This consists of 143.09 ha of RE 11.3.1 and 27.99 ha of RE 11.4.8. Table 5.2 lists the REs, impact areas and offset areas proposed for the residual impact on Brigalow TEC.

Table 5.2 Areas of impact and offsets for Brigalow TEC

Description	EPBC Act status	Impact area surface impacts (ha)	Impact area potential subsidence impacts (ha)	Offsets area (ha)
RE 11.3.1—*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	0.49	1.92	143.09
RE 11.4.8—*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Endangered	8.32	0	27.99
Total Brigalow TEC	Endangered	8.81	1.92	171.08

BioCondition assessments indicated that the current condition of Brigalow within the offset area exceeded that found within the impact area.

Based on the pre-European extent and distribution of vegetation communities (data from the Queensland Department of Environment and Heritage Protection, version 8 of the certified Regional Ecosystem map), it is estimated that approximately 870.75 ha of broad vegetation group 25a will regenerate in the non-remnant pastures in the offset site that once supported Brigalow prior to clearing. Of this regrowth, 97.5 ha already possess a foliage projective cover greater than six per cent, a benchmark used in the Galilee Basin Offset Strategy as representing functioning regional ecosystems when rehabilitated.

Regrowth of other regional ecosystems will serve to improve connectivity between fragments of Brigalow, as well as acting as buffer zones around these.

The SGCP BOP involves:

- the exclusion of cattle, control of weeds and fire, and improved connectivity between woodland fragments to improve the quality of existing remnants
- land formerly cleared of Brigalow and now being maintained as open pasture through recurrent clearing will be protected from future clearing and allowed to return to a Brigalow ecological community.

The proponent proposes to manage the non-remnant pasture to allow it to regenerate towards high-value regrowth and, ultimately, remnant vegetation. The proponent has a high level of confidence in its rehabilitation strategy as the ability of Brigalow to naturally recover after clearing is well-documented and supported by scientific data.

The proponent proposes to rehabilitate non-remnant pastures and exclude cattle from all Brigalow communities to improve the condition of existing remnants as many species are eaten by domestic livestock grazing affecting recruitment of shrubs and trees in Brigalow ecological communities. If this rehabilitation is successful it should result in improved connectivity, patch size and patch context of existing remnants, which will benefit the dispersal of native fauna, and improve stability of the overall community.

Fires are thought to have been naturally infrequent in Brigalow woodlands, although most of the dominant species in this community are tolerant of mild to moderate-intensity fires. Brigalow communities may be impacted by altered fire regimes in the project area. The proponent has committed to monitor offset sites to determine if fire suppression is required as a management measure to promote rehabilitation of non-remnant Brigalow.

Management of weeds is important for remnant Brigalow and re-establishment of regrowth to prevent weed invasion and associated habitat degradation and increased fire risk.

The proponent has committed to implement measures to mitigate the intrusion of weed species into remnant vegetation due to edge effects, control weed species, implement weed management measures, conduct weed monitoring and reporting and prepare a Weed and Pest Animal Management Plan (WPAMP) to manage pests and weeds during both the construction and operation phases of the project. I require a condition to be included in the final draft EA to setting completion criterion that any weed infestations are controlled and managed to control or eradicate weed species.

These proposed management measures for the offset site were assessed using the Commonwealth Government's Offset Assessment Guide, and their total offset gains were combined to generate an assessment of the overall benefits of the SGCP BOP on the Brigalow TEC. The benefit to the Brigalow TEC of the SGCP BOP is estimated to be 4783.8 per cent of the total impact of the project.

Coordinator-General's conclusion

I have recommended a condition of approval to the Commonwealth Environment Minister for the development of a Biodiversity Offset Plan (BOP) outlining how offsets to address the residual impacts of clearing Brigalow TEC will be managed, monitored and legally secured. The BOP is to be submitted to the Minister for approval at least three months prior to the commencement of mining operations and is to be consistent with the Galilee Basin Strategic Offset Strategy.

The offset area must be legally secured within two years of commencement of the specific component of the action that causes the residual impact on the Brigalow TEC. I have further recommended that within three months of identifying the offset area, the proponent must submit an offset area management plan for approval by the Commonwealth Minister and implement the plan.

The impacts of the project will be confirmed and refined during the final design phase of the project and predicted areas of Brigalow TEC clearance may change. Therefore, I have recommended a condition setting a maximum disturbance area for Brigalow TEC at 8.81 ha and a further 1.92 ha from subsidence impacts. Should detailed design result in a reduced area of land clearance for Brigalow TEC, I expect the proponent to detail these changes in the BOP.

I have also recommended a biodiversity funding condition for the proponent to contribute to a pool of funds for the better protection and long-term conservation of the EPBC Act listed threatened communities including the Brigalow TEC. The Minister for the Environment has conditioned this biodiversity funding for other projects in the Galilee and I recommend that it be applied to this project to address the conservation and recovery of the Brigalow TEC.

5.4.4 Threatened flora

No aquatic or terrestrial flora species listed as threatened under the EPBC Act were recorded or considered 'likely to occur' in the project area. Those species listed under the EPBC Act as 'possible' or 'unlikely to occur' are:

- two-nerved wattle (*Acacia deuteroneura*)
- Ooline (*Cadellia pentastylis*)
- silver kurrajong (*Commersonia argentea*)
- king blue-grass (*Dichanthium queenslandicum*)
- short-leaved milk-vine (*Micromyrtus rotundifolia*).

Table 5.3 outlines the status, likelihood and the assessment of each species.

Table 5.3 Threatened flora species and likelihood in project area

Scientific name	Common name	EPBC Act status	Likelihood of occurrence	Assessment
Acacia deuteroneura	Two-nerved wattle	V	Possible	No local records from specimen or observation-backed databases were present in project area. Known records 70 km south of the project area. Areas of similar habitat north of the recorded area may contain the species. It is considered possible that this species occurs within the project area.
Cadellia pentastylis	Ooline	V	Possible	No local records from specimen or observation-backed databases were present. It is possible that the species occurs on sandstone ranges or hills and lowlands on metamorphic rock within the project area.
Commersonia argentea	Silver kurrajong	V	Unlikely	All species records are from the south Brigalow Belt region. This species is not believed to occur or have suitable habitat within the project area.
Dichanthium queenslandicum	King Blue-grass	V	Unlikely	This species occurs mostly on black clay soils. It could potentially be found in RE 11.4.8 within the project area, although this is unlikely as there are no records this far inland. This species is not believed to occur within the project area.
Marsdenia brevifolia	Short-leaved Milk-vine	V	Unlikely	This species has been recorded north of Bogantungan, approximately 65 km east of Alpha. It is typically located in dry eucalypt forests on steep rocky slopes. While dry eucalypt forests are common within the project area, most areas are not rocky. Although this species is not considered likely to occur, there is possible habitat in the western portion of the SGCP area.

Likelihood of Occurrence: Unlikely = Habitat not present and no local records. **Possible** = Suitable habitat or local records were present; or where potential habitat was widespread but specific habitat features were absent and extensive targeted surveys did not reveal the presence of the species or where suitable habitat was present by very limited in extent and targeted did not reveal the presence of the species
Status: V = vulnerable

The EPBC Act listed threatened flora species listed as 'possible' or 'unlikely' to occur in the project area are not considered further in my assessment, as there is a low probability they will be affected by the project based on their habitat requirements and absence of local records.

5.4.5 Threatened fauna

The EIS assessment confirmed that one fauna species listed as threatened occurs in the project area and concluded that five species are likely to occur, four species as possibly occurring and two species as unlikely to occur in the project area. The confirmed species was one specimen of the brigalow scaly foot species caught in the

April 2010 survey. It was the first record of the species in the local area. At the time the species was listed as Vulnerable under the EPBC Act and was assessed in the EIS. As the species was delisted in April 2013 no assessment of this species is included in this report.

The species name, status under EPBC Act, likelihood of occurrence and field assessment of the remaining listed species are contained in Table 5.4.

Table 5.5 provides a summary of impacts associated with the project on potential habitat for threatened fauna species likely to occur in the project area based on suitable habitat within the project disturbance footprint.

Table 5.4 Threatened fauna species and likelihood in project area

Species scientific name	Species common name	EPBC Act status	Likelihood	Assessment
Neochmia ruficauda ruficauda	Star finch (sth)	V	Unlikely	No local records from specimen or observation-backed databases were present. The species is uncommon in the local area, rarely detected and unlikely to occur in the project area. An inhabitant of open native grasslands and woodlands, particularly those associated with watercourses. Buffel Grass (non-native) (*Cenchrus ciliaris*) infestations and grazing of wetland edges in the project area renders habitat unsuitable.
Rostratuls australis	Australian painted snipe	V	Possible	No local records from specimen or observation-backed databases were present. Little or no suitable habitat (ephemeral wetlands with emergent aquatic vegetation) for this species in most years in the project area. During years of extreme rainfall the species may use the area but it is unlikely that the area is significant for the species.
Rheodytes leukops	Fitzroy River turtle	V	Unlikely	No local records from specimen or observation-backed databases were present. Permanent water is absent from Alpha Creek in the project area or nearby. It is unlikely that this species will occur.
Dasyurus hallucatus	Northern quoll	E	Possible	No local records from specimen or observation-based databases were present. Suitable habitat is present within the project area and it is therefore possible that this species occurs within the site, despite a lack of local records. The nearest records are from the Carnarvon Range, 120 km south of the project area.
Nyctophilus corbeni	South-eastern long-eared bat	V	Possible	No local records from specimen or observation-based databases were present. Suitable habitat is present within the project area and it is therefore possible that this species occurs within the site, despite a lack of local records. The nearest publicly available record of this species is west of Taroom, 320 km away.

Species scientific name	Species common name	EPBC Act status	Likelihood	Assessment
Delma torquata	Collared delma	V	Possible	No local records from specimen or observation-based databases were present. Suitable habitat is present within the project area and it is therefore possible that this species occurs within the site, despite a lack of local records. The nearest record of this species is at Blackdown Tableland National Park, 250 km east of the project area.
Denisonia maculata	Ornamental snake	V	Likely	The project area is within the known distribution of the Ornamental Snake and there is high quality habitat within the project area.
Egernia rugosa	Yakka skink	V	Likely	The project area contains likely or known habitat for the Yakka Skink. The nearest record of this species is from Bogantungan, 60 km from the project area.
Furina dunmalli	Dunmall's Snake	V	Likely	Ideal habitat for this species is present within the project area. It is therefore considered likely that the species may occur, despite the lack of local records.
Geophaps scripta scripta	Squatter pigeon	V	Likely	No local records from specimen or observation-backed databases were present. The closest record of this species is approximately 70 km from the project area. Suitable habitat for the species is widespread in both remnant and non-remnant habitats. Local populations are probably small and/or only utilise the project area sporadically. This species is likely to occur in the project area in a transient capacity.
Poephila cincta cincta	Black-throated finch (sth)	E	Likely	Surveys did not detect black-throated finch (BTF) within the project area. Survey methods detected other finches and were adequate for detecting the BTF, if it was present. The species inhabits a variety of remnant vegetation types with native grassy understories. BTF require nearby permanent water sources for breeding sites. Potential habitat exists and is widespread in the project area. It is likely that low densities of BTF may utilise the site in a transitory capacity. BTF has been sighted at the Bimblebox Nature Refuge, 25 km north-west of the infrastructure corridor survey area. The BTF population at the Carmichael Coal project site, 160 km to the north is considered to be the largest known population in Australia.

Likelihood of Occurrence: Likely = Both local records and suitable habitat for the species is present. **Possible** = Suitable habitat or local records were present; or where potential habitat was widespread but specific habitat features were absent and extensive targeted surveys did not reveal the presence of the species or where suitable habitat was present by very limited in extent and targeted did not reveal the presence of the species. **Unlikely** = Habitat not present and no local records.
Status: E = endangered, V = vulnerable at the time of the SGCP's "controlled action" determination.

Table 5.5 Impacts on potential habitat for threatened fauna species

Species common name	Species scientific name EPBC Act	EPBC Act status	Description of high-quality habitat within the project area	Area of high-quality habitat impacted	
				To be cleared (ha)	Possible subsidence (ha)
Squatter Pigeon	*Geophaps scripta scripta*	V	All remnant vegetation	592.68	1080.19
Ornamental Snake	*Denisonia maculata*	V	Remnant eucalypt-dominated vegetation within 1 km of semi-permanent water	25.54	1.92
Dunmall's Snake	*Furina dunmalli*	V	Seasonally inundated, clay soils (regional ecosystems 10.3.3b, 11.3.1 and 11.4.8)	800	1080.19
Black-throated Finch (sth)	*Poephila cincta cincta*	E	All remnant vegetation	144.39	226.22
Yakka Skink	*Egernia rugosa*	V	Remnant vegetation within 3 km of semi-permanent water	800	1080.19

EPBC Act Status: V – Vulnerable, E – Endangered, M - Migratory

Squatter pigeon

Description

The Squatter Pigeon is listed as 'vulnerable' under the EPBC Act and Queensland's NC Act. This species is patchily distributed through Queensland. It is commonly observed in more open areas of dry eucalypt woodland on sandy soil dissected by low gravelly ridges, close to permanent water. It is also observed in open forest on the inland slopes of the Great Dividing Range, stretching from the Burdekin-Lynd divide to scattered sites in South-East Queensland. The current population of the subspecies is estimated to be stable at around 40 000 breeding birds.

The Squatter Pigeon is a ground-dwelling bird that is locally nomadic and forages on insects, ticks, fallen grass seeds, herbs and shrubs. The breeding season generally occurs from late winter through summer. The Squatter Pigeon breeds in a scrape in the ground lined with dry grass. Movement is restricted as this species is ground dwelling and flies to nearby trees only when flushed or for courtship.

The main identified threats include habitat degradation and ongoing clearance of habitat for development purposes or farming, grazing of habitat and predation by feral cats (*Felis catus*) and foxes (*Vulpes vulpes*).

Project impacts

All areas of the mine footprint could be considered potential habitat for the Squatter Pigeon. The project will clear 592 ha of remnant vegetation within 3 km of semi-permanent water, which is considered to be high quality habitat for the species. A further 1080 ha could be impacted by subsidence impacts of the project's underground mining.

Habitat loss due to reduction of water availability and clearing of vegetation for the project may impact the species' distribution. Reduction in water retention in Tallarenha Creek due to cracking and subsidence induced by longwall mining could impact on Squatter Pigeons dependent on the creek as a water source. The exclusion of livestock from the mine site and the surrounding offset area will also result in removal of artificial water for livestock and a subsequent source of water for this and other threatened species and migratory birds.

As the species is ground dwelling and nesting it is vulnerable to predication from dogs, cats, foxes and pigs. Management of these pest species would be required to minimise impacts. Increased project traffic and damage to nests and young birds by machinery during clearing could increase injury and death of birds. Mitigation measures committed to by the proponent to avoid or minimise these impacts are discussed at the end of this section and net habitat benefits from the proposed SGCP BOP are outlined in section 5.6 of this report.

Conservation advice, recovery plans and threat abatement plans

There is no recovery plan for the squatter pigeon (southern). The *Geophaps scripta scripta (Squatter Pigeon (southern)) Approved Conservation Advice* details the main identified threats as ongoing clearing of habitat, grazing of livestock and feral herbivores and predation, especially by feral cats and foxes. Proponent mitigation measures should focus on addressing identified threats to the species.

Priority actions in the conservation advice to support the recovery of the species include implementing the recommendations identified in the *Threat Abatement Plan for Predation by Feral Cats* and the *Threat Abatement Plan for Predation by the European Red Fox*. The threat abatement plans for feral cats and foxes discuss a range of control methods including baiting, shooting, trapping, habitat management, biological control and fertility control.

Other priority actions include managing threats to areas of vegetation that support populations of the species and implementing plans for the control or eradication of feral herbivores. The *Threat Abatement Plan for Competition and land degradation by rabbits* is relevant to this threat to the species. Rabbits have direct impacts on native flora and fauna by grazing on native vegetation and preventing regeneration and well as competing with the species for food and shelter.

The Squatter Pigeon may also be adversely affected by the red imported fire ant (*Solenopsis invicta*) which has been identified as one of the six priority tramp ant species that are invading Australia and increasing their population at the expense of other species. The *Threat Abatement Plan to Reduce the impacts of tramp ants on biodiversity in Australia and its territories* (tramp ant TAP) is relevant to the Squatter Pigeon. The impact of the tramp ant can displace native species and disrupt ecosystem processes including pollination and seed dispersal. The tramp ant TAP has been developed to address these threatening processes by preventing entry and advancement of the species into new areas. The use of construction machinery and import of building and construction materials to the mine site has the potential to

introduce pest animals such as the red imported fire ant. I require the proponent to address this TAP as part of its commitment to develop and implement a WPAMP.

Ornamental snake

Description

The Ornamental Snake is listed as 'vulnerable' under the EPBC Act. Its habitat requirements are woodlands and open forests containing brigalow (*Acacia harpophylla*), gidgee (*Acacia cambagei*), blackwood (*Acacia argyrodendron*) or coolabah (*Eucalyptus coolabah*) communities or pure grassland associated with gilgais or wetlands. Micro-habitat features include coarse woody debris such as fallen timber as well as rocky areas and deep soil cracks. It is endemic to Queensland.

During the day, the species shelters under fallen timber, coarse woody debris, rocks, bark and in deep soil cracks on gilgai mounds, particularly during dry periods. At night, the species forages near water, almost exclusively on frogs.

Known threats include habitat loss and fragmentation caused by land clearing for mining and roads, habitat degradation by caused by feral pigs and overgrazing by stock, alteration of water quality and increase of aquatic weeds reducing food source of frog population, poisoning from eating cane toads and predation by feral species.

Project impacts

The project will clear 25.54 ha of high-quality habitat suitable to the species to accommodate the open-cut mine and associated infrastructure. As the species seeks shelter under logs and in soil cracks during the day they are vulnerable to direct injury and death from machinery during clearing of the 25 ha. As Brigalow TEC will be avoided in the project area, with 8 ha to be cleared, impacts on the Ornamental Snake in this habitat are expected to be limited.

The Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles, states that clearing two or more hectares of 'important habitat' or altering water quality or quantity affecting four or more hectares of important riparian habitat is classified as a high risk of significant impact on the ornamental snake.

Small stands of Brigalow TEC will be fragmented by clearing for the 100m wide infrastructure corridor. The corridor could constitute a barrier to the movement of the species and fragmentation of its habitat. Vehicles on the service road along the corridor could result in road strike and mortality. The proponent considers that with the implementation of mitigation measures the corridor should not constitute a barrier to movement and road strike can be minimised.

Increase in pest animals caused by the project could cause mortality. Predation by feral animals including cats and dogs is a potential threat to the species. The increase of cane toad populations due to increases in pooled water caused by project activities are a threat as the Ornamental Snake can be poisoned after injecting the toad. Other impacts of pest animals include degrading suitable habitat by wallowing wild pigs.

Other mitigation measures committed to by the proponent to avoid or minimise impact on threatened species are discussed at the end of this section and net habitat benefits from the proposed SGCP BOP are outlined in section 5.6 of this report.

Conservation advice, recovery plans and threat abatement plans

The *Queensland Brigalow Belt Reptile Recovery Plan* includes the Ornamental Snake. The overall recovery objective of the plan is to secure and improve the long-term survival of the species and their key habitat, and to raise awareness of reptile conservation issues within the community. I note that the proponent has committed to raise awareness of reptile conservation issues by educating staff as part of the induction process and training on fauna avoidance will be provided to all staff.

Of the management practices recommended in the recovery plan for the continued survival of reptiles, the proponent has committed to a WPAMP to manage the impact of feral animals and invasive weeds. Invasive aquatic weeds are a threat to the Ornamental Snake as they choke waterways and reduce the quality of frog breeding habitat which results in the reduction of the snake's food source.

There is no recovery plan for the Ornamental Snake. The *Approved Conservation Advice for Denisonia maculata (Ornamental Snake)* details the main identified threats as land clearing and habitat degradation from human development, destruction of wetland and frog habitat by feral pigs and the potential threat of poisoning from eating cane toads. Proponent mitigation measures should focus on addressing identified threats to the species. Priority actions to support the recovery of the species include implementing the recommendations identified in relevant recovery plans. Actions in the conservation advice to support the recovery of the species include controlling introduced pests such as pigs, implementing management plans for the control of cane toads and establishing conservation arrangements or reserve tenure in population areas of high conservation priority.

The *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs* sets out the national framework to guide the coordination of the objectives and actions considered necessary to manage the environmental damage by feral pigs to species and ecological communities. The presence of feral pigs on the site was recorded in the project area and was assessed as having the potential to cause serious environmental harm through habitat degradation and vegetation damage and are a major risk to threatened species including the Ornamental Snake.

The proponent has committed to undertake vertebrate control activities for feral pigs, wild dogs and feral cats in consultation with landholders and local authorities in accordance with relevant best practice management guidelines and the LP Act. In addition waste items attractive to wild animals will not be allowed to accumulate outside designated animal proof fenced areas. Employees and contractors will be made aware of environmental obligations and compliance requirements of these mitigation measures through the site induction program.

The *Threat Abatement Plan for the biological effects, including lethal toxic ingestion, caused by cane toads* is relevant to the Ornamental Snake. The use of construction

machinery and import of building and construction materials to the mine site has the potential to introduce pest animals such as cane toads. An increase in pooled water due to ground subsidence caused from underground mining may provide breeding habitat for cane toads.

I require the proponent to address these TAPs as part of its commitment to develop and implement a WPAMP.

Dunmall's snake

Description

Dunmall's Snake is listed as 'vulnerable' under the EPBC Act. Its habitat requirements are woodlands and shrublands generally dominated by Brigalow (*Acacia harpophylla*), other Wattles (*A. burowii*, *A. deanii*, *A. leioclyx*), native Cypress (*Callitris* spp.) or Bull-oak (*Allocasuarina luehmannii*). All remnant and non-remnant habitats are considered important habitat. They shelter under fallen timber and ground litter during the day.

Known threats include extensive clearing of habitat for development (mining and urban), agriculture or pasture improvement, extensive overgrazing of habitat by domestic stock, loss of fallen timber and ground litter, invasion of habitat by predatory animals and introduced weeds.

Project impacts

The project will clear 800 ha of high quality habitat and have a possible impact on another 1080 ha due to subsidence. There is a risk of direct mortality of individuals during clearing of fallen timber and ground litter for project activities. The 100m wide infrastructure corridor will bisect the habitat for Dunmall's Snake and cause a barrier to movement of the species. In addition, vehicles on the service road along the corridor could result in road strike and mortality. Other impacts include the introduction of weeds by project vehicles into the species habitat as they cause increased fire fuel loads or alter the habitat of prey species.

The proponent has committed to prepare a Threatened Species Management Plan (TSMP) which will include specific mitigation and management measures to address predicted impacts on threatened species and their habitats. Measures which will minimise the impact on the habitat for Dunmall's Snake include:

- managing remnant vegetation through exclusion of stock
- pest animal management to minimise the threat of feral cats and foxes killing snakes
- revegetating cleared areas that do not form part of the operational mine such as the edges of the infrastructure corridor
- fire regime management including precautions such as clearing fire breaks between coal stockpiles to avoid ignition of native vegetation from spontaneous combustion of coal, and restricting cigarette smoking and the dumping of rubbish in areas of vegetation
- restricting unnecessary vehicle movement and speed limits to reduce possible fauna strike and death

- exclusion of cattle from waterways and remnant vegetation to prevent and habitat degradation.

The TSMP will contain the proposed monitoring and reporting timeframes for management of Dunmall's Snake to facilitate auditing of environmental performance measures.

As the snake shelters under fallen timber and ground litter, the proponent has committed to use fauna spotter-catchers to relocate the individual snakes, should they be found prior to and following to clearing activities, during the construction phase.

Further mitigation measures committed to by the proponent to avoid or minimise impact on threatened species are discussed at the end of this section and net habitat benefits from the proposed SGCP BOP are outlined in section 5.6 of this report.

Conservation advice, recovery plans and threat abatement plans

The *Queensland Brigalow Belt Reptile Recovery Plan* includes Dunmall's Snake. The overall recovery objective of the plan is to secure and improve the long-term survival of the species and their key habitat, and to raise awareness of reptile conservation issues within the community. There is no recovery plan for Dunmall's Snake.

The *Approved Conservation Advice for Furina dunmalli (Dunmall's Snake)* lists the possible threats to the species as past broadscale land clearing, habitat modification, drainage of swamps and predation by feral animals. The plan contains priority actions for recovery and threat abatement to support the recovery of Dunmall's Snake. They include managing disruptions to water flows, baiting for feral animals and placing conservation arrangements or covenants on private land to manage habitat. The *Threat Abatement Plan for Predation by Feral Cats* and the *Threat Abatement Plan for Predation by the European Red Fox* are listed as relevant to the species.

The proponent has committed to manage pest animal species in the proposed project area which would include the management of foxes and feral cats. This is considered to be not inconsistent with the 2013 *Threat Abatement Plan for Predation by the European Red Fox: Five Yearly Review* and 2008 *Threat Abatement Plan for Predation by Feral Cats*.

Black Throated Finch

Description

The southern subspecies of the Black-throated Finch (BTF) is listed as 'endangered' under the EPBC Act and 'vulnerable' under the Queensland NC Act.

Its habitat requirements are riparian areas within open eucalypt, acacia or melaleuca forest and woodlands and occasionally tussock grasslands. The BTF occurs in the Townsville region and at scattered sites in central-eastern Queensland, including the proposed Carmichael mine site 160 km to the north. The species requires a mosaic of different habitats in which it can feed on fallen grass seed and obtain water daily.

The Significant Impact Guidelines for the BTF note that the BTF requires access to three key habitat resources, being water sources, grass seeds and trees providing

suitable nesting habitat. The presence and configuration between and within these three key resources governs the distribution of the BTF. Any disruption to the connectivity between these resources will have a serious impact on an area's ability to sustain BTF populations.

BTF can breed all year, however breeding activity peaks in February and May. They nest in loose colonies in trees and shrubs. The movement patterns on this species are poorly understood, however the finch may undertake some movements prompted by food availability in response to rainfall or drought.

Project impacts

The BTF was not detected in any of the project's ecological surveys. Potential habitat is located in the west of the mining lease along Alpha Creek and within the infrastructure corridor. The EIS concluded that the large expanses of non-remnant vegetation within the mining area are not suitable as habitat for the BTF. The project will result in 144 ha of potentially high-quality BTF habitat and 229 ha of remnant vegetation being cleared within the infrastructure corridor and a further 226 ha of habitat possibly being impacted by subsidence caused by the underground mine. The removal of trees will reduce the available nesting sites and increase direct mortality if clearing occurs during breeding season from February to May. Any loss of water retention in Tallarenha Creek or its headwaters due to cracking and subsidence by longwall mining could impact populations.

Other potential project impacts on BTF include increase in predation by feral cats, fire regimes reducing the availability of grass seeds, and the spread of exotic grasses, such as Buffel Grass, degrading potential BTF habitat.

The EIS concluded that artificial lighting and changes to noise and air quality as a result of the project are not anticipated to have significant direct impacts on the BTF as activities are located away from potential habitat.

Mitigation measures committed to by the proponent to avoid or minimise impact on BTF are discussed at the end of this section and net habitat benefits from the proposed SGCP BOP are outlined in section 5.6 of this report.

Conservation advice, recovery plans and threat abatement plans

The *National Recovery Plan for the Black-throated Finch Southern Subspecies* lists possible threats to the species as clearing and fragmentation of woodland, riverside habitats and wattle shrub land; degradation of habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability; and alteration of habitat by changes in fire regime; invasion of habitat by exotic weed species, including exotic grasses; illegal trapping of birds; predation by introduced predators; and hybridisation with escapees of the northern subspecies. The plan contains actions to protect and enhance existing habitat, understand the importance of threats and verify the subspecies decline.

The plan identifies that proper management of habitat for the BTF is critical to the survival of the species, including managing overgrazing, clearing and fragmentation appropriately and implementing suitable fire and weed management strategies. The

proponent has committed to these measures being implemented through the WPAMP, Fire Management Plan and a TSMP.

There are two relevant TAPs for the BTF. They are the *Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (grasses TAP) and the *Threat Abatement Plan for competition and land degradation by rabbits* (rabbits TAP).

The grasses TAP has been developed to address threatening processes of ecosystem degradation, habitat loss and species decline due to introduced gamba grass (*Andropogon gayanus*), para grass (*Urochloa mutica*), olive hymenachne (*Hymenachne amplexicaulis*), and mission grass (*Cenchrus pedicellatus* syn. *Pennisetum pediccellatum*). It provides a framework for prioritising investment in threat abatement and identifies management and other actions required to ensure the long-term survival of native species and ecological communities affected by these grasses.

The goal of the grasses TAP is to minimise the adverse impacts of the introduced grasses on affected native species and ecological communities. I require the proponent to address this TAP as part of their commitment to develop and implement a WPAMP.

The rabbits TAP establishes a national framework to guide and coordinate Australia's response to the impacts of rabbits on biodiversity. It identifies the research, management and other actions needed to ensure the long-term maintenance of native species and ecological communities affected by competition and land degradation caused by rabbits.

Rabbits have direct impacts on native flora and fauna by grazing on native vegetation and thus preventing regeneration, and by competing with native fauna for food and shelter. They also have indirect and secondary effects, such as supporting populations of introduced cats and foxes, denuding vegetation and thereby exposing fauna species to increased predation, and digging and browsing leading to a loss of vegetation cover and consequent slope instability and soil erosion.

The goal of the rabbits TAP is to minimise the impact of rabbit competition and land degradation on biodiversity in Australia and its territories by protecting affected native species, broad-scale vegetation and ecological communities, and preventing further species and ecological communities from becoming threatened. As rabbits were recorded in the project area I require the proponent to address the objectives and actions of the rabbit TAP in the development of the project's WPAMP.

Yakka Skink

Description

The Yakka Skink (*Egernia rugosa*) is listed as vulnerable under the EPBC Act. This species was not detected during fauna surveys for the project. The species grows up to 40 cm long, lives in small colonies and is often associated with rocks, fallen timber, tree stumps, root cavities and abandoned animal burrows. It has been recorded in habitat ranging from sand plains to rocky outcrops in open dry sclerophyll woodland or forest and brigalow forest to open shrubland. The species is known to excavate deep burrow

systems and can inhabit cleared environments if suitable shelter structures are available.

Project impacts

The mine footprint will clear 800 ha of remnant vegetation which represents potential habitat for the species. During clearing, the species will be vulnerable to direct injury or death as their shelter sites in hollow logs, rabbit warrens, and rock piles are moved by machinery. The construction of the 100m wide infrastructure corridor will bisect potential habitat. The proponent does not consider that the cleared corridor will be a barrier to movement or increase the threat to road mortality of the Yakka Skink.

Subsidence which may be caused by underground mining may result in adverse impacts on a further 1080 ha of high-quality potential habitat.

Mitigation measures committed to by the proponent to avoid or minimise impact on threatened species are discussed at the end of this section. The residual impacts of habitat clearing and indirect impact of subsidence are addressed by the net habitat benefits from the proposed SGCP BOP outlined in section 5.6 of this report.

Conservation advice, recovery plans and threat abatement plans

The *Queensland Brigalow Belt Reptile Recovery Plan* includes the Yakka Skink. Key threats to the Yakka Skink identified in the draft *Queensland Brigalow Belt Reptile Recovery Plan* include predation by feral cats and foxes, destruction of burrows by trampling stock and feral pigs and inappropriate fire regimes. There is no recovery plan for the Yakka Skink. The *Approved Conservation Advice for Egernia rugosa (Yakka Skink)* provides direction to implement priority actions and mitigate against key threats. The advice lists the main identified threats as past broad scale clearing and habitat degradation. Other threats include roadside management, removal of wood debris and rock microhabitat features, ripping of rabbit warrens and predation by feral animals.

Prioirity actions listed in the conservation advice to support the recovery of the species include:

- discouraging the removal of fallen logs, leaf litter and rocks from known habitat sites,
- ensuring road construction activities do not adversely impact on known populations
- implementing management plans for control of foxes and feral cats
- implementing suitable fire management strategies for the habitat of Yakka Skink.

As the project area contains potential habitat for the Yakka Skink I require the proponent to address the conservation advice actions in the development of the WPAMP, Fire Management Plan and the TSMP.

Listed species that are possible to occur

The proponent's investigations concluded that the Northern Quoll (*Dasyurus hallucatus*), South-eastern Long-eared Bat (*Nyctophilus corbeni*), Collared Delma (*Delma torquata*) and Australian Painted Snipe (*Rostratula australis*) are species that may occur in the project area. Following is a brief discussion on each.

Northern Quoll is listed as endangered under the EPBC Act. It inhabits forest or woodland with rocky areas and complex vegetation structure in a variety of vegetation types including: eucalypt forest and woodlands, rainforests, sandy lowlands, shrub lands and grasslands. While it was not recorded in the project area, it is still possible that this species may utilise the area undetected.

South-eastern Long-eared Bat is listed as vulnerable under the EPBC Act. The preferred habitat of the bat is inland woodland vegetation dominated by eucalypt and bloodwood species as well as box, ironbark and cypress pine woodlands. Loose bark, fissures and hollows on trees afford roosting habitat. This species was not recorded during the fauna surveys.

Collared Delma is listed as vulnerable under the EPBC Act. It is endemic to Queensland. The preferred habitat is Eucalypt-domionated woodlands and open forests. Clearing of habitat and habitat degredation through grazing by livestock threatens the species. Other threats include predation by feral cats and foxes. While this species was not recorded during the fauna surveys, suitable habitat is present within the project area and it is therefore possible that this species occurs within the site.

Australian Painted Snipe was listed as vulnerable under the EPBC Act at the time of the project's referral. It is also listed as a migratory species under the EPBC Act. It inhabits and forages in ephemeral and permanent shallow freshwater wetlands and inundated grasslands, and the artificial habitats of sewage ponds and dams. This species has a scattered distribution throughout Queensland and south-eastern Australia.

The EPBC Act listed threatened fauna species discussed above that may possibly occur in the project area are not considered further in my assessment as they are unlikely to be affected by the project. Mitigation measures committed to by the proponent to avoid or minimise impact on threatened species are discussed at the end of this section and I require that these measures be applied to these species should they be found on site during project activities.

Listed species that are unlikely to occur

The two listed species from the region determined as unlikely to occur in the project area are Fitzroy River Turtle (*Rheodytes leukops*) and Star Finch (sth) (*Neochmia ruficauda ruficauda*). They are described briefly below.

Fitzroy River Turtle is listed as vulnerable under the EPBC Act. It is found in rivers with large deep pools. Threats include egg predation and nest destruction and habitat modification. This species was not recorded during the fauna surveys. Permanent water was absent from Alpha Creek in the project area or nearby and the EIS concluded that it is unlikely that this species would occur in the impact area.

Star Finch is listed as endangered under the EPBC Act. It inhabits damp grasslands, sedgelands or grassy woodlands near permanent water or regularly inundated areas. It was not recorded during field surveys, nor are there records in proximity to the project area. The presence of Buffel Grass and grazing by livestock of wetland edges makes

the habitat within the impact area unsuitable and therefore unlikely that the species will occur in the project area.

The EPBC Act listed threatened fauna species discussed above that are considered unlikely to occur in the project area are not considered further in my assessment as they are unlikely to be affected by the project. Mitigation measures committed to by the proponent to avoid or minimise impact on threatened species are discussed below and I expect that these measures be applied to these species should they be found on site during project activities.

Project mitigation measures

Proponent commitments to mitigate impacts on threatened species include:

- fauna spotter-catchers will be used to relocate any fauna species of conservation significance prior to clearing activities during the construction phase
- clearing will occur in one direction through the vegetation, to allow fleeing animals to disperse into adjacent habitat
- hollow-bearing trees will be inspected for fauna prior to felling
- reducing new cane toad breeding opportunities by minimising the creation of additional small waterbodies suitable for cane toad breeding. These include ponding areas, roadside ditches and flood channels.
- vehicles will use designated light or heavy vehicle roads on-site wherever practicable, and speed limits will be adhered to
- reduced speed limits will be implemented near waterways to reduce the potential for transient fauna to be impacted by vehicle movements
- Vehicle movements along the infrastructure corridor will be managed and limited to daylight hours to minimise road strike of fauna
- any road kills will be reported to the project's environmental supervisor
- project employees and contractors will be made aware of environmental obligations and compliance requirements through the site induction program
- project employees will be notified of the potential presence of threatened and/or near threatened species and instructed to temporarily cease clearing if any species of conservation significance are observed.

The proponent has committed to develop and implement a TSMP for the project. The TSMP will include specific mitigation and management measures to address predicted impacts on threatened species and communities. Measures include:

- remnant vegetation in the project area will be managed for biodiversity values, including implementation of an appropriate fire regime, pest animal and weed management and exclusion of stock
- revegetating cleared areas that do not form part of the operational mine including infrastructure corridor edges
- staged rehabilitation and revegetation of overburden as the mine operational life progresses in areas that are no longer being mined

- fire regime management including precautions such as clearing fire breaks between coal stockpiles to avoid ignition of native vegetation from spontaneous combustion of coal, and restricting cigarette smoking and the dumping of rubbish, particularly glass, in areas of vegetation
- where practicable, restricting unnecessary vehicle movement during and following rainfall
- exclusion of cattle from waterways and remnant vegetation to prevent fouling and habitat degradation.

The TSMP will contain the monitoring and reporting timeframes for management of each threatened species impacted on by the project to facilitate auditing of environmental performance measures.

Coordinator-General's conclusion—listed threatened species and ecological communities

I have concluded that significant adverse residual impacts are likely on MNES for:

- the threatened ecological community:
  - Brigalow (*Acacia harpophylla*) dominant and co-dominant
- threatened species:
  - Ornamental Snake (*Denisonia maculata*)
  - Squatter Pigeon (southern) (*Geophaps scripta scripta*)
  - Dunmall's Snake (*Furina dunmalli)*
  - Black-throated Finch (*Poephila cincta cincta)*
  - Yakka Skink (*Egernia rugosa*).

I have recommended a condition of approval to the Commonwealth Environment Minister for the development of a BOP by the proponent outlining how offsets to address the residual impacts of the project on the TECs and the five threatened species will be managed, monitored and legally secured.

I have recommended a condition setting a maximum disturbance area for habitat removal. I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and may change. Should detailed design result in changes to habitat removal, I expect the proponent to detail these changes in the BOP.

I have also recommended a condition for biodiversity funding for the proponent to contribute to a pool of funds for the better protection and long-term conservation of the EPBC Act listed threatened species including the Ornamental Snake, the Yakka Skink, the Black Throated Finch, Dunmall's Snake and Squatter Pigeon. The Minister for the Environment has conditioned this biodiversity funding for other proponent's projects in the Galilee Basin. I recommend that it be applied to this project commensurate with the scale of impacts.

5.5 Listed migratory species (sections 20 & 20A)

In deciding whether or not to approve the proposal for the purpose of section 20 or 20A of the EPBC Act, and what conditions to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the following conventions and agreements:

- The Bonn Convention
- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA)
- an international agreement approved under subsection 209(4) of the EPBC Act.

5.5.1 Migratory birds

An assessment of migratory species potentially occurring within the project area and a 50 km buffer was undertaken comprising desktop searches, field surveys and a likelihood of occurrence analysis. The EPBC Act Protected Matters Search Tool identified ten listed migratory species as potentially occurring in the project area. Table 20-4 in the EIS contains details of the description, habitat and likelihood of occurrence for each migratory species listed for the project area. Of these, two migratory species were recorded within the project site and seven migratory species were concluded to have a 'possible' likelihood of occurrence. The Australian Cotton Pygmy-goose (*Nettapus coromandeliance albipennis*) was identified as 'likely' to occur in the project area. However, the species has been delisted as a migratory species so there is no requirement to address it as MNES under the EPBC Act in this or any future assessment. Migratory species which were confirmed present during field surveys are discussed below.

Species known to occur

Two migratory species were identified within the project area. They are the Rainbow Bee-eater (*Merops ornatus*) and the Eastern Great Egret (*Ardea modesta*).

Rainbow bee-eater

The Rainbow Bee-eater (Merops ornatus) is a migratory bird protected under the JAMBA. The species is common and widespread across Australia, utilising most habitats except extensive rainforests and treeless plains. The majority of the global population breeds in Australia from August to January.

Proponent surveys of the project area revealed that the species is a common spring-summer breeding visitor to the region. They were recorded during the November 2012 survey. Locations where the species was recorded are shown in Figure 5 of the EIS.

Rainbow Bee-eaters inhabit a broad range of vegetation communities, including open woodlands, shrublands and cleared pastoral land. They are aerial foragers of flying insects. They breed in burrows dug into sandy ground, creek banks, disturbed sites such as roadside cuttings, quarries, gravel pits and mines. The species also nests in sandy woodlands where burrows are constructed into level ground. Pairs may breed singly, or as part of larger colonies in optimal habitat. Colonies were not observed

during the 2012 survey, but portions of the project area with sandy soils are likely to offer potential breeding habitat.

The Rainbow Bee-eater inhabits a range of habitat types throughout the project area including remnant and non-remnant vegetation. All vegetation types within the project area provide potential foraging habitat for the species.

Project impact and mitigation measures

The primary impact of the project on the Rainbow Bee-eater is through the clearing of potential foraging and breeding habitat. Table 5.6 indicates the area of habitat to be cleared and the area likely to be subject to subsidence impacts.

Table 5.6 Rainbow Bee-eater habitat impacts

Habitat Type	Description	Area to be Cleared (ha)	Area Subject to subsidence (ha)
Breeding habitat	All remnant vegetation in land zones 3 and 5	770.61	992.45
High-value feeding habitat	All remnant vegetation in other land zones	30.12	87.75
Low-value feeding habitat	Non-remnant pastures	6369.66	5150.11

As this species utilises a broad range of habitats and all remnant vegetation, impact could be extensive in areas to be cleared in the project area. Excavating open pits and stocking waste rock may increase the availability of nesting sites, while conversely increasing the susceptibility of nest disturbance as a result of ongoing project activities.

Large areas of suitable remnant habitat will remain in areas that would not be disturbed by mining. Impacts on this species may be mitigated by timing works in and around watercourses to avoid breeding times of September to February and to deploy fauna spotter-catchers to search for nest burrows in stream banks when works during this period cannot be avoided.

Conservation advice, recovery plans and threat abatement plans

The only identified threat to the rainbow bee-eater is cane toads reducing reproductive success by preying on eggs and chicks. As there is nesting habitat at the site, threats to this species by cane toads are considered possible. The rainbow bee-eater is identified as a species of interest in the *Threat abatement plan for predation by European red fox 2008*. I consider that the proposed proponent mitigation measures, and the recommended conditions relating to the management of pest animals for the proposed approval, are not inconsistent with this threat abatement plan.

Offset

The proposed project offset area contains a combination of breeding habitat, and low- and high-quality feeding habitats for the Rainbow Bee-eater as shown in Table 5.7.

Table 5.7 Rainbow Bee-eater habitat currently within the offset area

Habitat Type	Description	Area Contained in Offsets (ha)
Breeding habitat	All remnant vegetation in land zone 3 and 5	4430.64
High-value feeding habitat	All remnant vegetation in other land zones	3585.73
Low-value feeding habitat	Non-remnant pastures in land zones 3 and 5	13 013.57
	Non-remnant pastures in other land zones	791.35

The proponent's proposed SGCP BOP has three major benefits for the Rainbow Bee-eater:

- Increased protection for existing breeding habitats
- Conversion of non-remnant pastures on land zones 3 and 5 to breeding habitat
- Conversion of non-remnant pastures on other land zones to high-quality feeding habitat.

The Offset Assessment Guide calculated an overall expected gain of the SGCP BOP to the Rainbow Bee-eater as 360.2 per cent of the expected impacts of the project, giving a substantial net gain for the species.

I have recommended a condition of approval to the Commonwealth Environment Minister for the development of a BOP by the proponent outlining how offsets to address the residual impacts of removal of habitat for the Rainbow bee-eater will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and may change. Should detailed design result in changes to habitat removal, I expect the proponent to detail these changes in the BOP.

Eastern Great Egret

The Eastern Great Egret (*Ardea modesta*) is a large heron that inhabits creeks, rivers, farm dams and flooded fields. It is a common waterbird that is found throughout Australia and may occur anywhere its prey (fish, frogs) can be found. The species is listed under the JAMBA, the CAMBA and the Bonn Convention on Migratory Species and is a migratory species protected under the EPBC Act. The conservation status of the total Australian population is of Least Concern.

Eastern Great Egrets breed in large colonies on extensive wetland areas in coastal Northern Territory, the Channel Country and in the Murray-Darling Basin, with smaller colonies in scattered wetlands across the northern and eastern coasts of Australia. The breeding season is variable, depending to some extent on rainfall, but generally extends from November to April, with pairs at southern latitudes breeding in spring and summer (particularly November and December) and pairs at more northerly latitudes breeding in summer and autumn.

When not breeding the species disperses across Australia in search of smaller water bodies around which to forage, inhabiting any fresh or saline water bodies in which

prey is located, including ephemeral pools and farm dams. They forage in shallow water around the margins of water bodies, where they feed primarily on fish.

It was recorded in the infrastructure corridor section of the project area and potential habitat was identified across the project area. During the 2012 survey, one Eastern Great Egret was recorded at a farm dam near Dead Horse Creek. Habitat for the species is limited in extent, due to the paucity of surface water on-site. The project area does not support an ecologically significant population of the species or amount of the species' habitat.

Proponent surveys revealed Eastern Great Egrets to be occasional, non-breeding, visitors to the project area. The EIS predicts only one or two individuals are expected to be on-site in the project area at any one time. No breeding is expected within the region.

Any water bodies in the project area provide potential habitat for the species, especially those containing fish. Habitat is most widespread on-site during limited periods following heavy rain (usually between November-April), which coincides with when the species is likely to be breeding elsewhere. Permanent and semi-permanent water bodies, which provide foraging habitat during the dry season, provide habitat for the species in the project area.

While the ephemeral nature of most of this habitat makes estimating the extent and value of habitat on-site difficult, based on aquatic surveys undertaken by the proponent, water bodies considered potential habitat for Eastern Great Egrets were third order streams (lower reaches of Tallarenha and Sapling Creeks), Alpha Creek, and farm dams. All of these contain fish and macroinvertebrates, and all contain at least some pools of water into the dry season.

Project impact and mitigation measures

The project will impact on this habitat by removal of habitat at scattered farm dams. The removal of dams will result in the loss of foraging habitat of approximately 4.6 km of shoreline around dams.

A TSMP will be developed and implemented for the project. The TSMP will include specific mitigation and management measures to address predicted impacts on the Eastern Great Egret. Such measures include exclusion of cattle from waterways and remnant vegetation to prevent habitat degradation.

The TSMP will contain the monitoring and reporting timeframes for management of the species to facilitate auditing of environmental performance measures.

Offset

The amount of foraging habitat contained within the proposed SGCP BOP offset area, estimated by length of shoreline, is 15.61 km, including higher order streams of Alpha Creek (76 per cent of the total shoreline within the offset area). The proponent expects that new habitats may also be created through mine-induced subsidence, but the aerial extent and value of these habitats was not predicted by the proponent in the EIS.

The proponent proposes that the SGCP BOP will benefit the Eastern Great Egret through management measures including the exclusion of livestock from riparian areas and waterholes currently subject to high grazing and trampling pressure from cattle. Grazing along waters edge increases siltation of creeks and waterholes and removes semi-aquatic vegetation growing along shorelines and reduces the diversity and biomass of fish, frogs and crustaceans. The size and shoreline of the water bodies during dry periods is also reduced by cattle drinking at waterholes.

The proponent expects environmental gains with improved water quality within five years of excluding livestock. Proponent surveys indicate that all the water bodies within the offset area currently contain fish and macroinvertebrates which would respond quickly to improvements in habitat quality providing food for the eastern great egret.

The proponent has estimated that the management of the offset area will lead to a net environmental gain for the Eastern Great Egret of 133.7 per cent. I consider that the impact on the Eastern Great Egret is acceptable with the implementation of species mitigation and management measures committed to by the proponent in Chapter 9.16 of the AEIS and the management of the riparian areas and waterholes in the proponent's proposed offset area.

I have recommended a condition of approval to the Commonwealth Environment Minister for the development of a BOP outlining how offsets to address the residual impacts of removal of habitat for the Eastern Great Egret will be managed, monitored and legally secured. I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and removal of farm dams and areas of riparian habitat may change. Should detailed design result in the protection of farm dams, I expect the proponent to detail these changes in the BOP.

Coordinator-General's conclusion—migratory birds

The potential impacts to migratory species known or likely to occur in the project area are predicted to be minor as many of the species are highly mobile and capable of relocating with changes in the availability of suitable habitat. The survey identified the presence of two species – Rainbow Bee-eater and the Eastern Great Egret. In the case of the Rainbow Bee-eater, mining will avoid known breeding areas. The Eastern Great Egret is common around water bodies both in the project area and outside of it. There are no recovery plans in place for those migratory species known or likely to occur in the project area. The project is not expected to substantially interfere with the recovery of migratory species. There are no migratory species where an ecologically important proportion of the population will be impacted.

I am satisfied that the impacts are either minimal or the impacts can be effectively mitigated. It is considered that the project impact on these species will be quite minimal and their visitation is expected to continue. Accordingly, I have not recommended any specific conditions for the Commonwealth Environment Minister for controlling provisions 20 & 20A. However, I have recommended a condition of approval for the development of a BOP. The management of the offset area will address the improvement of habitat areas for migratory birds through destocking and restoration of riparian and aquatic habitats.

5.6 Offsets

In section 20 of the EIS the proponent committed to develop a biodiversity offsets strategy in consideration of the eight principles for the use of environmental offsets under the EPBC Act contained in the then Commonwealth government's Draft Policy Statement: *Use of environmental offsets under the EPBC Act*. The draft policy and its principles was superseded by the *EPBC Act Environmental Offsets Policy* in October 2012.

The proponent's offset assessment and proposals were included in a biodiversity offset strategy in the EIS documentation and a revised biodiversity offset plan in the AEIS, including identification of suitable offset areas adjacent to the project site.

The plan includes MNES-related offsets likely to be required by the Commonwealth Minister for the Environment under the EPBC Act, as presented in Table 5.8.

Table 5.8 Predicted residual impact areas for species and communities listed under the EPBC Act that are known or likely to occur

Environmental value	Area of high quality habitat to be cleared (ha)	Area of high quality habitat potentially impacted by subsidence (ha)	High quality habitat present in offset area (ha)
Black-throated finch *(Poephila cincta cincta)*	144.39	226.22	950.42
Brigalow threatened ecological community *(Acacia harpophylla dominant and co-dominant)*	8.81	1.92	171.08
Dunmall's Snake *(Furina dunmalli)*	800.73	1080.19	8016.41
Ornamental Snake *(Denisonia maculata)*	25.54	1.92	187.29
Squatter Pigeon *(Geophas scripta scripta)*	592.68	1080.19	5922.48
Yakka Skink *(Egernia rugosa)*	800.73	1080.19	8016.41

The EPBC Act *Environmental Offsets Policy* specifies that offsets should be "protected in an enduring way and … the tenure of the offset should be secured for at least the same duration as the impact on the protected matter". The proponent has committed to legally securing land-based offsets following financial close of the project, that is, internal financial approval, with offset areas secured prior to the commencement of on-ground disturbance.

The proponent proposes the offset area to be protected through a nature refuge agreement with the Queensland Government as a class of protected area under the NC Act. The agreement is registrable on title, binding future owners or lessees of the

land, and ensures that gains achieved through the offsets process are maintained in perpetuity, unless exempted by the refuge agreement.

Some of the offset area is contained within a mining lease. The proponent has proposed that under the *Environmental Offsets Act 2014,* this offset area should be protected as an 'Environmental Protection Offset Area'.

In relation to the provision of MNES offsets, I expect the proponent to legally secure land with sufficient offset requirements prior to any project activities that are predicted to adversely impact on any of the species and communities which are to be offset.

5.6.1 Offset proposal

The AEIS presented a revised SGCP Biodiversity Offsets Plan (SGCP BOP) to address the residual impacts on threatened species, their habitats and threatened REs posed by the project. The proponent committed to develop and implement the biodiversity offsets plan to manage the offsetting of cleared significant vegetation communities and deliver a net gain to all environmental values. The proponent committed to develop the plan in line with the objectives of the Commonwealth and State legislation and relevant policies and guidelines in force at the time of the AEIS in March 2014 including:

- *Galilee Basin Offset Strategy*
- *Queensland Biodiversity Offset Policy*
- *EPBC Act 1999 Environmental Offsets Policy.*

The SGCP BOP fulfils the obligations under the *Environmental Offsets Policy.* In accordance with the policy, the SGCP BOP utilises entirely direct offsets and the project's offset area is in close proximity to the impact area as it is located adjacent to the proposed mine. The offset area covers the properties Creek Farm (Real Property Description 4315PH720), Sapling (Real Property Description 3BF53) and Betanga (Real Property Description 31BF11), all of which are outside the footprint of the project.

The offset area includes an extensive riparian vegetation corridor along Alpha Creek serving as an important corridor for the movement of migratory birds. The offset area contains a mixture of remnant Brigalow TEC and non-remnant (cleared) pastures. Through the revegetation of pastures, existing vegetation remnants will be reconnected, and important corridors along Alpha Creek will be joined. A total of 21 853.71 ha is contained within the project offset area. Of these, 8016.41 ha consist of remnant vegetation, and the remainder contain non-remnant pastures.

The net benefits of the SGCP BOP to the three MNES were assessed using the *Offset Assessment Guide*, a balance sheet tool developed by the federal government. These matters were:

- the Endangered Brigalow ecological community
- the migratory Rainbow Bee-eater
- the migratory Eastern Great Egret.

The estimated benefits of the offsets exceed expected losses incurred due to the project. All offsets are direct and land-based.

The increased area, connectivity and quality of habitats on-site will deliver net benefits to MNES species that have not been recorded on-site but are considered likely to occur in the project area, including the Black-throated Finch, Squatter Pigeon, Ornamental Snake, Yakka Skink and Dunmall's Snake. The area of impacted high quality habitat and the area of proposed offset for this habitat is in Table 5.9. The proponent will need to review the SGCP BOP to ensure that any significant residual impacts on these species are adequately addressed in the provided offsets.

Table 5.9 Offsets for MNES that are considered likely to occur in the project area

	Area of high quality habitat (HQH) impacted		Area of high quality habitat (HQH) offset		% of impact offset*	
Species (*scientific name*)	**To be cleared (ha)**	**Possible subsidence (ha)**	**HQH in offset (ha)**	**New HQH to be created (ha)**	**Worst case****	**Best case ****
Black-throated finch *(Poephila cincta cincta)*	144.39	226.22	950.42	3404.07	340.0%	872.7%
Dunmall's Snake *(Furina dunmalli)*	800.73	1080.19	8016.41	13837.32	152.9%	285.8%
Ornamental Snake *(Denisonia maculata)*	25.54	1.92	187.29	975.48	2540.9%	2731.9%
Squatter Pigeon *(Geophas scripta scripta)*	592.68	1080.19	5922.48	11 422.08	365.2%	1303.7%
Yakka Skink *(Egernia rugosa)*	800.73	1080.19	8016.41	13 837.32	152.9%	285.8%

The proponent has committed to commencing the management of the offset land from the day of acquisition and continue to manage the offset area throughout the life of the project. The key management actions to be implemented include:

- all offset areas will be destocked, and perimeter fences maintained to maximise exclusion of domestic livestock from neighbouring properties
- all remnant and non-remnant vegetation will be allowed to passively regenerate across the offsets area. Within 15 years non-remnant vegetation within the area will comprise high-value regrowth linking currently fragmented vegetation remnants and provide important habitat values for many species. The offset management procedures will contain mandates that prevent the clearing of regrowth within the offset area throughout the duration of offsets management.
- fire will be managed to promote natural regeneration and weed control
- management of fire and livestock to halt the spread of weeds and exotic grasses including Buffel grass
- undertake surveys after regrowth has experienced ten years of growth, to determine if, and where, stem densities necessitate selective thinning of dense regrowth to expedite the development of vegetation communities towards natural structural and

vegetative features and reduce the time taken until the regrowth develops structural characteristics of remnant status.

Offset phases

The SGCP BOP focuses on the total offsets package to be delivered as part of the project. Figure 5.1 shows the SGCP impact and offset areas.

The project will be carried out in stages as described in section 2.2.3 of this report. The proponent proposes to deliver the offsets in two phases, corresponding to the stages of mine development. The first phase of offsets shown in Figure 5.2 is for the Epsilon stage, involving residual impacts from open-cut mining and infrastructure areas. Prior to impacts of the Epsilon stage, offset areas contained within the rural properties Creek Farm and Sapling Creek will be procured. Offsets contained within the property Betanga will be added prior to any mine expansion of the project following the Epsilon stage. All offsets will be managed similarly.

The total areas contained within the proponent's proposed offset to be delivered in the two phases are listed in Table 5.10.

Table 5.10 Area of vegetation impacted by Epsilon stage and total project and the offset proposed for each

Mine stage	Area to be impacted by mine (ha)			Area contained within offsets (ha)		
	Remnant vegetation	Cleared pasture	Total	Remnant vegetation	Cleared pasture	Total
Epsilon stage	127.59	1879.18	2006.74	4320.87	9721.92	14 042.79
Entire project	1864.20	9638.84	11 503.04	8016.41	13 837.32	21 853.71

The subset of offsets to be delivered as part of the Epsilon stage of the project is discussed below. The ecological footprint of the Epsilon stage of the project is only 17.4 per cent of the total footprint for the project, while the offsets to be delivered alongside the Epsilon stage constitute 64.3 per cent of the offsets for the total project.

All MNES with a residual impact caused by the Epsilon stage are to be offset prior to commencement of this stage of the project. While there will be no impact on Brigalow TEC in the Epsilon stage the proponent proposes that 137.4 ha of REs 11.3.1 and 11.4.8 will be protected within the offset area and 704.9 ha will be restored from non-remnant pasture to remnant Brigalow. Impact on Eastern Great Egret habitat along 1.3 km of ephemeral (1st-3rd order) drainage lines will be removed. This will be offset by the exclusion of livestock in the Epsilon stage offset area along 52.2 km of ephemeral (1st-3rd order) drainage lines, 6.81 km of Alpha Creek and 19.5 km of watercourses allowing vegetation to regrow to form foraging habitat.

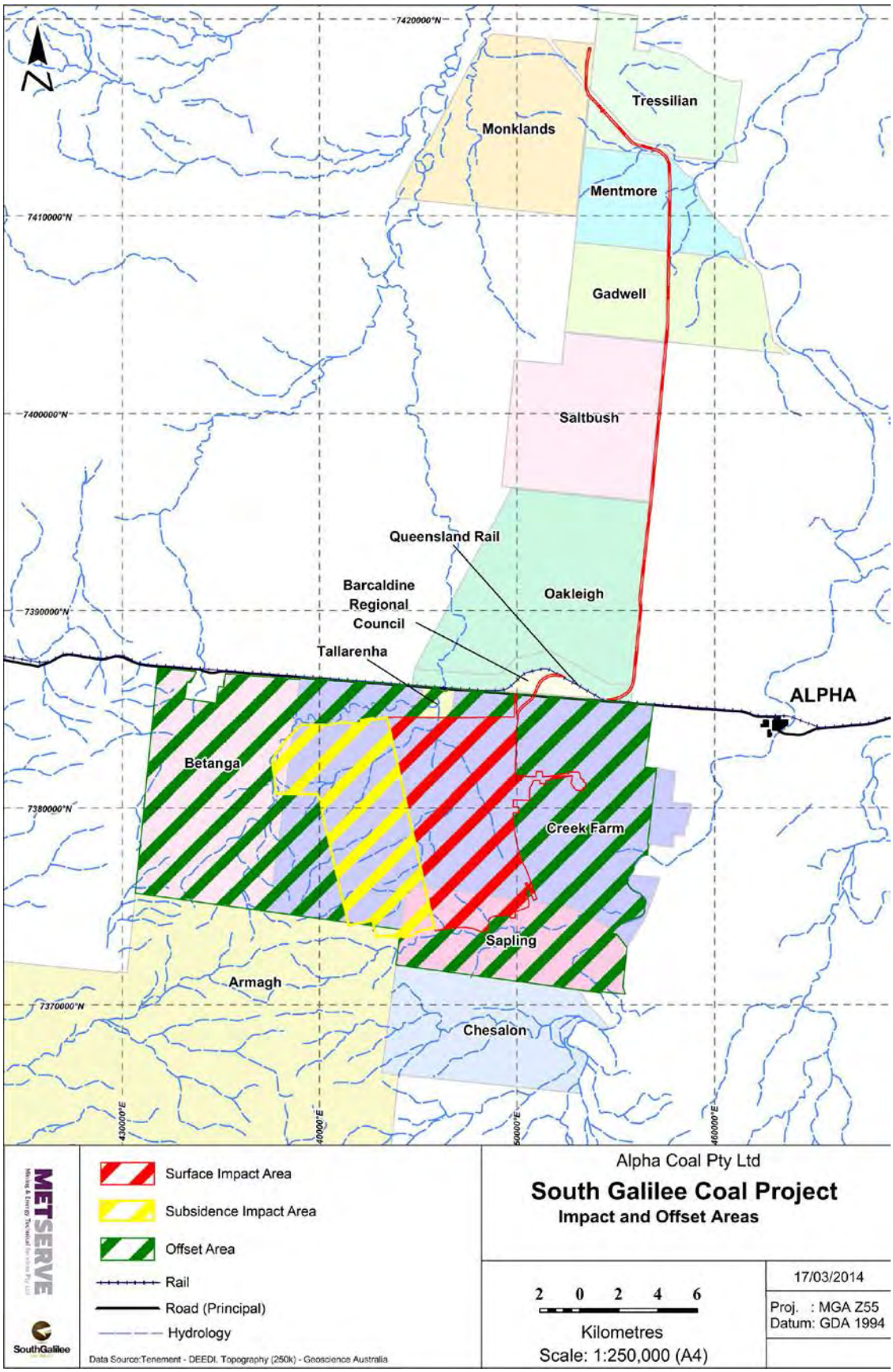

Figure 5.1 South Galilee Coal project- Impact and Offset Areas for total project

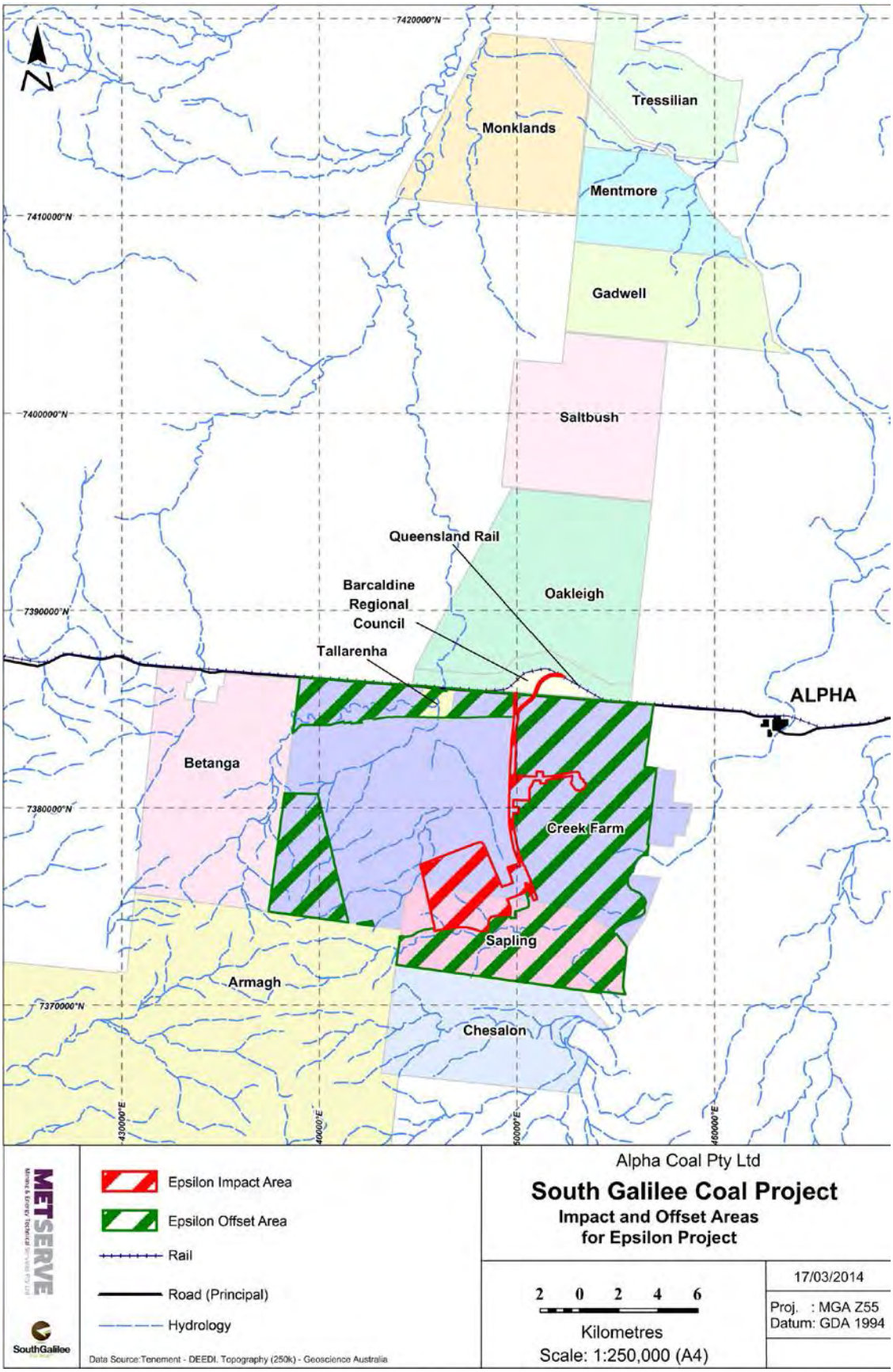

Figure 5.2 South Galilee Coal Project - Impact and Offset Areas for Epsilon stage

Table 5.11 outlines the proposed residual impact and offset areas for MNES and the per cent of impact calculated using the Commonwealth's *Offset Assessment Guide* for the Epsilon stage. A large proportion of the total offsets will be delivered by the time stage 1, 2 and 3 of the SGCP commences.

Table 5.11 Offset assessments for each MNES for the Epsilon stage

Protected Matter	Total Impact (adjusted ha)	Total Offset (adjusted ha)	Per cent of impact offset
Brigalow threatened community	0	n/a	n/a
Rainbow Bee-eater	301.09	6913.68	2296.2
Eastern Great Egret	0.39*	1.56*	400

*For the Eastern Great Egret, impacts and offsets are measured in kilometres of shore rather than hectares of habitat.

Offsets to be delivered prior to the commencement of the Epsilon stage are a subset of the total offset package for the project. The offset area for the Epsilon stage are contained within the Creek Farm and Sapling properties. Offsets for the Epsilon stage are connected to a recognised key north-south linkage corridor. By expanding the total area of this corridor, and linking it to vegetation along Alpha Creek, the value of this high-priority corridor will be enhanced. Table 5.12 contains the extent of remnant vegetation impacted by the Epsilon stage and the offset area proposed for the residual impact.

Table 5.12 Regional ecosystems contained within the impact and offset areas for the Epsilon Project.

Regional Ecosystem	Description	Impact area (ha)	Offset area (ha)
10.3.3b	Acacia harpophylla and/or Eucalyptus cambageana woodland in frequently inundated areas.	4.46	15.34
10.3.12a	Corymbia plena and Corymbia dallachiana open woodland on sandy alluvial terraces.	0	10.83
10.3.14d	Eucalyptus camaldulensis woodland fringing watercourses.	0	5.67
10.3.27a	Eucalyptus populnea woodland on alluvial plains.	5.73	342.48
10.3.28a	Eucalyptus melanophloia woodland on alluvial fans.	17.92	141.00
10.5.1b	Corymbia brachycarpa, Corymbia similis and Corymbia dallachiana open woodland on sand plains.	16.41	125.21
10.5.5a	Eucalyptus melanophloia open woodland on sand plains.	75.04	1,222.59
10.5.10	Corymbia leichhardtii open woodland on sand plains.	0	21.10
10.5.12	Eucalyptus populnea open woodland on sand plains.	2.14	128.32
10.7.3	Acacia shirleyi woodland at margins of plateaus.	0	119.48
10.7.5	Eucalyptus thozetiana open woodland on scarps.	0	7.02
10.7.7b	Melaleuca tamariscina open shrubland on ferricrete.	4.22	91.88
11.3.1	Acacia harpophylla and/or Casuarina cristata open forest on	0	109.41
11.3.19	Callitris glaucophylla, Corymbia spp. and Eucalyptus melanophloia on alluvial plains	0	208.16

11.3.2	Eucalyptus populnea woodland on alluvial plains.	0	226.93
11.3.6	Eucalyptus melanophloia woodland on alluvial plains.	0	119.81
11.3.7	Corymbia spp. woodland on alluvial plains.	0	56.62
11.3.25	Eucalyptus camaldulensis woodland fringing watercourses.	0	103.54
11.4.8	Acacia harpophylla and Eucalyptus cambageana woodland on	0	27.99
11.5.3	Eucalyptus populnea and/or Eucalyptus melanophloia on sand	0	62.79
11.5.5	Eucalyptus melanophloia and Callitris glaucophylla on sand	0.71	223.12
11.5.12	Corymbia clarksoniana woodland on sand plains.	0.94	6.93
11.7.1	Acacia harpophylla and Eucalyptus thozetiana on lower scarp	0	80.06
11.7.2	Acacia shirleyi forest/woodland on lateritic duricrust.	0	131.64
11.10.4	Eucalyptus decorticans, Lysicarpus angustifolius woodland on	0	157.49
11.10.7	Eucalyptus crebra woodland on sandstone.	0	297.04
11.10.13b	Corymbia leichhardtii woodland on sandstone.	0	278.42
Non-remnant pastures		1,879.1	9,721.92
Total		**2,006.7**	**14,042.7**

I consider that the biodiversity offsets can be delivered in stages to compensate for environmental impacts of each mining stage to the level of ecological impacts incurred at each stage.

I am satisfied with the assessment undertaken by the proponent to determine the residual impact and an appropriate offset. I consider that the proposed offsets will deliver a net gain to all matters of state and national environmental significance impacted by the project.

I have recommended a condition for consideration by the Commonwealth Minister for the Environment at that requires the proponent to prepare and submit a BOP to the Minister for approval at least three months prior to commencement of an activity and the activity must not commence before the approval is given in writing by the Minister to the proponent. My recommended condition also requires the BOP to be consistent with the Galilee Basin Strategic Offset Strategy, relevant recovery plans, threat abatement plans, conservation advices and MNES management plans.The condition requires the approval holder to legally secure the minimum offset areas for each environmental value listed in table A1 of the condition within two years of commencement of the specific component of the action.

I have also recommended a condition that details what must be contained in the management plan for each offset area. This plan is to be submitted to the Minister for approval within three months of identifying each offset area and must be implemented.

5.7 A water resource, in relation to coal seam gas development and large coal mining development (sections 24D & 24E)

5.7.1 Independent Expert Scientific Committee advice

In deciding whether or not to approve the proposal for the purpose of sections 24D and 24E of the EPBC Act, and what conditions to attach, the Commonwealth Minister for the Environment must consider if the proposal has or is likely to have a significant impact on a water resource.

Queensland is a signatory to the Council of Australian Governments (COAG) National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development (NPA). The NPA requires coal seam gas or large coal mining development proposals undergoing an environmental impact assessment, and that are likely to have a significant impact on water resources, to be referred to the IESC.

Prior to the inauguration of the statutory committee in November 2012, an interim committee (IIESC) provided advice to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (now DE) on proposed projects. A request for advice was submitted to the IIESC for the project by SEWPaC on 23 May 2012, and advice was provided by the IIESC on 29 June 2012. This advice informed my determination on the scope of additional information to the EIS that I required (refer to section 3.7 of this report).

On 8 July 2014, I submitted to the IESC a joint request for advice (with DE) for the project. This request for advice followed project changes after the EIS lodgement, groundwater modelling revisions and amendments to the EPBC Act requiring the Commonwealth Environment Minister to consider IESC advice for large coal mines and coal seam gas projects. The IESC considered the matter at its meeting of 12-13 August 2014 and provided advice to myself and DE on 14 August 2014.

The IESC advice relates to the following matters:

- groundwater modelling
- subsidence modelling
- water balance modelling
- impacts to water dependent assets
- impacts to the Great Artesian Basin (GAB).

The IESC advice informed my evaluation of the South Galilee Coal Project. My evaluation of each of these matters is contained in this section and detailed in Appendix 6.

5.7.2 Groundwater

The project is situated on the eastern edge of the Galilee Basin in Central Queensland. It is a large geological basin filled with sediment predominantly relating to, or produced by rivers (alluvial and tertiary sediment).

An outcrop of the GAB's lower boundary (known as the Rewan Formation) occurs approximately 15–20 km west of the proposed mine. Figure 5.3 illustrates aquifer connectivity within the Galilee Basin and the GAB.

The GAB is made up of several groundwater aquifers, which are recharged by rainfall infiltration and leakage from streams into outcropping sandstone along the Great Dividing Range to the west of the project. The Clematis Sandstone is the nearest GAB recharge bed to the project. Groundwater flows from these recharge areas toward springs in the west and southwest away from the project.

The low permeability Rewan Formation and the low permeability Bandanna overburden separate the Clematis Sandstone aquifer from the Permian coal seams (D1 and D2 seams), which are to be mined by the project. As a result of the east to west dip of the GAB and underlying formations, this separation is both of a vertical and horizontal nature. Figure 5.4 presents the conceptual groundwater model used for the EIS.

Groundwater is the principal source of water supply for stock watering and human consumption in the area surrounding the project, particularly at Alpha town located approximately 12 km north-east of the project. Alpha town and nearby bores source their water predominantly from aquifers contained within the alluvial and tertiary sediment. The Colinlea Sandstone, located below the project coal seams, also yields fresh water, and supplies at least 21 registered bores nearby to the project. The Bandanna Formation, in which the project coal seams are located, is not regarded to be a significant groundwater source as only limited and minor flows have been encountered.

Figure 5.3 **Location of the Great Artesian Basin, Surat Basin and underlying Bowen and Galilee Basins**

Source: Commonwealth of Australia. 2014. Background review: Aquifer connectivity within the Great Artesian Basin, and the Surat, Bowen and Galilee Basins.

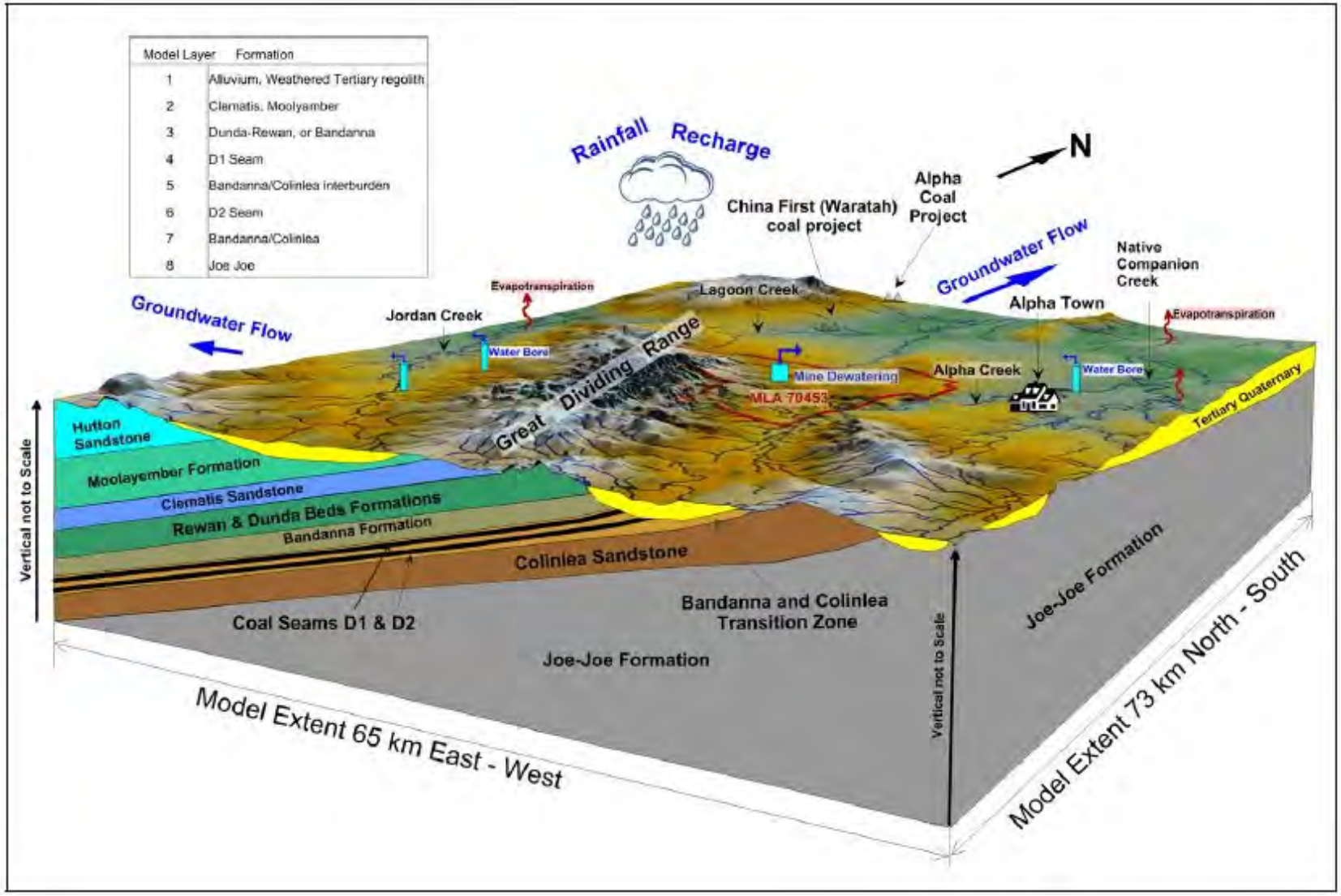

Figure 5.4 Conceptual groundwater model

(Source: South Galilee Coal Project EIS Section 8 Water Resources)

Groundwater assessment methodology

A hydrogeological baseline assessment was conducted for the EIS, which used data from ten monitoring bores installed in the project area and 149 DNRM-registered bores within 40 km of the project. Two rounds of groundwater quality sampling were completed between September 2011 and August 2012.

The groundwater assessment involved:

- a review of existing data, previous groundwater investigations, and other EIS reports
- a bore survey
- characterisation of the existing groundwater environment, such as aquifer types, groundwater levels, groundwater flow directions and aquifer interconnectivity, recharge and discharge processes, water quality, bore yields
- characterisation of the environmental values/uses of groundwater in the region
- development of conceptual and numerical groundwater models to assess the pre-mining, mining and post-mining groundwater environments and changes associated with each stage
- assessment of mine dewatering requirements in relation to the mining schedule
- assessment of the predicted impacts of the mine operation on the groundwater resource in terms of potential impacts on groundwater levels, quality and environmental values/uses, and outlining potential mitigation measures where appropriate
- assessment of the final open pit void effects in relation to predicting long term water levels and salinity
- development of monitoring and mitigation strategies for input into the EM Plan and conditioning in the EA.

I consider that the groundwater assessment provides an adequate understanding of the potential project impacts at this stage of the project design.

Baseline study findings

Table 5.13 displays the groundwater monitoring results from registered bores in the area. The depth to groundwater in the alluvial material is generally shallower than in the other geological units in the area, although the average depth to groundwater is greater than 10m. The range of groundwater elevations and bore yields is relatively consistent between the geological units.

Table 5.13 Groundwater monitoring results from DNRM registered bores

Geological unit	Number of bores	Depth to groundwater range[1] (m)	Groundwater elevation range (mAHD)	Range of bore yield[1] (L/sec)
Alluvial material	Total - 52 Near Alpha town - 16	3–39 mean 14.9	304–382	0.01–5 mean 1.5
Tertiary sediments	Total - 42 Near Alpha town - 19	8–52 mean 27	300–380	0.01–16 mean 2.3
Triassic sediments (*Rewan Formation, Clematis Sandstone and Moolayember Formation*)	22	10–93 mean 46.9	317–355	0.1–9 mean 1.5
Permian sediments (*Bandanna Formation, Colinlea Sandstone and Joe Joe Formation*)	33	10–86 mean 34.3	300–389	0.06–6 mean 1.7

Groundwater quality in the region is characterised by generally elevated concentrations of nitrate and some metals (e.g. iron, zinc), which exceed Australian and New Zealand Environment Conservation Council (ANZECC) guidelines for freshwater and aquatic ecosystems.

Groundwater samples taken from the project area were typically below laboratory reporting limits or ANZECC environmental criteria, with the exception of zinc, iron and ammonia. Baseline groundwater quality is generally compliant with irrigation and stock water acceptance criteria but unsuitable for drinking purposes.

Groundwater modelling

Conceptual model

The conceptual model used in the EIS is a representation of the existing groundwater system, identifying the most important geological units and hydrogeological processes. The key features of the model are presented in Figure 5.4.

The key elements of the conceptual model are:

- aquifer systems are recharged mainly through rainfall infiltration, with the greatest recharge rates in areas of higher topography on both the eastern and western sides of the Great Dividing Range, to the west of the project site
- groundwater flow patterns generally reflect surface topography, extending from the Great Dividing Range and GAB recharge beds west and south of the project, to the two main basins:
  - Groundwater flow to the east into the Burdekin Drainage Basin and north into the northern Galilee Basin
  - Groundwater flow down-dip to the west and out into the GAB system

- surface and groundwater interaction processes are limited because streams are ephemeral, flowing only when rainfall generates sufficient runoff and providing low volumes of recharge to the water table, which is typically greater than 10m below ground level
- water loss from vegetation is not a key aquifer discharge process
- the Joe Joe Formation to the east of the project site and the Rewan Formation are set as no flow boundaries to reflect their aquitard properties.

The conceptual model is considered to be appropriate by reviewing agencies.

Numerical model

The model was used to predict impacts on groundwater due to open-cut and underground mining, and subsequent post-mining groundwater recovery for the project. The model included predictive combined impacts on groundwater with the Galilee Coal (GC) project, which is located 47 km north of the South Galilee Coal project.

The model was developed using MODFLOW numerical code, with SURFACT code used for unsaturated conditions. The area covered by the model is greater than 4500 square kilometres compared with the project area of 310 square kilometres.

The northern border of the Waratah Coal Pty Ltd Galilee Coal project mine lease forms the northern boundary of the modelled area. Jordan Creek forms the western boundary and Native Companion Creek forms the eastern boundary. The southern boundary is approximately 13 km beyond the project MLA. Figure 5.5 illustrates that the model domain includes the entire MLA, Galilee Coal project area and Alpha town.

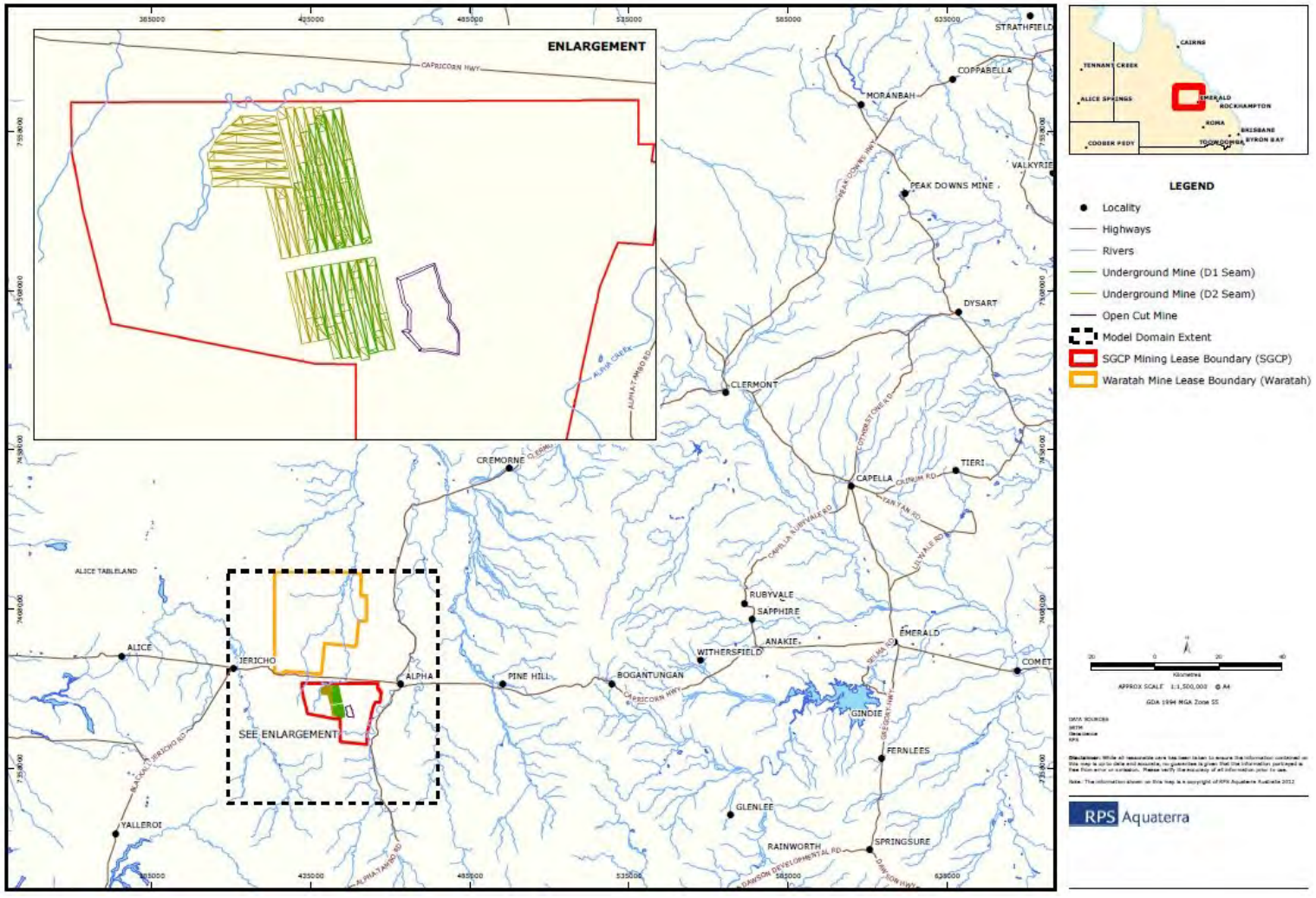

Figure 5.5 South Galilee Coal Project groundwater model boundaries

Source: South Galilee Coal Project AEIS Volume 1 Section 9.4 Groundwater

Groundwater data from 49 bores representing groundwater fluctuations over a period from 1970 to 2011 was used to construct and calibrate the groundwater model. The eight-layer model shows water levels that are consistent with observed time series data.

Hydraulic parameters determined from the other coal projects in the Galilee Basin were used to benchmark parameters for the project's groundwater model.

The model allows for the prediction of impacts to groundwater, surface water and water-related assets. When more data is available from the monitoring program, the model should be refined to provide for separation of aquifers and confining units in layer two – Clematis Sandstone (GAB aquifer) and Moolayember Formation. This refinement would improve confidence in impact predictions.

The numerical groundwater model is sufficient at this stage of the approval process, given that the detailed mine design is yet to be completed. Refinement of the model would allow for better quantification of the likely range of impacts to water resources in the project and surrounding areas. A more detailed discussion of the groundwater model is contained in my response to the IESC's advice in Appendix 6. While the groundwater model is generally sufficient to assess the likely impacts to groundwater resources, I require further information to be obtained and the model refined and re-run before commencement of South Galilee Coal stages 1, 2 and 3, or long-term continuation of the Epsilon stage. For example, a number of hydraulic parameters used in the groundwater model need justification and revision with updates of the model. Data from the groundwater monitoring program should be used in future model revisions.

The model revisions must incorporate the following parameters:

- recharge modelling calibrated to episodic recharge rather than a percentage of rainfall
- sensitivity analyses of hydraulic conductivity, storage parameters and recharge rates.

The model revisions must also address the following additional information requirements:

- validate the representativeness of the 20:80 split of layer two
- justify the horizontal and vertical hydraulic conductivity values
- justify the values adopted for general head boundaries (GHB) and explain the rationale behind the adoption of identical GHB conditions for any depth at a given location
- identify and justify the specific yield value, anisotropy ratios (horizontal versus vertical hydraulic conductivity) and fracturing parameters.

I require the proponent to refine the groundwater model to improve the representation of hydrogeological characteristics of the area, especially at Alpha town, so that potential impacts to groundwater from mining activities can be more accurately identified and, therefore, prevented and managed.

An independent peer-review of the model must be completed after the model is reviewed and before commencement of South Galilee Coal stages 1, 2 and 3, or long-term continuation of the Epsilon stage.

I have recommended a condition for the project's Commonwealth approval to guide the review and update of the groundwater model. Updates must incorporate groundwater monitoring data and measured mine dewatering volumes. The model must be re-run incorporating known licensed groundwater extractions within the model domain, including Alpha town and other nearby groundwater users. The outcomes of the model re-runs are to be reviewed by the proponent and used to inform the preparation of the groundwater monitoring and management plan and a research plan into the Rewan Formation. The recommended condition covers matters that are required by DEHP and DNRM before the EA and Water Act approvals can be issued and reflects proponent commitments.

Consistent with other Galilee Basin projects, the proponent must provide DNRM with the monitoring bore data. I have imposed a condition requiring the proponent to provide the monitoring bore data to the Coordinator-General within 60 days of publication of this evaluation report.

Impacts on water supply and quality

Landholders and the Alpha town water supply

The main uses of groundwater near the project are domestic use and stock watering. Groundwater from alluvial and tertiary aquifers is the main water supply for Alpha town.

I require the proponent to ensure that no nearby groundwater users, including Alpha town, are negatively affected by groundwater drawdown or contamination as a result of the project.

The AEIS showed that predicted groundwater drawdown, due to the project, at Alpha town and most nearby bores is less than 0.1 metre. Within the area of drawdown in and around the mining area, 38 registered bores would potentially be affected by greater than one metre drawdown, as shown in Table 3.1, section 9.4 of the AEIS. Drawdown at five key bores are presented in Table 5.14.

None of the 38 potentially affected bores supply water to Alpha town. Registered bore 38023 is located within the MLA and has the largest predicted drawdown of 46.49m. The AEIS identified two registered bores (7673 and 12030145) along the Capricorn Highway that are predicted to experience greater than 39m drawdown. These three bores are located adjacent to the underground mines where dewatering will occur. These bores are located on properties outside and to the south-east of the project area. Registered bores 69428 and 89487 are located north of the MLA and target very thin and shallow areas of the alluvium and tertiary sediment formation. They are shallow, prone to drying out during dry seasons and may become dry as a result of project drawdown.

Table 5.14 Predicted drawdown at key affected bores

Registered bore ID	Predicted drawdown (m)	Status	Latitude	Longitude
38023	46.49	Existing	-23.68185	146.48887
7673	39.86	Abandoned and destroyed	-23.6327839	146.46547
12030145	44.17	Abandoned but still usable	-23.63393	146.45537
69428	4.18	Existing	-23.52315	146. 41493
89487	3.56	Existing	-23. 51761	146. 429696

Source: Registered bore data sourced from DNRM groundwater database

The proponent considers that the Colinlea Sandstone and underlying aquifers are suitable for use as an alternative water supply for affected groundwater users. Most existing bores would need to be deepened to access the Colinlea Sandstone.

The proponent has committed to establishing make good arrangements with potentially affected groundwater users – including the Barcaldine Regional Council for potential impacts to Alpha town – to provide an alternative water supply from an external source if groundwater supplies are materially impacted by the mine. The proponent has also committed to investigate and maintain a register of all groundwater-based complaints, which will be made available to the relevant authority upon request.

Under the *Water Act 2000*, the proponent is required to hold a licence for 'associated water', which is defined as underground water that is taken incidentally as a result of extracting coal. At the time of writing, proposed amendments to the Act include removing the requirement for a licence for associated water. Instead, water take would be regulated through the project's EA. However, under the current regulatory regime the proponent is required to determine the quantity and quality of underground water expected to be removed during mining operations in an application for a licence for associated water.

The standard conditions that the proponent will need to comply with for a water licence under the *Water Act 2000* are presented in Appendix 1. In order to provide the level of detail required for a water licence application, the proponent will need to expand its existing groundwater monitoring program with additional bores in the GAB formations to the west of the mine, tertiary sediments and the Joe Joe Formation. I have stated a condition that requires the proponent to construct, maintain and decommission groundwater bores in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.

I have recommended a condition under the *Water Act 2000* for the proponent to identify all potentially affected bores and to outline management actions, including make good arrangements, which would ensure that unduly affected authorised water users would maintain access to a reasonable quantity and quality of water.

I have also recommended conditions that the proponent develop early warning triggers for impacts to groundwater at Alpha town and other potentially affected bores and to include these bores in the monitoring network. These matters must be detailed in the EM Plan and will be regulated through the proponent's EA.

Great Artesian Basin

The Rewan Formation is an aquitard defined as the base of the GAB. Potential impacts on the GAB would only arise indirectly from groundwater draining via geological fault structures from the Clematis Sandstone through the Dunda Beds and Rewan Formation into aquifers of the Bandanna Formation and Colinlea Sanstone. To induce the transfer of water from the Clematis Sandstone through the Rewan Formation (approximately 250-metre thick), the height of water in the Colinlea Sandstone would need to be lowered significantly.

Current modelling indicates that the Colinlea Sandstone will experience less than 3m of drawdown at the groundwater model's western boundary, making it unlikely to induce significant water transfer from the Clematis Sandstone.

Predicted drawdown in the Clematis Sandstone west of its outcrop due to the project is less than 1m, which is within the expected seasonal range. The proponent does not consider potential impacts on the GAB to be significant and therefore has not proposed any specific mitigation measures.

I require the proponent to ensure that the project does not significantly impact on the quality or quantity of water stored in GAB aquifers, particularly the Clematis Sandstone. Ongoing groundwater monitoring of the GAB is required to identify any long term unforseen impacts arising from the mining activities.

Ongoing groundwater monitoring of the GAB and improvements to the structure of the project's predictive groundwater model will assist in identification of any long–term unforseen impacts arising from the mining activities.

I have recommended a condition for the proponent to conduct research that characterises the Rewan Formation within the area impacted by the mine. I have also recommended conditions for the proponent to:

- broaden the proposed groundwater monitoring network to include the GAB
- review and update the groundwater model before the commencement of South Galilee Coal stages 1, 2 and 3, or long-term continuation of the Epsilon stage
- develop and implement low and high impact threshold levels for potential dewatering impacts on the GAB aquifers.

Subsidence impacts on groundwater

The geological material overlying the coal seams consists up to 60m of alluvial and tertiary sediments. It comprises embedded layers of clay and sand with groundwater contained in the sand layers. The majority of bores that source groundwater from the sand layers are located within creek valleys where alluvial material is thickest.

It is unclear whether the groundwater contained within the alluvial and tertiary sediments is interconnected with the groundwater of the Bandanna Formation containing the coal seams and the underlying Colinlea units. It is expected that clarity will be presented in the updated groundwater model for the project.

Longwall mining may cause subsidence - cracks and weakening of the overlying bedrock causing the ground level to sink. This cracking may contribute to the direct interconnection of different aquifers of different hydrochemistry which may impact the groundwater quality in the project area making it unsuitable for stock watering.

There has been no underground mining in the Galilee Basin to provide empirical data to inform modelling of surface fracturing caused by longwall mining. There is a risk that subsidence modelling for the project may not accurately predict the impacts of subsidence on water resources.

The model estimates that subsidence is expected to be up to 2.55m and 1.5m for the D1 and D2 coal seams, respectively. The total maximum subsidence is estimated to be 4.2m. Subsidence may result in changes to surface water drainage patterns, preventing flows downstream. The proponent has committed to monitor these potential impacts through a subsidence monitoring program and to implement mitigation measures such as progressively re-establishing free drainage in the subsidence area.

The proponent has proposed to manage impacts on groundwater from subsidence through monitoring aquifer interconnectivity and changes to hydrochemistry through the groundwater monitoring and management program. Subsidence impact management measures must be detailed in the EM Plan.

The proponent predicts that mine dewatering (active pumping of water out of mine pits) would reduce the impacts of the potential change to hydrochemistry from the blending of fresh and saline groundwater. Composite groundwater from this blending will be used on site and would not result in aquifer through-flow from the site. This groundwater flow towards the mine pits prevents any contaminated groundwater leaving the project site.

Aquifer flows will eventually achieve a new equilibrium after dewatering ceases at the end of mining operations. The proponent's groundwater modelling predictions for post-mining recovery found that bores affected by groundwater drawdown would not completely recover to pre-mining levels, even after 100 years. Post mining, groundwater flow from aquifers affected by subsidence will be generally in the direction of the final void which will act as a sink, as discussed further in the following section.

I require the proponent to refine the subsidence model to improve the quantification of potential impacts on groundwater and to ensure that nearby groundwater users and Alpha town are not negatively affected as a result of subsidence.

I have recommended a condition that the groundwater model be independently peer-reviewed and regularly updated with data from the groundwater monitoring program. Updates of the model must address additional information requirements including clarification of fracturing parameters used in subsidence modelling.

I have also recommended three conditions for the proponent to develop and implement management plans relating to subsidence and groundwater quality and flows to be approved by the Commonwealth Minister prior to commencement of the project. These matters must also be addressed in the EM Plan.

The groundwater monitoring and management plan must include:

- details of a groundwater monitoring network
- baseline monitoring data
- proposed trigger values for detecting impacts on groundwater levels
- timeframe for a regular review of the plan
- provisions to make monitoring data available to the relevant government authorities and the public
- a peer review by a suitably qualified independent expert.

The subsidence management plan must provide for the proper and effective management of the actual and potential environmental impacts resulting from the mine. It should also include a review of longwall mining methods with a view to implementing methods that minimise surface environmental disturbance.

Mine site water balance

A water balance model was developed to assess the performance of the conceptual mine site water management system (MWMS).

The water balance model is adequate for this stage of the approval process but should be revised as detailed mine planning progresses. The revision should take account of the final mine layout, water storage parameters and release systems to better define impacts on surrounding water sources. Surface water requirements for the mine site water balance and project impacts on surface water resources are discussed in section 5.7.3 below.

Groundwater inflows and mine dewatering

The proponent has modelled groundwater inflows to the mine voids and dewatering impacts on groundwater.

Predicted groundwater inflows to the mine voids range from 5–23 megalitres (ML) per day (2–8 gigalitres per year). The total inflow for the life of the mine is predicted to be 187 gigalitres.

Groundwater inflows to open pit and underground mine voids may result in drawdown of related aquifers and nearby bore levels.

The proponent has committed to monitor groundwater, including measuring and recording dewatering volumes, during mining activities. The proponent will engage a qualified professional to review the groundwater monitoring program annually. The proponent has not proposed any further mitigation measures. These will need to be addressed in the EM Plan.

As discussed previously, I require the proponent to refine the groundwater model to improve the understanding of impacts from groundwater inflows and mine dewatering, and to identify any material effects of groundwater drawdown on nearby groundwater users (including Alpha town) as a result of the project.

The proponent is required to review and update the site water balance model with data from the monitoring program. Results of the model will inform the groundwater management and monitoring plan.

I have recommended a condition for the proponent to develop and implement a groundwater management and monitoring plan to determine groundwater inflows and dewatering impacts. These matters must be detailed in the EM Plan.

Regional groundwater impacts are discussed below.

Final void inflows

A final void, 760 ha in area, would remain after mining activities cease. The void is expected to fill with water from groundwater inflows and rainfall. The EIS assessed the expected rate and quality of groundwater inflows to the final void. Management measures to protect the final void from surface water overflows are discussed in the surface water section below.

The groundwater assessment included assessment of the final void effects in relation to predicting long term water levels and salinity.

Modelling shows that evaporation from the final void lake will be replaced by groundwater inflows, resulting in a long term depression in the water table in the project area. Predicted groundwater inflows for the final void lake at 100 years post-mining are about 1.58 ML per day (0.58 gigalitres per year). The water level of the lake is predicted to stabilise between 7–12m below pre-mining water levels.

Within the area of drawdown in and around the mining area, 38 registered bores would potentially be affected by greater than one metre drawdown, although none of these potentially affected bores supply water to Alpha town. The proponent has committed to establish make good arrangements with the owners of the affected bores. The proponent has also committed to enter make good arrangements with Barcaldine Regional Council for potential impacts to Alpha town, to ensure water security for the township.

The water quality of groundwater inflows to the final void will reflect the geochemical composition of the surrounding strata material. Geochemical investigations undertaken for the EIS found that most of this material is expected to be non-acid forming (NAF) with some potentially-acid forming (PAF) material close to the coal seams. Geochemical investigations and experience at similar projects found that overburden material (tertiary sediments) is saline. Water that comes into contact with PAF or saline material has the potential to become contaminated and therefore no longer suitable for stock watering.

Proponent investigations indicate the final void's open-cut pit floor appears to be mainly low concentration PAF with PAF portions. Proposed management measures include

provision for monitoring runoff/leachate, limestone spreading on pit floor surfaces and water capture and treatment. Long term acid rock drainage control strategies for the void floor are to be incorporated into management of in-pit dumps of waste rock, and may require a combination of groundwater inundation and a cover/seal system.

The proponent has proposed to manage the risk of PAF contamination through selective handling, blending and disposal by deep burial or encapsulation. The proponent considers that mine waste segregation and handling practices will be sufficient to maintain adequate control over PAF contamination risk on-site. However, the management measures have not yet been finalised. They will need to be addressed in detail in the EM Plan.

Groundwater will flow towards the final void, preventing any contaminated water from flowing out. Additional measures to manage the final void will be developed in consultation with DEHP and included in a mine closure plan. The proponent has committed to prepare a Mine Closure Plan prior to decommissioning the project. The proponent's identified objectives of the post-mine land use are to ensure protection of the biological integrity of the surrounding environment after mining has ceased. The management arrangements for the final void, including the salinity levels will be a component of the plan which will be developed in consultation with appropriate stakeholders and DEHP.

I require the proponent to refine the groundwater model to provide a robust prediction of groundwater inflows to the final void. I also require the proponent to monitor and manage the risk of water contamination from PAF material in the final void.

Given the level of uncertainty regarding final void management in the EM Plan and the uncertainties regarding the groundwater model, I have recommended a condition that the proponent develop and implement a final void water monitoring and management plan. The EM Plan must be peer reviewed and include an environmental risk assessment of open final void and backfilling options and a justification for the preferred option.

Details regarding management of PAF and saline contamination needs to be included in the EM Plan before an EA can be issued.

Groundwater related assets

Groundwater related assets in and near the project area include the GAB aquifers (Clematis Sandstone), water supply sources for Alpha town and nearby groundwater users and potential GDEs. Impacts to Alpha town, nearby groundwater users and the GAB are discussed earlier in this section.

Groundwater-dependent ecosystems

No GDEs were located within or near the project area. The proponent therefore concluded that the project is not expected to impact on any GDEs. However, any impacts to riparian zones due to subsidence-induced changes to shallow aquifers or groundwater drawdown should be monitored, identified and mitigation measures developed, if necessary.

I require the proponent to ensure that riparian zones are not negatively affected by groundwater drawdown from the project.

I have recommended a condition for the proponent to conduct targeted riparian surveys to determine the presence of GDEs, which are to be monitored for impacts if they are present.

Coordinator-General's conclusion—groundwater

The key issues relating to groundwater as a result of the project are drawdown impacts and changes to the quality of water supply for Alpha town and nearby groundwater users.

The proponent's groundwater model allows for the prediction of impacts to groundwater, surface water and groundwater related assets but needs refinement before the commencement of South Galilee Coal stages 1, 2 and 3, or long-term continuation of the Epsilon stage.

Impacts to the GAB are considered to be unlikely, but improved modelling and more extensive groundwater monitoring during the life of the project are required to confirm this.

I require the proponent to ensure the following outcomes are achieved:

- the project does not negatively affect the quantity or quality of water supply for Alpha town and nearby groundwater users, or the GAB
- the project does not negatively affect riparian zones in the MLA
- groundwater in the final void is monitored and managed for contamination from PAF and saline material.

I also require the proponent to collect more data through ongoing groundwater monitoring, including GAB bores, which should be used to refine and re-run the groundwater model to improve prediction and quantification of project impacts to groundwater.

Details to be addressed in a baseline groundwater monitoring program will be set in the project's EA. Results from the baseline monitoring program will inform the development of groundwater quality trigger levels and groundwater thresholds that will also be detailed in the EA.

The EA will outline the objectives for the ongoing groundwater management and monitoring program and identify the information requirements to be included in the groundwater model review.

I have recommended conditions under the *Water Act 2000*, that will inform the standard conditions for a water licence under the Act in Appendix 3. The licence will require the proponent to ensure that existing water supplies are protected and that any unduly affected water supplies that existed prior to the mine commencing are made good. In order to ensure compliance with the conditions, the licence will also require the proponent to undertake monitoring and assessment of groundwater impacts and annual reports during the operational life of the mine.

Project construction cannot commence until revised modelling is undertaken, groundwater impacts are further quantified and mitigation measures are developed to minimise negative impacts to groundwater.

Management plans for subsidence, final voids and impacts to nearby groundwater users and riparian zones must be included in the EM Plan.

I have recommended conditions in Appendix 2 relating to groundwater model updates, the monitoring network, and development of management plans for:

- the final void
- groundwater
- mine dewatering
- subsidence.

5.7.3 Surface water

Introduction

The project is located within the Tallarenha Creek, Sapling Creek and Dead Horse Creek sub–catchments, shown in Figure 5.6. These creeks flow into the Belyando River via either Lagoon Creek then Sandy Creek or Alpha Creek then Native Companion Creek. The Belyando River joins the Suttor River, which is part of the headwaters of the Burdekin River Basin, then discharges through the Burdekin Falls Dam to the coast.

The MLA covers an area of 310 square kilometres which is 0.6 per cent and 0.2 per cent of the Suttor River and Burdekin River catchments respectively. Almost all of the 209.5 square kilometres of the Tallarenha Creek catchment, and more than half of the catchment areas of Sapling Creek (63.5 square kilometres) and Dead Horse Creek (65.5 square kilometres) are within the MLA area. The project area covers only 95 square kilometres, or 9500 ha. The project would result in disturbance of drainage lines over an area of 9000 ha within the Tallarenha Creek catchment and 500 ha in the Sapling Creek catchment. The disturbance area for Tallarenha Creek catchment includes potential impacts to drainage lines as a result of potential subsidence impacts.

The creeks and drainage lines within the project's MLA and infrastructure corridor areas provide seasonal habitat for aquatic flora and fauna and contribute to water flow for downstream habitats. These creeks also contribute water to water licence holders extracting from watercourses downstream of the project.

The environmental values for surface water in the project area include aquatic ecosystems, stock watering and cultural values. The watercourse catchments in the project area and the receiving water catchments have undergone widespread clearing for agricultural use and are classified as slightly to moderately disturbed from current grazing activities.

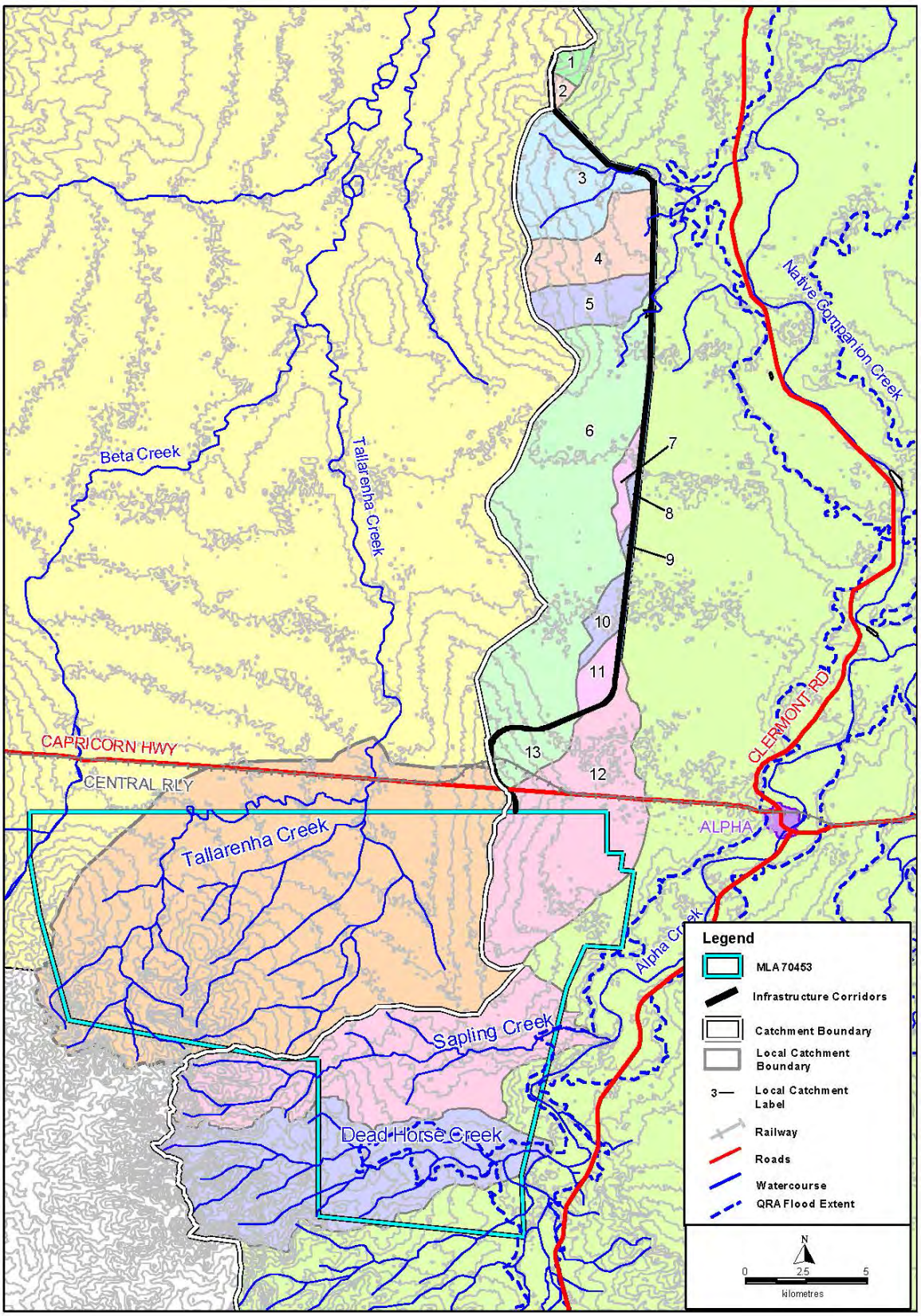

Figure 5.6 Catchments potentially affected by the project

Surface water assessment methodology

The proponent undertook a surface water assessment for the EIS to determine the potential impacts of the project surface water hydrology, flooding and quality in watercourses within and downstream of the project. The assessment was revised in the AEIS to take account of:

- changes in mine layout and timing, including the new Epsilon stage
- the removal of mining south of Sapling Creek and under Tallarenha Creek
- the elimination of the diversion of Sapling Creek
- the elimination of disturbance in the beds of all creeks in the project area.

Streamflow methodology and results

Catchment streamflow was recorded at gauging stations downstream of the project area. Long-term streamflow data has been collated since 1967 at the DNRM regional surface water gauging station in Native Companion Creek at Violet Grove gauge (station 120305A), 5 km north of Alpha township. Data includes water level, rainfall, electrical conductivity, and discharge and water temperature. The streamflow assessment indicated that local streams flow only briefly during and following periods of rainfall with long periods of no flow. Streamflow is greatest between December and February.

Flooding methodology

Flood modelling was conducted by the proponent for the major drainage paths crossing the project disturbance area, including the infrastructure corridor, to define the existing flood conditions and determine changes to these conditions caused by the project. Flood behaviour was modelled for the 2, 50, 100, 1000 and 3000 year and probable maximum flood (PMF) design events in Tallarenha Creek as the project could impact its existing hydrologic and hydraulic behaviour. A flood model was undertaken for 10 and 50 year and PMF design events for Native Companion Creek, due to its location in relation to the proposed infrastructure corridor. The post-development modelling took account of proposed project levees and drainage works.

An analysis of post-development conditions for Sapling and Dead Horse Creeks was not undertaken because the proponent's modelling predictions concluded that the creeks would not be affected by the project's mining operations, including subsidence impacts.

The proponent's hydrological models have not been calibrated because rainfall and streamflow data were not available for historical flood events at the project site. Further details of the modelling methodology, justification of model choice, sensitivity analysis and model limitations are in section 2.1 Appendix D of the EIS and section 9.3.2 of the AEIS.

The flood impact assessment and modelling was revised in the AEIS to take account of modified project and mine layout including:

- Sapling Creek is no longer affected by the project in terms of underground mining

- elimination of the diversion of Sapling Creek into Dead Horse Creek
- elimination of subsidence of the Tallarenha Creek channel and adjacent floodplain
- north-south-aligned longwall panels instead of east-west panels
- limited flood impacts to the southern margin of the Tallarenha Creek floodplain at the northern edge of the site.

Subsidence methodology

A subsidence assessment for the project was undertaken to determine the potential surface impacts caused by subsidence from underground mining, including impacts on surface water flows and quality. The model predicted subsidence impacts above the proposed longwall mining area based on the experience in the Bowen Basin. No actual subsidence information is available for the Galilee Basin as mining is yet to commence, and little information is available on subsidence above multiple seams extraction.

The IESC and DEHP noted these uncertainties of the subsidence modelling regarding parameters used, lack of quantification of the reduction of surface flows and, lack of data on the geotechnical properties of overburden to determine connectivity between the surface and the coal seam. I acknowledge the uncertainties in the modelling for subsidence impacts and have recommended conditions to address these uncertainties. I have considered these matters further in Appendix 6 to support my imposed and recommended conditions in Appendix 3 and Appendix 2 respectively.

Water balance model

A model was developed for the project to simulate the operation of all the major components of the site's MWMS including daily runoff from rainfall and up to 632 ML per year of water imported from external sources. The model accounted for the movement of all site water, including water quality, over the mine life reflecting the variation in catchment areas, water needs for coal production and groundwater inflows as the project progresses. The model used 124 years (1889 to 2012) of simulated climatic and streamflow data to assess the effects of varying climatic conditions.

The modelling assessed the performance of the conceptual MWMS to control surface water flow at the site. It indicated that the mine will mainly operate with a water deficit and will need to rely on an external water source post the Epsilon stage to make-up the balance. The MWMS was only conceptual during the assessment in the AEIS and that the proponent will finalise details of the MWMS in later stages of design.

The water balance model uncertainties identified by the proponent included:

- sufficient site-specific water data was not available so Australian Water Balance Model parameters were adopted from model experience in Bowen Basin mine sites
- the assumption was made that the MWMS would be operated in a systematic way; decisions made during operations may not always allow this to occur
- predicted groundwater inflows made up 40 to 60 per cent of gross water inputs to the water balance. If the actual groundwater inflows are higher than the modelled inflows there may be an increased risk of controlled and uncontrolled discharges.

Surface water - groundwater interaction

The proponent prepared a groundwater flow model to predict the effects of mining on the quantity and quality of groundwater discharge to streams and flow from streams to groundwater.

The existing depth to groundwater is generally more than 10m across the project area, and is therefore unlikely to support groundwater discharge to streams. If project activities cause groundwater levels to rise, then ground water discharge to streams may occur. This was accounted for in the model. The model also allowed for the creeks to provide a small amount of flow to groundwater all the time. Streams provide flow to groundwater when rainfall is high enough to cause runoff and stream flow.

Modelling predicted that the surface water-groundwater interaction volumes would not change materially from pre-mining, through mining to post-mining.

The IESC advised that the model generally allows prediction of impacts to interactions between surface water and groundwater but recommended a sensitivity/uncertainty analysis and further consideration to the surface water-groundwater interaction over time and area. I have considered these matters fully in Appendix 6 of this report and have recommended conditions for further modelling and monitoring.

Coordinator-General conclusions

I consider that the surface water assessment and modelling provides an adequate understanding of the potential project impacts on surface water flow, including flooding, and surface water quality at this stage of the project design.

I require further information to be obtained and the numerical groundwater model refined and re-run to address the surface water–groundwater interaction in streams potentially impacted by the project before commencement of South Galilee Coal stages 1, 2 and 3 or long term continuation of the Epsilon stage. I have recommended a condition of approval to the Commonwealth Environment Minister for a groundwater flow model review and a model re-run to validate the parameters used to model fracturing caused by longwall mining. In addition I have recommended a condition for DNRM to develop a monitoring and assessment program of the impact of the underground mining subsidence impacts of the mine. I have also imposed a condition requiring monitoring and reporting of surface water data.

I require the proponent to provide more information in relation to the site water balance model prior to the finalisation of the draft EA. This information is to include the site water balance calculations for quantity of runoff, the need for the finalisation of the design of the MWMS, and the need to provide information on the timing, location and quality of water discharges. I have recommended a condition for a groundwater management and monitoring plan and a numerical regional water balance model which takes into account the surface water interaction with groundwater for managing water on site and in the Galilee Basin. These conditions are discussed further in section 5.7.2 of this report.

I have recommended that DNRM develop and maintain a numerical regional water balance model for the Galilee Basin identifying the likely extent of groundwater-surface

water interactions and determining the potential impacts on surface water flow conditions, environmental values and existing surface water users. The model should take account of the site water balance model data provided by proponents. I expect this data to be based on robust modelling conducted by proponents.

I have recommended conditions to the Commonwealth Minister for the Environment, DNRM and DEHP in Appendix 2 and 3 for future groundwater and surface water modelling and monitoring to undertake additional sensitivity/uncertainty analyses when assessing surface water-groundwater interaction.

Impacts on surface water flow

The project will impact on surface water resources because operational raw water will be partially sourced from surface water harvesting by the proponent. The use of surface water by the proponent will be subject to authorisation and approval under the *Water Act 2000* and the provisions of the Water Resource (Burdekin Basin) Plan 2007.

Without mitigation measures the potential impacts of the project on surface water flow include:

- impact on the natural catchment of Tallarenha Creek by the progressive excavation and rehabilitation of the 3690 ha open-cut mining pit over 33 years of operations
- permanent impact on the natural catchment of Tallarenha Creek by the proponent's proposal to leave a 760 ha final void at the site following decommissioning of the mine post 2047
- reduced streamflows due to the proponent's proposal to contain mine-affected water in dams during the 33 year operational stage
- reduced streamflows due to evaporation loss, ranging from 1.4 to 6.9 gigalitres per annum, from the project dams and ponds capturing rainfall runoff
- changes to flow patterns as a result of subsidence of underground mine areas
- changes to stream leakage to groundwater during periods of surface runoff resulting from changes to groundwater levels caused by underground mining
- changes to amounts of groundwater discharge to streams resulting from changes to groundwater levels caused by underground mining
- reduced water availability to water licence holders, licensed irrigators, private weirs and off-stream water harvesting storages located downstream of the project site.

Mitigation and management

Potential impacts on surface flow of Sapling Creek have been avoided by removal of the Sapling Creek watercourse diversion shown in the EIS. The revised project, as shown in the AEIS, will not require any watercourse diversions or disturbance of the beds of Sapling and Tallarenha Creeks in the project area.

To reduce impacts, the proponent modified the project to:

- reduce the area of disturbance footprint draining to the MWMS
- include water management structures for the Epsilon stage

- change the catchment boundaries and water runoff directions due to revised dump layouts with more water draining to the east to sediment dams
- change the timing of demand for water by the CHPP and haul road dust suppression.

The proponent has committed to diverting clean water flows around the active mining areas and would construct an open clean water diversion channel which traverses the open-cut operations, as shown in Figure 5.7. The proponent developed a MWMS which requires clean water runoff from undisturbed areas to be diverted around active mining areas. I require the proponent to provide maps, with suitable contours, showing the watercourse diversion from the EIS and the revised layout without the diversion to illustrate topography, drainage and creeks for the Epsilon stage and later stages of the project. These maps will provide evidence of surface flow direction to assist DEHP to formulate EA conditions.

I have not stated draft EA conditions for surface water flow as the submitted EM Plan did not contain the results of a baseline monitoring program or the coordinates of monitoring points. The proponent needs to provide DEHP with information on the monitoring points and water flow in the revised EM Plan.

Within the project area groundwater discharge to streams is virtually zero but there are areas of groundwater recharged by leakage from surface runoff and flowing streams during a rainfall event. Modelling indicated that leakage from stream systems into groundwater during these rainfall events could be approximately 2 ML/day. Underground mining may increase leakage flow patterns by causing changes through the fracture zone above the underground longwall mine. These effects and any increase in leakage rates would be expected to reduce with time due to sedimentation infilling the cracking in the fracture zone following intense rain events and flooding.

Mining and post-mining simulations run by the proponent indicated that levels of both leakage and discharge are not expected to change with time. There is no additional induced flow from surface water streams because the depth to water table is typically 10m or more. The groundwater model simulations show no change to stream leakage due to mining and mine dewatering as the streams are already recharging the water table at maximum potential rate.

The proponent’s modelling predicts that groundwater levels and flow system will reach equilibrium after dewatering ceases at the end of mining operations. At this equilibrium, groundwater flow will continue towards the final void. As a result, the proponent does not propose any mitigation measures for surface water-groundwater interaction quantity or quality. The proponent has committed to monitoring the potential impacts from induced flow of the project and, if required, develop mitigation measures to address any issues as they are identified.

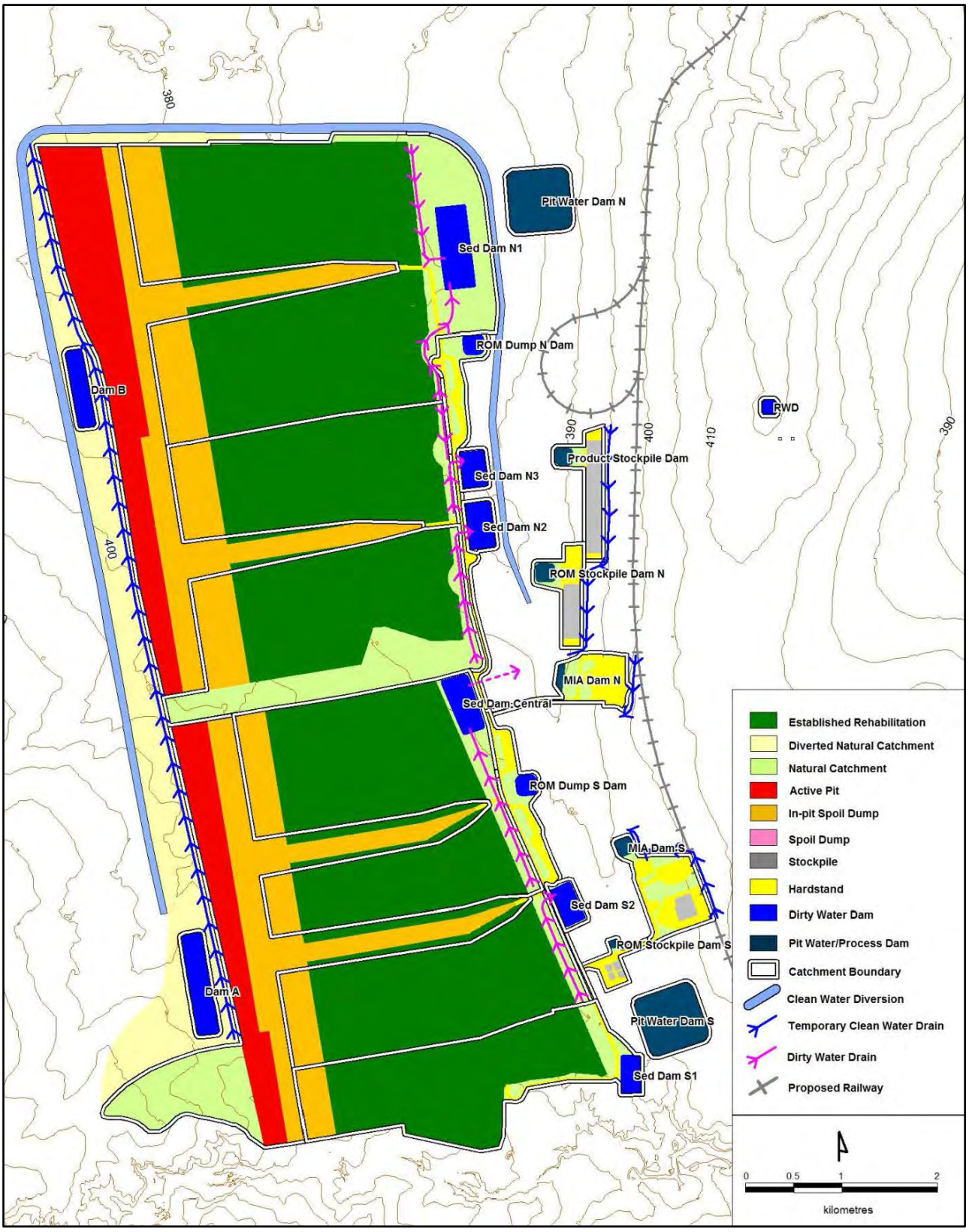

Figure 5.7 Mine arrangement and water management system

Impacts on surface water quality

The watercourses and drainage paths are disturbed from current grazing activities across the project area. The revised mine layout indicates that the project will result in the disturbance of drainage lines within the Tallarenha Creek and tributaries of Native Companion Creek catchment only, with no impact to Sapling Creek and Dead Horse Creek. Potential impacts of the project on surface water quality include:

- changed water quality in surface run-off originating from disturbed catchments
- increased levels of salinity and concentrations of dissolved metals in catchment run-off
- surface runoff into open-cut pits resulting in changed water quality of surface water captured in pits
- poor quality of water in the final void which will remain permanently as a water body
- poor quality water in dirty water storage dams seeping down into groundwater then reappearing off-site in the surface water system via shallow groundwater flow.

The modelled results in the AEIS were similar to the EIS for calculating the risk of discharge of mine affected water into the environment. The proponent concluded that the proposed MWMS provides a high level of confidence that water inundation of the open-cut mine pits would not cause flooding at the mine workings. The levies preventing influx of water into the mine pits will be designed for probable maximum flood level. The proponent proposes to operate the saline water system as a zero contaminated water discharge system with excess water which accumulates in the open-cut pits to be transferred away from the mining areas into eleven water storage dams, shown in Figure 5.7, for later reuse.

The pit excavation and dewatering activities during the operational phase have the potential to impact on surface water aquatic ecosystem values and habitat for migratory birds. The eastern great egret was recorded on the project site during the 2012 survey. It inhabits water bodies including dams, foraging to feed on fish. Other listed species likely to occur in the project area which require water sources include the squatter pigeon and the black throated finch. As any water body may provide habitat for these species, they may consume the contaminated water in the pits or the mine water storage dams. The proponent has committed to develop and implement a TSMP which will include specific mitigation and management measures to address predicted impacts on the great eastern egret, and other species which may be impacted by mining activities causing alteration to habitat relating to surface flows and water quality. The plan will contain monitoring measures, reporting and auditing requirements. Further information on potential impacts to these species and management measures is contained in sections 5.4 and 5.5 of this report.

The proponent has identified that the total pit water dam capacity requirements are substantial at 28 300 ML. Construction of the two pit water dams will be staged to match the catchments of the water inflows. Proponent modelling showed that additional storage dam capacity will be required after year ten of the project to store the groundwater inflows that are predicted to significantly exceed the site water demands.

The water balance model results indicate that there are no predicted uncontrolled discharges from the dams of the saline water system at the one percentile confidence level in any one year of the project life. The proponent has committed to operate each of the saline water dams at a level where the runoff from its own catchment can be contained during a 1 in 20 annual exceedence probability (AEP) 3 month summer rainfall event. However, to maintain distance between the top of the mine-affected water storage dams and the designed full supply level during higher rainfall events the proponent proposes to undertake controlled water releases. I note that the MWMS schematic diagram lists several contaminated water discharge points where Pit Water Dam S, Pit Water Dam N, Dirty Water Dam S and other saline water dams could spill into Alpha Creek or Tallarenha Creek. The proponent's EM Plan proposed specifications for contaminant release during flow events in conditions W7 to W11. I expect DEHP to develop conditions for the draft EA to set limits on contaminant levels necessary to maintain water quality objectives and environmental values and flow rates in streams.

The proponent has identified that water with elevated metal concentrations contained in the saline water dams would overflow to Tallarenha Creek in a failure to contain scenario. While the proponent has concluded that the environmental impact of these uncontrolled releases is unlikely as significant environmental values have not been identified in the predicted overflow area, DEHP will consider the failure to contain scenario in the preparation of the draft EA conditions and require the proponent to undertake a risk analysis of environmental impact during such an event and submit it as part of the revised EM Plan. Conditions relating to the design of containment structures have been stated in Appendix 1.

The discharge regime for the mine contained in the EIS and AEIS is not designed for a zero discharge of contaminants under all possible rainfall events. The proponent is yet to provide detailed information on alternative management approaches to off-site discharge of excess water. As untreated and uncontrolled releases from the contaminated water dams has the potential to impact on human and livestock health and environmental values downstream, I require the proponent to finalise the proposed management measures for discharges of potentially contaminated water from the mine's water management system and update the EM Plan. The updated plan is to contain:

- scientific and technical evidence supporting the proponent's conclusion that off-site impacts to the receiving environment from discharges of water would be negligible
- consider the impact of the volume of flows as well as the water quality in the receiving creeks
- describe the discharge protocols
- contain mitigation measures for identified impacts.

Mitigation and management

The proponent proposes to minimise the impact of project activities on surface water quality by minimising the need for mine-affected water to be released from the project area. The proponent has developed a MWMS to minimise controlled releases of mine-

affected water during low rainfall events and prevent un-controlled releases. The MWMS manages water in three sub-systems: saline water system, waste rock runoff water system and raw water system. Catchment runoff in the project area which is potentially coal-affected, highly saline and has elevated concentrations of dissolved metals will be managed through the saline water system. This system capture water and pump it into eleven dams constructed over various stages of the project.

Runoff from waste rock areas, which is expected to have high turbidity and moderately elevated salinity and metal concentrations, will be managed by the waste rock runoff water system by capturing and treating water in six sediment dams and two dirty water dams shown in Figure 5.7. The dams will be constructed progressively as the areas of disturbance from project activities increase over the mine life.

The modelling indicated that if sediment dams are not pumped into the pit water dams or dirty water dams there is a small risk of overflows from sediment dams in the later years of the project as the dam volumes become larger. Modelling of a high runoff scenario showed an increased risk of offsite discharge to greater than ten per cent after year four. All dams will be constructed in the Tallarenha Creek catchment except for Sediment Dam S1, which is adjacent to Sapling Creek and in the catchment of Alpha Creek. I expect the proponent to monitor the water levels in these dams and undertake effective mitigation measures to ensure overflow does not occur and result in uncontrolled releases to Tallarenha Creek and Alpha Creek.

The proponent has committed to preparing a *Standard Operating Procedure – Dams* and an *Operational Plan – Regulated Dams* which must contain mitigation measures to prevent uncontrolled water releases. I have stated conditions for the draft EA in Appendix 1 that condition the mandatory reporting of water levels and prevention of unauthorised discharge from the regulated dams. These conditions will apply to the sediment dams built as part of the saline water management system, as the dams are likely to be classified as regulated structures.

The proponent undertook a comprehensive analysis of sample waste rock from the mine site. Results identified inconsistent run–off quality. It is proposed to design and operate both the waste rock runoff system and the saline runoff in accordance with the design storage allowance provisions of DEHP. I have stated a condition for the draft EA in Appendix 1 that all the regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the DEHP guideline *Structures which are dams or levees constructed as part of environmentally relevant activities*. The guideline provides model conditions for regulated structures.

The AEIS stated that there is potential for seepage from project water storages and waste facilities resulting in downward leakage through surficial sediments to lower permeability weathered sediments. Lateral migration on the lower permeable sediments could occur, which could migrate down gradient at shallow depth toward surface water drainages. It is envisaged that this seepage would be controlled by regional groundwater drawdown, which would limit the potential for impacted groundwater to leave the site. Flow is toward the mined voids, and this component of unsaturated flow occurs above the water table.

The proponent has committed to shallow seepage monitoring adjacent to the storage facilities to enable identification and assessment of potential seepage. I expect the proponent to include measures in the revised EM Plan to monitor the potential occurrence of this shallow seepage to enable identification and assessment of seepage. If monitoring detects a potential for off-site seepage then I expect active seepage controls, such as cut-off trenches, to be implemented and monitored. I recommend DEHP develop additional conditions for the draft EA when this matter is satisfactorily addressed by the proponent in the revised EM Plan.

I have conditioned the operation, mandatory reporting, annual inspection, transfer arrangements and register of regulated structures. My condition also requires that the structures must not be abandoned by the proponent but be decommissioned and rehabilitated to meet rehabilitation criteria. Alternatively the structures can be left in place if there is an agreement between the proponent, the administering authority and the landholder for a beneficial use, the water is suitable for that beneficial use and it does not contain contaminants that will migrate to the environment.

I note the proponent intends the final void to remain as a water storage. As groundwater inflows are expected to be saline post mine closure, the salinity levels in the water storage could increase depending on the amount of rainfall falling directly over the void. The void has been modelled indicating that the saline water in the void will never overflow the top of the pit into the surrounding environment, even during extreme rainfall events.

The final void has been designed to run in a north-south direction. This will provide the maximum shading of the water in the void therefore reducing the amount of water evaporation and reducing the potential for increasing salinity levels.

The proponent has committed to construct flood levees to protect of the final void at the end of mine life from the probable maximum flood level. This mitigation measure will minimise potential for release of contaminants in the void water to the surrounding surface environment by avoiding the escape of saline water from the final void in the long term. The levees will also prevent non-saline overland rainfall flows from entering the void and reducing salinity levels.

The proponent has committed to making the voids safe by fencing to prevent access for people and livestock. The highwall slope will remain at the final batter angles and made safe to minimise the potential for animals to be harmed by falling into the contaminated water in the void. All exposed coal seams will be covered with inert material wherever practicable to reduce the contamination of rainfall runoff as it passes over it as the runoff enters the void. The void area will not be suitable for human or animal use due to the steep sides of the batter and salinity of pit lake water.

The proponent has committed to conduct an investigation into the final void to develop mine decommissioning acceptance criteria. The investigation is to include a study of options available for minimising final void area and volume , a void hydrology study, addressing the long-term water balance in the void, connections to groundwater resources and water quality parameters in the long-term. It will also study the voids capability to support native flora and fauna.

It is highly likely that final void water will not be discharged to the surrounding environment, thus avoiding impact on ecology in surrounding waterways. I am satisfied that there will be no impacts on the region's surface water from the final voids, given the fact that the modelling has predicted that no water will ever be discharged by overtopping.

I have recommended a condition of approval to the Commonwealth Environment Minister for a final void water monitoring and management plan for ministerial approval and implementation. I also expect DEHP to include a condition in the draft EA for the residual void outcome specifying that the void must not cause any serious environmental harm to surface waters and specifying the maximum size and depth of the void to mitigate escape of contaminated pit water to surface water.

The raw water system will allow for water supplied from the external raw water supply source to be stored in the raw water dam to be constructed early in the construction schedule near the accommodation camp. The water is expected to have low salinity. The proponent has committed to constructing a water treatment plant near the raw water dam to supply potable water. The category of referable dam will be determined through the undertaking of dam failure impact assessment as required under the Water Supply (Safety and Reliability) Act 2008. I note that due to the 13 800 ML design storage allowance capacity of Pit Water Dam North and its proximity to the Capricorn Highway, there is potential to impact the road infrastructure should there be a dam break. The dam is also located in an area of potential habitat for the Ornamental Snake, Yakka Skink, Dunmall's Snake, Squatter Pigeon, BTF and the Rainbow Bee-eater. I expect, through conditions to be developed in the EA, the dam design will minimise the risk of dam break occurring to avoid or minimise damage to or flooding of highway infrastructure and environmental impacts of an uncontrolled release of contaminated water through the habitat of listed species.

The proponent has committed to working with DEHP to derive the appropriate release conditions for a controlled release of mine-affected water off-site, based on the ANZECC guidelines for fresh aquatic ecosystems, and site specific data. To satisfy information requirements for the issue of an EA, the proponent's water quality monitoring program must provide a database of site-specific water quality data related to local flow conditions. In particular, the proponent is to provide information on the surface flow at the time of water quality sampling and the date the samples and flow data were taken.

The proponent has committed to constructing a clean-water diversion around the open-cut mine pit to capture and divert overland flow of clean water into Tallarenha Creek. During finalisation of the EA, I require the proponent to prepare and implement a clean-water diversion water quality management protocol and a monitoring program. This should include the maintenance of the infrastructure over the life of the mine and requirements for maintenance post mine closure to ensure quality of water released into Tallarenha Creek.

With regard to monitoring, I have stated a set of partial conditions for the draft EA to monitor impacts on surface waters. Before the draft EA for the project can be finalised

for public notification the proponent will need to provide DEHP with details of the water monitoring program including:

- a comprehensive baseline water quality monitoring program
- proposed reference sites, including coordinates and details of their location, for the baseline water quality monitoring program
- a sampling schedule detailing the sampling events that have been undertaken and planned
- clean water diversion water quality management and monitoring program.

The proponent will need to submit the revised EM Plan to DEHP as part of the application for an EA, as specified in transitional provisions of the recently amended EP Act. The revised EM Plan is to provide numerical release limits for each contaminant into each of Tallarenha Creek and Alpha Creek. If the locally derived values from the baseline monitoring program are not available at the time of submission to DEHP, the EM Plan is to contain default values from the latest version of the *Model water conditions for coal mines in the Fitzroy Basin*. These values can be varied through application to DEHP once sufficient baseline monitoring has been undertaken by the proponent and submitted to DEHP for review.

I expect the revised EM Plan to include a description of the locations, capacities, storage allowance, within-site-water-balance transfer capabilities, spillway locations and controlled discharge points, and controlled release strategies of regulated dams. It should also fully address surface water and baseline monitoring sites, release points, and detail event based sampling. I require the mine's draft EA, issued by DEHP, to specify conditions for water quality and release criteria for controlled releases.

Receiving Environment Monitoring Plan

The proponent has committed to preparing a receiving environment monitoring plan prior to operations. The proponent has provided proposed EA conditions for a receiving environment monitoring program in W20 to W22 of the EM Plan in the AEIS. However, section 3.4.5 of the EM Plan lacks information to provide justification for the proposed conditions. The proponent will need to provide details of the program to DEHP in the revised EM Plan prior to issuing the draft EA.

Impacts on Tallarenha Creek - surface flow and quality

The project will potentially impact on the existing hydrologic and hydraulic behaviour of Tallarenha Creek. Surface water from the catchment area surrounding the open-cut mine operations will be directed into an 18 km long open clean-water drainage channel constructed around the open-cut pit operations. The drainage channel discharges the surface water into the main channel of Tallarenha Creek downstream of the project.

Impacts from open-cut mining on the quality of surface water flow in the main channel of Tallarenha Creek are avoided as the channel is located west and north of the open-cut operation of the project. However, flow changes in the Tallarenha Creek are predicted due to underground mining with the north-south orientation of the longwall panels, allowing a northern flow of surface water into the creek.

The proponent has committed to establish a monitoring plan over the underground subsidence area adjacent to Tallarenha Creek to identify subsidence-induced changes to the floodplain drainage patterns that could prevent flow draining downstream. If these impacts are identified through aerial and ground survey of the area, channels will be constructed to direct flows downstream.

The proponent has also committed to develop and implement an Erosion and Sediment Control Plan which will maintain and monitor water quality in the creek. I have stated a condition for the draft EA requiring the development and implementation of an Erosion and Sediment Control Plan for all stages of the project to minimise erosion and the release of sediment to receiving waters including Tallarenha Creek and all waters as defined in Appendix 1 of this report.

Regarding discharges to receiving waters I have stated a set of partial conditions for the draft EA to manage and monitor impacts on surface waters. Before the draft EA for the project can be finalised for public notification the proponent will need to provide DEHP with details of potential water discharged from site into Tallarenha Creek including:

- latitude and longitude locations of mine affected water release points
- mine affected water source and location and monitoring point
- mine affected water release limits and monitoring frequency for water quality characteristics
- trigger investigation levels for each water quality potential water contaminant
- receiving waters contaminated trigger levels and monitoring frequency
- receiving water upstream background sites and downstream monitoring points.

Surface water management

The proponent's Water Management Plan (WMP) in the AEIS examines and addresses issues relevant to the importation, generation, use and management of water on the project site to minimise the quantity of water that is contaminated and released from the project site. The proponent prepared the WMP using the DEHP *Guidelines on the preparation of water management plans for mining activities*. I note that there is information on water management issues and strategies in the WMP which need to be included in the revised EM Plan, as the EM Pan is to be a stand-alone document without references to the AEIS. The proponent proposes to manage surface water by:

- separating of saline water, waste rock runoff and diverted clean runoff
- minimising surface disturbance to lower saline water runoff
- minimising the generation of industrial saline water
- containing saline water in dams for use for the CHPP and dust suppression
- collecting and treat any waste rock runoff in a controlled manner
- maximising the use of on-site water to minimise the importation of external raw water.

Flooding impacts and management

On mining lease - impacts

The mine development could potentially cause some changes in flood levels across the project site and downstream of the project area. The revised flood impact assessment report in section 9.3 of the AEIS contains maps of the flood depth, extent and velocity of the existing and post-development conditions of Tallarenha Creek, Sapling Creek and Dead Horse Creek and the infrastructure corridor.

Potential flood impacts arising from on-lease activities include:

- changes in depth and extent of flooding on five landholdings
- changes to Tallarenha Creek flood water levels, extent and flow velocity due to the construction of a clean water diversion around the disturbed areas
- changes to the flood-water extent and duration due to land subsidence caused by underground mining
- flooding of mine pits and underground mine workings
- flooding of project infrastructure including the accommodation village at more than the 100 year ARI design flood level.

The project is likely to minimally impact on only one homestead, which is predicted to experience an increase in flood depth of 0.002m during the 50 year ARI design event and there would be a reduction in flood depth during the 10 year ARI design event.

The proponent's modelling concluded that the proposed post-development works on the mining lease would result in little or no increase in the duration of flood inundation in Tallarenha Creek downstream of the mine lease.

On mining lease - mitigation and management

To determine appropriate mitigation measures and conditions for the draft EA for on lease mining activities, the proponent needs to provide further details on changes to flow, impacts to the infrastructure corridor, off-site discharge and flood concentration times, including the high runoff scenario. This information is to be provided to DEHP in the revised EM Plan as part of their application documentation for a draft EA.

To mitigate flooding of project infrastructure and mining operations, the proponent has proposed measures on the mining lease, including construction of a drainage channel around the open-cut operations and 30m wide small drainage channels linking underground mining operations subsidence contours. Several flood levees will be constructed as regulated structures to ensure progressive containment of water on the mining lease and to prevent overflow of water into the project's final void from the PMF level.

I require the proposed levees to have adequate long-term stability, particularly with regard to the levees needed to protect the final void from capturing surface water flow or flood waters after mining ceases. These levees are to be left as permanent landscape features and need to be designed and constructed to prevent long-term erosion and failure. The proponent will finalise the design of the levees after financial

close of the project but has provided indicative cross-sections, which demonstrate that they could be constructed to withstand erosion from flood water in the long-term.

I note the proponent has committed to review the nominal 3000 year ARI level of flood protection as part of detailed design and conduct a risk assessment for an extreme flood event. I expect the proponent to undertake its commitment to hold discussions with DEHP during this design phase regarding the level of flood protection. All revised flood mapping in the revised EM Plan has to include the proposed mine access road and accommodation village, as this mine infrastructure could be impacted by flooding during mine operations.

Off mining lease – impacts

Potential flood impacts arising from off-lease activities include:

- changes in depth and extent of flooding at eight landholdings (one of which is also predicted to be impacted as a result of on-lease activities)
- changes to flood water levels of tributaries of Native Companion Creek, extent due to the construction of the embankment for the infrastructure corridor.

The project's infrastructure corridor is outside the area of the mapped floodplain for Native Companion Creek. Modelled impacts to surface water resources arising from the construction of the off-lease embankment for the infrastructure corridor include changes to flood-water levels and extent. There is little or no increase in the duration of inundation The model included flood mitigation measures including openings at creek crossings and high flow areas to maintain existing flow patterns downstream. With these mitigation measures the model predicts the infrastructure corridor embankment results in flood impact on seven properties.

Off mining lease - mitigation and management

Mitigation measures for the flood impacts of the infrastructure corridor, which was modelled as an embankment, include 17 drainage openings 40m or 80m wide. The openings will be of sufficient size at locations along the corridor, such as creek crossings and high-flow areas, to maintain existing flow patterns to downstream areas and avoid obstruction to natural flow and water levels upstream of the embankment. The proponent has advised that the size of these openings will be confirmed during detailed design.

The proponent's modelling indicates that the presence of the proposed embankment in the infrastructure corridor catchment could result in little or no increase in the duration of inundation in the 2, 50 and 100 year ARI flood event. Changes in water level, velocity and duration do not extend a significant distance upstream of the infrastructure corridor. With the proposed proponent mitigation measures, some areas will become inundated, but at flows less than would have previously been the case in the 10 and 20 year ARI events. The proponent has indicated that refinements during detailed design to the cross drainage arrangement could further mitigate these impacts. Further consideration of the design of rail line levels during the detailed design stage may be required to minimise localised impacts on Native Companion Creek due to a change in the water level at the downstream boundary of the model.

The infrastructure corridor and project activities outside the MLA are not regulated by the environmental authority. The activities that could lead to impacts will be regulated through a material change of use or development approval condition. I have stated conditions to avoid impacts of environmental nuisance and stormwater from activities in the off-lease area in Appendix 1.

I have required other Galilee Basin rail proponents to meet consistent drainage design criteria. Therefore, I have also imposed a condition that sets limits for the extent of inundation, afflux, culvert exit velocities and inundation times. It requires the proponent to provide the final rail design and a consultation report to the Coordinator-General for approval once these reports and flood modelling have been completed.

I have included an impose condition requiring proponent to consult with land and asset owners regarding the potential impacts and management of flooding caused by the placement of the infrastructure corridor and railway. This consultation will occur after completion of detailed design work for the corridor, when flood modelling will be reviewed and updated.

Coordinator-General's conclusion—surface water impacts

The proponent has provided environmental protection objectives, performance criteria, control strategies and a monitoring program for surface water in the EM Plan. I have stated a number of conditions for the draft EA in order to protect surface water values. Further conditions will need to be developed by DEHP when the EM Plan is revised to take account of the detail mine design. The revised EM Plan should provide the locations of release points and trigger values and be updated to reflect the latest version of the *Model water conditions for coal mines in the Fitzroy Basin.*

I require results of future surface water monitoring to be included in updates to the site water balance model and groundwater model. Appendix 1, 2, and 3 contain conditions and recommendations to mitigate and minimise potential impacts on surface water flow and quality.

5.7.4 Regional water impacts

Regional groundwater flow impacts

Regional groundwater modelling undertaken for the AEIS used data from the project and the Waratah Coal Pty Ltd Galilee Coal project.

The regional modelling predicted that with both mines operating at predicted capacity groundwater drawdown would be up to 3m around Alpha town and between 3–5m for bores south-west of the project in the Clematis Sandstone (GAB aquifer). Groundwater levels in bores immediately adjacent to the project are not expected to completely recover to pre-mining levels within 100 years after mining ends. Without mitigation, the resulting drawdown of groundwater could negatively affect nearby groundwater users and the water supply of Alpha town.

The proponent has committed to establish make good arrangements with potentially affected groundwater users, including BRC for any impacts to Alpha township, if the quality or quantity of the groundwater supply is materially impacted by the mine. These

arrangements would be determined in consultation with other Galilee Basin proponents and be commensurate with each project's impacts. The proponent has also committed to investigate and maintain a register of all groundwater-based complaints, which will be made available to the relevant authority upon request.

In addition to the proponent's commitments, conditions will be included in a water licence under the *Water Act 2000* that will require the licence holder to make good any unduly affected pre-existing water supplies.

I have also recommended a condition for implementation under the *Water Act 2000* for the proponent to identify all bores potentially affected by the project and that make good arrangements be established in case the bores are unduly impacted. These are conditioned to ensure that authorised users of those bores maintain access to an equivalent quantity and quality of water to that prior to mining.

Regional surface water impacts

The EIS concluded that there is some potential for the project to add to the impact on downstream water flow of other proposed mining projects such as Alpha Coal, Kevin's Corner and Galilee Coal. The proponent concluded that the project's contribution to reduction in streamflows for waterways of the Burdekin Basin would be minor.

I acknowledge the proponent's assessment of the impacts of their project on surface water quality when combined with the potential impacts of other existing and proposed projects located downstream of the project in the catchments of Alpha Creek, the Suttor River and the Belyando River. The proponent has determined that the impact of the project to off-site discharge is minimal and that the impact when combined with other projects will be similarly limited. I require the proponent to provide additional scientific and technical evidence to support this determination during finalisation of the EM Plan using the surface water information available in published EIS and Coordinator-General Evaluation Reports for other mines in the Galilee Basin.

However, responsibility for coordinating the collection of information from individual proponents to determine regional impacts rests with state agencies.

I have recommended that local water quality objectives for the Galilee Basin be developed by DEHP to ensure consistent water quality standards for waterways throughout the Galilee region.

Draft environmental values and water quality objectives are being developed for the Burdekin including Suttor sub-basin (and Belyando catchment), Haughton and Don Basins. Final consultation is likely to be undertaken between January and March 2015. Subject to the consultation and approval by the administering authority, final environmental values and water quality objectives are expected to be incorporated into Schedule 1 of the Environmental Protection (Water) Policy 2009 by June 2015. These standards will lead to the development of model water conditions for coal mines in the basin to form the basis of future EA conditions.

State assessment of regional water impacts

Given the potential multiple water licence applications for mine dewatering in the Galilee Basin, DNRM has commenced preparing a regional water balance model in collaboration with the Commonwealth Office of Water Science, Geoscience Australia and the Bureau of Meteorology.

DNRM's assessment will consider the combined impacts of five currently proposed coal mines on the Galilee Basin's groundwater budget and environmental assets, by comparing estimated groundwater use of the mines to the calculated long-term groundwater extraction limit that the Galilee Basin is capable of supporting. Proposed coal mines being considered in the assessment include:

- Alpha Coal project
- Carmichael Coal project
- China Stone Coal project
- Galilee Coal project (also known as China First Coal Mine)
- Kevin's Corner project
- South Galilee Coal project.

The regional water balance assessment is likely to provide an understanding of the risk to adjoining water entitlement holders and regional impacts on groundwater resources. Estimates of mine impacts would be further enhanced as more data becomes available through operational stages of these mines. This data would progressively improve the basis for more comprehensive numerical modelling which would, in turn, enable more robust assessment of impacts on specific water resources and environmental assets.

A regional water balance model (RWBM) would complement work undertaken by each Galilee Basin mining proponent and contribute to the ongoing adaptive management of water resources in the region. The aim of the model will be to address potential regional impacts on water resources in the Belyando-Suttor sub-catchment and the aquifers of the eastern part of the Galilee Basin. In order to support adaptive management of regional water resources, the model would need to be regularly re-run with up-to-date data.

A regional groundwater and surface water monitoring and assessment program would provide up-to-date data for the RWBM. DNRM is currently assessing existing monitoring networks in the eastern Galilee Basin and additional monitoring bores either proposed by mining proponents or recommended by the Coordinator-General. DNRM's assessment outcomes will inform the regional groundwater and surface water monitoring and assessment program and be subject to review by a contracted party external to DNRM.

Coordinator-General's conclusion—regional water impacts

In support of the state's regional water balance assessment, I have made several recommendations for DNRM and DEHP to ensure the monitoring and assessment of regional water resources and the development of a RWBM, local water quality objectives and a regional water monitoring and assessment program. These

recommendations and conditions have been included in other evaluation reports that I have completed for other mining projects in the Galilee Basin, including Alpha Coal, Carmichael Coal, Galilee Coal and Kevin's Corner projects.

My recommendation for the development and maintenance of a RWBM is that it should:

- identify linkages between hydrogeological formations, the likely extent of aquifer connectivity and groundwater/surface water interactions, and characteristics of aquifer recharge
- use baseline monitoring and site water balance model data provided by project proponents
- have regard to relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Galilee Basin subregion of the Lake Eyre Basin
- determine potential impacts on groundwater resources, surface water flow conditions, environmental values and existing surface water users.

I have also made a recommendation for the development of a regional groundwater and surface water monitoring and assessment program that will inform the development of the RWBM. The program, to be developed and maintained by DNRM in consultation with DEHP and Galilee Basin coal mine proponents, will:

- establish a protocol with mine proponents for the collation and delivery of surface water and groundwater monitoring data
- collate and overview surface water and groundwater monitoring data recorded by project proponents in accordance with project approval requirements
- have regard to relevant key deliverables expected from the Australian Government's proposed bioregional assessment for the Lake Eyre Basin
- adopt a risk-based assessment of regional impacts based on data provided and impact assessment reports prepared by project proponents, including potential impacts on existing water users, aquatic habitat loss and impacts on ecological systems. Regional impacts include the impacts of proposed mining project activities, including but not limited to:
  - open-cut and underground mining operations
  - mine dewatering
  - mine waste management
  - stream diversions and flood levees
  - subsidence
- report on the success of water management measures and inform the ongoing adaptive management of water resources in the region
- periodically publish data and reports with reference to monitoring and assessment program outcomes.

The development of local water quality objectives by DEHP must be based on:

- impact assessment, baseline monitoring and site water balance model data provided by project proponents
- results of the regional water balance model and any ongoing regional surface water and groundwater monitoring and assessment program
- relevant key deliverables expected from the Australian Government' proposed Bioregional Assessment for the Lake Eyre Basin.

I have also imposed conditions to ensure the proponent contributes data and pro-rata funding to the RWBM and regional water monitoring and assessment programs.

5.8 Ecologically sustainable development

5.8.1 Principles

I have considered the proponent's application of the principles of ecologically sustainable development (ESD) in my evaluation of project impacts. The principles, as defined in Part 1, section 3A of the EPBC Act, are:

- **the integration principle:** decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable consideration
- **the precautionary principle:** if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- **the inter-generational equity principle:** the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- **the biodiversity principle:** the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
- **the valuation principle:** improved valuation, pricing and incentive mechanisms should be promoted.

5.8.2 Evaluation of the project against ESD principles

The integration principle

The EIS process, as outlined in section 3 of this report, has facilitated the consideration and integration of economic, environmental and social considerations in both the analyses by the proponent and the government assessment process.

I note that the proponent has incorporated findings from risk assessments, economic modelling, environmental assessment and consultation with key stakeholders into the EIS documentation and demonstrated that the project has effectively integrated both long-term and short-term economic, environmental, social and equitable considerations.

I am satisfied that all long-term and short-term environmental impacts from the mine will be managed through an EA, which will be administered by DEHP, and that my conditions in Appendices 1, 2 and 3 will further mitigate adverse impacts of the project based on the above findings.

The precautionary principle

I am satisfied that the EIS documentation contains sufficient information at this stage of the assessment process to identify any potential threats of serious or irreversible environmental damage from the project.

Where there is a lack of scientific certainty regarding environmental impacts, a precautionary approach has been taken in setting conditions that require the proponent to ensure that adverse environmental impacts from the project are minimised.

My conditions supplement the proponent's commitments and proposed management measures and require baseline and ongoing monitoring to increase the scientific understanding of potential impacts to MNES. These conditions include:

- a condition for the proponent to complete a Groundwater Monitoring and Management Plan to ensure adequate scientific understanding and to inform cumulative impact assessments, regional water balance model, bioregional assessments or relevant research for the Bioregional Assessment of the Galilee Basin sub-region and Lake Eyre Basin
- a recommendation to identify unforeseen impacts to groundwater requiring groundwater level monitoring in the Clematis Sandstone and Dunda Beds aquifers, appropriate trigger levels for the early detection of induced flow from GAB aquifers, and investigations if upper or lower limits are met
- a recommendation to re-run and undertake an independent peer review of the groundwater flow model to ensure that groundwater impacts are accurately characterised
- a recommendation for the development and maintenance of a regional water balance model for the Galilee Basin in order to identify linkages between hydrogeological formations, the likely extent of aquifer connectivity and groundwater/surface water interactions, the characteristics of aquifer recharge and potential impacts on groundwater resources and surface water flow conditions
- recommendations for the development of a regional groundwater and surface water monitoring and assessment program for the Galilee Basin and associated proponent contribution requirements including data collection and analysis and pro-rata funding
- conditions requiring the development of MNES Management Plans prior to the commencement of project stages with significant MNES impacts, consistent with relevant recovery plans, threat abatement plans and conservation advice to maximise ongoing protection and long-term conservation of EPBC listed species and communities on the project site

The inter-generational equity principle

I am satisfied that the inter-generational equity principle has been adequately applied throughout my evaluation of the project and throughout my conditioning. I consider that the conditions for the project will allow for the project to be constructed, operated, rehabilitated and decommissioned in a sustainable manner that protects MNES and the local environment for future generations.

My recommended conditions require the proponent to facilitate the preservation of potentially impacted EPBC Act listed threatened species and communities, minimise impacts on groundwater and manage environmental risks associated with final voids to minimise long term environmental impacts.

The biodiversity principle

The TOR that I developed for the project outlined the requirements for the proponent's EIS, including considerations of biodiversity conservation and ecological integrity. The biodiversity principle has been carried throughout all stages of the EIS process in both the proponent's assessment documentation and my evaluation.

I am satisfied that this principle has been adequately incorporated into my conditions for an EA for the project, my recommended biodiversity conditions to the Commonwealth Minister for the Environment and for an MCU or development approval for the off-lease and rail components. Biodiversity conservation and ecological integrity are also considered in proponent commitments, which will mitigate and offset any residual impacts to the controlling provisions for the project.

The valuation principle

I am satisfied that adverse environmental impacts from the project can be suitably compensated through environmental biodiversity offsets for all significant residual impacts. I consider that the outcomes delivered by direct and indirect offsets will be commensurate with the potential impacts on MNES and the environment generally.

5.8.3 Coordinator-General's conclusions

Based on the completion of a comprehensive environmental assessment process, proponent commitments and EM Plan, my stated conditions for the draft EA for the project (Appendix 1) and my recommendations for conditions to be placed on subsequent State and Commonwealth approvals, I am satisfied that the project complies with the provisions of Part 1, section 3A of the EPBC Act in accordance with the above criteria.

5.9 Social and economic impacts

In accordance with the TOR, the proponent completed a social impact assessment (SIA) for the project. This identified potential impacts and the proponent's responses and mitigation measures for community and stakeholder engagement, workforce management, housing and accommodation, community safety and wellbeing and regional business development and local content.

Action plans have been developed in response to each of the main social impacts. The specific action plans are:

- Community and stakeholder engagement
- Workforce management
- Housing and accommodation
- Community safety and wellbeing
- Regional business development and local content.

Overall, the SIA revealed a number of key social and economic impacts and is committed to working closely with local communities to maximise project benefits and minimise negative impacts.

The proponent has committed to implement the action plans throughout the life of the project and work with stakeholders to provide a coordinated and consistent approach to the management of social impacts.

My conditions require the proponent to provide an annual report to the Coordinator-General for a period of two years after the commencement of operations for both the Epsilon stage and the first stage of the main open-cut mine. The report will also include any operational activities undertaken during this period. The report should describe the actions, outcomes and adaptive management strategies to:

- Enhance local employment, training and development opportunities
- Avoid, manage or mitigate project related impacts on local community services, social infrastructure and community safety and well being
- Inform the community about project impacts and show that community concerns have been taken into account when reaching decisions.

The project will provide a significant boost to the regional and state economy with the capital expenditure expected to be $4.2 billion over the life of the project. Operational expenditure is approximately $21.7 billion, over the 33 year operational mine life. The project could create up to 1600 construction jobs, 1288 operational jobs and 300 decommissioning jobs.

Refer to section 7 of this report for more detailed social and economic assessment which outlines the specific mitigation and management measures in accordance with DSDIP'S SIA guideline. The proponent's response to potential impacts identified through consultation during and after the EIS processes are summarised in the SIA action plans in Appendix 5 of this report.

5.10 Coordinator-General's overall MNES conclusions

I have reviewed all of the EIS documentation provided and I am satisfied that the proponent has adequately assessed any potential impacts on the controlling provisions under the EPBC Act as a result of the project.

The proponent has provided information on mitigation measures, control strategies and monitoring programs in the EIS and AEIS and the proponent commitment list to ensure that any adverse impacts can be avoided, minimised and managed, with offsets provided for residual impacts. Mitigation measures will also be addressed in the future EA for the project. My recommended and imposed conditions will supplement these measures, strategies and programs to ensure the requirements of the EPBC Act are met.

I consider that the requirements of the assessment bilateral agreement have been satisfied. Based on my conclusions for each of the respective controlling provisions as discussed above, I am satisfied that the project would not result in unacceptable significant impacts on MNES.

6. Evaluation of non-MNES environmental impacts

This section discusses the major environmental impacts on matters of State interest that are not also protected under the EPBC Act, including:

- state listed terrestrial and aquatic ecology including flora, fauna and biodiversity connectivity values
- land use values
- air quality, noise and vibration
- transport impacts
- indigenous and non-indigenous cultural heritage

The report evaluates strategies for managing impacts and where necessary includes conditions or recommendations to mitigate adverse impacts.

Many matters of interest to the State have been dealt with in the previous chapter as that are also MNES. In these circumstances, cross references will be made to the MNES considerations

6.1 Terrestrial and aquatic ecology

The project area has historically been used for low intensity beef cattle grazing on leasehold tenure and includes limited areas of remnant and non-remnant natural vegetation.

6.1.1 Vegetation and flora

The nature and scale of the project means there will be some unavoidable impacts to vegetation in the short to medium term, including loss of remnant vegetation and connectivity.

Approximately 3690 ha of the project area will be cleared for open-cut mining, and the underground mine could impact on a further 4570 ha due to subsidence. Associated infrastructure including the infrastructure corridor will impact an area of 885 ha. These

figures were based on an initial estimate by the proponent and will be refined during the detailed design phase. The Biodiversity Offsets Plan proposes offsets for an impact of 6370 ha for the open cut mine and infrastructure and 5150 ha for the underground mine. The impact predictions in the section are based on those included in the BOP.

About 1881 ha of remnant vegetation has been identified in the potential impact area. Approximately 801 ha of remnant vegetation will be cleared for the open-cut mine and the infrastructure corridor. Around 1080 ha of remnant vegetation overlies the underground mine area and may be impacted by subsidence. None of the remnant vegetation is mapped as essential habitat for threatened flora or fauna.

Clearance of 492 ha of remnant vegetation of least concern under the *Vegetation Management Act 1999* is expected.

The EIS identified nine regional ecosystems (REs) within the project area. Of these, only Brigalow is listed as an endangered ecological community under the *Nature Conservation Act 1992* (NC Act). Brigalow is also listed as a threatened ecological community under the EPBC Act. As such, impacts and mitigation is fully addressed in section 5.4.3 of this report.

Three threatened or near-threatened flora species under the NC Act were confirmed in the project area:

(a) round-leaved heath myrtle (*Micromyrtus rotundifolia*)

(b) large-podded trefoil (*Desmodium macrocarpum*)

(c) *Eleocharis blakeana*.

In addition, one near-threatened flora species (Western Rosewood [*Acacia spania*]) was considered likely to be present, despite not having been located during survey activity.

Mitigation measures

The proponent has made commitments to minimise the impact on vegetation during construction and operations, including:

- staged clearing
- mitigating weed species
- establishing buffer zones around threatened ecological communities
- restricting clearing
- restricting construction to dry weather conditions
- clearing and possibly translocating species of significance
- progressively rehabilitating areas of the site
- developing and implementing a TSMP
- developing and implementing a WPAMP and a Fire Management Plan.

The proponent has committed to rehabilitate the project site to a stable, self-sustaining native vegetation landscape as far as possible and to re-establish pre-mining cattle grazing land uses. It has outlined rehabilitation goals, objectives, indicators and

completion criteria in its draft EMP and these will need to be further refined when applying for an environmental authority (EA).

I have recommended in Appendix 2 that the proponent undertake the following measures to identify and manage threatened species:

- conduct pre-clearance ecological surveys to identify the extent to which matters of state environmental significance (MSES) would be unavoidably impacted by the project
- develop a TSMP which documents impact mitigation and management measures that maximise the ongoing protection and long-term conservation of threatened species known or likely to occur within the project area.

I have also imposed a condition for the proponent to prepare an offset strategy to address any significant residual impacts for MSES.

6.1.2 Terrestrial fauna

Survey work for the EIS was undertaken in March 2009, October 2009, April 2010 and May to June 2011. Additional fauna surveys were undertaken in November 2012.

Two near-threatened terrestrial vertebrate species under the NC Act were confirmed from the project area during surveys—the little pied bat and the square-tailed kite. One vulnerable species under the NC Act—the brigalow scaly foot were also confirmed.

One endangered (EPBC Act and NC Act), four vulnerable (EPBC Act and NC Act) and one near-threatened (NC Act) fauna species are likely to occur within the project area but were not detected during the fauna surveys. These were the ornamental snake, yakka skink, Dunmall's snake, squatter pigeon, cotton pygmy goose and the black-throated finch. Impacts on these species are addressed in section 5.4.5.

Table 6.1 summarises fauna species included in the surveys that may occur in the project area.

The construction and operation of the project may impact on terrestrial fauna through:

- habitat loss from clearing
- edge effects and fragmentation
- direct mortality from vehicle movements
- subsidence and hydrological impacts
- weeds
- pest animals with wild dogs of concern in relation to reptiles and medium sized mammals
- altered fire regime
- noise and vibration
- artificial light
- regional impacts.

Table 6.1 Fauna species that may occur in the project area

Scientific name	Common name	EPBC Act status	NC Act status	Likelihood of presence	Background and survey results
Dasyurus hallucatus	Northern quoll*	E	–	Possible	Suitable habitat but no siting or local records
Chalinolobus picatus	Little pied bat		NT	Confirmed	Suitable habitat
Phascolarctos cinereus	Koala	V	LC	Confirmed	Thin distribution
Nyctophilus	South-eastern long-eared bat	V	V	Possible	Suitable habitat but no local records
Delma torquota	Collared delma	V	V	Possible	Suitable habitat but no local records
Strophurus taenicauda	Golden-tailed gecko	–	NT	Possible	Potential habitat but no local records
Egernia rugosa	Yakka skink*	V	V	Likely	Known habitat but no local records
Denisonia maculate	Ornamental snake*	V	V	Likely	Suitable habitat and known distribution
Furina dunmalli	Dunmall's snake*	V	V	Likely	Suitable habitat but no local records
Paradeima orientalis	Brigalow scaly foot	-	V	Confirmed	One specimen caught during survey
Rheodytes leukops	Fitzroy River turtle*	V	V	Unlikely	Unsuitable habitat and no local records
Geophaps scripta scripta	Squatter pigeon*	V	V	Likely	Suitable habitat but no local records
Neochmia ruficauda rifucauda	Star finch (sth)*	E	E	Unlikely	Unsuitable habitat and no local records
Poephila cincta cincta	Black-throated finch (sth)	E	E	Likely	Potential habitat but no local records
Falco hypoleucos	Grey falcon	-	NT	Possible	Little breeding habitat
Granfiella picta	Painted honeyeater	-	V	Possible	Limited habitat but no local records
Lopoictinia	Square-tailed kite	-	NT	Confirmed	Small population
Nettapus coromandelianus	Cotton pygmy-goose	-	NT	Likely	May use artificial waterholes transiently
Rostratula australis	Australian painted snipe*	V	V	Possible	Limited habitat

Mitigation measures

Mitigation measures proposed by the proponent include:

- using fauna spotter–catchers to relocate any fauna species of significance prior to land clearing, this is particularly important in relation to the potential 135 ha koala habitat loss
- clearing in one direction allowing fleeing animals to disperse
- inspecting trees before felling
- communicating possible presence of threatened or near-threatened species to contractors and employees
- developing and implementing a TSMP
- developing and implementing a WPAMP
- developing and implementing a Bushfire Management Plan
- developing and implementing a Fire Management Plan.

6.1.3 Aquatic ecology

The project site is located in the upper catchment of the Burdekin River Basin. The project area crosses the upper tributaries of Sandy Creek and Native Companion Creek, which are both tributaries of the Belyando River. The Belyando River is part of the Suttor River sub-basin, which has a total catchment area of approximately 52 550 square kilometres.

The Belyando/Suttor catchment produces a highly ephemeral flow, closely linked to rainfall patterns that are quite variable in the subtropical climate of the region. Therefore, water quality and quantity in these streams is highly variable and heavily dependent on seasonal rainfall.

The surface aquatic ecology values of the site were determined through a combination of desktop and field surveys. Sampling was carried out in April 2010 and July 2011 with 11 sampling sites selected. The studies found waterways were subject to stock trampling and grazing pressures, clearing of riparian vegetation and modifications such as damming of creeks for stock watering. Most aquatic communities were of low or limited diversity, which was within expectations given the inland location and ephemeral nature of the streams.

There was a lack of abundant macrophyte cover identified in the surveys. Seven species of aquatic plants were recorded; however, none of these are of conservation significance.

Fish diversity was limited, with the study finding 11 of the 20 species historically recorded in the Belyando catchment. This included two exotic pest fish species (Mosquitofish [*Gambusia Holbrook*] and Tilapia) and one translocated species (Yellowbelly)—both of which have the potential to proliferate under disturbed conditions, but were recorded in low numbers. None of the fish species in the Belyando catchment is listed as a threatened species. Few, if any, taxa of macroinvertebrates were unique to pool bed samples and diversity was within ranges for Central Queensland.

No aquatic reptiles and mammals were found during the survey period. No stygofauna were found at any of the 22 groundwater bores sampled, and the proponent concluded the presence of stygofauna in the project area is unlikely.

Water quality has been impacted by cattle grazing and is quite variable—very soft to very hard. Notably, electrical conductivity, dissolved oxygen, pH and turbidity levels were outside guideline ranges although this is common for ephemeral stream systems.

Potential impacts to the aquatic ecology values may include:

- Erosion sediment
- Release of contaminants
- Waterway crossing structures
- Impacts to surface water flow regime.

Mitigation measures

To reduce impacts on aquatic flora and fauna, the proponent has committed to implement mitigation measures, some of which will be included in the proposed EM Plan. The key measures would include:

- conducting regular water sampling and monitoring
- minimising the number of creek crossings to lessen impact on in-stream habitat
- avoiding construction works near streams
- undertaking construction during the dry season
- storing excavated earth material away from waterways and bunded
- managing and monitoring the release of mine-affected water
- monitoring the location and spread of Tilapia during the life of the mine as part of the WPAMP
- managing erosion, mine run-off and vegetation clearing throughout all stages of the project to ensure diversity in the macroinvertebrate community is not further diminished
- preparing and implementing a detailed Erosion and Sediment Management Plan, which would incorporate strategies for reducing the run-off of coal dust into waterways.

Current best practice will be used to manage fuels, oils and chemicals to prevent contaminants of waste leaving the site.

The proponent has recognised that contaminant concentration in pit water is likely to exceed levels required for protection of downstream receiving water values and has committed to containing pit water in a system with a low risk of discharge. The proponent has committed to ongoing surface water quality monitoring. Further details on protection of water quality can be found in section 0.

Additionally, the EM Plan will address mine operations to minimise impacts to waterways by managing the potential for waterway contamination, especially during periods of river flow.

6.1.4 Proposed Offset Area

For coordinated projects, the Coordinator-General has the powers necessary to decide state offsets as part of the broad conditioning powers under the SDPWO Act. I will take advice from state agencies on offsets for the project and consider the Queensland environmental offsets framework and provisions of the *Environmental Offsets Act 2014*. This advice will inform my determination and approval of any state offsets for significant residual impacts to significant state biodiversity values that are considered necessary over and above Australian Government requirements. I will not require any additional offsets for impacts on matters of state environment significance if the Australian Government requires an offset for the same values.

The proponent has identified residual impact areas of state-significant value that will potentially require an offset.

The proposed offset area is adjacent to the mine project and will be 21 854 ha in area. Of this, approximately 8016 ha consists of remnant vegetation and the balance contains non-remnant pastures. The offset area includes the majority of REs present within the impact area. As impact and offset areas occur on the same pastoral properties, they have been subject to similar management histories. Consequently, the condition of vegetation present in offset and impact areas is similar.

The offsets area will be managed to protect and restore remnant vegetation:

- protect land to prevent clearing from grazing
- exclude livestock to protect watercourses and improve the ecological values of existing remnant vegetation
- revegetate non-remnant pastures
- link existing vegetation remnants and improve connectivity of regionally significant wildlife corridors
- exclude cattle, as grazing is considered harsh on ecosystem health.

6.1.5 Coordinator-General's conclusions

Vegetation and flora

I consider that impacts on vegetation communities will be minimised by implementing the mitigation measures outlined in the EIS, AEIS and draft EMP, such as staged clearing.

Indirect impacts to vegetation communities may arise from subsidence of areas overlying the underground component of the mine. I accept the EIS findings that these impacts are likely to be minor, localised and largely confined to 'least concern' communities and previously cleared areas which can be effectively monitored and managed through an adaptive subsidence management plan in accordance with the proposed EM Plan. I have stated a condition requiring a Subsidence Management Plan to be developed and implemented prior to commencing activities that cause subsidence.

In regard to listed threatened flora species under the NC Act, I am satisfied that impacts would probably be confined to a limited number of populations of near-threatened species. Appropriate management of vegetation and flora will be required under the Pre-clearance Surveys and TSMP outlined in Appendix 2.

Fauna

I consider that the EIS and AEIS adequately identified potential impacts on native fauna. I consider that the proposed mitigation and management measures are appropriate to manage the impacts and that the long-term viability of species or their distributional range would not be threatened.

Aquatic ecology

I consider the likely impacts on aquatic ecology have been adequately identified in the EIS and AEIS. I am satisfied that the development of management plans with specific measures to minimise impacts associated with construction and operational activity and ongoing monitoring will mitigate impacts to acceptable levels.

Through the provisions of the EM Plan, the proponent will be required to ensure mine operations minimise impacts to waterways. The conditions of the EA would ensure impacts on water quality and aquatic flora and fauna are managed to acceptable standards.

Offsets

I have imposed a condition in Appendix 3 that requires the proponent to finalise an offsets strategy following the Commonwealth Minister for the Environment's decision on the project. The strategy must include any new information relevant to the state values offset determination obtained since preparation of the EIS and AEIS. I will review and approve a final offsets strategy that includes my state values offset determination.

6.2 Land use

The project area consists of predominantly low-lying undulating land with shallow relief ranging from 378m above sea level to 450m above sea level. The western portion of the project area contains the northern edge of the Carnarvon Range

Land in the project area is principally used for low-intensity beef cattle grazing with the majority of the area already cleared for improved pasture. This section addresses the project's impacts on those land uses including soils, land suitability and stock routes.

There are six leasehold grazing properties within or intersected by the mine component of the project. The project will alter land use in the local area by reducing the amount of land available for agricultural purposes during the operational phase. Additionally, as part of the proposed South Galilee Offset Plan, the offset area of 21 854 ha will be destocked and exclude domestic livestock. As the offset is to be delivered in two stages (Epsilon and the South Galilee main project), destocking will occur

progressively to reflect these stages. Grazing may continue in areas not directly disturbed as a result of the project.

The infrastructure corridor, proposed to connect the project to the Galilee Basin SDA common use rail line, intersects a further nine properties. The EIS did not detail the proposed off-site works for this connection. Detailed assessment of these works will be undertaken through a subsequent approvals process.

6.2.1 Impacts and mitigation

Soils

The proponent undertook a soil survey and land suitability assessment of the project area, which recorded soil profiles and landscape features at 102 sites. Fifty-eight soil samples from thirteen profiles representing the main soils within the project area were analysed.

Eleven soil types were identified in the project area. Soil analysis indicated a general lack of acidity and salinity. Soil acidity and salinity can impact on plant growth and future rehabilitation. Approximately 80 per cent of the project area has thick topsoil layers suitable for post-mining rehabilitation.

No areas within the project area are included in the Contaminated Land Register or the Queensland Environmental Management Register.

Topsoil will be removed and stockpiled in dedicated topsoil areas around the mine for later use in mine rehabilitation.

An Erosion and Sediment Control Plan will be developed and implemented prior to the commencement of construction to manage potential impacts. The plan will contain standard erosion control measures, specific measures applicable to particular areas and processes and details of the monitoring and reporting program. Erosion and sediment control will form part of the conditions of the future EA.

Land suitability

The project is not located within a Priority Agricultural Area under the *Regional Planning Interests Act 2014* (RPI Act) and does not constitute a regulated activity under the current Regional Planning Interests Regulation 2014. Therefore, the provisions of the RPI Act are not relevant to the project.

The project area contains approximately 780 ha of good quality agricultural land (GQAL). However, there will only be a minor impact as only about 5 ha of GQAL would be directly disturbed by the proponent.

Activities associated with the project would not limit the land-use suitability of the areas surrounding the project area. The proposed post-mining land use comprising a mosaic of self-sustaining vegetation communities and grazing land, using appropriate native tree, shrub and grass species and improved pasture species where suitable, will result in sustainable land use. A proposed offset area of 21 854 ha will exclude grazing. The limits to cattle grazing of the post-mining landforms within the project area will depend on the slope of the land.

Rehabilitation

Broad rehabilitation strategies are outlined in the EIS. The main objectives are:

- creating a landform similar to pre-mining unless other beneficial land uses are agreed
- rehabilitating mine wastes and disturbed land to a self-sustaining condition or an agreed post-mining land use
- capturing all mine affected water and maximising on-site storage capacity so existing and future use of downstream water is not compromised.

The proponent has committed to producing a rehabilitation management plan with performance criteria that will be submitted to DEHP as part of the required EM Plan. The proponent is committed to the salvage and use of all topsoil suitable for rehabilitation and will develop a Topsoil Management Plan as part of the EM Plan.

Progressive rehabilitation will commence within one year of when areas become available for rehabilitation purposes. Land will be regarded as successfully rehabilitated when targets for land suitability, land use, landform stability and land contamination have been met.

The impacts of subsidence are addressed in section 5.7.

Stock route

The project's external infrastructure corridor intersects a stock route (Alpha to Drummond), which runs parallel and to the north of the Central Western Railway. Current DNRM policy is that the stock route network is to be retained to ensure the future connectivity of the network. The proponent has committed to consult with landholders and DNRM regarding the alignment of this stock route. I have made a recommendation for the proponent to document and implement management measures for gazetted stock routes impacted by the project that provide safe passage across the project for stock, personnel and the general public, and maintain the route in accordance with any agreements reached with relevant stakeholders.

6.2.2 Coordinator-General's conclusions

The proposed post-mining land use and the progressive rehabilitation plan outlined in the EIS will minimise the long-term impacts on soils.

I note the proponent's commitment to salvage and use topsoil in rehabilitation.

I am satisfied that the impacts on existing agricultural activities will be minor. I expect that any economic loss as a result of any agricultural land acquisition would be dealt with in negotiations between the landholder and the proponent.

The Erosion and Sediment Control Plan to be developed for the EA, and implemented prior to the commencement of construction, will minimise loss of soil from the mine site.

I have recommended a condition requiring the development and implementation of erosion and sediment control measures for the project outside the mining lease to minimise erosion and sediment release to receiving waters.

I acknowledge the importance of stock routes to the rural community and have made a recommendation that stock route connectivity be maintained.

6.3 Air quality

The EIS described the potential impacts of the project on ambient air quality at nearby potential sensitive receptors. A revised air quality assessment, including modelling for the initial stage Epsilon mine, was contained in the AEIS.

In both the EIS and AEIS, potential impacts were assessed against the Environmental Protection (Air) Policy 2008 (EPP(Air)) objectives for ground level concentrations for total suspended particles (TSP), particles with a diameter of less than 10 µm (PM_{10}) and particles with a diameter of less than 2.5 µm ($PM_{2.5}$). Dust deposition rates were also assessed against relevant guidelines.

6.3.1 Impacts

During mine construction, particulate emissions would occur as a result of clearing topsoil and vegetation, excavating and transporting waste material, blasting activities, vehicle traffic on unpaved roads, and exhaust emissions from vehicles and machinery.

Emissions will also occur during the project's operations, due to graders and dozers; draglines; trucks, shovels and scrapers; dumping and spreading of overburden and interburden; conveying and dumping of ROM coal; loading and unloading of stockpiles; blasting; transporting materials; and loading of trucks and trains.

No hazardous or toxic pollutants are expected to be released from the mining activities at quantities to be of concern to human or environmental health. Odour may occur from mining related activities including the burning of fuel, equipment use or explosive usage. As the sources of gaseous emissions are widely dispersed, have low emission levels and localised impacts the likelihood of exceeding environmental air quality limits beyond the MLA boundary is minimal. I stated conditions for inclusion in the draft EA for the project requiring that air quality objectives must be met.

Sensitive receptors

The proponent has modelled the extent of particulate emissions from the mining activity in the surrounding area. Locations potentially subject to impacts from these emissions are known as sensitive receptors.

Eleven potential sensitive receptors were identified within 19 km of the closest approach to the project's disturbance area. The sensitive receptors include the homesteads of grazing properties, the Alpha township and the proposed on site accommodation village. The closest receptors to the surface works are the project's accommodation village (three km), Chesalon Homestead (six km) and Creek Farm and Oakleigh Stations (eight km). Alpha township is 14 km from the surface works.

The potential sensitive receptors are identified in Figure 6.1.

The accommodation village, while a potential sensitive receptor is not regulated under the provisions of the mine's environmental authority. The accommodation village is

classed as a workplace and is therefore required to have adequate mitigation measures put in place by the proponent in accordance with the *Work Health and Safety Act 2011*.

Predictive modelling outputs

Short and long-term background air quality/dust monitoring was undertaken to understand the current air environment of the project site. The short-term monitoring found that the air emissions were typical of a rural grazing area, with existing PM_{10} levels relatively low. Dust sampling conducted at representative sensitive receptors was within EPP (Air) limits for $PM_{2.5}$ and PM_{10}.

Modelling was used to predict potential ground-level concentrations of pollutants at surrounding potential sensitive receptors for the different South Galilee Coal mine stages.

Two modelling scenarios were undertaken, in year 3 (initial phase of the mine) and year 26 (fully developed mine), based on the maximum waste rock extraction likely during the life of the mine and worst-case meteorology (using a two-year simulation period).

The modelling results for year 3 of the project concluded that the $PM_{2.5}$ levels would meet the limits at all sensitive receptors. The maximum PM_{10} (24-hour) concentration would exceed the limit at the accommodation village for one 24-hour period. Annual average particulate and dust limits would be met at all sensitive receptors. These results are within the EPP (Air) objective limits.

In year 26, the modelling predicted that the $PM_{2.5}$ levels would comply with the limits at all sensitive receptors. The maximum PM_{10} (24-hour) concentration would exceed the limit at the accommodation village for three days per year. The PM_{10} (24-hour maximum) concentration would exceed the limit at Villafield Station Homestead on one occasion. The TSP (annual average) limit and dust limits would be met at all sensitive receptors. Dust mitigation measures are summarised in the next section. These results are within the EPP (Air) objective limits.

Epsilon Mine stage

Separate air dispersion modelling for the Epsilon stage was undertaken on the footprint encompassing the open-cut mining area.

The results showed that the $PM_{2.5}$ levels complied with the EPP (Air) objective limits at all potential sensitive receptors. The maximum PM_{10} (24-hour) concentration exceeded the limit at the project's accommodation village for one 24-hour period.

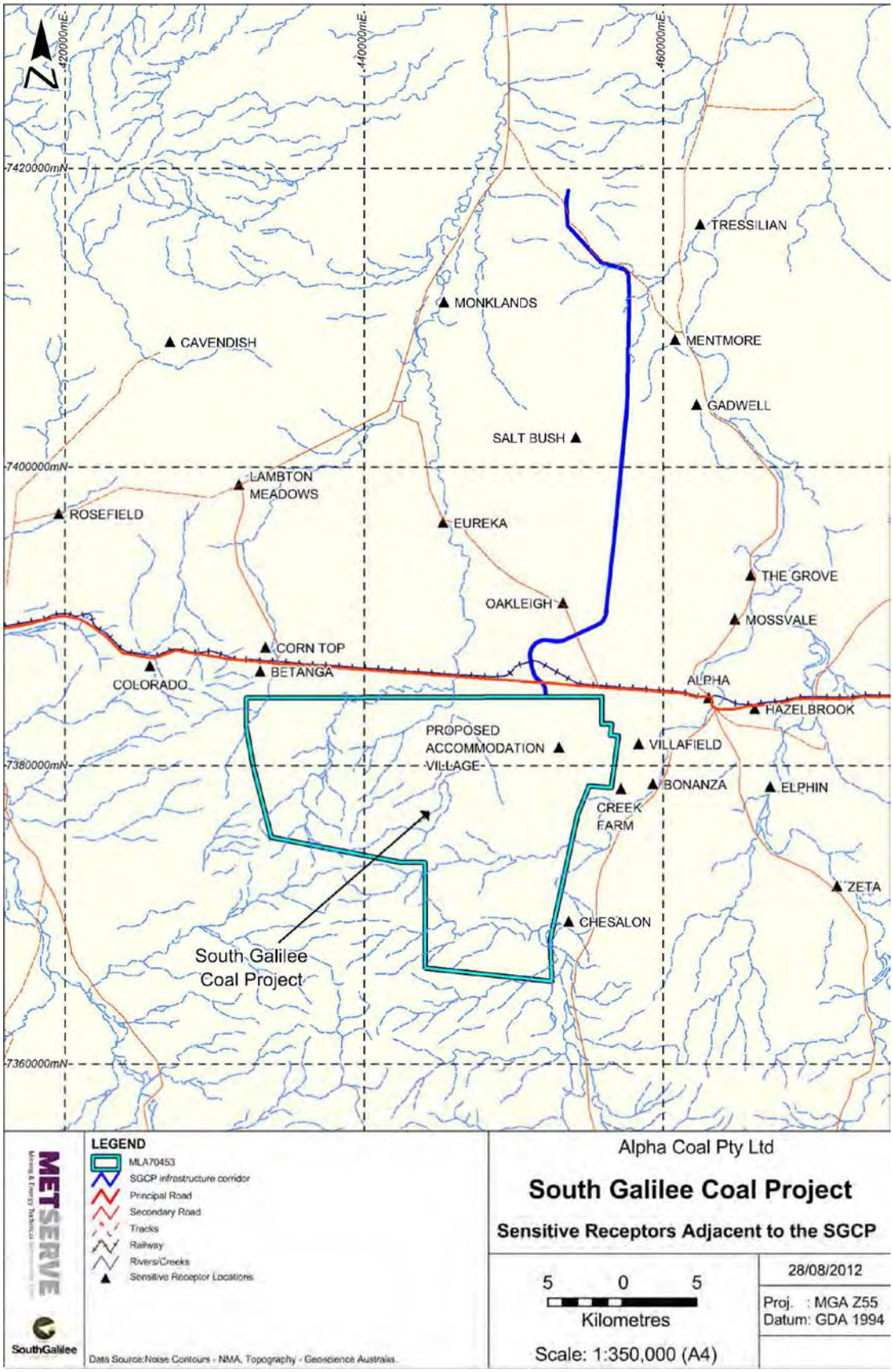

Figure 6.1 Sensitive receptors

6.3.2 Mitigation measures

Although the overall air quality impact of the project is low, the proponent will implement dust minimisation strategies, particularly during wind events, committing to:

- develop and implement a Dust Management Plan to mitigate adverse air quality impacts under worst-case meteorological conditions. Specific commitments of the plan include:
  - disturb only the minimum area necessary for mining
  - rehabilitate promptly
  - use water sprays and water trucks to suppress dust in coal-handling areas
  - maintain water sprays on raw and product coal stockpile and transfer points
  - ensure adequate groundcover is maintained
  - maintain haul roads in good condition investigate the use of chemical suppressants if haul roads become too slippery
  - keep other road usage to a minimum and maintain roads in good condition
  - use water trucks regularly to suppress dust
  - keep waste rock areas moist, particularly if used by dump trucks, and keep recently spread material moist to encourage crusting of surface
  - transport coal by rail in accordance with the QR Network (2010) *Coal Dust Management Plan*.
- implement long-term dust monitoring to address:
  - potential PM_{10} (24-hour maximum) exceedence at the proposed accommodation village in year 3
  - potential PM_{10} exceedence (24-hour maximum) at the proposed accommodation village and Villafield Station Homestead in year 26
  - future dust exposure levels from the neighbouring Galilee Coal project
- investigate complaints and, if substantiated, implement the measures prescribed in the Dust Management Plan
- produce a monthly report detailing air quality results and publish it on the proponent's website.

6.3.3 Coordinator-General's conclusions

I am satisfied that, based on the predictive modelling undertaken, the human health and ecological risks associated with dust and other air emissions from the project are relatively low. The proponent proposes to meet air quality objectives to ensure the project does not adversely impact human or ecological health by implementing the mitigation measures outlined above.

Additionally, I am satisfied that the combined impacts of the other mines to the north—Galilee Coal, Alpha Coal and Kevin's Corner—and this project would not lead to significant impacts on sensitive receptors.

The proponent has committed to developing and implementing a Dust Management Plan and to transport coal by rail under the guidelines of the QR Network (2010) *Coal Dust Management Plan*.

To ensure these outcomes, I have stated a condition in Appendix 1 for inclusion in the draft EA for the project that dust impacts must meet acceptable air quality objectives.

The development of a Dust Management Plan, in conjunction with the proponent's other commitments and my conditions and recommendations in Appendix 2, should ensure that air quality impacts of the project are adequately managed and air quality objectives would be met at all sensitive receptors.

6.4 Noise and vibration

The noise created by the project could affect sensitive receptors, including homesteads on grazing properties, the Alpha township and the project's accommodation village.

The outcome I require is that the project, with the application of appropriate mitigation measures, operates without creating adverse noise and vibration impacts on sensitive receptors, buildings and infrastructure in close proximity to the project

6.4.1 Noise

Noise modelling for the South Galilee coal mine stages was undertaken in the EIS, with the Epsilon initial development stage modelled in the AEIS. The EIS identified 11 potential sensitive receptors within 19 km of the closest approach to the project including the accommodation village. Two homesteads, Chesalon and Creek Farm (the two closest sensitive receptors) are located 1 km from the lease boundary, but 6 km and 8 km respectively from surface works.

Impacts

While the largest noise events will be associated with blasting, haul trucks and other mobile equipment will cause temporary noise impacts, with dump trucks the dominant noise source.

The noise modelling for the EIS found that noise would meet the objectives of the Environmental Protection (Noise) Policy 2008 (EPP (Noise)) for most of the sensitive receptors. However, Creek Farm Homestead and Chesalon Homestead are predicted to not meet noise limits for 15 per cent of the time during the night. This can be mitigated be management of the timing of use and operational location of heavy equipment and installation of bunding. Predictive noise levels for Alpha township (7 km from the lease boundary and 14 km from surface works) were found to comply with the goals for all time periods.

The AEIS modelled noise impacts associated with the Epsilon stage of the project. Similar to the findings for the South Galilee Coal stages of the project, the modelling showed that indoor noise goals would be met at all locations at all times, except the accommodation village. Chesalon Homestead is predicted to be impacted by the Epsilon stage in relation to background noise creep at night for 15 per cent of the time.

Mitigation

Mine construction will be regulated by an EA and supported by an EM Plan containing measures to mitigate impacts to sensitive receptors and acoustic environmental values.

Mitigation measures proposed include:

- the development and implementation of a Noise Management Plan which will include limits for operating equipment in highly exposed locations at night time
- operation of heavy equipment behind bunding
- management of the timing of use and the operational location of heavy equipment
- installation of noise mitigation measures such as closed windows and air conditioning at the accommodation village.

During the Epsilon mine stage, the proponent will adjust work activities and install noise monitors to comply with operating limits at the Chesalon Homestead.

6.4.2 Vibration

Impacts

Vibration will be caused by blasting at the mine site, however the EIS indicated that blasting vibration and overpressure goals set by the proponent would be met for all sensitive receptors, homesteads, buildings and infrastructure.

Mitigation

Measures proposed by the proponent to manage vibration impacts include:

- conducting blasting in accordance with the DEHP Ecoaccess guideline “Noise and Vibration from Blasting”
- restricting blasting to specific time periods—9 am and 3 pm Monday to Friday, and 9 am to 1 pm Saturday

The proponent has also committed to achieving and maintaining the level of noise and vibration which is outlined in the EA.

6.4.3 Coordinator-General’s conclusions

I am satisfied that the EIS and AEIS have adequately assessed noise and vibration impacts for the project.

The proponent must meet the conditions in the project’s EA for all noise and vibration sources relevant to sensitive receptors. These conditions will be based on the DEHP model mining conditions and will be determined by the administering authority after the completion of this report.

I am satisfied that the mitigation measures proposed and the commitments made by the proponent will effectively manage the potential noise and vibration impacts.

6.5 Waste

6.5.1 General waste

The project will generate non-mineral waste during the construction and operation phases, including:

- hydrocarbon waste
- paints and resins
- chemicals and herbicides
- excess spoil from construction
- vegetation
- batteries
- tyres
- food waste
- recyclable waste
- wood waste
- scrap metal
- sewage.

The proponent has committed to preparing a Waste Management Plan that would include strategies for:

- managing general waste in accordance with the waste and resource management hierarchy in the *Waste Reduction and Recycling Act 2011*—namely, to avoid, reduce, re-use, recycle, treat and dispose
- characterising and separating waste
- assessing waste reduction opportunities for identified waste
- training personnel and contractors.

Treatment, storage and transport of regulated waste from the mine site requires an approval under the EP Act. The movement of regulated waste is also subject to a waste tracking system under the EP (Waste) Regulation.

Sewage treatment will be undertaken during construction and operation. Sewage sludge will be transported off site by a licensed contractor. The treatment and transportation of sewage will be regulated by the conditions in the EA for the project.

Proponent commitments relevant to general waste include:

- development of a Waste Management Plan
- segregation of regulated wastes
- containment of any spillage of combustible liquids
- appropriate design of hydrocarbon and chemical storage areas.

6.5.2 Mine waste

Mine wastes are the materials disturbed during mining (overburden and interburden) and coal processing (coarse and fine rejects), which do not have marketable value and are disposed of on site.

The open-cut mining process will involve stripping topsoil and waste rock. Approximately 919 million cubic metres of waste rock and 48 million tonnes of coarse and fine rejects will be removed over the life of the project.

Waste rock characterisation and management

Geochemical analysis conducted indicated that the bulk of overburden/interburden is likely to be non-acid forming (NAF) waste. The bulk of the overburden is not expected to be an immediate source of salinity. Some potentially acid forming (PAF) material within 5m of D1 seam is likely to be fast-reacting when exposed to atmospheric conditions.

All PAF material will be selectively handled to ensure that the potential for acid rock drainage is limited. PAF material stored in a waste rock emplacement will have a 10m cover of NAF material over the waste rock emplacement. The EM plan and EA will also address waste rock management.

The proponent has committed to continue geochemical sampling and assessment over the life of the project to validate mine waste characteristics and proposed management measures.

Coal rejects

Approximately 1.5 mtpa of will be produced by the coal washing and handling plant. The mining truck fleet will transport these rejects to the waste rock emplacement, where they will be covered with a 10m NAF cover. Coal-reject material will not be placed at the base or on the surface of any waste rock emplacements.

6.5.3 Coordinator-General's conclusions

I am satisfied that the EIS sufficiently addressed the potential impacts associated with waste generation, management and disposal as well as sewage treatment and quality. I conclude that proponent commitments, and the mitigation measures in the proposed Mine EMP and Waste Management Plan will be sufficient to manage general and regulated waste over the life of the project.

I have also stated conditions regarding general waste on the mining lease.

The proponent must meet the conditions in the project's EA for the treatment of sewage. These conditions will be determined by the administering authority during the next project stages.

Regarding mine waste, I accept that the proponent's findings that the bulk of overburden/interburden is likely to be NAF waste and that most of these materials are not expected to be an immediate source of salinity. I am satisfied that the proponent

has adequately examined options for disposing of coarse rejects and that the management proposals outlined in the EIS and EM Plan would mitigate impacts.

6.6 Transport

The EIS and AEIS addressed transport impacts on the regional and local road network, the rail network and Alpha Aerodrome.

Local roads near the vicinity of the mine and the township of Alpha are controlled by BRC and are largely unsealed, servicing local rural properties. Two state-controlled roads exist within the vicinity: the Capricorn Highway and Clermont–Alpha Road.

The Epsilon stage will connect to the Central Western Railway (via a two kilometre rail spur off lease) for a proportion of inward freight as well as for transporting coal to the Port of Gladstone.

6.6.1 Impacts and mitigation

Roads

Impacts

Road impacts have been addressed in accordance with DTMR's *Guidelines for Assessment of Road Impacts of Development* (GARID).

The road traffic analysis in the EIS concluded that the increase in traffic generated by the project during construction and operations would not have a significant impact on the road network.

Additional traffic on the Capricorn Highway, in particular the impact on sections with narrow seal widths between Emerald and Alpha, will need to be monitored. However, traffic calculations undertaken for the project predict that the traffic volumes would be lower than the capacity of the Capricorn Highway. Further work is required by the proponent on the potential pavement impacts of the project on these roads.

Of concern for BRC and DTMR is the predicted movement of heavy and over-size vehicles and their impacts on road infrastructure.

Mitigation

The proponent has committed to provide maintenance contributions to DTMR for any specific road impacts identified during the detailed design stage. Additionally, the proponent has committed to maintaining transport safety, efficiency and the condition of road operations and assets.

A new road will need to be constructed to allow site access. Access will be via a proposed T-junction onto the Capricorn Highway requiring an Auxiliary Right Turn and Auxiliary Left Turn at the intersection of the Capricorn Highway and the mine access road, and will be funded by the proponent. Further consultation on the design and standard of this road will be required with DTMR as part of the proponent's RIA.

The proponent has committed to developing a Transport Management Plan for the Mine Development works prior to the commencement of mine construction in consultation with DTMR and other key stakeholders. This will include addressing road safety.

Appendix 2, Part C sets out transport mitigation requirements for the project which cover transport infrastructure, traffic management plans, road impact assessment (RIA) and road use management plans. These conditions require the proponent to implement all necessary measures to mitigate adverse impacts on the safety, conditions and efficiency of state controlled and local roads for all stages of the project. This will include submission of an impact management program to DTMR and the preparation of an RIA, a construction traffic management plan and a road use management plan.

Rail

Epsilon stage impacts

The Epsilon stage requires access to the QR Central Western Railway. The proponent proposes to build a spur line (approximately 5–10 km with 2 km off the lease) to link its site and grade separation will require the spur to be taken under the Capricorn Highway.

Further consultation will be required with DTMR in regard to rail crossing lights/boom gates for state-controlled roads for intersections between the project site and Emerald, should the Central Western Railway option be progressed. The proponent will need to assess this impact further and submit additional documentation to DTMR in accordance with the Australian Level Crossing Assessment Model (ALCAM) for assessing level crossings.

It is estimated that the construction stage will generate up to nine train movements per week on the Central Western Railway.

South Galilee Coal mine impacts

For the South Galilee stages of the mine, the proponent intends to obtain access to the Galilee Basin SDA rail corridor to Abbot Point. At peak production 14 rail movements per week would be needed. The rail underpass under the Capricorn Highway and an approximately 70km connecting line would be utilised to access the Galilee Basin SDA rail corridor.

Coal dust management

The impact of coal dust releases from coal trains leaving the site will be managed by the proponent applying the QR Network 2010 *Coal Dust Management Plan* or equivalent. Dust mitigation measures would include veneering, wagon loading systems that profile coal piles to avoid wind erosion and monitoring of coal dust emissions to air.

Air transport

The Alpha Aerodrome is owned and managed by BRC and is rated for light aircraft only. This project and other proposed Galilee Basin coal projects could see a large

increase in the number of flights and with a preference for a FIFO workforce by Galilee Basin proponents, an upgrade will be required to the aerodrome to accommodate larger aircraft.

The AEIS indicated that the project will result in an increase of up to 18 air movements per week. However, the estimated collective impact from other Galilee Basin projects including the Alpha Coal project, the Galilee Coal project (Northern Export Facility) and this project would add up to 91 weekly air movements during construction and 63 during operations.

The proponent has committed to assist in upgrading the Alpha Aerodrome commensurate with the project's use of the facility.

6.6.2 Coordinator-General's conclusions

I am satisfied that the EIS process adequately investigated the impacts of the project on the local and state-controlled road networks.

The proponent must update the RIA as more detailed information becomes available during the detailed design phase, as I have recommended in my conditions.

I require the proponent to undertake further consultation with DTMR relating to road impacts which will need to be addressed in a RIA or infrastructure agreement. Based on the mitigation commitments in the EIS and AEIS, conditions in this report and the approvals required for the project under the TI Act for state-controlled roads and local government legislation for local roads, I am satisfied that impacts to the road network can be effectively managed.

Regarding air transport impacts, a number of proponents of coal projects in the southern Galilee Basin (including the project proponent) propose to utilise the Alpha Aerodrome as a FIFO destination for construction and at least part of their operations. I support the development of a single aerodrome for FIFO operations to improve regional operational efficiency and for the opportunity it provides to the local community for improved air services including health services.

To achieve this, the Alpha Aerodrome will require a significant upgrade and the cost should be borne equitably by participating proponents that will derive the main benefit from the upgrade. Proponents, including GVK Hancock for the Alpha Coal project and Waratah Coal Pty Ltd for the Galilee Coal project, must consult and reach agreement with BRC, as the owner and operator of the facility, on the scope of the upgrade work, timings and method of cost apportionment.

6.7 Cultural Heritage

This section evaluates impacts on Indigenous cultural heritage (ICH) and non-Indigenous cultural heritage (NICH) sites and items. For my evaluation of the broader social and economic opportunities for, and impacts on, the local Indigenous community and region, refer to section 7.2 of this report.

6.7.1 Indigenous cultural heritage

Indigenous cultural heritage in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003* (ACH Act). To comply with the duty of care provision under section 23 of the ACH Act, the proponent must prepare a Cultural Heritage Management Plan (CHMP), which is an agreement between the proponent and the native title claimants that provides for the identification and management of ICH.

The project is located within the boundary of the currently registered native title claim by the Wangan and Jagalingou People (Federal Court No. QUD 85/04). In accordance with the ACH Act, a CHMP was executed with the Wangan and Jagalingou People on 11 July 2011 and approved by DEHP on 5 August 2011.

No Indigenous cultural heritage items were identified during the exploration and drilling processes and the project is not expected to impact directly on any currently listed ICH values.

Potential indirect impacts on items or sites of ICH may arise from vegetation clearing and ground disturbance to accommodate project elements; erosion on stream banks and drainage lines; spoil placement; and subsidence in underground mining areas.

Mitigation measures will ensure impacts on ICH are minimised and include:

- conducting a comprehensive field survey prior to surface disturbance
- demarcating any sites on which identified Indigenous cultural heritage features are found near areas of proposed surface disturbance, where practicable, to minimise the risk of accidental damage
- collecting and relocating significant ICH features, where disturbance is unavoidable and where practicable
- training employees and contractors
- developing and implementing a monitoring program (in consultation with Wangan and Jagalingou People) before construction, to monitor the potential impact of project activities, should significant ICH features be identified.

Coordinator-General's conclusions

Based on the measures proposed in the EIS, the registered CHMP and the legislative requirements of the ACH Act and Commonwealth *Native Title Act 1993 (*NT Act), I am satisfied that impacts on ICH would be appropriately managed throughout the life of the project.

Implementing these measures would satisfy the duty of care requirements under the ACH Act and NT Act, and would ensure ICH places and objects are adequately identified and managed by the proponent and the native title claimants as custodians of their cultural heritage.

6.7.2 Non-Indigenous cultural heritage

Non-Indigenous cultural heritage field surveys were undertaken across the site in late 2011. The project area does not contain any sites listed on the national, state or local

government NICH registers. However, sites may exist within the project area that have not yet been recorded.

Two sites in the area were assessed as meeting the threshold for local heritage significance—Sapling Creek Overshot and Creek Farm Overshot (outside of the project site and infrastructure corridor). Before ground disturbance activities, the Sapling Creek Overshot would be demarcated and signed to avoid accidental damage associated with project activities.

To manage cultural heritage impacts, a non-indigenous CHMP will be developed prior to construction. Further, the proponent has committed to provide cultural awareness training to its workforce through site inductions and a plain English manual on NICH.

I have recommended that the proponent prepare and document procedures for identifying and managing impacts on NICH for the construction and operational phases in any application for an MCU or development approval for project components not on the mining lease.

I recognise that there is potential for additional heritage sites and objects to be uncovered during project construction. If any heritage values are discovered, I require the proponent to follow the discovery process set out in Section 16.5.1 of the EIS.

Coordinator-General's conclusion

Based on the measures identified in the Proponent Commitments Register (Appendix 5) and EMPs, the requirements of the *Queensland Heritage Act 1992* and my recommendation (Appendix 2), I am satisfied that impacts to NICH would be appropriately managed throughout the life of the project.

6.8 Hazard and Risk

Hazards are defined as a situation or an object with the potential to cause harm to people or property. Risk can be defined as the likelihood and severity of harm occurring from an identified hazard.

6.8.1 Risk assessment and management

The proponent undertook a preliminary assessment of hazard and risk in accordance with AS/NZS ISO 31000:2009 *Risk Management Principles and Guidelines.* The assessment focused on potential harm to people and property, including on-site personnel, contractors, visitors and people who live/work in close proximity to the project.

The assessment considered strategies to manage fire, health, emergency situations and surrounding land holdings during construction, operation and decommissioning. Hazards were scored according to their likelihood of occurrence and potential consequence. Twenty-seven hazards were identified as having the potential to occur during construction, operations and decommissioning, and of these, 19 were scored as 'high' risk.

The 11 potential sensitive receptors identified within 19 km of the closest approach to the project's disturbance area are pastoral homesteads. The potential impacts and risks to these areas were assessed as 'low'.

The identified hazards include:

- transporting, storing and using dangerous goods and hazardous substances
- strata failure
- fire and explosion
- vehicle collisions
- inrush hazards (where significant quantities of water or other fluid material that have the potential to flow swiftly or release into or within an underground coal mine)
- outburst hazards (of gas or coal) from an underground mine
- blasting
- pit inundation
- natural hazards (flood, bushfire)
- emergency response plan.
- rail corridor, including train derailments.

Chapter 19 of the EIS detailed some of the project-specific risks and the proposed mitigation measures. The risk assessment concluded that, once management measures are implemented, the residual risk would not exceed generally accepted levels.

6.8.2 Risk management system

In addition to specific measures to mitigate identified risks, the proponent will also implement a Risk Management System, based on the *AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines*. The system will identify, analyse and evaluate potential ongoing risks throughout the life of the project, in consultation with relevant internal and external stakeholders. The system will be regularly reviewed to ensure the risk mitigation measures remain current throughout the life of the project.

6.8.3 Health and safety

Potential health and safety impacts on both off-site sensitive receptors and on-site personnel have been identified in the context of activities associated with construction, operation and decommissioning. The majority of health and safety risks for the project are contained on the mine lease, with very little impact to the 11 potential sensitive receptors identified within 19 km of the closest approach to the project's disturbance area.

Potential health and safety risks on nearby sensitive receptors, relating to water quality, air quality and noise and vibration impacts, would be well within acceptable limits once mitigation and management measures are implemented. Overall, the impacts are classified as minor at a local level and negligible on a regional, state or national level (refer to sections 5.7.3, 6.3 and 6.4 for further detail).

6.8.4 Coordinator-General's conclusions

I am satisfied that the potential risk to nearby sensitive receptors is low and that residual risks would be well within acceptable limits, once mitigation measures are implemented on site.

I note that the proponent has committed to further review management plans in consultation with relevant stakeholders (refer to section 4.2), and that the proponent's Commitment Register at Appendix 5 outlines a detailed approach to minimising risk.

Based on the proposed mitigation measures, management plans, proponent commitments and EA conditions to address broader health concerns such as air quality, water and noise, I am satisfied that the hazards and potential health and safety impacts will be appropriately managed throughout the life of the project.

6.9 Greenhouse gases

Under the *National Greenhouse and Energy Reporting Act 2007* (Cwlth) (NGER Act), the proponent must report on greenhouse gas (GHG) emissions.

The NGER Act prescribes an accounting methodology and includes the following scope definitions for emissions that are attributable to a project:

- Scope 1 (direct emissions)—must be reported
- Scope 2 emissions (indirect emissions from the consumption of purchased electricity)—must be reported.

Scope 3 includes all indirect emissions that are not included in Scope 2, and are a consequence of the activities of the facility but occur at sources or facilities not owned or controlled by the entity. Reporting Scope 3 emissions is not mandatory.

In accordance with the NGER Act accounting methodology framework and the TOR for the project, the proponent did not assess Scope 3 emissions.

The TOR required the proponent to address the loss of carbon sink capacity due to vegetation clearing. Scope 1 and Scope 2 emissions were calculated for the life of the mine. The loss of carbon sink capacity was also calculated.

6.9.1 Impacts

GHG emissions will be generated as a result of:

- operating the mine, including draglines, the coal handling and preparation plant and lighting, using electricity consumed from the grid (Scope 2)—which will be the largest contributor to GHG emissions
- fuel consumption associated with constructing and operating the mine (Scope 1)—primarily diesel consumption by fleet vehicles
- explosives combustion (Scope 1)
- wastewater treatment (Scope 1)
- emissions of coal seam gas from underground mining operations (Scope 1)
- vegetation clearance (Scope 1).

The GHG assessment reported that the project's maximum annual GHG emissions will be approximately 357 kilotonnes CO2-e, which is 0.00065 of the 2008/09 Australian emission total.

In accordance with the provisions of the *Energy Efficiency Opportunities Act 2006* (Cwlth), the proponent must identify, evaluate and publicly report on cost-effective energy-saving opportunities if the project is anticipated to use over 0.5 petajoules of energy per annum.

6.9.2 Mitigation

The proponent has committed to implement the following strategies to minimise energy consumption, maximise energy efficiency and minimise GHG emissions:

- conduct periodic energy audits with a view to progressively improving energy efficiency
- implement measures to maintain efficiency of the dragline
- monitor compressed air circuit
- consider energy efficiency when purchasing electrical equipment
- consider fuel efficiency of haul trucks prior to purchase
- design access ramps to optimise truck diesel consumption.

These commitments are included in the Proponent Commitment Register (Appendix 5 of this report).

Climate change models predict hotter, drier and windier weather during the operating life of the mine. This may result in higher dust emissions; however, the changes are likely to be small and manageable based on current dust-control technology. More details are in the risk assessment of climate change-induced scenarios, undertaken as part of the EIS.

6.9.3 Coordinator-General's conclusions

I am satisfied that the GHG emissions assessments provided in the EIS adequately quantify the project's Scope 1 and 2 GHG emissions and that the GHG emissions and climate change assessments undertaken adequately quantify the expected impacts.

The proposed control strategies, EM Plan requirements and the proponent commitments are sufficient to minimise GHG emissions and effectively manage climate change impacts. I am satisfied that the proponent has assessed the GHG emissions attributable to the proposed mining activities and developed strategies to reduce GHG emissions in the design, construction and operation of the project.

7. Economic and social impacts

7.1 Economic impact assessment

The economic assessment was undertaken using the Input–Output method. This method modelled the project's direct and indirect impacts on the regional, state and national economies in terms of industry output, household income, employment and value added.

The capital expenditure for the project is expected to be $4.2 billion over the 33 year operational life of the project plus two years for construction; and operational expenditure is expected to be approximately $21.7 billion over the operational mine life.

This expenditure will significantly boost the regional and state economies and is expected to generate direct and indirect employment opportunities, and contribute significantly to the Queensland Government and Commonwealth Government in royalties and taxes, freight and port charges. The key benefits of the project include:

- coal royalties estimated at $2.8 billion to $4.9 billion of state royalties and $1.2 billion of Commonwealth royalties over the life of the project, depending on coal prices and exchange rate fluctuations
- export revenues of $40.3 billion to $62.7 billion over the life of the project
- projected employment of 1600 construction jobs, 1288 operational jobs and 300 decommissioning jobs
- an estimated $226.4 million in state payroll tax revenue, including payroll tax directly generated by mine site staff, and further revenue generated by flow-on jobs
- a contribution to Queensland Government revenue through annual tenure rents, annual land tax liability, annual port dues and stamp duties
- a contribution to federal government revenue through the minerals resource rent tax, company tax, and goods and services tax
- a contribution of approximately $41.3 billion in additional industry output to the Queensland economy and a boost to gross state product of approximately $21.6 billion
- an estimated $23.5 billion to value-added gross domestic product throughout construction and operation.

7.2 Social impact assessment

7.2.1 Overview

A social impact assessment (SIA) was conducted as part of the EIS. The SIA addressed the principles of the *Social impact assessment guideline* (DSDIP 2013) and recognised the complementary guideline *Managing the impacts of major projects in resource communities* (DSDIP 2013).

The SIA focused on two study areas. The first was Barcaldine Region, with a particular focus on Alpha (the closest town to the mine site) and directly affected landowners (landholders within MLA 70453 or the infrastructure corridor located to the north of the project). The second study area included Blackall–Tambo, the Central Highlands Regional Council (focusing on Emerald), and Isaac Regional Council.

The SIA identified the following positive impacts of the project:

- employment opportunities
- flow-on economic impacts (for example, increased spending, opportunities for local business development or expansion)
- increased Indigenous business opportunities
- increased training and employment opportunities for Indigenous Australians.

The SIA identified the following potential negative impacts:

- concerns regarding the influx of a large workforce into the area, potentially affecting residents' feelings of safety and security in their community
- increased cost of living due to inflationary pressure from higher disposable incomes
- increased demand for housing and accommodation
- disruption to road users.

The SIA concluded there were no adverse significant social or economic impacts, but considering regional and local needs will be critical. The proponent has committed to action plans to enhance positive and mitigate negative project impacts.

7.2.2 Action plans

Community and stakeholder engagement

The proponent engaged with the community and stakeholders as part of the SIA, consulting one-on-one with key stakeholders during community and technical reference groups. Stakeholders identified a 'changing sense of place' in the local, physical and social environment (particularly Alpha town) as a key concern.

As described in the Community and Stakeholder Engagement Plan, the proponent has committed to work closely with the community of Alpha to retain the values and lifestyle of a small community, while encouraging economic growth and business development in the region. The Community Safety and Wellbeing Plan (refer below) will also promote positive interaction between the workforce and local community.

The EIS identified some key areas of concern for landholders, including:

- groundwater extraction on the mine site potentially reducing the usable groundwater in the area
- mine site and associated infrastructure impacting on stock routes
- air, noise and dust
- weeds and pests
- complaints and dispute resolution.

The Landowner Management Plan includes actions to ensure the proponent communicates clearly and consistently about project activities, responds effectively to issues, and regularly reviews and updates land access procedures.

As part of Community and Stakeholder Engagement Plan, the proponent will implement an enquiry and complaints management system prior to commencing construction, which will detail plans for receiving, recording, tracking and responding to complaints within a reasonable timeframe. A community liaison officer will work with stakeholders and an Indigenous liaison officer will be responsible for ensuring Indigenous workforce and business opportunities are maximised.

Coordinator-General's conclusion

I consider that the stakeholder engagement, conducted as part of the SIA, was sufficient to identify potential project impacts. The proponent has developed plans and strategies for continued engagement and has committed to further developing the Community and Stakeholder Engagement Plan prior to construction.

I have imposed a condition requiring the proponent to provide annual reports to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period for the Epsilon and South Galilee mines, and for two years following the commencement of Epsilon and South Galilee mining operations. The report must describe the actions to inform the community about project impacts and show that community concerns have been considered when reaching decisions.

Workforce management

The proponent expects the workforce to be predominantly FIFO given the remote location of the project and because more skilled workers will be needed that cannot be provided locally. The proponent has considered sourcing FIFO workers from regions such as Bundaberg, Cairns, Fraser Coast, Townsville, Whitsunday, Brisbane and the Gold Coast.

Locals will be encouraged to apply for positions at the mine and if workers live within 20 minutes of the site, they will not be required to live on site. All other workers will be housed in the on-site accommodation village. With limited housing and infrastructure available in areas such as Alpha township, the on-site accommodation village will reduce the potential pressure from a large construction workforce. In addition, eight mine managers will be based in Alpha township and drive to the mine site.

Epsilon mine workforce

The Epsilon workforce is anticipated to consist of 150 workers for both construction and operations. The workforce will include FIFO workers based in Emerald, with a bus or drive-in, drive-out (DIDO) to the site, as well as employment of local residents where practicable.

South Galilee mine workforce

The peak workforce is anticipated to consist of up to 1600 workers (including contractors) during construction, with up to 1288 required during the operational phase and up to 300 workers during decommissioning. It is anticipated that the workforce would fly into Alpha Aerodrome then travel by bus to the mine.

Key strategies of the proponent's workforce management plan include:

- a Local Employment Policy that recruits locally, where practicable
- sourcing FIFO workers from areas of high unemployment (in Queensland) who travel to identified Queensland regional hubs
- developing training programs for delivery and/or private training providers
- recruitment programs that reflect equal opportunity and include disadvantaged groups—for example, Indigenous people, women, mature workers and disabled people
- a dedicated Indigenous liaison officer to provide employment information and business development and contracting opportunities to Indigenous people.

Coordinator-General's conclusion

I accept that the proponent's Workforce Management Plan includes strategies to recruit locally when possible, and recruit a FIFO workforce from areas within Queensland where there are high unemployment rates with high labour force capacity. I note the proponent's commitment to increase Indigenous workforce participation and to encourage women and disadvantaged groups into the workforce.

I expect the proponent to:

- provide training and development opportunities for people locally and regionally
- develop and implement workforce strategies, and to ensure appropriate monitoring and reporting
- maximise local employment opportunities over the life of the project, including opportunities for Indigenous people and other disadvantaged groups.

I have imposed a condition in for reporting on the actions to enhance local employment, training and development opportunities.

Housing and accommodation

The proponent's Housing and Accommodation Plan recognises that the majority of project staff will be housed in the on-site village which will include additional beds for service contractors and specialists. It will be used from the construction period of Epsilon to stages thereafter and through to full operation for the peak workforce. The village will include ensuite accommodation, laundry facilities, multi-purpose sports courts, gymnasium, swimming pool, restaurants and stores.

During the peak operational phase of the project, the proponent intends to base up to eight staff in Alpha township. Taking into account other proposed resource developments in the region, without adequate management measures there may be significant increases in population, increases in housing costs, and shortages in

housing and temporary accommodation. Alpha town is particularly vulnerable due to its population of 430 residents (Estimated Resident Population 2010) in 300 private dwellings and key land development constraints such as infrastructure limitations and flooding.

While the on-site village will limit housing impacts in the region to some degree, the proponent has committed to a number of strategies to reduce local and regional housing market impacts. These include:

- establishing joint strategies with other proponents, government agencies and service providers to plan for increased demand and services due to increased population from mine workers and families who may wish to relocate to the area
- monitoring housing availability and affordability in Alpha township and the BRC area, including monitoring timeframes and triggers for new land releases (e.g. may need to consider five-year look ahead)
- exploring options for delivering housing in Alpha, should workers decide to reside in Alpha township.

Coordinator-General's conclusion

The proponent's Housing and Accommodation Plan proposes initiatives to assist workers who wish to live locally, and strategies to mitigate against excessive demand on local services and infrastructure.

Implementing a monitoring program for the housing market will provide evidence of any potential impacts of the workforce on housing affordability and availability in Alpha and surrounds.

I have imposed a condition for reporting on the actions and adaptive management strategies to avoid, manage or mitigate project-related impacts on local and regional housing markets.

Community safety and wellbeing

The significant infrastructure, employment and economic changes occurring in the Galilee Basin will have a dramatic effect on the town of Alpha. The proponent has committed to a Community Safety and Wellbeing Plan that proposes strategies to ensure the proponent works collaboratively with locals, other proponents, key stakeholders and employees. The objectives of the plan are to:

- develop and implement a Good Neighbour Policy/Code of Conduct to guide positive interactions between the proponent staff, contractors and consultants, and the local community—particularly neighbouring landholders
- address health and wellbeing issues with key stakeholders
- support emergency services in the region during construction and operation of the mine
- minimise road safety risks to employees and the local community
- minimise the impacts on the safety and security of the local community

- provide support services to FIFO employees and their families to ensure social, cultural and religious values and needs are being met
- ensure the safety of the mine and its employees.

The proponent has also committed to participate in future planning and coordination processes to deal with regional impacts on infrastructure and services. Strategies will be jointly developed by industry, communities, local governments and state agencies, and will inform and align with regional planning priorities.

Coordinator-General's conclusion

I have imposed a condition for reporting on the actions to avoid, manage or mitigate project-related social impacts on local community services, infrastructure and community safety and wellbeing.

Regional business development and local content

In accordance with the *Queensland Resources and Energy Sectors Code of Practice for Local Content*, the proponent will implement a Local Content Plan that gives local industry full, fair and reasonable opportunity to be considered for project contracts. The plan's objectives are to:

- ensure local and regional businesses maximise growth as a result of the project, and are given fair and equitable access to tendering opportunities and supply chain services
- facilitate access to business opportunities for local and Indigenous businesses.

The proponent will also implement a Regional Capacity Building Program, which involves partnering with key stakeholders to deliver general business management seminars and to upskill local and regional businesses. Training will address areas such as business start-up, financial planning, resource management, occupational health and safety and financial stability and quality.

Local and regional businesses will be encouraged to tender for work, where they are technically capable and commercially competitive. This will aim to:

- diversify the local economy
- increase spending in the local area
- provide opportunities for local businesses to expand and develop.

Coordinator-General's conclusion

The proponent's SIA recognised the importance of local industry participation and the potential benefits for local and regional businesses as a result of the project. There is also potential to develop local supply chains through the procurement of local products and services.

I consider the opportunity for Indigenous participation an important element of the proponent's local content plan and acknowledge the proponent's use of the Black Business Finder to offer Indigenous businesses an opportunity to be involved and to benefit from the project.

I expect the proponent to be a signatory to the *Queensland Resources and Energy Sectors Code of Practice for Local Content* and to ensure that Queensland suppliers, contractors and manufacturers are given an opportunity to tender for project-related business activities for the Epsilon and South Galilee mining construction and operational phases.

8. Conclusion

The South Galilee Coal project has undergone a comprehensive environmental impact assessment. In undertaking my evaluation of the EIS, I have considered the following:

- the EIS and AEIS prepared for this project
- submissions on the EIS and AEIS, including agency advice
- IESC advice
- additional documentation provided by the proponent as requested.

I am satisfied that the requirements of the SDPWO Act have been met and that sufficient information has been provided to enable the necessary evaluation of potential impacts, and development of mitigation strategies and conditions of approval.

The environmental assessment commenced with the declaration of this coordinated project in June 2010 and has involved a comprehensive body of work by the proponent. More detailed work will occur in the detailed design phase of the project.

The potential impacts identified in the EIS documentation and submissions have been assessed. I consider that the mitigation measures adopted by the proponent and required by the conditions stated in this report would result in acceptable overall outcomes. Additionally, the future EA will include comprehensive environmental conditions.

Based on the information provided by the proponent and outlined in section 7, I conclude that the project would deliver economic benefits to both the local, regional and state economies. The employment benefits generated by the project over the 33 year project life will be significant with an estimated 1600 construction jobs, 1288 operational jobs and further indirect local, regional and indigenous employment opportunities to be generated. The project would also contribute to state and federal government revenue through taxes and royalties.

Accordingly, I approve the South Galilee Coal project, subject to the conditions and recommendations in Appendices 1 , 2 and 3. In addition, I expect that the proponent's commitments will be fully implemented as presented in the EIS documentation and summarised in Appendix 5 of this report.

To proceed further, the proponent will be required to:

- obtain EPBC Act approval
- obtain a range of State Government approvals for the project, including an EA and mining lease
- finalise and implement a range of management plans

- finalise the Biodiversity Offsets Strategy.

If there are any inconsistencies between the project (as described in the EIS documentation) and the conditions in this report, the conditions shall prevail. The proponent must implement all the conditions of this report.

Section 5 of this report describes the extent to which the material supplied by the proponent addresses the actual or likely impacts on MNES of each controlled action for the project.

Copies of this report will be issued to:

- Australian Government Department of the Environment
- DEHP
- DNRM
- DTMR
- BRC.

A copy of this report will also be available on the Department of State Development, Infrastructure and Planning's website at **www.dsdip.qld.gov.au/cg**

As per section 35A(b) of the SDPWO Act, this report will lapse three years from the date it is published on the department's website, or when an approval application is decided for the project, unless a later time is subsequently decided by the Coordinator-General.

Appendix 1 Stated conditions

Section 1 On-lease

This section includes the Coordinator-General's stated conditions for the draft environmental authority (EA) (mining lease) under the *Environmental Protection Act 1994* (EP Act) for the mine component of the project. These conditions are stated pursuant to section 47C of the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

These conditions do not form a complete draft environmental authority (EA) for the project. In accordance with the former section 203 of the EP Act, the proponent is required to develop and finalise an environmental management plan (EM Plan) before completion of the draft EA. This will be undertaken during the detailed design phase for the mine. Once the EM Plan is approved, the administering authority will develop additional conditions for issues not covered by the stated conditions. The additional conditions must be consistent with the stated conditions.

Schedule A – General

A1 This environmental authority authorises the 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, and

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.

A3 In carrying out the mining activity authorised by this environmental authority, the holder of this environmental authority must not exceed the disturbance area limits in Table A1.

Table A1 Disturbance area limits

Disturbance area	Area (ha)
Open-cut mining areas (including final void)	3690
Underground mining area	4570
Surface infrastructure	355
Roads	110
Rail	195
Accommodation camp	20
Dams/drainage	360
Total	**9300**

Monitoring

A4 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

A5 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.

A6 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.

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, and

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 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, and

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.

A12 Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must:

a) comply with the amended or changed standard, policy or guideline within 2 years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation or another timeframe approved by the administering authority, and

b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

Schedule B – Air

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 exceedences 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, 2003 (or more recent editions)

b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than 5 exceedences recorded each year (5 days exceedences per year are for the natural events such as bushfires and dust storm), when monitored in accordance with the most recent version of either:

i) Australian Standard AS3580.9.6 of 2003: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet – Gravimetric method*, or

ii) Australian Standard AS3580.9.9 of 2006: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} low volume sampler – Gravimetric method,* or

iii) Australian Standard AS 3580.9.8 of 2008: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance (TEOM) analyser*.

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 of 2003: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method*.

d) Any alternative methods of monitoring, which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority, are also acceptable.

B2 The proponent must monitor air quality identified in Table B1: Air Quality Monitoring Details for the activity, which must include, but not be limited to:

a) continuous monitoring of PM_{10} at one location and dust deposition at seven locations during the operation of the activity

b) high-volume air sampling of TSP, 1-day-in 6 sampling regime, collected over 24 hours (midnight to midnight)

c) meteorological monitoring (including at least temperature, wind speed and direction humidity, temperature and precipitation) at a single location

d) the monitoring locations must comply with the Australian Standard AS/NZS 3580.1.1:2007 *Methods for siting and analysis of ambient air. Part 1.1: Guide to siting air monitoring equipment*

e) regular reporting of the measured dust deposition rates and PM_{10} concentrations to a publicly available website

f) investigation of all measured exceedences to determine the influence of emissions from the mining site.

g) Should an alternative sampling method (other than as discussed in Condition B1) be required; the proponent may seek approval from administering authority to exclude this requirement. In seeking such exclusion, the reasons for the exclusion shall be provided and be fully justified.

Table B1: Air quality monitoring details

Air quality determination	Sampling frequency	Monitoring standard	Monitoring point description	Approximate monitoring point location (GDA94)	
				Latitude	Longitude
PM_{10}	Hourly	AS 3580.9.8:2008: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance (TEOM) analyser*	Project Accommodation Village	(TBA)	(TBA)
Dust deposition	Monthly	AS 3580.10.1:2003: *Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method*	Project Accommodation Village	(TBA)	(TBA)
			Chesalom Station Homestead	(TBA)	(TBA)
			Bonanza Station Homestead	(TBA)	(TBA)
			Villafield Station Homestead	(TBA)	(TBA)
			Eureka Station Homestead	(TBA)	(TBA)
			Corntop Station Homestead	(TBA)	(TBA)
			Alpha Township	(TBA)	(TBA)
TSP	Annual average	AS/NZS3580.9.3 of 2003: *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method*	Project Accommodation Village	(TBA)	(TBA)
Meteorological data	Hourly	AS 2923:1987: *Ambient air – Guide for measurement of horizontal wind for air quality applications*	Project Accommodation Village	(TBA)	(TBA)

B3 To ensure that the air quality monitoring program remains effective and well-targeted through the life of the project, the monitoring locations must be reviewed periodically. The periodic review should consider:

a) the frequency and cause of any exceedences of air quality objectives measured by the monitoring program over period of at least 2 years

b) dust complaints

c) future progression of the mining activities

d) locations of sensitive receptors relative to the mining activities, and

e) mining operating modes.

B4 Prior to the commencement of mining activities, the holder must develop and implement a Dust Management Plan to outline measures to minimise and manage any impacts from the operation of the project on local air quality. The management plan shall include, but not necessarily be limited to:

a) dust control measures including watering of haul roads and application of water to raw and product coal stockpiles and transfer points and waste rock emplacement areas

b) ambient Air Quality Monitoring Program to specify how the ambient dust impacts of the project will be monitored

c) reactive and/or proactive dust management measures, which potentially could involve curtailment of activities in adverse weather, and

d) the regular review of the air quality management plan and analysis of complaints and air quality monitoring data to refine knowledge of actual site-specific emissions and to improve the effectiveness of dust emission controls.

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.

Acid sulfate soils

C3 Treat and manage acid sulfate soils in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.

Schedule D – Noise

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

Sensitive place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and Public Holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
LAeq, adj, 15 mins	40	40	30, except 35 in Alpha township	45	40	30, except 35 in Alpha township
LA1, adj, 15 mins	50	50	45	50	45	40
Commercial place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and Public Holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	7am to 6pm	6pm to 10pm	10pm to 7am
LAeq, adj, 15 mins	50	45	40	45	40	35

Table D1 – Noise limits notes: The limit for Alpha township is higher due to higher existing background noise levels than in rural locations.

D2 The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the low frequency noise to exceed 50dBLin during evening and night time (i.e. between 6pm and 7am, Monday to Saturday, or 6pm to 9am on Sundays and public holidays) measured outdoor at a sensitive place or commercial place; where the low frequency noise is defined by the maximum linear sound pressure level measured over a one hour period in one third octave band centred in the frequency range 10Hz to 200Hz.

D3 The holder of this environmental authority must ensure that the mining activities do not cause the short duration, impact, impulse or transient maximum noise at any instant during night time to exceed 50dBA LAmax measured outdoor at a sensitive place or commercial place.

D4 A noise and vibration monitoring program must be developed by a suitably qualified and experienced person to monitor compliance with Table D1 Noise Limits, Table D2 Blasting Noise Limits and Conditions D2 and D3. The noise and vibration monitoring program must be implemented at least three (3) months prior to the commencement of mining activities.

D5 The noise and vibration monitoring program must be made available to the administering authority on request.

D6 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 short duration noise: LAmax over a night time period, noting the number and magnitude of transient noise events;

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

D7 The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in Schedule D - 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 place limits	
	7am to 6pm	6pm to 7am
Airblast overpressure	115dB (Linear) Peak for nine (9) out of ten (10) consecutive blasts initiated and not greater than 120dB (Linear) Peak at any time	no blasting
Ground vibration peak particle velocity	5mm/second peak particle velocity for nine (9) out of ten (10) consecutive blasts and not greater than 10mm/second peak particle velocity at any time	no blasting

Schedule E – Groundwater

Bore construction and maintenance and decommissioning

E1 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.

Further conditions based on the DEHP model mining conditions will be added by the administering authority.

Schedule F – Water

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.

Annual water monitoring reporting

F2 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 exceedences 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.

Temporary interference with waterways

F3 Destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Mines (or its successor) guideline – *Riverine Protection Permit Exemption Requirements (WSS/2013/726)*.

Water Management Plan

F4 A Water Management Plan must be developed by an appropriately qualified person and implemented.

Stormwater and water sediment controls

F5 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.

F6 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 F5

b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F4, for the purpose of ensuring water does not become mine-affected water.

Further conditions based on the DEHP model mining conditions will be added by the administering authority including conditions relating to the monitoring and management of groundwater impacts.

Schedule G – Sewage treatment

Relevant conditions based on the DEHP model mining conditions will be added by the administering authority.

Schedule H – Land and rehabilitation

Biodiversity offsets

H1 The holder of this environmental authority must provide an offset for impacts on applicable state significant biodiversity values, in accordance with the South Galilee Coal project Biodiversity Offset Plan <dated XXXX>. The biodiversity offset must be provided:

a) prior to impacting on state significant biodiversity values, or

b) where a land-based offset is to be provided, within 36 months of the later of either of the following:

i) the date of issue of this environmental authority, or

ii) the relevant stage identified in the Biodiversity Offset Plan, or

c) where an offset payment is to be provided, within 4 months of the later of either of the following:

i) the date of issue of this environmental authority, or

ii) the relevant stage identified in the Biodiversity Offset Plan.

Review of biodiversity offset delivery

H2 The Biodiversity Offset Plan must be reviewed by <insert date 5 years after EA issue date>, and from then on every 5 years, with a report prepared by an appropriately qualified person. The report must:

a) assess the area of state significant biodiversity value proposed to be impacted by the mining activities in the Biodiversity Offset Plan, and

b) identify the actual on-ground areas of state significant biodiversity value impacted by the mining activities.

Residual void outcome

H3 Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.

Relevant conditions based on the DEHP model mining conditions will be added by the administering authority including conditions relating to rehabilitation criteria and planning.

Schedule I – Regulated structures

Assessment of consequence category

I1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence 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

d) following any change in surroundings or in the conditions downstream.

I2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

I3 Certification must be provided by the suitably 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

I4 Conditions I5 to I9 inclusive do not apply to existing structures.

I5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

I6 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority which has been certified by a suitably qualified and experienced person and a design and design plan and the associated operating procedures in compliance with the relevant conditions of this authority.

I7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and must be recorded in the Register of Regulated Structures.

I8 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:

i) floodwaters from entering the regulated dam from any watercourse or drainage line, and

ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

c) have the floor and sides of the dam designed and constructed to prevent or 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.

I9 Certification by the suitably 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

I10 Operation of a regulated structure, except for an existing structure, is prohibited unless:

a) the holder has submitted to the administering authority:

i) one paper copy and one electronic copy of the design plan and certification of the ‘design plan’ in accordance with condition I6

ii) a set of ‘as constructed’ drawings and specifications

iii) certification of those ‘as constructed drawings and specifications’ in accordance with condition I9, and where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the Design Storage Allowance (DSA) volume across the system, a copy of the certified system design plan.

b) the requirements of this authority relating to the construction of the regulated structure have been met

c) the holder has entered the details required under this authority, into a Register of Regulated Structures

d) there is a current operational plan for the regulated structures.

I11 Each regulated structure must 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

I12 Conditions I13 to I16 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

I13 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that, during routine inspections of that dam, it is clearly observable.

I14 The holder must, as soon as practicable 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.

I15 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

I16 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

I17 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.

I18 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 DSA volume for the dam (or network of linked containment systems).

I19 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 systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

I20 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

I21 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

I22 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably 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.

I23 The suitably 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).

I24 The holder must:

a) within 20 business days of receipt of the annual inspection report, provide to the administering authority:

i) the recommendations section of the annual inspection report, and

ii) 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 to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

I25 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and rehabilitation

I26 Structures must not be abandoned but be either:

a) decommissioned and rehabilitated to achieve compliance with condition I27; or

b) be left in-situ for a beneficial use(s) provided that:

i) it no longer contains contaminants that will migrate into the environment, and

ii) it contains water of a quality that is demonstrated to be suitable for its intended beneficial use(s), and

iii) the administering authority, the holder of the environmental authority and the landholder agree in writing that the structure will be used by the landholder following the cessation of the environmentally relevant activity (or activities).

I27 After decommissioning, all significantly disturbed land caused by the carrying out of the environmentally relevant activity (or activities) must be rehabilitated to meet the following final acceptance criteria:

a) the landform is safe for humans and fauna

b) the landform is stable with no subsidence or 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 such 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 soil suitability class

h) for land that is not being cultivated by the landholder:

i) groundcover, that is not a declared pest species is established and self-sustaining

ii) vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining, and

iii) the maintenance requirements for rehabilitated land are no greater than that required for the land prior to its disturbance caused by carrying out the mining activity (or activities).

i) for land that is to be cultivated by the landholder, cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of petroleum activities being completed.

Register of Regulated Structures

I28 A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.

I29 The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated structure is submitted to the administering authority.

I30 The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition I10 has been achieved.

I31 The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.

I32 All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

I33 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 Structures, in the electronic format required by the administering authority.

Transitional arrangements

I34 All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

I35 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table I1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.

I36 Table 1 ceases to apply for a structure once any of the following events has occurred:

a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or

b) it has been decommissioned; or

c) it has been certified as no longer being assessed as a regulated structure.

I37 Certification of the transitional assessment required by I34 and I35 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Table I1 – Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*			
Compliance with criteria	**High**	**Significant**	**Low**
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70%-≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50-≤70%	Within 5 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

Definitions

'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.

'Administering authority' means the agency administering the *Environmental Protection Act 1994*.

'Annual exceedence probability or AEP' the probability that at least one event in excess of a particular magnitude will occur in any given year.

'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.

'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.

'Assessed' or **'assessment'** by a suitably qualified and experienced person in relation to a consequence assessment of a structure, 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 structure means:

(a) operations of any kind and all things constructed, erected or installed for that structure; and

(b) any land used for those operations.

'Authority' means an environmental authority.

'Certifying, certify, certification or certified relating to regulated structures' 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)).

In all other cases **'certifying, certify, certification or certified'** means by an appropriately qualified and experienced person in relation to any program, plan or report, 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.

'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, grazing and farmland, unoccupied buildings or public roads.

Note: A 'sensitive place' and 'commercial place' is based on Schedule 1 of the *Environmental Protection (Noise) Policy 2008* (EPP Noise). That is, a commercial place is inside or outside a commercial or retail activity.

'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 structure 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)*.

'Construction' or **'constructed**' in relation to a structure includes building a new structure and modifying or lifting an existing structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

'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 exceedence probability (AEP) specified in that Manual.

'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*.

'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.

'Emergency action plan' means documentation forming part of the operational plan held by the holder or a nominated responsible officer, which identifies emergency conditions that sets out procedures and actions that will be followed and taken by the structure 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 structure owners to annually update contact.

'Environmentally relevant activity' has the meaning defined in the *Environmental Protection Act 1994*.

'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.

'Incident' means a set of circumstances arising as a result of activities carried out under an environmental authority which cause or threaten to cause environmental harm.

'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 and rehabilitation 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.

'Hydraulic performance' means the capacity of a regulated structure 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 structure' means any structure that is not a high or significant consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

'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.

'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:

(1) areas that have been capped and have monitoring data demonstrating hazardous material adequately contained with the site

(2) 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 both.

'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.

'Project' means the South Galilee Coal Mine located within Mining Lease (application) MLA 70453.

'Protected area' means a protected area under the *Nature Conservation Act 1992*; or

(a) a protected area under the *Nature Conservation Act 1992*; or

(b) a marine park under the *Marine Parks Act 1992*; or

(c) a World Heritage Area.

'Receiving waters' means the waters into which this environmental authority authorises releases of mine-affected water.

'Register of Regulated Structures' includes:

(a) date of entry in the register

(b) name of the dam or levee, its purpose and intended/actual contents

(c) the consequence category of the dam or levee 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 structure

(e) name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings

(f) for a regulated dam:

  (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) for a regulated levee:

  (i) the crest length of the levee (metres) measured along the centreline of the levee

  (ii) location coordinates (latitude and longitude in GDA94), and chainage distances (metres), of each end of the levee, and of each point along the crest of the levee which marks a change in direction

  (iii) levee crest level (metres AHD), also at each end of the levee, and at each point along the crest of the levee which marks a change in direction

  (iv) maximum height of the levee (metres), from the crest level to the adjacent toe (inside or outside) of the embankment, and the location and chainage of this maximum height

  (v) the crest width of the levee (metres)

  (vi) the Annual Exceedence Probability of the design flood for operation of the levee

  (vii) the freeboard (metres) between design flood level and the crest level of the levee

(h) the design plan title and reference relevant to the structure

(i) the date construction was certified as compliant with the design plan

(j) the name and details of the suitably qualified and experienced person who certified that the constructed dam or levee was compliant with the design plan

(k) details of the composition and construction of any liner

(l) the system for the detection of any leakage through the floor and sides of a dam

(m) dates when the regulated structure underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year

(n) dates when recommendations and actions arising from the annual inspection were provided to the administering authority

(o) dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

'Regulated structure' means any dam or levee 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 structures include 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.

'Rehabilitation' is the process of reshaping and revegetating land to restore it to a stable landform.

'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.

'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, or

(f) a public park or gardens.

A sensitive place does not include 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), whether or not the mining camp is located within a mining tenement that is part of the mining project that is 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 not 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.

In contrast, 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.

Note: A '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 and 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 the *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.

'Spillway' means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the structure, normally under flood conditions or in anticipation of flood conditions.

'Structure' means dam or levee.

'Suitably qualified and experienced person' means a person who has professional qualifications, training, skills and 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.

'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:

- for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design
- 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.

Section 2 Off-lease

This section relates to those components of the project located off the mining lease, including:

- a rail spur to join the existing Central Western Railway, including an rail underpass under the Capricorn Highway
- a rail spur to join with proposed common use rail in the Galilee Basin SDA to the Port of Abbot Point
- any construction access road for rail components.

Off-lease components of the project may be assessed under one of three statutory instruments:

- the Jericho Planning Scheme under the *Sustainable Planning Act 2009* (SP Act), where the following conditions are to be considered stated by the Coordinator-General under section 39 of the SDPWO Act and the assessment manager will be the Chief Executive of Barcaldine Regional Council (BRC)
- a Community Infrastructure Designation under the SP Act, where the following conditions are to be recommendations made for the Minister for Transport under section 43 of the SDPWO Act.
- For any project elements located inside an SDA, the relevant development scheme for that SDA under the SDPWO Act. If project elements are located within an SDA, the stated conditions in this section are to be considered as recommendations made under section 52 of the SDPWO Act. Recommendations would relate to the applications for development approvals and material changes of use for the project. The Coordinator-General would be responsible for ensuring recommendations are implemented.

Condition 1 Compliance and auditing of conditions

(a) The holder of this approval must:
  (i) within 3 months of the commencement of the approved activities, obtain from an independent third party a certified report on compliance with the conditions of this approval
  (ii) obtain further such reports at regular intervals, not exceeding 6-monthly intervals during construction and 3-yearly intervals during operation, from the completion of the report specified in condition 1(a)(i)
  (iii) provide each report in conditions 1(a)(i) and 1(a)(ii) to the administering authority within 30 business days of its completion
  (iv) take any corrective and/or preventive action necessary to comply with the conditions of this approval.

(b) The holder of this approval must provide an annual Update Report detailing activities during the previous 12 months to the administering authority detailing:
  (i) significant disturbance undertaken
  (ii) rehabilitation undertaken
  (iii) results and interpretation of any monitoring.

Condition 2 General

(a) All plant and equipment must be maintained and operated in proper condition.

(b) Measures to prevent fauna being harmed from entrapment must be implemented during construction and operation activities.

Condition 3 Environmental nuisance

(a) Activities must not cause environmental nuisance at any nuisance sensitive place unless specifically authorised by a condition of this approval or where an alternative arrangement is in place.

Condition 4 Air quality

(a) Notwithstanding Condition 3, dust deposition attributable to project activities, when measured at a nuisance sensitive place, must not exceed 120 milligrams per square metre per day, averaged over 1 month.

(b) Other indicators that are measured at any nuisance sensitive place must not exceed the air quality objectives specified in Schedule 1 of the Environmental Protection (Air) Policy 2008.

Condition 5 Noise and vibration

(a) Notwithstanding Condition 3, blasting operations must be designed to not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any nuisance sensitive place.

(b) Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10 mm/s at any time, when measured at or extrapolated to any nuisance sensitive place.

Condition 6 Water quality

(a) Contaminants must not be directly or indirectly released to waters unless authorised by a specific condition of this approval.

Condition 7 Sediment and erosion control

(a) Measures must be implemented to minimise stormwater entry onto significantly disturbed land.

(b) Sediment and erosion control measures to prevent soil loss and deposition beyond significantly disturbed land must be implemented and maintained.

Condition 8 Flammable or combustible liquids

(a) All flammable and combustible liquids must be contained within an on-site containment system, controlled in a manner that prevents environmental harm and maintained in accordance with the current edition of AS1940: *Storage and Handling of Flammable and Combustible Liquids.*

Condition 9 Rehabilitation

(a) Unless otherwise approved by the administering authority, within 6 months after the completion of an activity, the holder of this approval must commence reinstating temporarily disturbed areas that is:
  (i) a stable landform
  (ii) re-profiled to a level consistent with surrounding soils and established drainage lines.

(b) After decommissioning, all significantly disturbed land caused by the activities must be rehabilitated to meet the following final acceptance criteria:
  (i) any contaminated land (e.g. contaminated soils) is remediated and rehabilitated
  (ii) 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 preselected analogue sites is established and self-sustaining
  (iii) for land that is to be cultivated by the landholder, the cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of project activities being completed.

(c) Monitoring of performance indicators must be carried out on rehabilitation activities until the final acceptance criteria in condition (b) have been met for the rehabilitated area.

Definitions for Section 2	
administering authority	The Chief Executive of the Barcaldine Regional Council or if a Community Infrastructure Designation is declared for the activity, the Minister for Transport and Main Roads, or the Coordinator-General if the activity is included in a State Development Area.
alternative arrangement	A written agreement between the approval holder and the occupier of a nuisance sensitive place about the way in which a particular nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant nuisance impact.
certified	A Statutory Declaration by a suitably qualified person accompanying the written document warranting that: • all relevant material has been considered in the written document, and • the content of the written document is accurate and true, and • the written document meets the requirements of the condition.
environmental nuisance	as defined in Section 15 of the *Environmental Protection Act 1994*.
measured	The standards used to measure air particulates and contaminants including the most recent version of either: *Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet – Gravimetric method,* or *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,* or *Australian Standard AS3580.9.8 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance (TEOM) analyser, or* *Australian Standard/New Zealand Standard 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,* or using an alternative sampling methodology determined in consultation with the Department of Environment and Heritage Protection.
minimise	taking all reasonable and practical measures to minimise the adverse effect having regard to the following matters: a) the nature of the harm or potential harm b) the sensitivity of the receiving environment c) the current state of technical knowledge for the activity d) the likelihood of successful application of different measures that might be taken to minimise the adverse effects e) the financial implications of the different measures as they would relate to the type of activity f) if the adverse effect is caused by the location of the activity being carried out, whether it is feasible to carry out the activity at another location.

Definitions for Section 2	
monitoring	Monitoring and sampling carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken): a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009—Environmental Protection (Water) Policy 2009 b) for noise, the Environmental Protection Regulation 2008 c) for air, the Queensland Air Quality Sampling Manual and/or Australian Standard 4323.1:1995 Stationary source emissions method 1: Selection of sampling positions or 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. d) for soil, the Guidelines for Surveying Soil and Land Resources, 2nd edition (McKenzie et al. 2008), and/or the Australian Soil and Land Survey Handbook, 3rd edition (National Committee on Soil and Terrain, 2009) e) for dust, Australian Standard AS3580
nuisance sensitive place	Includes: • a dwelling (including residential allotment, mobile home or caravan park, other residential premises, motel, hotel or hostel • a library, childcare centre, kindergarten, school, university or other educational institution • a medical centre, surgery or hospital • a protected area under the *Nature Conservation Act 1992*. • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment • a workplace used as an office or for business or commercial purposes, which is not part of the project activity(ies) and does not include employees accommodation, grazing and farmland, unoccupied buildings or public roads
sediment and erosion control measures	Suitable measures are included in the document International Erosion Control Association (Australasia) *Best Practice Erosion and Sediment Control*.
significantly disturbed	Has the same meaning as in Schedule 12, section 4 of the Environmental Protection Regulation 2008.
waters	All or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

Appendix 2 Coordinator-General's recommended conditions

Section 1 Recommended conditions for the Commonwealth Minister for the Environment

In accordance with Item 21 of the Bilateral Agreement between the Commonwealth and the State of Queensland, this section recommends conditions for consideration by the Commonwealth Minister for the Environment in making a decision on the proposed action under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999.*

Condition 1 Matters of national environmental significance (MNES) management plan/s

(a) At least three months prior to commencement of the action, the approval holder must submit MNES plan/s for the management of direct and indirect impacts of the action on MNES, to the Commonwealth Minister for the Environment (the Minister) for approval.

(b) The MNES management plan/s must be consistent with relevant recovery plans, threat abatement plans and approved conservation advices and must include:

- (i) a description of environmental values for each of the MNES addressed in the plan
- (ii) details of baseline and impact monitoring measures to be implemented for each of the MNES including control and impact sites to be monitored throughout the life of the project. The monitoring must provide sufficient data to quantify likely impacts resulting from mining operations, including subsidence and changes in groundwater levels, to set habitat management goals (Conditions 1(b)(v) and 1(b)(vi))
- (iii) details of potential impacts, including area of impact, on each of the MNES from the action, including impacts from:
  - (1) vegetation clearing
  - (2) subsidence from underground mining, including subsidence induced fracturing and any changes to groundwater or surface water flow
  - (3) mine dewatering
  - (4) earthworks
  - (5) noise and vibration
  - (6) emissions (including dust)
  - (7) light spill and other visual impacts
  - (8) flood levees
  - (9) weeds and pests
- (iv) measures that will be undertaken to mitigate and manage impacts on MNES resulting from the action. These measures must include but not be limited to:
  - (1) the use of fauna spotters prior to and during all vegetation clearing activities to ensure impacts on MNES are minimised
  - (2) measures to avoid impacts on MNES and their habitat located in the Project Area, but outside areas to be cleared, constructed upon and/or undermined, including adjacent to cleared areas
  - (3) measures to rehabilitate all areas of MNES habitat
  - (4) habitat management measures including but not limited to management of subsidence and groundwater impacts of the project.
- (v) goals for habitat management for each relevant MNES
- (vi) a table of specific criteria for assessing the success of management measures against goals, and triggers for implementing corrective measures if criteria are not met within specified timeframes. This table must include but not be limited to

measures relating to subsidence and groundwater impacts, including early warning triggers for impacts on groundwater at the Alpha township. Goals and triggers must be based on the baseline condition of the relevant MNES as determined through baseline monitoring (see Conditions 1(b)(ii)) and 5(a)(ii))

(vii) an ongoing monitoring program to determine the success of mitigation and management measures against the stated criteria in Condition 1(b)(vi), including monitoring locations, parameters and timing. Monitoring for water resource MNES must include hydrogeological, hydrological and ecological parameters

(viii) details of how compliance will be reported

(ix) details of how the MNES management plan/s will be updated to incorporate and address outcomes from research undertaken for MNES under this and any state approvals, including updating of goals, criteria and triggers (as required under (Conditions 1(b)(v) and 1(b)(vi))

(x) details of qualifications and experience of persons responsible for undertaking monitoring, review and implementation of the MNES management plan/s

(xi) details of how, where habitat for an EPBC Act listed threatened species or community not previously identified and reported to the Department is found in the Project Area, the approval holder will notify the Department in writing within five business days of finding this habitat, and within 20 business days of finding this habitat will outline in writing how the conditions of this approval will still be met (refer Condition 2(d)(viii)).

(c) Mining operations must not commence until the required MNES management plan/s have been approved by the Minister in writing. The approved plan/s must be implemented.

Note: Management plans may also be required under state approvals. Whenever possible a combined document should be prepared to address both state government and EPBC Act approval conditions.

Condition 2 Biodiversity Offset Plan

The approval holder must legally secure the minimum offset areas detailed in Table A1 within two years of commencement of the specified component of the action.

Table A1. Minimum offset areas required for impacts on EPBC Act threatened species and communities

Environmental value	Area of high quality habitat to be cleared (ha)	Area of high quality habitat potentially impacted by subsidence (ha)	Minimum offset requirement (ha)
Black-throated finch (*Poephila cincta cincta*)	144.39	226.22	To be completed by DoTE
Brigalow threatened ecological community *(Acacia harpophylla dominant and co-dominant)*	8.81	1.92	To be completed by DoTE
Dunmall's snake *(Furina dunmalli)*	800.73	1080.19	To be completed by DoTE
Ornamental snake *(Denisonia maculata)*	25.54	1.92	To be completed by DoTE
Squatter pigeon *(Geophas scripta scripta)*	592.68	1080.19	To be completed by DoTE
Yakka skink *(Egernia rugosa)*	800.73	1080.19	To be completed by DoTE

(a) To compensate for authorised unavoidable impacts on MNES, the approval holder must submit a Biodiversity Offset Plan (BOP) to the Minister for approval at least three months prior to commencement of mining operations.

(b) Offsets for authorised unavoidable impacts (defined in Table A1) must be managed in accordance with the BOP.

(c) The BOP must be consistent with the Galilee Basin Strategic Offset Strategy, relevant recovery plans, threat abatement plans, conservation advices and MNES management plan (see Condition 1) and must include:

  (i) location of species and communities' habitat offset areas including maps in electronic Geographic Information System (GIS) format

  (ii) conservation and management measures for long term protection

  (iii) details of how offset sites have been or will be legally secured within required timeframes to ensure their long-term protection

  (iv) a monitoring program for the offset site/s suitable to measure the success of the management measures against stated performance criteria including monitoring locations, parameters and timing

  (v) a description of the potential risks to the successful implementation of the BOP, and details of contingency measures that will be implemented to mitigate these risks

  (vi) details of how the BOP will be updated to incorporate outcomes from research undertaken for MNES under this and any state approvals, including updating of goals, criteria and triggers (as outlined at (Conditions 1(b)(v) and 1(b)(vi)).

  (vii) an outline of how compliance will be reported

  (viii) details of persons responsible for monitoring, reviewing and implementing the BOP.

(d) The action must not commence until the BOP is approved by the Minister in writing. The approved BOP must be implemented.

Note: An approved Biodiversity Offset Plan is also required by the state government. A combined document should be prepared to address both State and EPBC Act approval conditions where possible.

Condition 3 Offset area management plans

(a) Within three months of identifying any offset area in accordance with Conditions 1(b), 2(a) and 2(d), the approval holder must submit a management plan for that offset area to the Minister for approval. Each offset area management plan must address the relevant requirements of the BOP and contain:

  (i) detailed baseline description of offset areas, including surveys undertaken, condition of existing MNES and their habitats, relevant environmental values, area of primary habitat for each EPBC Act listed threatened species and community, connectivity with other habitat areas and biodiversity corridors

  (ii) management measures and offset plans for each offset area to improve the habitats of MNES

  (iii) a table of specific goals and associated timeframes for habitat management measures for each offset area with criteria for assessing the success of habitat management measures and corrective measures to be implemented if criteria are not met.

(b) Once approved, offset area management plans must be implemented.

Condition 4 Biodiversity funding

(a) The approval holder must establish and/or contribute to a pool of funds established for the better protection and long-term conservation of the EPBC Act listed threatened species and communities listed in Table A1.

(b) The mechanism to establish and/or contribute to a pool of funds, including terms of reference to support a regional approach, funding mechanisms and an initial work plan, must be provided to the Minister for approval three months prior to commencement of South Galilee Mine stage 1 activities. The mechanism may be in the form of a trust fund or other mechanism/s as agreed by the Minister in writing.

(c) The approval holder must contribute $XX (to be determined by the Minister) per annum for 10 consecutive years to the pool of funds beginning from the commencement of South Galilee Mine stage 1 activities. The approval holder must provide notice of the establishment of and/or contribution to the pool of funds to the Department of the Environment in writing prior to commencement of mining activities. Documentary evidence must be provided to the department showing that the annual financial contributions to the pool of funds have been provided within 30 calendar days of each payment.

(d) These funds must facilitate the development and implementation of research programs consistent with priorities to manage development impacts on EPBC Act listed threatened species and communities listed in Table A1 which are consistent with, and take into consideration, any relevant recovery plans, threat abatement plans and/or conservation advices. Research programs should identify measures to mitigate and manage the impacts on EPBC Act listed threatened species and communities listed in Table A1 and should address:

  (i) methodologies for a baseline survey that will report on each species' life history, movement patterns, habitat requirements and population dynamics. Survey methodologies must be in accordance with the department's survey guidelines or alternative best practice methodologies that are agreed to in writing by the Minister prior to commencement and endorsed by a suitably qualified independent expert. The baseline survey must begin with the first year of the date of this approval

  (ii) an ongoing monitoring program (developed from the baseline monitoring) for each species, to continue for the duration of the project approval, with annual reporting to the department

  (iii) commitments, including financial commitments and associated timeframes, that will be implemented by the approval holder to support the undertaking of research

  (iv) the timeframes for undertaking each research component

  (v) timing and methods of reporting research outcomes to the Minister, the scientific community and the public

  (vi) outcomes of consultation with the department on how the proposed research programs align with other studies for the EPBC Act listed threatened species and communities listed in Table A1

  (vii) identification of priority actions for funding must be decided in consultation with the Queensland Department of Environment and Heritage Protection and members of relevant Recovery Teams.

(e) A review of funding must be undertaken five years after the establishment of the pool of funds and/or the commencement of the action or as otherwise agreed by the Minister in writing. This review must take into account progress of the research programs and any subsequent on-ground actions, as well as the involvement of other holders of approvals under the EPBC Act in funding and administrative arrangements. The review must be provided to the department within six months after the five-year period.

Condition 5 Groundwater management and monitoring plan

(a) At least three months prior to commencing South Galilee Mine stage 1 activities or within 2 years of commencing the Epsilon Mine stage, whichever is the sooner, the approval holder must submit to the Minister for approval a Groundwater Management and Monitoring Plan (GMMP). The GMMP must contain the following:

  (i) details of a groundwater monitoring network that includes:

    (1) control monitoring sites

(2) sufficient bores to monitor potential impacts on the Great Artesian Basin (GAB) aquifers (whether inside or outside the Project Area) and Alpha town

(3) a rationale for the design of the monitoring network with respect to the nature of potential impacts and the location and occurrence of MNES (whether inside or outside the Project Area)

(ii) baseline monitoring data including a detailed bore census and investigation of private bores in the area predicted to be impacted

(iii) details of proposed trigger values for detecting impacts on groundwater levels and a description of how and when they will be finalised and subsequently reviewed in accordance with state approvals

(iv) details of the timeframe for a regular review of the GMMP in accordance with the requirements of the environmental authority issued under the EP Act, and subsequent updates of the GMMP, including how each of the outcomes of the following will be incorporated:

(1) independent review and update of the groundwater conceptual model, as well as the numerical groundwater model and water balance calculations (if recommended by the independent auditor), to incorporate monitoring data

(2) the Rewan Formation Connectivity Research Plan (Condition 6).

(v) provisions to make monitoring data available to the Department and Queensland Government authorities (if requested) on a six monthly basis for inclusion in any cumulative impact assessment, regional water balance model, bioregional assessment or relevant research required by the Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations

(vi) provisions to make monitoring results publicly available on the approval holder's website for the life of the project

(vii) a peer review by a suitably qualified independent expert and a table of changes made in response to the peer review.

(b) The approval holder must not commence South Galilee Mine stage 1 activities until the GMMP has been approved by the Minister in writing. The approved GMMP must be implemented.

Note: Many elements of the GMMP will be required by the state approval for the project through the Environmental Authority under the *Environmental Protection Act 1994*. Where possible, a combined document should be prepared that addresses both state government and EPBC Act approval conditions.

Condition 6 Rewan Formation Connectivity Research Plan

(a) At least three months prior to commencing South Galilee Mine stage 1 activities, the approval holder must submit for the approval of the Minister a Rewan Formation Connectivity Research Plan ('Rewan Research Plan') that characterises the Rewan Formation within the area impacted by the mine. The Research Plan must include but not be limited to the following:

(i) research aims

(ii) personnel responsible for conducting research and their qualifications

(iii) timeframes for research and reporting

(iv) methods, including, but not limited to, seismic surveys to determine the type, extent and location of fracturing, faulting and preferential pathways (including any fracturing induced by longwall mining subsidence) and an examination of the hydraulic properties (including but not limited to petrophysical analysis and facies mapping) of the Rewan Formation, to better characterise the Rewan Formation and the contribution of fracturing, faulting and preferential pathways to connectivity, including a description of how research will be undertaken in a manner that does not cause impacts on MNES (unless the activities will be undertaken in accordance with a plan approved pursuant to conditions of this approval)

(v) an explanation of how research will inform the GMMP, any regional groundwater and surface water monitoring and assessment program, or Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations

(vi) a peer review of the Rewan Research Plan, by a suitably qualified independent expert and a table of changes made in response to the peer review.

(b) The approval holder must not commence South Galilee Mine stage 1 activities until the Rewan Research Plan has been approved by the Minister in writing. The approved Rewan Research Plan must be implemented if the project's South Galilee Mine Stage 1 proceeds.

Condition 7 Groundwater flow model review

(a) The approval holder must undertake an independent peer review of the adequacy of their current groundwater flow model to characterise groundwater impacts prior to the commencement of the South Galilee Mine stage 1. This review must consider the parameters used in the groundwater flow model, the required additional modelling information and the parameters outlined in (b). The peer review must be undertaken by a suitably qualified independent expert. The peer review report must be submitted to the Minister within two years of this approval and should identify any additional information requirements.

(b) The approval holder must re-run the groundwater flow model. These re-runs must incorporate the following parameters in the scenarios and address the following additional information requirements:

(i) recalibrate current recharge modelling from a percentage of rainfall to episodic recharge

(ii) include the following parameters in any sensitivity analyses:

(1) recharge rates

(2) hydraulic conductivity

(3) storage

(iii) review and justify the following parameters used in the current model, and modify if required:

(1) General Head Boundary conditions, including the identical values used for any depth at any given location

(2) specific yield value

(3) anisotropy ratio

(4) horizontal and vertical hydraulic conductivity values

(5) sensitivity analyses of:

(A) the confining layer of the Rewan Formation and the resulting drawdown impacts

(B) vertical hydraulic conductivity

(6) layer structure, with the view to splitting the Bandanna Formation from the Rewan Formation and Dunda Beds

(iv) review and justify the parameters used to:

(1) inform modelling of fracturing caused by longwall mining recharge parameters for the Clematis Sandstone to represent the flux into the recharge beds of the GAB, and modify if required

(2) represent the 20:80 split of layer 2 in the model, and modify if required

(3) inform modelling of drawdown in layers 7 and 8, and modify if required

(v) demonstrate and review the hydrogeological setting in the area between the South Galilee mine lease area and Alpha town, using a much more detailed smaller scale model including cross sections if necessary

(vi) document and incorporate known licensed groundwater extractions within the model domain including Alpha town

(vii) document and justify any other changes made as part of the model re-runs that are not outlined above

(viii) as per the IESC information guidelines, provide an assessment of the quality of, and risks and uncertainty inherent in, the data used in the background data and modelling, particularly with respect to predicted potential scenarios.

(c) The outcomes of the model re-runs are to be reviewed in order to inform the preparation of the GMMP and the Rewan Research Plan, and to correct any subsequent inaccuracies in the MNES management plan/s, prior to submitting these plans to the Minister for approval.

Condition 8 Final Void Water Monitoring and Management Plan

(a) The approval holder must develop a Final Void Water Monitoring and Management Plan, which must include:

(i) an environmental risk assessment of both open final void and backfilling options; and

(ii) justification for the preferred option that demonstrates there will be no unacceptable impacts on MNES.

(b) The Final Void Water Monitoring and Management Plan must be peer reviewed by a suitably qualified expert. The peer review must be submitted to the Minister for approval at the same time as the Final Void Water Monitoring and Management Plan is submitted to the Minister for approval.

(c) The approval holder must not commence South Galilee Mine stage 2 until the Minister has approved the Final Void Water Monitoring and Management Plan in writing.

(d) The approved Final Void Water Monitoring and Management Plan must be implemented.

Condition 9 Subsidence management plan

(a) A Subsidence Management Plan must be developed and certified by an appropriately qualified person and implemented by the approval holder prior to the commencement of activities that result in subsidence.

(b) The Subsidence Management Plan must:

(i) provide for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity authorised by this approval and ensure compliance with the conditions of this approval

(ii) include baseline data

(iii) describe the proposed impacts of subsidence on any land, watercourse and floodplain including but not limited to:

(1) physical condition of surface drainage:

(A) erosion

(B) areas susceptible to higher levels of erosion such as watercourse confluences

(C) incision processes

(D) stream widening

(E) tension cracking

(F) lowering of bed and banks

(G) creation of instream waterholes

(H) changes to local drainage patterns

(2) overland flow:

(A) capture of overland flow by subsided long-wall panels

(B) increased overbank flows due to lowering of high bank of watercourses

(C) the portion of local and large scale catchment likely to be captured by subsided long-wall panels and the associated impacts on downstream users

(3) water quality:

(A) surface water

(B) groundwater

(4) land condition: current land condition to be impacted by subsidence

(5) infrastructure: detail of existing infrastructure (pipelines, railway, powerlines and haul roads) should be identified where there is a potential impact from effects of land subsidence

(iv) propose options for mitigating any impacts associated with subsidence, how these mitigation methods will be implemented, and the extent to which these measures will impact MNES

(v) describe cumulative impacts on watercourses, diversions or catchments

(vi) describe impacts on groundwater

(vii) quantify the area of on ground impacts to MNES

(viii) include a program for monitoring and review of the effectiveness of the Subsidence Management Plan.

(c) The Subsidence Management Plan must be reviewed each calendar year and a report prepared on 1 July each year, certified by an appropriately qualified person. The report must:

(i) assess the plan against the requirements under 9(b)

(ii) include recommended actions to ensure potential environmental impacts are effectively managed for the coming year

(iii) identify any amendments made to the Subsidence Management Plan following the review.

(d) The approval holder must attach a written response and recommended actions to the review report required by 9(c). The response must detail the actions taken and/or proposed to be taken in order to ensure continuing compliance with this approval.

(e) The review report required by 9(c) and the written response to the review report required by condition 9(d) must be submitted to the administering authority upon request.

Definitions for Part A	
Approval holder	The person to whom the approval is granted.
Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations	This will be conducted in conjunction with relevant state and territory government agencies and natural resource management bodies and entails a scientific analysis of the ecology, hydrology and geology for the purpose of assessing the potential risks to water resources in the area as a result of the direct and indirect impacts of coal seam gas development and large coal mining development.
Commencement/commence/ commenced/commencing	The first instance of any specified activity. Unless the activity is specifically defined for the purposes of these conditions, commencement of an activity includes any physical disturbance including clearing of vegetation, earthworks, new road works, new rail works, construction of new camps, development of mining associated infrastructure and mining operations. Commencement does not include: (a) erection of signage or fencing (b) minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or associated with the mobilisation of the plant, equipment, materials, machinery and personnel prior to the start of railway and road development or construction; or (c) activities that are critical to commencement that are associated with mobilisation of plant and equipment, materials, machinery and

Definitions for Part A	
	personnel prior to the start of railway or road development or construction only if such activities will have no adverse impact on MNES, and only if the approval holder
The Department	The Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.
Environmental values	Includes but is not limited to habitat for EPBC Act listed threatened species and communities and hydrology of identified water resources.
EPBC Act Offsets Policy	The *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (October 2012).
EPBC Act listed threatened species and/or community/ies	A threatened species or community, or a migratory species listed under the EPBC Act.
Excavation of the first box cut	Bulk earthworks excavating the first box cut required for either underground or open-cut mining, which for the avoidance of doubt does not include clearing or topsoil stripping.
Galilee Basin Strategic Offset Strategy	The Queensland Government Department's Galilee Basin Strategic Offset Strategy (2013) or any future updated version.
Groundwater conceptual model	The conceptual groundwater model developed for the project as described in AMCI (Alpha) Pty Ltd (2014) *South Galilee Coal Project Additional Environmental Impact Statement,* Volume 1, Section 9.4.
Impact/s/ed	As defined in section 527E of the EPBC Act.
IESC information guidelines	*Information Guidelines for Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals*, April 2014.
Legally secure	To secure a covenant or similar legal agreement in relation to a site, to provide enduring protection for the site against developments incompatible with conservation.
Matters of National Environmental Significance	In the context of this project's approval, includes the following: (a) Listed Threatened Species and Communities, including: • Black-throated Finch (southern) *(Poephila cincta cincta)* • Brigalow threatened ecological community *(Acacia harpophylla dominant and co-dominant)* • Dunmall's Snake (Furina dunmalli) • Ornamental Snake (Denisonia maculata) • Squatter Pigeon (Geophaps scripta scripta) • Yakka Skink *(Egernia rugosa)* (b) Migratory birds • Rainbow Bee-eater *(Merops ornatus)* • Eastern Great Egret (*Ardea modesta*) (c) Water resources, in relation to coal seam gas development and large coal mining development
Mining operations	The extraction of ore from the ground as well as any immediately associated activities, including initial clearing of vegetation, removal and storage of overburden, storage of ore and dewatering, but not including exploratory surveys or the construction or operation of transport, accommodation or power generation infrastructure.
The Minister	The Minister responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.
Numerical groundwater	Any computational method that represents an approximation of an underground water system that simulates hydraulic heads (and

Definitions for Part A	
model	watertable elevations in the case of unconfined aquifers) and groundwater flow rates within and across the boundaries of the system under consideration.
Project	The South Galilee Coal project, declared a Coordinated Project under the *State Development and Public Works Organisation Act 1971* consisting of the following stages: • Epsilon mine stage • South Galilee mine stage 1 • South Galilee mine stage 2 • South Galilee mine stage 3
Project area	All disturbance areas as defined in the maps at Appendix A. It is noted that minor alterations may be made in order to avoid Matters of National Environmental Significance or State Significant Biodiversity Values found during pre-clearance surveys. These are permitted only where they will result in a lower level of impact to these matters.
Specified component	is any part of the approved action that the Minister has agreed in writing to consider individually for the purposes of these conditions, and also includes the six components specified in Table A1.
State approvals	Include any permits, licences or other authorisations, including any associated conditions, issued in relation to the action by any Queensland Government agency.
Subsidence	The totality of subsidence effects and subsidence impacts; where 'subsidence effects': means deformation of the ground mass due to mining, including all mining induced ground movements, such as vertical and horizontal displacement, tilt, strain and curvature; and 'subsidence impacts': means physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs.
Suitably qualified independent expert	A person who has professional qualifications, training, skills or experiences related to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relative protocols, standards, methods or literature
Survey guidelines	Include the following: (a) Matters of National Environmental Significance, Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999: http://www.environment.gov.au/epbc/publications/nes-guidelines.html (b) Survey Guidelines for Australia's Threatened Frogs, Threatened Mammals, Threatened Reptiles and Threatened Bats: http://www.environment.gov.au/epbc/guidelines-policies.html (c) Survey Guidelines for Australia's Threatened Birds: **http://www.environment.gov.au/resource/survey-guidelines-australias-threatened-birdsguidelines-detecting-birds-listed-threatened**

Section 2 Other approvals

This section includes recommended conditions, made under section 52 of the SDPWO Act. The recommendations relate to approvals under Acts other than the *Sustainable Planning Act 2009* (SP Act) or EP Act, Chapter 4A or 5, which require the preparation of an EIS or a similar statement to address environmental effects for the project.

While the recommendations guide the assessment and approval authorities' managers in assessing the applications, they do not limit their ability to seek additional information or power to impose conditions on any development approval required for the project.

Each recommendation nominates the entity responsible for implementing the recommendation.

Part A Recommended conditions under the *Water Act 2000*

Condition 1 Groundwater monitoring plan

(a) Prior to the commencement of mining activities, the proponent must present a groundwater monitoring plan for acceptance by the administering authority for the *Water Act 2000* in relation to the groundwater monitoring to be conducted during mine construction and operations. The plan must include existing groundwater monitoring locations, aquifers accessed by each bore and the proposed frequency of monitoring.

(b) Prior to the commencement of operational mine dewatering, the proponent must present an amended groundwater monitoring plan for acceptance by the administering authority. The amended plan must:

  (i) Monitor any ongoing impacts of the mine dewatering

  (ii) Contain, as a minimum, 3 bores in the Rewan Formation and 2 bores in the Clematis Sandstone.

(c) The Clematis bores are to be positioned such that they provide early warning of any potential changes in groundwater levels caused by the proponent's operations.

(d) Within 12 months of the amended groundwater monitoring plan being accepted by the administering authority, the monitoring bores in the Rewan Formation and the Clematis Sandstone must be drilled and monitoring of water levels commences by automated means.

DNRM is designated as the agency responsible for this condition.

Condition 2 Water security

(a) In accordance with relevant conditions of the environmental authority under the EP Act, the proponent must collect data that identifies natural groundwater level trends to help assess predicted water level impacts from the mining operation on authorised water users including the BRC bore water supply for the township of Alpha.

(b) Within 3 years following the publication of this Coordinator-General's evaluation report, the proponent must provide a report to each potentially affected authorised water user and the administering authority. The report must include a summary of the baseline information and address potential impacts to the groundwater supplies of those users

(c) In the report required by (b), the proponent must:

  (i) identify operational bores for each potentially affected authorised water user

  (ii) for each operational bore:

    (1) identify natural groundwater levels and water quality

    (2) identify the condition and supply capacity of the bore

    (3) identify the operational requirements and current use of the bore

    (4) clearly outline the predicted reduction in water level at the bore due to the proposed mining operations

(5) provide an initial assessment of the likely water supply impacts to the affected authorised water users, and timing of those impacts, during and following the project activity

(6) outline the potential future actions (i.e. make good measures) which would ensure the potentially affected authorised water users will be no worse off and have access to a reasonable quantity and quality of water for the authorised use and purpose of the bore/s

(d) If alternative groundwater supplies are to be used in make good measures outlined in (c), the report must detail the source aquifer's characteristics and impact of extraction.

(e) The proponent must enter into agreements with all potentially affected water users (as defined in conditions of the water licence or relevant legislation at the time) about the make good measures outlined in (c), or other negotiated arrangement

(f) The agreement must be entered into prior to the commencement of the project.

DNRM is designated as the agency responsible for this condition.

Part B Recommended conditions under the *Transport Infrastructure Act 1994*

Condition 1 Transport infrastructure

(a) The proponent must implement all necessary measures to mitigate adverse impacts on the safety, condition and efficiency of state-controlled and local roads for all stages of the project.

(b) An impact mitigation program must be submitted to DTMR for review and approval at least three months prior to the commencement of project construction and address one or more of the following:

(i) construction of any required works (including intersections, site accesses or any other required works in State-controlled and/or LGA road reserves) included in an approved Road Impact Assessment (RIA)

(ii) payment of any contributions towards the cost of works, rehabilitation or maintenance included in a RIA

(iii) undertaking or implementing any other action included in an approved Road-use Management Plan (RMP)

(iv) actions or payments as otherwise agreed in writing with DTMR and/or BRC in an infrastructure agreement.

(c) The RIA prepared for (b) must be submitted to DTMR and/or BRC for review and approval six months prior to the anticipated commencement of the relevant project stage and should include, but not be limited to, information about the design and construction of the:

(i) site access road intersection with the Capricorn Highway

(ii) rail underpass under the Capricorn Highway.

(d) The RMP(s) prepared for (b) should be submitted to DTMR and/or BRC for review and approval six months prior to the anticipated commencement of the relevant project stage.

(e) Any infrastructure agreement between the proponent, DTMR or BRC prepared for (b) must be signed by each party prior to commencement of project construction.

(f) In the event that agreement cannot be reached between the proponent and DTMR, the matter may be referred to the Coordinator-General, by either party, to bring the matter to a conclusion and to meet these conditions.

The entity responsible for ensuring this condition is implemented is DTMR.

Condition 2 Permits, approvals and traffic management plans

(a) To ensure efficient processing of the project's required transport-related permits and approvals, the proponent must undertake the following, no later than three months prior to the commencement of construction works or significant project-related traffic:

(i) submit detailed drawings of any works required to mitigate the impacts of project-related traffic to DTMR or BRC for review and approval

(ii) obtain all relevant licences and permits required under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor (section 33 for road works approval, section 62 for approval of location of vehicular accesses to state roads and section 50 for any structures or activities to be located or carried out in a state-controlled road corridor)

(iii) obtain permits 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, and the relevant LGA(s), as required by the *Transport Operations (Road Use Management) Act 1995*

(iv) prepare and implement a Construction Traffic Management Plan in accordance with DTMR's *Guide to preparing a Traffic Management Plan*, to include 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).

The entity responsible for ensuring this condition is implemented is DTMR.

Definitions for Part C	
Infrastructure agreements	Infrastructure agreement(s) are negotiated between a proponent and DTMR and/or the relevant LGA(s). They are intended to formalise arrangements about transport infrastructure works, contributions and road-use management strategies detailed and required under the impact mitigation program. The infrastructure agreement/s should incorporate the following: (a) project-specific works and contributions required to upgrade impacted road infrastructure and vehicular access to project sites as a result of the proponent's use of state-controlled and local transport infrastructure by project traffic (b) project-specific contributions towards the cost of maintenance and rehabilitation, to mitigate impacts on state-controlled and/or local road pavements or other infrastructure (c) agreed performance criteria that detail protocols for consultation about reviewing and updating project-related traffic assessments and impact mitigation measures that are based on actual traffic volume and impacts, should previously advised traffic volumes and/or impacts change (d) the proponent's undertaking to fulfil all commitments relating to transport infrastructure as detailed in the South Galilee Coal project environmental impact statement commitment register.
Road impact assessment	An acceptable RIA report is one developed by a suitably qualified person in accordance with the DTMR *Guidelines for Assessment of Road impacts of Development (2006)* (GARID) and includes: (e) a completed DTMR 'Transport Generation proforma detailing project-related traffic and transport generation information or as otherwise agreed in writing with DTMR and the relevant LGA(s) (f) use of DTMR's Pavement Impact Assessment tools or such other method or tools as agreed in writing with DTMR and the relevant LGA(s) (g) a clear indication of where detailed estimates of project-related traffic are not available, and documentation of the assumptions and methodologies that have been previously agreed in writing with DTMR and relevant LGA(s), prior to RIA finalisation

Definitions for Part C	
	(h) details of the final impact mitigation proposals, listing infrastructure-based mitigation strategies, including contributions to road works, rehabilitation, maintenance and summarising key road-use management strategies (i) Australian Level Crossing Assessment Model (ALCAM) assessments of all rail crossings. Development impact is to be projected at 5 year increments for the first 10 years of construction and operation of the project with future reviews and assessments to occur every 5 years thereafter including decommissioning.
Road-use management plans	An acceptable Road-use Management Plan (RMP) is one developed by a suitably qualified person in accordance with DTMR's *Guide to Preparing a Road-use Management Plan* for each stage of the project and includes: (a) a table listing RMP commitments and provides confirmation that all works and road-use management measures have been designed and/or will be undertaken in accordance with all relevant DTMR standards, manuals and practices and/or as required by the relevant LGA (b) optimised project logistics and minimised road-based trips on all state-controlled and local roads.
Significant project-related traffic	An increase in project traffic equal to or greater than 5% in either traffic numbers (AADT) or axle loadings (ESAs), as outlined in the GARID
Unduly affected	(a) a material reduction in the supply of water from the pre-existing bore relative to the supply available immediately prior to the taking of the water by the proponent, or (b) (b) a material increase in the cost of maintaining the supply of water from the pre-existing bore relative to the cost of supply immediately prior to the taking of water by the proponent, or (c) (c) the taking of water by the proponent causes a material reduction in the quality of water available to the owner of the pre-existing bore.

Section 3 Coordinator-General's general recommendations

This section includes general recommendations to guide the assessment managers in assessing the development applications, they do not limit their ability to seek additional information or the power to impose conditions on any development approval required for the project.

Each recommendation nominates the entity responsible for considering and implementing the recommendation.

Recommendation 1 Pre-clearance surveys

(a) Prior to commencement of construction, the proponent must conduct pre-clearance ecological surveys of areas to be impacted, consistent with:
  (i) Queensland state government survey guidelines
  (ii) Australian government threatened species guidelines.

(b) The surveys must be sufficient to identify the extent to which the following will be unavoidably impacted by the project:
  (i) matters of state environmental significance as defined by the State Planning Policy
  (ii) MNES as listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

(c) The surveys must include riparian zones along watercourses to identify surface or groundwater dependent vegetation.

(d) Survey results must be included in the Biodiversity Offset Plan for the project in accordance with recommended Condition 2 (Appendix 2, Section 1, Part A).

DEHP is designated as the agency responsible for this recommendation.

Recommendation 2 Threatened species protection measures

(a) Prior to the commencement of the project, the proponent must develop and document impact mitigation and management measures that maximise the ongoing protection and long-term conservation of threatened species known or likely to occur within the project area including, but not limited to, those detailed in Table A2.

Table A2. Threatened species known or likely to occur in the project area

Species	NC Act Status
Black-chinned honeyeater *(Melithreptus gularis)*	Near threatened
Black-throated finch *(Poephila cincta cincta)*	Endangered
Brigalow scaly foot (*Paradelma orientalis*)	Vulnerable
Cotton pygmy-goose *(Nettapus coromandelianus)*	Near threatened
Dunmall's snake *(Furina dunmalli)*	Vulnerable
Freckled duck (*Stictonetta naevosa)*	Near threatened
Koala (*Phascolarctos Cinereus*)	Vulnerable
Little pied bat *(chalinolobus picatus)*	Near threatened
Ornamental snake *(Denisonia maculata)*	Vulnerable
Square-tailed kite *(Lophoictinia isura)*	Near threatened
Squatter pigeon (*Geophaps scripta scripta*)	Vulnerable

(b) Mitigation and management measures under (a) must:

(i) detail actions and procedures to be followed during the pre-construction, construction, operational and (if appropriate) rehabilitation phases of the project

(ii) be supported by a program of monitoring, reporting and review to facilitate adaptive management of the actions and measures, should it be required

(iii) detail how the project will comply with all relevant provisions of the *Nature Conservation Act 1992 (Qld)*.

(c) All identified impact mitigation and management and reporting and monitoring measures documented in (a) and (b) must be implemented for all stages of the project's construction and operations.

DEHP is designated as the agency responsible for this recommendation.

Recommendation 3 Regional water balance model

(a) To address potential cumulative impacts on water resources in the Belyando-Suttor sub-catchment and the aquifers of the eastern part of the Galilee Basin, the authority responsible for administering the *Water Act 2000* must ensure the development and maintenance of a numerical regional water balance model for the Galilee Basin. The regional water balance model should:

(i) include the identification of linkages between hydrogeological formations, the likely extent of aquifer connectivity and groundwater/surface water interactions, and characteristics of aquifer recharge

(ii) have regard to baseline monitoring and site water balance model data provided by project proponents

(iii) have regard to relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Galilee Basin subregion of the Lake Eyre Basin

(iv) determine potential impacts on groundwater resources in the eastern Galilee Basin

(v) determine potential impacts on surface water flow conditions, environmental values and existing surface water users

(vi) make results publicly available on the administering authority's website.

DNRM is designated as the agency responsible for this recommendation.

Recommendation 4 Local water quality objectives

(a) To address the potential cumulative impacts on surface water quality in the Belyando-Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin, the authority responsible for administering the *Environmental Protection Act 1994* (EP Act) must develop:

(i) Belyando-Suttor sub-catchment environmental values and water quality objectives for the Galilee Basin. Water quality objective development should also have regard to, where available:

(A) impact assessment, baseline monitoring and site water balance model data provided by project proponents

(B) results of the regional water balance model (Recommendation 3) and any ongoing regional surface water and groundwater monitoring and assessment program (Recommendation 5)

(C) relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Lake Eyre Basin

(ii) model water conditions for coal mines and coal seam gas projects in the Galilee Basin to form the basis of future environmental authority conditions and any other related decisions that the administering authority under the EP Act may be required to make in relation to cumulative impacts on water quality.

DEHP is designated as the agency responsible for this recommendation.

Recommendation 5 Regional groundwater and surface water monitoring and assessment program

(a) To address the potential impacts from a number of different Galilee Basin mine projects proceeding at the same time on water resources in the Belyando-Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin, DNRM must, in consultation with DEHP and Galilee Basin mine proponents, ensure the development of an ongoing regional groundwater and surface water monitoring and assessment program with reference to existing water users and the maintenance of environmental values. The monitoring and assessment program should:

(i) establish a protocol with coal mine and coal seam gas proponents for delivery of surface water and groundwater monitoring data recorded by proponents in accordance with environmental authority and Coordinator-General requirements

(ii) collate surface water and groundwater monitoring data that will inform the development of the regional water balance model referred to in Recommendation 3

(iii) have regard to relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Lake Eyre Basin

(iv) based on data provided, impact assessment reports prepared by proponents, and the use of the model results referred to in Recommendation 3, produce a risk-based assessment of regional cumulative impacts, including impacts on existing water users, potential habitat loss and impacts on ecological systems. Regional cumulative impacts should include the impacts of proposed mining projects, including but not limited to:

(A) open-cut and underground mining operations

(B) mine dewatering

(C) mine waste management

(D) stream diversions and flood levees

(E) subsidence

(v) report on the outcomes of the Galilee Basin coal mine and coal seam gas proponents' water management measures to inform the ongoing adaptive management of water resources in the region

(vi) periodically publish data and reports with reference to monitoring and assessment program outcomes.

DNRM is designated as the agency responsible for this recommendation.

Recommendation 6 Rail coal dust management

The proponent must develop and implement coal dust management procedures to mitigate the emission of coal dust from loaded and unloaded trains with the objective of:

(a) preventing environmental nuisance at any nuisance sensitive place unless specifically authorised by a condition of another approval

(b) minimising damage to rail infrastructure due to coal dust contamination of ballast

(c) minimising the loss of ecological values.

DTMR is to have jurisdiction for this recommendation.

Recommendation 7 Stock routes

The proponent must document and implement management measures for gazetted stock routes impacted by the project to:

(a) provide safe passage for stock, personnel and the general public

(b) maintain stock routes in accordance with any agreements reached with landholders, BRC or the administering authority, including provisions for any re-aligned stock routes.

DNRM is to have jurisdiction for this recommendation.

Recommendation 8 Local content reporting

The proponent must prepare an annual report in accordance with Queensland Resources and Energy Sector Code of Practice for Local Content 2013. The report must describe the actions, outcomes and adaptive management strategies proposed to enhance local and regional employment opportunities, business growth and economic development throughout the project's mine construction and operations.

The Coordinator-General is to have jurisdiction for this recommendation.

Recommendation 9 Management measures and procedure requirements to be included in development approval applications off the mining lease

(a) The proponent in any application for a Development Approval off the mining lease must prepare and document management measures and procedures that will:

(i) ensure compliance with applicable environmental legislation and any stated conditions under the SDPWO Act

(ii) implement relevant commitments made by the proponent in the project's environmental impact statement documentation

(iii) minimise adverse impacts to the greatest extent practicable to:

(A) the functioning and biodiversity of ecosystems

(B) soil structure and quality

(iv) minimise the clearing of native vegetation to the greatest extent practicable

(v) prevent environmental nuisance from dust, odour, light, smoke or noise at a nuisance-sensitive place

(vi) establish rehabilitation objectives, including a rehabilitation schedule

(b) The management measures and procedures must detail appropriate performance criteria and standards, monitoring and auditing and corrective actions so that all reasonable and practicable measures to prevent or minimise environmental harm are identified

(c) When approved, the approval holder must:

  (i) implement and make available the management measures and procedures in (b) to all employees, contractors and subcontractors

  (ii) make the management measures and procedures publicly available on the proponent's website prior to the commencement of any construction work

  (iii) regularly review and amend as necessary the management measures and procedures in response to monitoring and auditing reports and changes in legislation and standards. Any management measures and procedures must be updated on the proponent's website within 30 business days.

The assessment manager is responsible for ensuring this recommendation is implemented.

Note to the applicant:

Matters to consider in developing management measures and procedures may include but are not necessarily limited to:

- soils (including geotechnical investigations, soil types, salinity, sodicity and acid sulfate potential)
- erosion and sediment control (suggested guideline: International Erosion Control Australasia 2008, *Best Practice Erosion and Sediment Control*)
- native flora and fauna
- fauna passage, connectivity between populations and prevention of entrapment during construction
- weeds and pests
- progressive rehabilitation of disturbed areas
- surface waters (suggested guideline: Department of Natural Resources and Mines guideline *Riverine Protection Permit Exemption Requirements Version 1.01* [WSS/2013/726])
- surface flood waters
- dust and air quality (including coal dust management)
- noise and vibration from construction activities (suggested guideline *Application requirements for activities with noise impacts*, DEHP)
- rail operational noise (suggested guideline NSW Environment Protection Authority *Rail Infrastructure Noise Guideline 2013*)
- chemical and fuel storage
- waste management
- stock routes
- agricultural land integrity
- lighting and visual amenity
- existing transport and utility infrastructure
- non-Indigenous cultural heritage
- decommissioning and rehabilitation
- hazard and risk (including managing any adverse impacts of flood, severe storms, bushfire and landslide).

Definitions	
administering authority	The Chief Executive of the Barcaldine Regional Council or if a Community Infrastructure Designation is declared, the Minister for Transport and Main Roads.
coal dust management procedures	Appropriate procedures would be consistent with the aims, objectives and mitigation measures in the QR Network (2010) *Coal Dust Management Plan* and include reference to: a) wagon loading systems b) load profiling c) coal wagon veneering d) dust monitoring systems e) wagon washing f) periodic removal of dust from ballast and tracks.
environmental impact statement documentation	Environmental impact statement documentation prepared for the South Galilee Coal project in accordance with the provisions of the *State Development and Public Works Organisation Act 1971*.
environmental nuisance	As defined in Section 15 of the *Environmental Protection Act 1994*.
minimise	Taking all reasonable and practical measures to minimise the adverse effect having regard to the following matters: a) the nature of the harm or potential harm b) the sensitivity of the receiving environment c) the current state of technical knowledge for the activity d) the likelihood of successful application of different measures that might be taken to minimise the adverse effects e) the financial implications of the different measures as they would relate to the type of activity f) if the adverse effect is caused by the location of the activity being carried out, whether it is feasible to carry out the activity at another location.
nuisance sensitive place	Includes: • a dwelling (including residential allotment, mobile home or caravan park, other residential premises, motel, hotel or hostel • a library, childcare centre, kindergarten, school, university or other educational institution • a medical centre, surgery or hospital • a protected area under the *Nature Conservation Act 1992*. • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment • a workplace used as an office or for business or commercial purposes, which is not part of the project activity(ies) and does not include employees accommodation, grazing and farmland, unoccupied buildings or public roads
project	The South Galilee Coal project, declared a Coordinated Project under the *State Development and Public Works Organisation Act 1971*, consisting of the following stages: • Epsilon mine • South Galilee mine stage 1 • South Galilee mine stage 2 • South Galilee mine stage 3
proponent	AMCI (Alpha) Pty Ltd

Definitions	
relevant provisions	Relevant provisions of the *Nature Conservation Act 1992* include but are not limited to: • a Clearing Permit to clear protected plants, except where an exemption applies. The Nature Conservation (Protected Plants) Conservation Plan 2000 outlines how clearing permits, licences and exemptions can be issued to take protected plants. • a Species Management Program will need to be submitted for consideration in relation to tampering with animal breeding places. Section 332(4) of the Nature Conservation (Wildlife Management) Regulation 2006 identifies that the removal of a breeding place may occur under an approved species management program or a damage mitigation permit. • the management principles outlined in Section 73 of the *Nature Conservation Act 1992.*
state government survey guidelines	• Department of Environment and Resource Management (2011) *Ecological Equivalence Methodology Guideline: Policy for Vegetation Management Offsets: Queensland Biodiversity Offset Policy* or • Department of Environment and Resource Management (2011) Biocondition, a Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual or • equivalent methodology determined in consultation with the Department of Environment and Heritage Protection
suitably qualified person	A person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
threatened species	Includes native wildlife that is prescribed under the *Nature Conservation Act 1992* as— endangered wildlife vulnerable wildlife near threatened wildlife. Or Threatened flora and fauna listed in a category defined in section 179 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Appendix 3 Imposed conditions

This appendix includes conditions imposed by the Coordinator-General under section 54B of the SDPWO Act. The conditions are relevant to applications for development approvals for those parts of the project where there is no relevant approval applicable under other legislation.

These imposed conditions take effect from the date of publication of this Coordinator-General's evaluation report.

The conditions do not relieve the proponent of the obligation to obtain all approvals and licences from all relevant authorities required under any other Act.

In accordance with section 54B(3) of the SDPWO Act, I have nominated the entity to have jurisdiction for the conditions in this schedule.

Condition 1 Offsets

(a) The proponent must prepare a detailed plan that:

- (i) details any offset requirements conditioned by the Commonwealth Minister for the Environment in any approval for the project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- (ii) details proposed offsets to address any significant residual impacts for matters of state environmental significance consistent with (a)(i)
- (iii) includes but is not necessarily limited to:
  - (1) a detailed description of the land to which the plan relates, the values affected and the extent and likely timing of impact on each value
  - (2) evidence that values impacted can be offset
  - (3) the offset delivery mechanism(s) comprising one or more of: land-based offsets; direct benefit management plans; offset transfers and/or offset payments
  - (4) a legally binding mechanism that ensures protection and management of offset areas.

(b) The offsets plan must be provided to the Coordinator-General for approval within 60 days of an approval decision under the EPBC Act and no later than 2 months prior to the commencement of construction.

(c) The approved offsets plan must be implemented as directed by the Coordinator-General.

The Coordinator-General is to have jurisdiction for this condition.

Condition 2 Proponent contribution to regional water balance modelling, monitoring and assessment programs

(a) To address the potential impacts of a number of different Galilee Basin coal mines proceeding at the one time on water resources in the Belyando-Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin, the proponent must, when requested by the administering authority:

- (i) prepare, to the satisfaction of the administering authority, a groundwater and surface water monitoring and reporting program that takes into account requirements of any regional groundwater and surface water monitoring and assessment program developed in accordance with Recommendation 5 of this report (Appendix 2, Section 2)
- (ii) provide monitoring results in the format and at intervals specified in the protocol for coordination of regional groundwater and surface water monitoring data to the lead agency for the surface water monitoring and assessment program
- (iii) contribute to the ongoing operation of the regional groundwater and surface water monitoring and assessment program of this report, including pro-rata funding.

Condition 3 Apportionment of pro-rata funding—regional water balance modelling, monitoring and assessment programs

(a) The apportionment of pro-rata funding pursuant to Condition 2(a)(iii) will be determined by the Coordinator-General in consultation with:

(i) Galilee Basin proponents of projects that have been declared coordinated projects under the *State Development and Public Works Organisation Act 1971*

(ii) Galilee Basin proponents that have made an application for and/or have been granted a mining lease or petroleum lease

(iii) The Department of Natural Resources and Mines

(iv) The Department of Environment and Heritage Protection

(v) The Department of State Development, Infrastructure and Planning.

The Coordinator-General is to have jurisdiction for this condition.

Condition 4 Provision of bore data

(a) The proponent must provide the administering authority for the *Water Act 2000* with data collected by the proponent from vibrating wire piezometer bore sites for the project including:

(i) strata log

(ii) construction detail

(iii) probe depth settings

(b) The data must be provided within 60 days of the publication of this Coordinator-General's evaluation report.

DNRM is to have jurisdiction for this condition.

Condition 5 Flooding

(a) A suitably qualified person must document and certify that the design and construction of the rail component of the project:

(i) is in accordance with the design criteria in the Department of Transport and Main Roads (March 2010) Road Drainage Manual 2nd edition

(ii) meets the following criteria for a two per cent annual exceedence probability rainfall event (50 year Annual Recurrence Interval):

(1) not cause, or have the potential to increase flood damage at a residential premises or occupied commercial workplace

(2) a maximum increase in afflux of 0.1m at a residential premises or occupied commercial workplace

(3) a maximum increase in afflux of 0.2m at infrastructure

(4) a design objective of an increase in afflux of 0.3m generally, with a maximum increase in afflux of 0.5m at other locations

(5) a maximum culvert outlet velocity of 2.5m/s

(6) any increase in duration of floodplain inundation is not to exceed 72 hours or 20 per cent of existing flood duration (whichever is greater)

(7) any increase in duration of inundation must not alter rural land uses or result in significant impacts upon valued pasture land, other valued agricultural land uses such as cultivated ground or flood-free ground and evacuation access for cattle.

(b) Relevant land owners likely to be impacted by changes to the existing flooding/drainage system must be consulted prior to completion of the final design for the rail component of the project.

(c) The certified final design and a report on the consultation required in (b) must be provided to the Coordinator-General for approval at the completion of the final design and revised flood modelling.

(d) A summary of the information provided to the Coordinator-General in (c) must be provided to relevant land owners within two months of the Coordinator-General's approval.

The Coordinator-General is to have jurisdiction for this condition.

Condition 6 Social impact assessment reporting requirements

(a) The proponent must provide an annual report to the Coordinator-General:
  (i) from the commencement of construction up to and including the peak construction workforce period for the Epsilon mine
  (ii) for two years following the commencement of Epsilon mining operation
  (iii) from the commencement of construction up to and including the peak construction workforce period for the South Galilee mine stages
  (iv) for two years following the commencement of the South Galilee mine operations

(b) Each report will describe:
  (i) action and adaptive management strategies to avoid, manage or mitigate project-related impacts on local and regional housing markets
  (ii) actions to enhance local employment, training and development opportunities
  (iii) actions to avoid, manage or mitigate project-related social impacts on local community services, infrastructure and community safety and wellbeing
  (iv) actions to inform the community about project impacts and show that community concerns about project impacts have been taken into account when reaching decisions.

The Coordinator-General is to have jurisdiction for this condition.

Definitions	
annual exceedence probability	Is the probability that at least one event in excess of a particular magnitude will occur in any given year
certify	A Statutory Declaration by a suitably qualified person accompanying the written document warranting that: • all relevant material has been considered in the written document • the content of the written document is accurate and true • the written document meets the requirements of the condition.
commercial workplace	A workplace used as an office or for business or commercial purposes, which is not part of the project activity(ies) and does not include project employees accommodation, grazing and farmland, unoccupied buildings or public roads
infrastructure	Includes state or local government controlled roads, unoccupied buildings, electricity supply or communication structures and airfields
flood damage	Damage caused by flooding that would adversely affect land and/or premises to an extent likely to have a significant cost.
project	The South Galilee Coal Project, declared a Coordinated Project under the *State Development and Public Works Organisation Act 1971*.
rail component	As defined in the Environmental Impact Statement, Volume 1, Section 4.6.2 and the Project Supplementary Environmental Impact Statement, Volume 1,Section 2.5
relevant land owners	Includes private freehold and leasehold land owners, and owners of infrastructure assets including public utilities and government agencies likely to be affected by flooding caused by the rail component of the project.

suitably qualified person	A person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

Appendix 4 Standard dewatering conditions for a water licence under the *Water Act 2000*

This appendix includes, for information only, the conditions for a water licence under the *Water Act 2000*. The licence will need to be issued to the proponent before project activities commence which could impact on landholder or other user water supplies. Relevant components will be inserted by the proponent at the time of application.

Recitals

XXXX Coal Pty Ltd (hereinafter "the licensee") is the Principal holder of mining lease numbers ML XXXX and ML XXXX for the XXXX Coal project which proposes to construct and operate an open-cut coal mine near XXXX ("the mine") on the mining leases. The licensee will construct works (comprising bores and works that pump groundwater from a sump) accessing the XXXX Coal Measures. These works are referred to as the Dewatering Works. The water taken through the dewatering works may be used for the consumptive purpose/s authorised under this licence.

The operation of the Dewatering Works will impact on the piezometric levels in the region of the mine during the life of the mine and for a period after the mines closure.

The licensee prior to the time of making application for a Licence, prepared an EIS that deals with the hydrology of the area and the effects of the proposed extraction on groundwater. The EIS included predictions of the impact of the Dewatering Works on the aquifers in the region. These predictions, were referenced in the Report titled:

"XXXX Groundwater Impact Assessment – Appendix X of the XXXX Mine Project – Environmental Impact Statement - 2014"

The report "XXXX Mine Groundwater monitoring plan" outlines the proposed groundwater monitoring program.

The conditions set out in Schedule A and Schedule B of this Licence are herewith after referred to as "the Conditions".

DEFINITIONS

In this Licence, unless the context otherwise requires:

"bore owner" means the registered owner of the land on which a bore exists as approved development under the *Sustainable Planning Act 2009* and/or from which water is taken under the authority of the *Water Act 2000*;

"Business day" means a day on which trading banks are open for normal banking business in Brisbane;

"Chief Executive" means the Chief Executive, Department of Natural Resources and Mines.

"Measures to make good" has the meaning ascribed to it in Schedule B condition 3.1;

"Licensee" has the meaning ascribed to it in the Recitals;

"Dewatering Works" has the meaning ascribed to it in the Recitals;

"Monitoring Bores" means the monitoring bores as identified the report "XXXX Mine Groundwater monitoring plan" and any subsequently drilled bores for monitoring purposes;

"Pre-existing bore" has the meaning ascribed to it in Schedule B condition 1.1;

"Restoration measures" has the meaning ascribed to it in Schedule B condition 3.1;

"Conditions" has the meaning ascribed to it in the Recitals; and

"Unduly affected" has the meaning ascribed to it in Schedule B condition 1.2.

INTERPRETATION

In this Licence:

(a) headings to Conditions are for ease of reference only and shall not in any way affect the meaning of the Conditions;

(b) a reference to days or months is a reference to Business days and calendar months; and

(c) words in the singular shall include the plural and vice versa.

NOTICES

(a) Form of Notice

Any notices, consents, document, invoice or other communication ("notice") required or permitted to be given by this Licence:

must be in writing; and

may be given by being delivered or sent by prepaid registered post (or by facsimile transmission where facsimile transmission facilities are available for receipt of such a communication) to the address of the parties set out below or such other address as may be notified as the appropriate address from time to time for the purposes of this Licence.

The Chief Executive:

The Chief Executive
C /- The Manager

Water Management and Use

Department of Natural Resources and Mines
PO Box 1762
ROCKHAMPTON QLD 4700
Telephone: 1800 822 100
Facsimile: (07) 4999 6904
Email: centralwaterservices@dnrm.qld.gov.au

Licensee:

XXX Coal Pty Ltd
Environmental Superintendent – XXXX Mine
GPO Box XXX
BRISBANE QLD 4001

(b) Time Service Occurs

A notice is deemed to be served on a party, in the case of post, on the third business day after posting and, in the case of facsimile, on the day of transmission if the transmission is before 5.00pm on a business day and in all other circumstances on the business day following transmission of the facsimile provided that the sending party has received a report that there has been a correct and complete transmission.

1 EXISTING WATER SUPPLIES TO BE PROTECTED

1.1 Existing bores

(a) Any bore that:

(i) is in existence at the date of issue of this licence, and

(ii) is approved development under the *Sustainable Planning Act 2009*; and

(iii) takes water from any aquifer; and

(iv) takes that water under the authority of the *Water Act 2000*;

(v) is a “pre-existing bore.”

(b) Any bore that is constructed to replace a pre-existing bore is taken to be a pre-existing bore.

(c) Any bore that is constructed as a measure to make good the supply of water from a pre-existing bore under the licence is taken to be a pre-existing bore.

1.2 For a pre-existing bore, if at any time, in the opinion of the chief executive:

(a) the taking of water under the licence causes a material reduction in the piezometric level in the pre-existing bore relative to the piezometric level existing immediately before the commencement of the taking of water under the licence; and

(b) that reduction in piezometric level causes, either:

(i) a material reduction in the supply of water from the pre-existing bore relative to the supply available immediately prior to the taking of water under the licence; or

(ii) a material increase in the cost of maintaining the supply of water from the pre-existing bore relative to the cost of supply immediately prior to the taking of water under the licence;

(c) the taking of water under the licence causes a material reduction in the quality of water available to the owner of the pre-existing bore, then the pre-existing bore will be regarded as being "unduly affected" by the taking of water under the licence.

1.3 The licensee must co-operate with the owner of any pre-existing bore that is unduly affected, or is likely to become unduly affected, to collect piezometric, water supply and water quality information necessary to quantify the impacts of the taking of water under the licence on the supply, reliability, quality or quantity of water available from such pre-existing bore.

2 UNDULY AFFECTED EXISTING SUPPLIES TO BE MADE GOOD

2.1 Where an existing bore is unduly affected by the taking of water under the licence, the licensee shall, at the cost of the licensee, carry out such measures, or cause such measures to be carried out, as are necessary to make good the supply of water to the owner of the unduly affected bore, pursuant to the terms of the licence (the "measures to make good").

2.2 A water supply to the owner of a pre-existing bore unduly affected by the taking of water under the licence will be considered to be made good if:

(a) the supply of water available to the owner of the existing bore, whether from the existing bore or another source, is not materially less than that which would have been available from the existing bore but for the taking of water under the licence; and

(b) the reliability and the quantity of water is equivalent to that which was available from the existing bore immediately before the commencement of the taking of water under the licence; and

(c) the owner of the pre-existing bore does not suffer increased cost in the operation of the made good water supply; and

(d) the quality of the water available to the owner of the existing bore is suitable for the purposes for which the owner uses the water.

3 MEASURES TO MAKE GOOD EXISTING SUPPLIES

3.1 Measures to make good an unduly affected pre-existing bore may include one or more of the following:

(a) deepening an existing bore;

(b) replacing an existing bore with another bore;

(c) replacing or modifying existing water supply equipment;

(d) providing a water supply of an equivalent quantity of suitable quality by piping from an alternate water source;

(e) providing a cash settlement to the owner of an existing bore; or

(f) other measures as may be agreed between the Licensee and the owner of an existing bore.

3.2 If an existing bore is unduly affected by the taking of water under the licence then the licensee shall agree with the owner of the unduly affected pre-existing bore on measures to make good the supply of water from such an existing bore.

3.3 If, after advice from the parties that agreement pursuant to Schedule B condition 3.2 cannot be reached, and in the opinion of the chief executive all reasonable attempts have been made to achieve agreement, then the chief executive:

(a) may give a notice to the licensee to require the licensee to provide to the satisfaction of the chief executive any data necessary to determine the measures necessary to make good the supply of water from the existing bore;

(b) will, in consultation with the licensee and the owner of the existing bore, determine the measures to be taken to make good the supply of water from the existing bore; and

(c) will, upon determining the measures to be taken to make good the supply of water from the existing bore, give the licensee a notice to inform the licensee of the determination.

3.4 The licensee must implement, at the cost of the licensee, all measures necessary to make good the supply of water from an unduly affected pre-existing bore, either as agreed between the licensee and the owner of such bore under Schedule B condition 3.2 or as determined by the chief executive and notified under Schedule B condition 3.3.

4 URGENT RESTORATION

4.1 If, in the reasonable opinion of the Chief Executive,

(a) restoration measures agreed pursuant to Schedule B condition 3.2 or as determined pursuant to Schedule B condition 3.3 need to be carried out urgently to maintain an adequate supply of water, and

(b) the licensee is not responding with appropriate haste to carry out the restoration measures;

then the Chief Executive will issue a notice to the licensee directing the licensee to commence an appropriate program for implementation of restorations measures within forty-eight hours of receipt of the notice.

4.2 If, in the opinion of the Chief Executive, the licensee fails to adequately comply with a notice issued pursuant to Schedule B condition 4.1, the Chief Executive will:

(a) carry out the necessary restoration measures; and

(b) notify the licensee of the cost of the restoration measures and direct the licensee to reimburse the Chief Executive for the cost of the restoration measures

The licensee shall pay to the Chief Executive the costs of the restoration measures stated in the notification.

5 MONITORING AND ASSESSMENT

5.1 Monitoring will be undertaken in accordance with the recommendations of the report entitled “XXXX Mine Groundwater Monitoring Plan” and any subsequent revisions of this report. Subsequent provisions of this report must be approved by the Chief Executive.

5.2 The Licensee must implement the monitoring program outlined in the report entitled “XXXX Mine Groundwater Monitoring Plan” and any subsequent revisions of this report. Subsequent provisions of this report must be approved by the Chief Executive.

5.3 The licensee must provide monitoring reports to the Chief Executive annually during the operational life of XXXX Mine. These reports must include water level data from those bores mentioned in the report entitled “XXXX Mine Groundwater Monitoring Plan”.

5.4 The Licensee must, if directed by the Chief Executive, make any amendments considered necessary to the monitoring report entitled “XXXX Mine Groundwater Monitoring Plan” to

ensure that the monitoring program is adequate to assess the effects of the extraction of water authorised under this license.

5.5 The licensee shall provide to the Chief Executive a Performance Review Report in respect of the performance of the XXXX Mine project dewatering works and those monitoring bores as identified in the "Definitions" at the times stated in Schedule B condition 6. One hard copy and an electronic copy shall be furnished to the chief executive. Topics addressed in any Performance Review Report shall include:

(a) the monthly volume of water extracted from Dewatering Works;

(b) any changes in water quality in the Dewatering Works and monitoring bores;

(c) the piezometric levels on a quarterly basis in the Monitoring Bores;

(d) an assessment of the need for adjustment of the model used to assess piezometric impact;

(e) details of any adjustment since the previous Performance Review Report to the model used to predict piezometric impact, and if adjustments have been made to the model, plans are to be provided showing:

(i) the revised prediction of the total piezometric impact from the commencement of pumping to xx years after the commencement of pumping or such other period as the Chief Executive may determine, made using the adjusted model; and

(ii) the difference between these predicted piezometric impacts and the piezometric impacts as predicted at the time of application for licences by the licence holder.

(f) an assessment of any material departure of the performance of the Dewatering works (including piezometric impact) from the performance predicted for a withdrawal amount of the volumes predicted in the Environmental Impact Statement

(g) plans showing the piezometric impact caused by the operation of the Dewatering Works, using the then current model, are to be included in the next scheduled Performance Review Report pursuant to Schedule B condition 6.1;

(h) details of any pre-existing bores which are predicted by the then current model to become unduly affected by the Dewatering Works to be included in the next scheduled Performance Review Report; and

(i) details of any restoration measures carried out since the commencement of pumping if it is the first Performance Review Report or since the previous Performance Review Report, in respect of pre-existing bores unduly affected by the Dewatering works including details of piezometric drawdown, bore description and licence number

5.6

(a) In conjunction with the second Performance Review Report, the licensee will provide the Chief Executive with a Peer Review Report (PRR) of the model used by XXXX Coal Pty Ltd to predict piezometric drawdown and associated impacts of the Dewatering Works. The peer review must be undertaken external to XXXX Coal Pty Ltd and the models developing consultants. The PRR must at least review the following:

(i) the assumptions about the hydrogeology of the aquifers;

(ii) impacts on the physical integrity of the aquifers;

(iii) the ability of the geological formation to contain the piezometric drawdown and impacts due to the extraction of the water;

(iv) any other matter the Chief Executive considers reasonable;

(b) The name and contact details of the reviewers who undertake the PRR in Schedule B condition 5.6(a) must also be provided to the Chief Executive.

6 FREQUENCY OF REPORTING

6.1 The first water year shall be defined as the period covering the period from the commencement of extraction (under the authority of this licence) of water from the Dewatering Works to the end of the next following June. Thereafter the water year shall commence on 1 July of any year and end on 30 June the year following. The first Performance Review Report shall cover the period as defined by the first water year. Thereafter scheduled Performance Review Reports shall then be provided in respect of the relative intervening periods, at the end of the 2nd, 3rd, 4th, 5th, 7th water years and thereafter every three years. The Chief Executive may call for a Performance Review Report at any other time during the currency of the Licence (unscheduled Performance Review Report) if he is of the reasonable opinion that the piezometric impact of the Dewatering Works is greater than the most recent prediction of piezometric impact reported by the licensee.

6.2 An unscheduled Performance Review Report will cover the period from the date of the immediately preceding Performance Review Report, be it an unscheduled or a scheduled Performance Review Report, and the date notified by the Chief Executive as the date of the unscheduled Performance Review Report, or such other period as the Chief Executive may determine. The scheduled Performance Review Report next following an unscheduled Performance Review Report will cover the period from the date of that unscheduled Performance Review Report and the date of the scheduled Performance Review Report.

6.3 A Performance Review Report will be due three months after the end of the relevant water year, or three months after notification of requirement of an unscheduled report.

6.4 The Chief Executive will advise the licensee of the acceptability of a Performance Review Report or Monitoring Report within 60 days of the date of receipt of same. If the Chief Executive reasonably considers a report unacceptable, he will notify the licensee in writing of the deficiencies. The licensee will then submit a further report within 60 days of such notification, or such longer period as determined by the Chief Executive and the same procedure shall be followed as with the original report.

7 Closure Of XXXX Mine PROJECT OPERATIONS

7.1 One year prior to the closure of the mine, the licensee will:

(a) In the case of a pre-existing bore that has become unduly affected since the commencement of pumping from the Dewatering Works and where the restoration measures carried out by the licensee depend on matters beyond the control of the bore owner, enter into arrangements with the bore owner, to the reasonable satisfaction of the bore owner, to maintain a supply at the affected bore in accordance with Schedule B condition 3.2;

(b) Provide to the Chief Executive a XXXX Mine Project Operation Pre-Closure Report

7.2 It shall be acceptable for the bore owner entering into an arrangement with the licensee pursuant to Schedule B condition 7.1 to require that the arrangement reasonably provides the bore owner with independent control over restored water supply.

7.3 A XXXX Mine Project Operation Pre-Closure Report pursuant to Schedule B condition 7.1 shall contain:

(a) the piezometric levels in the Monitoring Bores and the Dewatering Works;

(b) an assessment of the need for adjustment of the model used to assess piezometric impact;

(c) details of any adjustment since the previous Performance Review Report to the model used to predict piezometric impact;

(d) details of any restoration measures carried out since the last Performance Review Report;

(e) plans showing the prediction, using the then current model, of the total piezometric impact from the commencement of pumping to XXX years after commencement of pumping or such other period as the chief Executive may determine;

(f) details of any unduly affected bores for which arrangements could not be successfully made pursuant to Schedule B condition 7.1;

7.4 The Chief Executive will advise the licensee of the acceptability of a XXXX Mine Project Operation Pre-Closure Report within 60 days of the date of receipt of the same. If the Chief Executive considers the report unacceptable, he will notify the licensee in writing of the deficiencies. The licensee will then submit a further report within 30 days of such notification or such longer period as determined by the Chief Executive and the same procedure shall be followed as with the original report until the final report is reasonably accepted by the Chief Executive.

7.5 The licensee will fully implement arrangements pursuant to Schedule B condition 7.1 at least 90 days before XXXX Mine Project Operation closure.

7.6 Schedule B condition 7 will operate even if this licence has expired at the relevant time unless a licence is then in place and otherwise regulates closure.

8 GENERAL PROVISIONS

8.1 The taking of water under the authority of this water licence is only permitted for the express purposes listed on this licence and only during the mining operation authorised on ML XXXX and ML XXXX.

8.2 This licence expires on the day stated in the licence, or the day stated in any subsequent renewal of the licence, or upon the closure of the mine referred to in Schedule B condition 8.1.

Appendix 5 Proponent commitments

This appendix includes commitments made by the proponent in the EIS and AEIS.

Introduction	
1.	Stakeholder consultation will continue to be undertaken over the life of the project.
Project Rationale and Alternatives	
2.	With the exception of recyclable waste, which will be transported off-site by recycling contractors, waste will be either treated on-site or disposed of in an on-site landfill designed and managed to the appropriate legislative standards.
3.	The accommodation village will utilise pre-fabricated components where practicable, in order to minimise disturbance and waste associated with its construction.
4.	The proponent will work cooperatively with other Galilee Basin proponents to coordinate or enhance impact mitigation measures already proposed for rail transport on the proposed common user rail line.
Project Description	
5.	Coal contained in underground pillars and development workings will be sterilised along with coal below endangered Regional Ecosystems which will be avoided for conservation purposes.
6.	Rehabilitation activities will be undertaken progressively throughout the mine life.
7.	Construction inputs will be stored at designated laydown areas and temporary storage facilities within the area to be used for Mine Infrastructure Area (MIA) and Coal Handling and Preparation Plant (CHPP) in the operational phase.
8.	Ballast material for construction of the on-site rail component and the project rail spur component will be stockpiled near the rail loop area within the MLA 70453 and at the northern end of Saltbush Road.
9.	Construction activities will typically be undertaken during daylight hours, seven days a week.
10.	The proponent will finalise required land acquisitions and consent from other tenement holders prior to commencement of construction.
11.	Land clearing will be undertaken progressively to minimise exposure of disturbed areas, degradation of topsoil and the spread of weeds. Topsoil will be removed and stockpiled in dedicated topsoil areas around the mine for later use in mine rehabilitation.
12.	A site access road will be constructed from the Capricorn Highway to the construction office site.
13.	A haul road will be constructed from the quarry on the Alpha-Tambo Road through MLA 70453, to connect with the proposed road alongside the project rail line within the infrastructure corridor.
14.	State roads will be upgraded where required.
15.	Temporary first aid, fire and emergency response facilities will be constructed where the MIA is proposed during the construction phase.
16.	Blasting will be undertaken in accordance with the conditions of the Environmental Authority (EA).

Project Approvals	
17.	The proponent will follow relevant State Government processes to preserve and protect any Aboriginal cultural heritage values within the project area.
18.	The proponent will comply with the requirements of the *Equal Efficiency Opportunities Act 2006.*
19.	Once operational, the project will be assessed against the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) thresholds, and if triggered (whether as an individual facility, as part of another facility or as part of the entire controlling corporation group), will comply with all requirements of the NGER act.
20.	The project will comply with all requirements of the *Explosives Act 1999*.
21.	The proponent will obtain a license, authority or permit to store and to use explosives.
22.	Where material is extracted outside of Mining Lease Application (MLA) 70453, the proponent will require a license to extract quarry material under the *Forestry Act 1959*.
23.	The proponent will operate in accordance with the requirements of the *Mining and Quarrying Safety and Health Act 2009*.
24.	If required, the proponent will submit development applications to the relevant local government authority for activities outside MLA 70453 requiring their approval.
25.	The project will adhere to all requirements regarding duty of heavy vehicle operator, duty of driver and regulations pertaining to heavy vehicle height, width and length.
26.	The project will comply with the standards set out in the Transport Operations (Road Use Management – Vehicle Standards and Safety) Regulation 2010.
27.	The project will adhere with the *Transport (Rail Safety) Act 2010* and ensure that rail transport operators have the competency and capacity to carry out railway operations safely.
Matters of National Environmental Significance	
28.	Land clearing will be minimised or avoided, where practicable.
29.	The Threatened Species Management Plan (TSMP) will include specific mitigation and management measures to address predicted impacts on threatened species and communities. Such measures include: • remnant vegetation in the project area will be managed for biodiversity values, including implementation of an appropriate fire regime, pest animal and weed management and exclusion of stock • revegetating cleared areas that do not form part of the operational mine (e.g. infrastructure corridor edges) • staged rehabilitation and revegetation of overburden as the mine operational life progresses in areas that are no longer being mined • fire regime management including precautions such as clearing fire breaks between coal stockpiles to avoid ignition of native vegetation from spontaneous combustion of coal, and restricting cigarette smoking and the dumping of rubbish (particularly glass) in areas of vegetation • where practicable, restricting unnecessary vehicle movement during and following rainfall • exclusion of cattle from waterways and remnant vegetation to prevent fouling and habitat degradation.
30.	The TSMP will contain the proposed monitoring and reporting timeframes for management of each threatened species impacted on by the project to facilitate auditing of environmental performance measures.

31.	Proponent employees and contractors will be made aware of environmental obligations and compliance requirements through the site induction program. They will be notified of the potential presence of threatened and/or near threatened species and instructed to temporarily cease clearing if any species of conservation significance are observed.
32.	Trees will be felled into the construction zone to avoid impacting on vegetated margins. Vegetation clearing and construction will be limited to dry weather conditions where practicable to minimise erosion, runoff and soil disturbance.
33.	Rehabilitation of disturbance areas will be undertaken throughout the life of the project in accordance with a Rehabilitation Management Plan (RMP). A Mine Rehabilitation and Closure Plan will be prepared to direct land rehabilitation during and after the operational life of the mine. Re-establishing vegetation cover will be undertaken with a view to creating self-sustaining ecosystems similar to surrounding ecosystems. The final land use will be a combination of grazing and native bushland.
34.	Disturbed vegetation areas that are no longer required post-construction will be stabilised and revegetated as soon as practicable and monitored for weeds as per the Weed and Pest Animal Management Plan (WPAMP).
35.	Retained areas of native vegetation will be monitored and managed for the life of the project to reduce weed infestation and promote biodiversity values in the areas.
36.	Vehicles will use designated light or heavy vehicle roads on-site wherever practicable, and speed limits will be adhered to. Reduced speed limits will be implemented near waterways to reduce the potential for transient fauna to be impacted by vehicle movements. Any road kills will be reported to the Environmental Supervisor.
37.	A WPAMP will be prepared and implemented over the life of the project. The WPAMP will include a monitoring program and auditable performance measures, including reductions in class 1 and 2 pest animals and noxious weeds.
38.	The introduction and/or spread of weed species will be mitigated by: • restricting light vehicle movement in areas outside of regular activity, particularly on irregularly used tracks • restricting vehicle movement during and following rainfall, where practicable • implementing strict wash-down procedures for all vehicles (including clearing and construction machinery) entering clearance zones, grazing areas or conservation areas • controlling weeds according to guidelines under the relevant Weed Fact Sheet from the Department of Agriculture, Fisheries and Forestry • training and awareness of all staff.
39.	Due to residual impacts on threatened species, their habitats and threatened Regional Ecosystems posed by the project, a Biodiversity Offsets Strategy has been developed and will be implemented.
40.	The Draft Policy Statement: Use of environmental offsets under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) identifies eight principles for the use of environmental offsets under the EPBC Act. The project Biodiversity Offsets Strategy will be developed in consideration of these principles.
41.	Detailed monitoring programs will be detailed in the following management plans to be prepared prior to the commencement of construction: • WPAMP • TSMP • Fauna Management Plan.

42.	Reference sites will be monitored to allow a comparison of the development and success of the rehabilitation against a control. Reference sites indicate the condition of surrounding un-mined areas that the rehabilitated disturbance area will aim to replicate. Monitoring will be conducted periodically by independent, suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness.
Water Resources	
43.	The proposed water management system will aim to maximise reuse of water on-site, through the provision of large on-site water storages.
44.	Water will only be released from the site dams in compliance with the EA conditions, which will be developed in consultation with DEHP to manage potential cumulative impacts.
45.	All water, waste, fuel and chemical storage facilities will be designed, constructed, and operated (for example, to AS1940) to prevent seepage, thus the risk to groundwater resources will be limited. Monitoring will validate seepage control measures.
46.	Shallow seepage monitoring will be required adjacent to the storage facilities to enable identification and assessment of potential seepage.
47.	Raw water suitable for potable demands will be stored in the proposed Raw Water Dam which will similarly be constructed early in the construction schedule.
48.	A water treatment plant will be constructed near the Raw Water Dam to supply potable water.
49.	During the course of the mine life, progressive rehabilitation of available (i.e. no longer required) disturbed areas will be undertaken and once established and demonstrated to produce acceptable quality runoff, these areas will be diverted away from the Mine Water Management System (MWMS) through clean water bypass drains.
50.	The bulk water supply will be treated on-site to potable quality using a package water treatment plant utilising a suitable technology such as reverse osmosis. Treated water will be reticulated to all the mine industrial and CHPP areas, and accommodation village via the proposed dedicated service corridors.
51.	Potable water will be stored in header tanks at the water treatment plant, accommodation village and all other industrial areas. Water will also be stored at the CHPP and all other areas where sufficient water reserve is required for fire fighting.
52.	All sewage water generated during the project will be collected and treated on-site to Class C effluent standard.
53.	The MWMS will be limited to disturbed and mine affected areas (disturbed catchments, contaminated water sources and contaminating processes).
54.	The underlying premise for the MWMS is that clean water runoff from undisturbed catchments will be diverted around the active mining area.
55.	Contaminant concentrations in pit water at the project are likely to be in excess of levels required for protection of downstream receiving water values, and will be contained in a system with a low risk of discharge.
56.	Sampling and testing of dump run-off water program
57.	The sediment dams will be sized to contain runoff from the 10 year Average Recurrence Interval (ARI) 24 hour rainfall event.

58.	All dams proposed as part of the project will be designed, constructed and approved to minimise the potential for dam failure in consultation with the DEHP. All dams proposed for the project will be subject to additional DEHP approval requirements (separate to this EIS) and detailed dam design and assessment will be undertaken.
59.	All building and operational areas will be protected from release waters in the event of a dam failure, minimising risk to human health and well-being, and potential loss of production.
60.	For the purposes of this EIS assessment, water balance modelling indicates that it will be unlikely for the project to undertake controlled releases from the water management system to balance the mine water inventory during very high rainfall events. However, if this is required, water releases will be undertaken in accordance with an approved procedure and in compliance with Environmental Authority conditions.
61.	All of the dams containing potentially saline water will be Regulated Dams and administered under the *Queensland Environmental Protection Act 1994 (EP Act).*
62.	During more detailed design the referable category of the proposed Raw Water Dam will be determined through the undertaking of dam failure impact assessment as required under the *Water Supply (Safety and Reliability) Act 2008*.
63.	Surface exposures of dispersive soils will be either treated to minimise dispersion potential, or covered with topsoil so that the dispersive substrates are not left exposed.
64.	The nominal 3000 year ARI level of flood protection will be further reviewed as part of detailed design and subject to a detailed risk assessment including various consequences that may arise from different methods to recover the mine pit(s) in the event of an extreme flood. Discussions will be held with DEHP during the detailed design phase to agree on an appropriate risk based level of flood protection.
65.	The flood protection levee banks will be regulated structures with conditions administered through the EA. This will require design to be undertaken by a suitably qualified and experienced engineer and certification of the design and construction of the levee bank.
66.	The EA conditions will also require certified annual surveillance inspections by a suitably qualified and experienced engineer and obligation for the EA holder to rectify deficiencies identified in the annual surveillance outcomes.
67.	An Erosion and Sediment Control Plan (ESCP) will be developed and implemented throughout construction and operations to control erosion at the source.
68.	A monitoring plan will also be established over the underground subsidence area adjacent to Tallarenha Creek. The purpose of the plan will be to identify subsidence-induced changes to the floodplain drainage patterns that could prevent flow draining downstream. If these impacts are identified through aerial and ground survey of the area, channels will be constructed to direct flows downstream.
69.	In order to mitigate the effects of ponded water from self-contained catchments, the progressive re-establishment of free drainage in the subsidence area will be completed as far as practicable.
70.	A post subsidence drain and waterway monitoring program will be implemented and surface cracks within drains and waterways that have not naturally filled after approximately three storm events will be sealed with clay.
71.	As part of the subsidence monitoring program, the ponding volumes and/or surface area extent of ponding will be monitored over time.

72.	The proposed surface water monitoring for the project will include surface water quality monitoring.
73.	Two programs are proposed for surface water quality monitoring. A baseline monitoring program and an on-going water quality monitoring program are proposed to access the impact of the project mine and infrastructure corridor operations on the receiving environment. Both programs would be undertaken in accordance with the Monitoring and Sampling Manual 2009 (DERM 2010).
74.	A monitoring program will also be established over the underground subsidence area adjacent to Tallarenha Creek.
75.	Landholders who have groundwater supplies that are materially impacted by the operation, to a degree where groundwater is not able to be used for its pre-mining beneficial use (in terms of quality and/or quantity) will be provided with an alternate water supply of comparable yield and quality. The proponent has made a commitment to 'make good' affected groundwater supplies prior to construction commencing.
76.	The proponent will make good in relation to groundwater changes associated with the bores that supply Alpha township. Make good commitments are limited to the extent applicable to the project on a stand-alone basis as predicted by the project's groundwater model and future changes to it resulting from ongoing groundwater monitoring.
77.	All water, waste, fuel and chemical storage facilities will be designed, constructed, and operated to prevent seepage, thus the risk to the groundwater resources is limited. Monitoring will be conducted to validate seepage control measures.
78.	The potential risks associated with seepage from mine waste and water infrastructure will be minimised via the appropriate design and construction of chemical, fuel and mine waste storage facilities.
79.	Groundwater monitoring will ensure compliance with water licence (for dewatering) conditions with regards to water level impacts, and groundwater quality compliance with EA conditions resulting from the EIS and EMP processes.
80.	After mining has ceased and decommissioning and rehabilitation works are complete, the proponent will relinquish the mining lease.
81.	During mining, dewatering volumes will be measured and recorded regularly and volumetric rates compared to the model-predicted rates to confirm the modelling predictions.
82.	Groundwater monitoring and sampling will be conducted by a suitably qualified and experienced professional in accordance with the current edition of the Water Quality Sampling Manual or subsequent updated versions; and *the AS/NZS 5667.11:1998 Australian/New Zealand Standard for water quality* – sampling Part 11; guidance on sampling groundwater.
83.	An annual review of the monitoring data will be conducted by a suitably qualified and experienced hydrogeologist and will include assessment of groundwater level and quality data, and the suitability of the monitoring network.
84.	All groundwater-based complaints will be investigated and a register kept of the nature of the complaint, the results of assessment, and any actions taken. The register will be made available to the regulating authority upon request.
85.	Groundwater levels in the bores will be measured (quarterly) during the pre-mining and mining operation period.
86.	Groundwater levels will be measured annually during the rehabilitation period.

Nature Conservation	
87.	Vegetation clearing will be undertaken in accordance with mitigation measures aimed to minimise the potential impacts. Clearing of vegetation will utilise a staged approach.
88.	The proponent will implement measures to mitigate the intrusion of weed species into remnant vegetation due to edge effects.
89.	Buffer zones will be established around areas of threatened ecological communities and communities with a conservation-significant biodiversity status, where clearing is adjacent to these areas.
90.	Retained areas of native vegetation will be monitored and managed for the life of the project to reduce weed infestation and promote biodiversity values in the areas.
91.	Trees will be felled into the construction zone to avoid impacting on vegetated margins.
92.	Topsoil and mulch will be stockpiled where practicable for use on retained vegetation and rehabilitation areas to promote revegetation and retention of soil quality.
93.	Vegetation clearing and construction will be limited to dry weather conditions where practicable to minimise erosion, runoff and soil disturbance.
94.	Disturbed vegetation areas that are no longer required post-construction will be stabilised and revegetated as soon as practicable and monitored for weeds.
95.	Reasonable measures will be taken to control velvety tree pear, prickly pear and harrisia cactus in the project area, with particular focus on areas near and with remnant vegetation.
96.	A WPAMP will be prepared and implemented over the life of the project.
97.	Vertebrate pest control activities will be undertaken in consultation and cooperation with local authorities and landholders, particularly for pests such as pigs, wild dogs and feral cats, in accordance with relevant best-practice management guidelines and the *Queensland Land Protection (Pest and Stock Route Management) Act 2002* (LP Act).
98.	Where practicable, the project will reduce new cane toad breeding opportunities by minimising the creation of additional small waterbodies suitable for cane toad breeding (e.g. ponding areas, roadside ditches or flood channels).
99.	Proponent employees and contractors will be made aware of environmental obligations and compliance requirements through the site induction program.
100.	Fauna spotter-catchers will be used to relocate any fauna species of conservation significance prior to clearing activities during the construction phase.
101.	Clearing will occur in one direction through the vegetation, to allow fleeing animals to disperse into adjacent habitat.
102.	Hollow-bearing trees will be inspected for fauna prior to felling.
103.	A TSMP will be developed and implemented for the project.
104.	Vehicles will use designated light or heavy vehicle roads on-site wherever practicable, and speed limits will be adhered to.
105.	A Biodiversity Offsets Strategy has been developed and will be implemented. Offset options are presented in the Biodiversity Offsets Strategy and outline measures that ensure these offsets are managed to maintain and enhance biodiversity values.

Land	
106.	Topsoils will be stripped prior to any excavation works for later use in the rehabilitation and revegetation of the project site.
107.	The proponent will undertake detailed design of the infrastructure corridor in consultation with the Department of Natural Resources and Mines (DNRM) Stock Route Management Unit and design concessions may include provision for an underpass or overpass.
108.	As a minimum, all areas significantly disturbed by mining activities will be rehabilitated to a stable landform with self-sustaining vegetation cover.
109.	A geochemical monitoring program will be established to routinely sample and test waste materials during operations.
110.	In the event of a significant fossil find, the find will be demarcated and the Queensland Museum will be alerted.
111.	To maintain the integrity of vegetation in areas adjacent to disturbed areas, appropriate erosion, sediment and dust controls will be established prior to and during soil disturbance.
112.	Prior to stripping soil, vegetation on areas to be disturbed will be cleared and windrowed. The windrowed material may be retained for fauna habitat, shipped or burned on-site.
113.	Where there is variation in recommended stripping depths, detailed field checking will be undertaken prior to stripping to confirm appropriate stripping depth.
114.	Care will be taken to ensure that dispersive clay subsoils are not stripped and mixed with topsoil.
115.	An ESCP will be developed and implemented prior to the commencement of construction.
116.	Selected final slopes on rehabilitation sites will be monitored to identify any exceedence of background soil loss rates.
117.	All chemicals and fuels will be appropriately stored in accordance with relevant Australian Standards.
118.	Facilities and procedures will be implemented to minimise the risk of land contamination and appropriately manage wastes at the project.
119.	Waste management measures will be implemented to minimise the risk of land contamination at the site. Waste management will aim to promote sustainable waste management practices in accordance with the *Waste Reduction and Recycling Act 2011* (WRR Act).
120.	Where direct light impacts could potentially occur, appropriate mitigation measures will be impacted, including the installation of light fixtures in accordance with *AS 4282:1997 Control of the obtrusive effects of outdoor lighting* and the direction of lights away from fauna habitats, where practicable.
Rehabilitation and Decommissioning	
121.	The proponent is committed to the rehabilitation goals listed in the DEHP Guideline Resource Activities – Rehabilitation requirement for mining resource activities. This states that the rehabilitation landform is to be safe to humans and wildlife, non-polluting, stable, self-sustaining and free of maintenance, and able to sustain an agreed post-mining land use.
122.	The proponent is committed to the salvage and use of all topsoil suitable for rehabilitation.

123.	A Coal Rejects Management Plan will be developed to manage the treatment and storage processes for coal rejects over the life of the project.
124.	A RMP will be prepared and updated as required.
125.	To maintain the integrity of vegetation in areas adjacent to disturbed areas, appropriate erosion, sediment and dust controls will be established prior to and during soil disturbances. Prior to stripping the soil, regrowth vegetation will be cleared and windrowed. Where practicable, windrowed vegetation will be chipped or retained for fauna habitat.
126.	Ongoing investigation into dispersive material management will be undertaken and landform design and management strategies will be modified where necessary.
127.	Major earth works programs will be scheduled to avoid the high rainfall period between December and March, where practicable.
128.	Disturbed areas will be stabilised as quickly as possible to limit erosion. Progressive revegetation will be undertaken and erosion and sediment control measures will be employed.
129.	Decommissioning and rehabilitation of the project site will be undertaken in a manner that prevents environmental harm and risk to human health. Any dangerous goods or chemicals will be removed from site and any contaminated areas will be managed and rehabilitated to ensure that there is no danger posed to the wider public.
130.	Disturbance of areas with an extreme topography constraint will be avoided where practicable.
131.	The proponent will manage the impacts of flooding in accordance with *State Planning Policy 1/03-Mitigating the Adverse Impacts of Flood, Bushfire and Landslides (SPP 1/03).*
132.	Flood levees will be constructed to minimise impacts of flooding and any potential for release of contaminants to the environment, including protection of the final void at the end of mine life from the Probable Maximum Flood level.
133.	Should a landslide/slippage occur, the proponent will manage the impacts in accordance with SPP 1/03, in consultation with the Queensland Government State Disaster Management Group.
134.	When detected, any minor deleterious surface expressions of subsidence (e.g. surface cracking) will be rectified as soon as practicable.
135.	Monitoring of impacts associated with alterations to the drainage regime will be conducted on regular intervals and if necessary rectification works will be undertaken to mitigate affected areas.
136.	At the end of the mine life, haul roads will be rehabilitated to blend in with the surrounding landform, or retained if required by the landowner. Decommissioned roads will be revegetated. Any compacted areas will be ripped, topsoiled and reseeded.
137.	Any overhead powerlines no longer required will be dismantled and disposed of off-site by a licensed contractor. Any compacted areas around powerline footings will be ripped, topsoiled and reseeded.
138.	All infrastructure areas will be assessed for contamination prior to demolition, with contaminated material collected separately and treated in accordance with regulated waste procedures on-site.

139.	All waste material generated during the decommissioning process will be disposed of by an appropriately licenced contractor, with recycling of materials undertaken wherever possible. Hazardous materials, including waste oil, will be disposed of in accordance with the relevant Environmental Management Plan (EMP), environmental licence conditions, Material Safety Data Sheet (MSDS), requirements and Queensland waste tracking legislation.
140.	Rehabilitation will be monitored during operations and after final rehabilitation has been completed to validate rehabilitation performance and identify any additional work required to meet success criteria.
141.	An RMP that details rehabilitation performance criteria will be submitted to the DEHP for review and comment.
142.	In addition to rehabilitated areas, reference sites will be monitored to allow a comparison of the development and success of rehabilitation against a control.
143.	Rehabilitation areas will be monitored using the selected parameters and trends tracked to demonstrate progress towards a stable non-polluting, safe and self-sustaining ecosystem.
Air Quality	
144.	If there are instances of spontaneous combustion, strategies such as smothering the fire by burial with waste rock will be used.
145.	Although the overall impact of the project on air quality is low, the mine will implement dust minimisation strategies, particularly during wind events.
146.	A monthly report will be prepared to detail the results of monthly air quality monitoring results and the occurrence of any complaints.
147.	Upon receiving a valid complaint in relation to dust nuisance, the complaint will be investigated and air quality mitigation measures must be implemented as soon as practicable if the complaints are substantiated.
148.	The project will achieve and maintain the level of dust control which is outlined in the EA.
149.	All monitoring and sampling techniques will be in compliance with the DEHP's Air Quality Sampling Manual and applicable Australian Standards.
150.	The existing long-term real-time dust concentration monitoring network will be maintained by the proponent to demonstrate seasonal variation of the air quality of the area.
151.	Dust monitoring results will be subjected to regular review to determine if the project is causing an increase in dust concentration above acceptable levels. Dust concentration data will include an analysis of the prevailing meteorological extraction rates and processes.
152.	Local meteorological data will be collected from a weather monitoring station installed by the proponent at the Creek Farm Homestead. This station will be used to collect temperature, relative humidity, rainfall and wind speed data over the life of the project.
153.	Dust deposition (fallout) monitoring will continue to be undertaken at these locations over the life of the project.
154.	A Dust Management Plan will be developed and implemented to mitigate adverse air quality impacts under worst case meteorological conditions.

Noise and Vibration	
155.	Where there exists the possibility that short-duration, high-level noise events may occur during the night-time hours (10.00pm to 6.00am) considerations will be given to the potential for sleep disturbances within the accommodation village and surrounding residences.
156.	Modelling has been used to predict the impact of airblast overpressure on the areas surrounding the project. The modelling is based on empirical data and will need to be refined using airblast overpressure measurements taken once the mine is operational.
157.	A Noise Management Plan will detail ongoing noise monitoring requirements including responses to noise complaints.
158.	It is proposed to monitor noise at the accommodation camp and initially monitor background creep at Chesalon Station Homestead. A Noise Management Plan will detail ongoing noise monitoring requirements including responses to noise complaints.
159.	Reporting will be conducted internally on monitoring results, incidents and complaints and externally to relevant regulatory bodies on request.
160.	Upon receiving a valid complaint in relation to noise and vibration nuisance, the complaint will be investigated and noise and vibration mitigation measures must be implemented as soon as practicable if the complaints are substantiated.
161.	The proponent will achieve and maintain the level of noise and vibration which is outlined in the EA.
162.	Where site activities are the cause of a complaint, a revision of noise and vibration management procedures will occur for the activities identified as causing noise or vibration nuisance or a high noise event.
163.	For the on-site accommodation village to comply with the indoor acoustic quality objectives, the accommodation units will be air conditioned, allowing the overall building structure to provide sufficient noise reduction.
164.	To reduce background creep at Chesalon Station Homestead the following mitigation methods will be undertaken: Operation of trucks behind mounding during evenings (i.e. not operating dump trucks in highly exposed locations on the top of overburden at night but at a lower level with the waste rock emplacement intervening and acting as a noise barrier). Shovels and other heavy equipment operated during the evening should be used deep in the pit rather than close to the pit surface.
Waste	
165.	The proponent is committed to minimising the impact of waste on the environment and the community, where practicable, through the adoption of the waste and resource management hierarchy principles in the *Waste Reduction and Recycling Act 2011* (WRR Act) as well as the approaches outlined in the Waste – Everyone's responsibility Draft Queensland Waste Avoidance and Resource Productivity Strategy (DEHP, 2014).
166.	A Waste Management Plan (Waste MP) will be developed prior to commencement of the project.
167.	The Waste MP will be reviewed and updated as required.
168.	Waste management training will be provided to appropriate personnel and contractors.
169.	Waste will be managed in a manner that protects downstream water quality values.

170.	Waste management will aim to promote sustainable waste management practices in accordance with the WRR Act.
171.	In order to minimise inputs, natural resources (e.g. water, waste or process by-products) will be recycled where practicable. Techniques to maximise the reuse of waste water and recycling of waste products will be applied to the project with appropriate refinement on the basis of operational experience.
172.	A continuous improvement approach will be adopted for the project over the life of the mine. This waste related approach will involve reviewing and modifying processes, material and operating practices throughout the mine life when required. The development of key performance indicators will be included in the Waste MP.
173.	All regulated wastes will be segregated as required and will comply with all regulatory requirements and Australian Standards for their transport, handling, use, storage and disposal.
174.	Spillage of flammable and combustible liquids will be contained within an on-site containment system (primary bunding) and controlled in a manner that prevents environmental harm and maintained in accordance with *Section 5.9 of AS 1940*.
175.	In accordance with the EMP, training will be provided to personnel and contractors in the management of chemicals, hydrocarbons and wastes. Personnel and contractors will be made aware of the correct procedures for the prevention, management and clean-up of chemical and fuel spills. Spill management kits will be retained in the workshop and on service vehicles. Sites that become contaminated will be investigated and managed in accordance with the remediation, reporting and monitoring requirements of the contaminated land provisions of the EP Act.
176.	The movement of regulated waste other than that specified in Section 17 of the EP Regulation is required to be monitored by a waste tracking system. Waste tracking will be undertaken at the project site with any wastes generated to be tracked in accordance with the EP Regulation.
177.	The project will trigger a reporting obligation under the *National Pollutant Inventory* (NPI) and consequently the proponent will be required to estimate and report mine emissions to the NPI on an annual basis in accordance with the National Pollutant Inventory Guide and associated manuals.
178.	An on-site landfill facility will be established at the start of the construction phase following the approval of MLA 70453.
179.	Geochemical sampling and assessment will continue to be undertaken over the life of the project to validate mine waste characteristics and the proposed management measures.
180.	A detailed inventory of waste streams and volumes will be developed as part of the Definitive Feasibility Study and detailed engineering design processes.
181.	During both construction and operation, colour-coded, signed bins will be used to segregate and collect food wastes, paper and other recyclables.
182.	The consumption of raw water will be kept to a minimum by implementing water efficient work practices and recycling where practicable.
183.	Vegetation clearing for fire breaks will be conducted where possible. Vegetation clearing will be performed around infrastructure, to ensure a buffer distance separates infrastructure from potential bushfires.
184.	Appropriate waste management procedures will be undertaken to prevent nuisance caused by odour or vermin on-site.

185.	Tyres will be segregated, stored and stacked in a single designated tyre storage area before disposal in accordance with the DERM's (now DEHP) *Disposal and Storage of Scrap Tyres at Mine Sites*. Any on-site disposal of used tyres will be documented in accordance with the site EMP and EA conditions.
186.	Any spillages that may occur will primarily be within the waste storage areas or within contained refuelling areas. Sumps within the containment areas will be kept clean and pumped regularly with both liquid and solid fractions stored in separate containers and removed off-site by a licensed hazardous waste management contractor.
187.	All hydrocarbon and chemical storage areas will be designed, constructed and stored in accordance with *AS 1940*.
188.	Appropriate actions will be taken to ensure potential impacts of regulated wastes on land are minimised.
189.	Sewage produced by the project will be managed on-site. The Sewage Treatment Plant (STP) will be operated in accordance with manufacturer's recommendations and will be subjected to regular inspections to ensure efficient operation of the system.
190.	A detailed decommissioning Waste MP will be prepared prior to the decommissioning phase once waste quantities, sources and management measures are confirmed.
191.	A contaminated site assessment will be conducted as part of the Final Rehabilitation Report.
192.	The design of the on-site landfill facility will be finalised during the DFS and detailed engineering processes.
193.	The landfill site will be monitored over the life of the project and will be rehabilitated.
194.	Program for sampling and testing of interburden, overburden and processing wastes.
Transport	
195.	The project's internal road network will include parking for operational personnel and visitors, including appropriate disabled parking facilities.
196.	Visitor transport and parking on site will be addressed by the Transport Management Plan (TMP).
197.	The existing narrow gauge Queensland Rail (QR) central line will be used to transport Epsilon coal to Gladstone.
198.	There will be no reduction of transport safety, efficiency or condition of road operations and assets above what is already in place. No significant interruptions to existing transport operations are expected during the construction or operational phases of the project.
199.	Provide maintenance contributions to DTMR.
200.	Assist with the upgrade of the Alpha Aerodrome.
Indigenous Cultural Heritage	
201.	The proponent will work with Traditional Owners to protect the Indigenous cultural heritage values located within the project area.
202.	Field surveys will be ongoing and will be completed prior to the commencement of construction.

203.	The proponent will continue to engage with the Wangan and Jagalingou People to identify any Indigenous cultural heritage sites, landscapes or places of cultural significance. Any items of cultural significance will be managed in accordance with the Cultural Heritage Management Plan (CHMP).
204.	The following general mitigation and management measures will be implemented at the project site to minimise impacts on Indigenous cultural heritage: comprehensive field survey will be conducted prior to surface disturbance where identified indigenous cultural heritage features are located proximal to proposed surface disturbance, these sites will be demarcated where practicable to minimise the risk of accidental damage where direct disturbance is unavoidable, consideration will be given to collecting and relocating significant Indigenous cultural heritage features all project employees and contractors will be made aware of their responsibilities and obligations in relation to cultural heritage (including procedures to be followed in the event of accidental discovery of Indigenous cultural heritage material or skeletal remains) as part of the induction and training process. In the event that significant Indigenous cultural heritage features are identified, a monitoring program will be developed in consultation with the Wangan and Jagalingou People prior to the commencement of construction in order to monitor the potential impact of the project activities against baseline values.
Non-Indigenous Cultural Heritage	
205.	Should any potentially significant archaeological artefacts or archaeological places be identified during the operation of the project, the proponent will comply with Part 9 of the Heritage Act. As required by Section 89 of the Heritage Act any person who discovers archaeological artefact (that is an important source of information about an aspect of Queensland's history) will notify the DEHP.
206.	A Non-Indigenous CHMP will be developed prior to the commencement of construction.
207.	The proponent will nominate an independent Cultural Heritage Advisor for the project to provide expert advice, where required.
208.	Prior to the commencement of ground disturbance activities, Sapling Creek overshot (the only known non-Indigenous cultural heritage feature located within the project area) will be demarcated and signed (e.g. with fencing or flagging tape) to avoid accidental damage associated with project activities.
Hazard and Risk	
209.	The proponent will implement its Corporate Environment Policy (EIS Appendix T – Corporate Environment Policy) in order to reduce the hazard and risk associated with the project.
210.	An integrated approach to risk management will be implemented at the site, recognising the hazards at all points in the operation and providing control measures to minimise risk.
211.	Develop and comply with Potential Acid Forming (PAF) Management Plan.
212.	Design appropriate cover system for in-pit and ex-pit dumps
213.	Blending of PAF and Acid Neutralising Capacity (ANC) material trials to assess lag times before the onset of PAF conditions.
214.	Dumping and traffic compaction lifts depths of PAF materials will consider the risk of accelerated oxidation through convection.
215.	Develop a geological model to predict PAF/Non-Acid Forming (NAF) horizons for materials scheduling.

216.	The addition of any supplementary dangerous goods that may be required for the project in minor quantities will be identified prior to their arrival on site and appropriate measures implemented to manage their safe storage and use in accordance with the requirements of the relevant Australian Standards.
217.	The Material Safety Data Sheet (MSDS) for each chemical to be used will be available at appropriate locations such as chemicals storage facilities and the Coal Handling and Preparation Plant (CHPP). Spill prevention and spill response strategies will be implemented.
218.	Frictional ignition will be minimised by using drums and picks on cutting machines with minimal potential to cause friction, using water sprays to suppress sparking, ventilation around cutting areas to reduce methane build-up and maintaining appropriate gas fire extinguishing equipment.
219.	Interactions with mobile equipment will be mitigated by: • identifying the conditions (operational and environmental) under which the mobile plant and equipment may be used • only using mobile plant and equipment within their approved design parameters • proper design and maintenance of roadways, including minimum dimensions and conditions • nominating maximum loads that may be carried or towed by the mobile plant and equipment • nominating maximum speeds at which the mobile plant and equipment may operate • ensuring personnel involved in the operation of mobile plant and equipment have competency and authorisation requirements • operators to carry out brake testing, pre-shift inspection and defect reporting to demonstrate that the mobile plant and equipment is safe for use.
220.	An Emergency Response Management Plan (ERMP) will be developed.
221.	A number of mitigation measures will be put in place, including limited access to the blast areas and ensuring that the blasts are undertaken by suitable qualified personnel with appropriate knowledge and training. Transportation of initiating explosives to site will be carried out by a licensed transporter that operates in accordance with the Australian Dangerous Goods Code. The storage of explosives, detonators and boosters will comply with the requirements of AS 2187 Explosives-Storage, Transports and Use and the additional requirements relating to explosives in the Coal Mining Safety and Health Regulation 2001.
222.	The proponent will ensure that an Energy Isolation Procedure is developed, implemented and maintained.
223.	A Working at Height Procedure and Permit System will be developed, implemented and maintained.
224.	A Lifting and Cranage Procedure and Permit System will be developed, implemented and maintained.
225.	A Confined Space Procedure and Permit System will be developed, implemented and maintained.
226.	The Tyre and Rim Management Plan will ensure that procedures are in place to lift, fit, remove, test, repair, maintain and change tyres and rims on mobile earthmoving equipment and workshop plant and equipment.
227.	Procedures to minimise electrical risk will ensure that competent personnel carry out electrical work. Electrical installations will comply with legislation and appropriate Personal Protective Equipment (PPE) will be identified and used.

228.	If mine and process water discharges to waterways are required they will be restricted to emergency discharges only during extreme rainfall and flood conditions. Any such discharges will be significantly diluted and flood waters to meet the conditions set in the EA.
229.	Licensed transporters operating in compliance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) will undertake the transport of dangerous goods to the transport site.
230.	The proponent will adhere to planning and maintenance guidelines for fuel systems and construction of explosive storage facilities. With correct controls in place for dangerous goods and hazardous substances, there will be negligible risk to employees, adjacent land users, general public, property and the environment.
231.	To minimise the hazards associated with diesel leaking during tanker unloading, controls will be implemented to reduce risks to health and safety of site personnel and potential adverse impacts to the environment.
232.	All chemicals will be stored according to AS 1940 and managed in accordance with the Hazardous Material Management System developed for the mine, incorporating the provision and use of the respective MSDS.
233.	As the mine progresses, additional sampling will be conducted to validate the propensity of the coal to combust. Appropriate mitigation measures will be implemented as required.
234.	The proponent will provide safety inductions for any personnel operating machinery or light vehicles on-site. Personnel and contractors will be required to have the appropriate level of training and licenses. All equipment at the site will be equipped with two-way radios for communication and appropriate traffic signage. Designated driving procedures will be used to minimise the risk of accidents occurring.
235.	At level crossings on minor roads, signal lights and signage will be installed to ensure the risk of collision is reduced.
236.	The proponent will develop a Fire Management Plan (FMP) prior to the construction phase of the project which will provide management approaches to protect human life and assets and to minimise the physical and environmental impacts of fires. The identification of fire risks will be achieved by the initiation of a detailed risk assessment.
237.	Prior to the commencement of construction activities, the proponent will prepare a Bushfire Management Plan (BMP) which will provide a strategic approach to bushfire management at the project site.
238.	The EMRP provides step-by-step guidance for the management of any emergency such as fire, flood, landslide, dam collapse, fuel spill, explosion or radiation, which can impact on the project and its employees. An EMRP will be developed by the proponent prior to the construction phase of the project.
239.	Regular hazard audits will be conducted to provide input into the EMRP.
240.	Guidelines for preparing EMRPs are available from the Queensland Government Department of Community Safety and will be considered when preparing the EMRP for the project. It will be developed in conjunction with stakeholders.
241.	The SPP 1/03 will also be referred to when preparing the EMRP.
242.	Fire drills will be undertaken on a regular basis. The project site will have a team of employees trained in fire fighting to Coal Competency Standard and hold senior first aid tickets. All fire fighting facilities and equipment will be installed, serviced, maintained and inspected by a certified body. The site will have a suitably equipped water truck that can support fire response requirements. Regular audits are conducted on the fire protection standards by external parties.

243.	Stores, workshops and offices will be fitted with approved and certified smoke detectors. The project will be constructed to meet industry and fire protection standards. First aid, fire fighting equipment and exit locations will be suitably signed. All work areas will be within the required distance to reach emergency exits.
244.	Surrounding neighbours will also be notified in emergency situations, where appropriate.
245.	All proponent employees will be inducted prior to working on the site and all contractors will undergo a contractor induction prior to commencing work. Mine site personnel and contractors are to be trained in basic first aid, emergency response techniques and the Safety and Health Management System (S&HMS) as part of the Queensland Coal Board generic induction and the project site specific inductions. All visitors will be escorted by mine site personnel. The induction program, which will be competency based, will cover procedures in the S&HMS for personnel to do their duties. Refresher training will be undertaken and is to be a continuing process aimed at informing all employees, including contractors, of their duties associated with the S&HMS and procedures.
246.	The EMRP will be reviewed regularly to include results from operational hazard and regular hazard audits, and after any significant emergency situation that occurs. The plan shall be reviewed by a cross section of internal and external stakeholders.
247.	In accordance with The Coal Mining Safety and Health Act 1999 (CMSH Act) the proponent will prepare and implement a Risk Management Plan (RMP) that integrates elements of risk management and practices to ensure the safety of employees and contractors.
248.	The proponent will implement particulate and gas/vapour exposure standards and procedures.
249.	The effects of heat will be managed by provision of suitable working environments, equipment and protective clothing.
250.	All equipment (both fixed and mobile) will comply with the AS 1259.1.2 Occupational Noise and the CMSH Act in regard to design and operating noise levels.
251.	The proponent will implement hearing conservation standards and procedures during construction and operation to ensure that employees and contractors will not suffer adverse health effects from noise generated in the workplace.
252.	All chemicals, including persistent organic chemicals, will be managed in accordance with the existing Hazardous Material Management System developed for the mine, incorporating the provision and use of the respective MSDS.
253.	Hydrocarbons will be stored and handled in accordance with Australian Standard AS 1940:2004, The Storage and Handling of Flammable and Combustible Liquids.
254.	Potable water quality will be regularly tested.
255.	If significant areas of weed infestation or other declared pest species (either flora or fauna) are identified and pose a significant risk to mine personnel, visitors, surrounding landholders, the environment or the operation, appropriate eradication and management measures will be taken.
256.	Waste will be managed to avoid adverse impacts on the health of mine personnel and minimise risk of impact on the environment.
257.	Prior to being given access to the site, visitors will be required to complete mandatory registration and an environmental, operational, health and safety induction. Blood alcohol content testing and random testing for drugs will also be carried out. The scope of induction will reflect the type of work to be undertaken whilst on the project site.

258.	Mine employees, contractors and visitors will be supplied with the relevant and appropriate PPE for the tasks to be conducted on site.
259.	The rehabilitation strategies planned for the project will involve decommissioning and rehabilitation in a manner that prevent environmental harm and risk to human health.
Greenhouse Gas Emissions	
260.	A number of measures to maintain efficiency of the dragline will be implemented including load monitoring, regular bucket maintenance and electrical calibration checks.
261.	Longwall efficiency will be monitored.
262.	The compressed air circuit will be regularly monitored as leaks degrade the efficiency of the compressor.
263.	The energy efficiency of electrical equipment will be a consideration during purchase.
264.	The fuel efficiency of haul trucks will be considered during purchase.
265.	Access ramps will be designed to optimise truck diesel use efficiency.
266.	A conveyor will transport coal to the CHPP from the underground operation. Since this infrastructure passes the open pit, there are dump stations to the conveyor to significantly shorten the coal haul route.
267.	The EM Plan will address greenhouse abatement including: • commitments to the abatement of greenhouse gas emissions from the development • commitments to energy management, including undertaking periodic energy audits with a view to progressively improving energy efficiency • opportunities for offsetting greenhouse emissions, including, if appropriate, carbon sequestration and renewable energy uses; and commitments to monitor, audit and report on greenhouse emissions from all relevant and the success of offset measures.
268.	Identified strategies to adapt to changes in climate will be incorporated into the project EM Plan. Strategies will include cooperating with government, other coal mining companies and other sectors where practicable to adapt to potential changes in climate.
Climate, Natural Hazards and Climate Change	
269.	The potential impacts of flooding will be managed in accordance with the recommendations of SPP 1/03. Flood levees will be constructed progressively throughout the project site as required to minimise impacts of flooding on mining activities and any potential for uncontrolled release of contaminants to the environment
270.	As a bushfire mitigation measure, areas surrounding the project infrastructure will be managed to meet the requirements of SPP 1/03. As mining construction and operations progress, fire breaks will be maintained to minimise risk of bushfire. Areas subjected to increased risk of bushfire will be regularly inspected to maintain them clear of vegetation and other combustible materials.
271.	The proponent will follow the Queensland Fire and Emergency Services regulations and procedures and will have a dedicated, fully trained project Mines Rescue Team. Employees/contractors who form the team will have full senior and occupational first aid qualifications.

272.	Despite the low risk of occurrence, should a landslide/slippage occur at the project site that meets the definition in SPP 1/03, the proponent will manage the impacts in accordance with the SPP 1/03 and in consultation with the Queensland Government State Disaster Management Group. The site ERMP will also be implemented.
273.	In the unlikely event of an earthquake, the proponent will follow the site ERMP.
Social	
274.	Where a substantial portion of land will be required for mining operations, the proponent proposes to acquire land by negotiation.
Economic Environment	
275.	Rural properties that are adjacent to or are dissected by the infrastructure corridor may be impacted in terms of management/operational practices such as restricted movement of stock, fence realignment and access to water points. The proponent will proactively engage with these landholders to mitigate any management/operational impacts.
276.	The stock route that follows the Capricorn Highway is located on the northern side of the existing Central Line rail corridor. As the infrastructure corridor may dissect this stock route, the proponent will work with the relevant agencies and stakeholders to allow unencumbered movement of stock to this stock route.
Housing and Accommodation	
277.	The proponent will put in place measures to reduce impacts on housing in Alpha township, with majority of workforce to reside in onsite accommodation.
278.	The proponent will put in place measures to minimise impacts on Alpha's services, social value and safety by ensuring sufficient facilities have been incorporated into the design of onsite accommodation.
279.	The proponent will implement a good neighbourhood policy and workforce code of conduct to minimise negative impacts on Alpha community values.
280.	The proponent will work with other proponents, government agencies and service providers to plan for increased demand for infrastructure and services due to increased population from mine workers.
281.	The proponent will put in place measures to monitor housing affordability in Alpha.
282.	The proponent will work with BRC and Department of Housing and Public Works and other proponents to develop strategies that monitor the impact of rental stocks and offset negative impacts on housing, including social housing.
283.	The proponent will inform the labour market in advance of plans to recruit through Bus In Bus Out, Fly In Fly Out and the location points of hire.
284.	The proponent will work with other proponents and agencies and establish targets and strategies to identify vulnerable locations in the workforce sourcing regions.
285.	The proponent will implement a Local Employment Policy that investigates the development of pre-employment training programs and notifies local people of opportunities through the media.
286.	The proponent will liaise with Department of Aboriginal and Torres Strait Islander and Multicultural Affairs to ensure Indigenous candidates are provided opportunities.
287.	Contribute to the Central Queensland workforce development strategy, providing workforce estimates and profiles to assist with planning and program development and identifying employment gaps.

288.	Working with the Department of Employment, Training and Education (DETE) to develop workforce strategies that link to local and regional training programs and up-skilling.
289.	Disadvantaged groups will be actively included in recruitment and policies will be in place to reflect equal opportunities for all. Anti-discrimination and cultural awareness training will be undertaken and strategies implemented to increase the number of under-represented groups (e.g. Indigenous people) participating in skills development training and those employed.
290.	The proponent will participate in a Memorandum of Understanding with the Queensland Government and the Queensland Resources Council and investigate the expansion of the Bowen Basin Indigenous Participation Partnership to Galilee Basin
291.	The proponent will appoint a dedicated Indigenous Liaison Officer to assist with employment opportunities, initiatives and retention strategies for Indigenous people.
292.	Work with relevant agencies to identify potential barriers to Indigenous participation and support Indigenous workforce participation.
293.	The proponent will work with DETE to identify skills gap in the local community and tap into opportunities.
294.	The proponent will investigate the opportunity to establish a combined proponent training association.
295.	The proponent will work with agencies and relevant training providers to develop a suite of training programs.
296.	A multi-skilled workforce will be developed that supports individual career path progression and staff will be encouraged through attractive rostering, remuneration and development programs.
297.	The proponent will develop a graduate support program, traineeship program, and Indigenous trainee and apprenticeship programs.
298.	Work with schools to promote vocational opportunities to encourage applications for workforce opportunities.
299.	Work with Queensland Minerals and Energy Academy and Queensland Resources Council to expand existing programs into the local area and areas of high unemployment to encourage young people to start a career in the resource section.
Regional Business and Local Content	
300.	The proponent will develop a Local Content Plan to ensure full, fair and reasonable opportunity for local industry to compete for goods and services of the Project.
301.	The proponent will work with agencies and organisations and locals to encourage the use of local and regional businesses to help diversify the local economy, increase spending in the area and provide opportunities for local businesses to expand and develop.
302.	The proponent will work with key stakeholders to introduce a Regional Capacity Building Program to facilitate training on generic and contract requirements.
303.	Partner with key stakeholders to deliver a Regional Capacity Building Program to assist local and regional businesses in areas such as financial planning and stability and resource management.
304.	Work with relevant stakeholders to prepare a Mine Closure Plan to assess local and regional impacts following the mine's closure.
305.	Develop and implementation of a 'Buy Local' program to support the sustainability of local and regional businesses.

306.	The proponent will register with the Industry Capability network website portal for suppliers to express their interest to work with the project and to look at procurement and tendering opportunities.
307.	The proponent will work with and consult with relevant agencies and organisations to promote Indigenous employment opportunities.
Community Safety and Wellbeing	
308.	The proponent will work with stakeholders to look at on road traffic control, VMS systems and education programs for employees and stakeholders and consider impacts on other local communities.
309.	The project will review and update vehicle numbers to inform development of Road Use Management Plan (RUMP) and TMP throughout the duration of the mine.
310.	The project will move employees to and from site by bus to reduce the number of vehicles on the road.
311.	The project will use the existing rail network as much as practicable to minimise police escorts.
312.	The RUMP will be developed and implemented (linking with a fatigue management procedure) that analyses opportunities for education and engagement of employees and other stakeholders.
313.	An Emergency and Disaster Management Response Plan will be developed in consultation with Emergency Services and aims to capture the flow on effects of other service providers in the area.
314.	The proponent has committed to supporting local emergency service providers in the event of an emergency.
315.	The proponent will provide relevant information such as work programs and employee statistics to emergency services on a regular basis.
316.	The proponent will link into a Memoranda of Understanding with existing key service providers to provide mine based resource and infrastructure assistance and will include involvement in cross training exercises and Emergency Services and ongoing consultation.
317.	Available mine resources are not available for offsite use when mining is occurring.
318.	The project would continue to promote healthy lifestyle through education, training and provision of recreational facilities to be built on site.
319.	The project will actively promote occupational health and safety through education and training to minimise the incidence of workplace accidents.
320.	The project would implement a Drug and Alcohol Policy and Accommodation Village Behavioural Policy and a Workforce Code of Conduct and ensure all employees are contractually bound.
321.	The project will develop and implement a Good Neighbour Policy to guide positive interactions between the Proponent staff, contractors and consultants, and the local community, particularly neighbouring landholders.
322.	A Landholder Management Plan will be implemented to ensure the proponent engages appropriately with adjoining landholders to monitor impacts on agricultural productivity.
323.	A Code of Conduct will be prepared which would be strictly enforced for all SGCP employees and contractors and would apply to behaviour in and outside of the workplace.
324.	The proponent would maintain a 24-hour free call community complaints hotline and all complaints would be recorded, addressed and reported.

325.	The proponent will establish a FIFO workforce Family Support Plan, involving a variety of stakeholders. The plan will identify the needs and aspirations of all employee s including FIFO workers to ensure their wellness and quality of life.
326.	Good communication services will be provided for employees to ensure they keep in contact with family and friends.
327.	Ensure an Employee Assistance Program is implemented to assist employees in dealing with personal issues and coping with family changes.
328.	The proponent will implement a 'Fit for work' fatigue management procedure in conjunction with employees and other stakeholders.
329.	The proponent will implement an education program for workers and contractors incorporating ways drug and alcohol policies, fatigue management, socially acceptable behaviour, cultural awareness and lessons how helping to protect the locals' way-of-life.
Stakeholder and Community Engagement	
330.	The proponent will develop a Community and Stakeholder Engagement Plan that acknowledges the importance of engaging openly and honestly with stakeholders.
331.	The proponent will respond quickly and fairly to community and stakeholder enquiries and complaints and will continue to identify, monitor and respond to community members/ organisations and other key stakeholders throughout the life of the project.
332.	The proponent will conduct relevant public meetings and information sessions as required throughout the mine's lifespan, to ensure stakeholders and communities are kept informed of the Project's plans and actions.
333.	The proponent will encourage dialogue with all stakeholders and will work in partnership to deliver on SIA action plans and address cumulative impacts with other proponents through the Galilee Basin Roundtable.
334.	The proponent will implement a range of communication and engagement tools to inform, engage and encourage participation from the community such as public displays, updates and 24-hour hotline.
335.	The proponent will maintain and support ongoing consultation with the community and stakeholders that have been historically associated with the project including the Technical Reference Group and Community Reference Group.
336.	The proponent will establish a Community Consultative Committee to pro-actively identify and respond to issues and provide information about the project to other community members and stakeholders.
337.	The proponent will implement a complaint and dispute resolution system to ensure all community and stakeholder issues have been dealt with appropriately and closed out.
338.	The proponent will develop an Issues and Risk Management Plan as part of the Community and Stakeholder Engagement Plan to ensure a centralised and swift approach to issues that could adversely impact on the reputation of The Proponent.
339.	The proponent will develop a Media Management Plan to ensure open and positive relationships with the media to help achieve balanced coverage.
340.	The Community Liaison Officer will monitor the performance, effectiveness and efficiency of the Community and Stakeholder Engagement Plan and modify processes and communication channels as appropriate.
341.	Bandwidth will be made available for Police and Emergency Services. (Police requirement is 1Mb).

342.	Floor space will be allocated within the main communications facility for a Queensland Police Service secure equipment rack.
343.	Access to support infrastructure such as an associated telecommunications tower is provided for the installation of QPS equipment (antenna).
344.	Mains power (240 volt AC) will be provided for the operation of the radio communications equipment.
345.	Maintain ongoing regular discussion with the BRC regarding future works programs and provide advance notice of off-lease works approval requirements.
Landholder Management	
346.	The proponent will listen to its neighbours, communicate clearly and consistently about Project activities, respond effectively to issues; regularly review and update land access procedures, and provide 'mutual assistance' where possible.
347.	The proponent will undertake ongoing consultation with landholders regarding the alignment of stock routes.
348.	The proponent will establish make good agreements that address the concerns regarding groundwater impacts resulting from the project.
349.	The project will minimise impacts to visual amenity, air and noise on neighbouring landholders by taking into account the interests of landholders in the development of infrastructure and operating procedures during the design phase.
350.	The project will undertake Pest and Weed Management Plan as part of the Environment Management Plan.
351.	Land Access Agreements will be developed and appropriate protocols with landholders to minimise access impacts.
352.	The proponent will seek to engage landholders as required to monitor and address issues such as agricultural productivity as they arise.
Cumulative Impact	
353.	The proponent will participate in a roundtable and this commitment is on the basis of similar commitments to be given by all proponents operating or intending to operate in the Galilee Basin whose projects have been declared a 'coordinated project' by the Coordinator General.
354.	The proponent understands that the roundtable may be tasked with developing short, medium and long term strategies for responding to regional impacts on infrastructure and services that are beyond the scope of individual project assessments. These strategies may be delivered through partnerships between industry, communities, and local governments and state agencies, and will inform and align with regional planning priorities.
355.	The proponent will work with the Local Area Infrastructure Program (LAIP) to bring together industry, local government and government agencies to identify and prioritise strategic infrastructure needs, address the phasing of strategic infrastructure and explore how funding of projects can be aligned.
356.	LAIPs will link closely to the Government's Royalties for the Region's program and Australian Government funding programs.

Appendix 6 Response to the Independent Expert Scientific Committee advice

Introduction

Section 131AB of the EPBC Act states that the Commonwealth Minister for the Environment must obtain the Independent Expert Scientific Committee's (IESC) advice before deciding whether to approve a proposal for the purposes of sections 24D and 24E of the EPBC Act.

Queensland is a signatory to the Council of Australian Governments National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development (NPA). The NPA requires coal seam gas or large coal mining development proposals undergoing environmental impact assessment, and that are likely to have a significant impact on water resources, to be referred to the IESC.

Prior to the inauguration of the statutory committee in November 2012, an interim committee (IIESC) advised the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (now DE) on proposed projects. SEWPaC sought advice on the project's EIS documentation from the IIESC on 23 May 2012.

The IIESC provided its advice on 29 June 2012 and recommended that the groundwater model be peer-reviewed and that the proponent provide further information on site and regional water balances, water quality impacts and water-dependent assets. This advice informed the Coordinator-General's decision about the scope of additional information required to complete the evaluation process.

On 8 July 2014, DE and the Office of the Coordinator-General submitted a joint request for advice to the IESC for the South Galilee Coal project. The IESC provided final advice to the Office of the Coordinator-General and to DE on 14 August 2014.

The IESC advice informed the Coordinator-General's evaluation of the South Galilee Coal project and is discussed in section 5 of this report. Following is a consolidated response to the IESC advice.

The IESC identified the following key water-related assets near the project area:

- water supply bores for Alpha town
- Clematis Sandstone—a recharge bed of the Great Artesian Basin (GAB)
- GAB springs to the west of the project's groundwater-flow-model domain area
- potential groundwater-dependent ecosystems (GDEs).

Key potential impacts of the project on surface and groundwater, as identified by the IESC, were:

- drawdown and depleted groundwater flow in the Clematis Sandstone, with the potential for impacts on GAB recharge and springs
- uncontrolled releases of water from the site into the environment

- increased connectivity between coal seams and overlying hydrostratigraphic units (aquifers) due to cracking, and increased sediment transport to Tallarenha Creek, as a result of subsidence. These impacts could change the quality of groundwater and surface water, respectively.

In addition to the IESC advice, the Coordinator-General received technical advice from professional surface and groundwater experts at DNRM and DEHP. The Coordinator-General's conclusions are based on an analysis of the proponent's technical reports, IESC advice and advice from Queensland government agency experts.

IESC advice and Coordinator-General's response

IESC comment 1 – Groundwater model

The Coordinator-General is satisfied that the groundwater model, at this stage of the approval process, is adequate to assess the potential impacts on groundwater, interactions with surface water, water resources and water-dependent assets and users of that surface water and groundwater.

The detailed mine design needs to be developed further by the proponent to finalise measures for managing surface water and groundwater for the project. Before large scale mining (i.e. commencement of South Galilee Coal stages 1, 2 and 3, or long-term continuation of the Epsilon stage) commences, the proponent will review and update the groundwater model with further data collected from the proposed monitoring bores. In updates of the model, the proponent must also justify the hydrogeological parameters used and address other issues discussed in the following sections.

The Coordinator-General acknowledges the IESC advice that the revised groundwater model should be independently peer reviewed. This has been the standard practice for other Galilee Basin proponents and a requirement of approvals by the Commonwealth Minister for the Environment.

HYDROGEOLOGICAL PARAMETERS REQUIRING JUSTIFICATION

The 20:80 split of layer 2—Clematis Sandstone (GAB aquifer) and Moolayember Formation—is considered reasonable at this stage of the assessment process and does not represent a major flaw in the model.

During the future review of the groundwater model, several parameters should be justified including hydraulic conductivities, specific yield (particularly for layers 1 and 2) and anisotropy ratio. Other model parameters should be reconsidered including groundwater recharge and boundary conditions, with further sensitivity analyses quantifying the uncertainties.

Hydraulic conductivities

The IESC had concerns that the hydraulic conductivity values used in the model may be too low for the Clematis Sandstone. The model used a horizontal hydraulic conductivity of 0.2m per day and a vertical hydraulic conductivity of 0.002m per day. Field testing at the Carmichael Coal Mine and nearby Galilee Coal project sites suggest a horizontal hydraulic conductivity between 3–15m per day.

While the Coordinator-General does not consider this issue to significantly affect predictions, the proponent should justify the use of these conductivity values in revisions of the groundwater model. Data from groundwater monitoring during mining operations would provide greater certainty in model reviews.

Specific yield

The IESC stated that the specific yield value of 0.01 used for layer 1 (tertiary sediments) and layer 2 (Clematis Sandstone) are lower than those typically used for sandstone formations. Specific yield generally relates to an unconfined aquifer. Alluvium and tertiary sediments are typically unconfined in the area around the project, whereas the Clematis Sandstone is not considered an unconfined aquifer.

The values used by the proponent are lower than that used for other Galilee Basin coal projects for the tertiary sediments (0.05) but the same as those used by the Carmichael Coal Mine project for the Clematis Sandstone (0.01). Given the confined nature of the Clematis Sandstone in the vicinity of the mine, the Coordinator-General considers that this issue would not significantly affect the proponent's impact predictions.

It should be noted that DNRM experience is that productive alluvium across Queensland typically displays a specific yield between 0.05 and 0.15. These figures that result from water balances and model calibrations, are significantly lower than figures published in scientific literature.

The proponent should provide further justification for specific yield parameters used for layers 1 and 2 during future reviews of the groundwater model.

Anisotropy ratio

The anisotropy ratio is the difference between the horizontal and vertical hydraulic conductivity of an aquifer. The project used an anisotropy ratio of 100 for the Clematis Sandstone (GAB aquitard), whereas other proponents in the area adopted an anisotropy ratio of between 10 and 30. The Coordinator-General does not consider this to be greatly different but given that the horizontal hydraulic conductivity already seems low, the proponent should provide further justification for the value used for the Clematis Sandstone during future reviews of the groundwater model.

Recharge

It is difficult to estimate recharge in an area like the eastern Galilee Basin where water use is historically low, and therefore historical stress on the system is also low.

Recharge is the inflow of water to the groundwater system from the surface. In the groundwater model used, the proponent presented recharge as a percentage of recorded rainfall. There is not always a straight forward relationship between recharge and rainfall given the irregular nature of recharge.

The Coordinator-General expects the proponent to calibrate the model to episodic recharge, particularly in the tertiary sediments near Alpha town, as further monitoring information is obtained from the project area. These recharge rates should be included in the sensitivity analysis associated with the future groundwater model review.

Boundary conditions

The Coordinator-General considers the boundary conditions used in the model are appropriate.

However, during future model reviews, the proponent should provide additional information regarding the general head boundary (GHB) values used in parts of the model and justify the adoption of GHB conditions that are identical for any depth at a given location.

Sensitivity analysis would allow the proponent to trial a range of boundary conditions in the model and address any concerns regarding the values adopted for GHB.

Sensitivity and uncertainty

Sensitivity analysis was carried out by the proponent through increasing the vertical hydraulic conductivity of the Rewan and Dunda Formations by a factor of 10 and 100 and observing the change in predicted inflows to the mine.

The Coordinator-General considers that it is worth carrying out a sensitivity analysis at the next stage on the confining layer of the Rewan Formation (an aquitard defined as the base of the GAB). This should be included in future model reviews to further define drawdown impacts.

While the model allows surface water impacts to be predicted, more comprehensive sensitivity/uncertainty analyses would better quantify the likely range of outcomes. The Coordinator-General agrees with the IESC that the model allows for interaction between groundwater and surface water, and that the water balance shows no impact to stream flow across the model domain as a result of groundwater drawdown from the project. The Coordinator-General recommends that the proponent should further consider the finer-scale temporal and spatial variation in surface water–groundwater interaction in the ephemeral streams, particularly along Alpha Creek during the detailed design phase for the project.

The need for sensitivity analyses on hydraulic conductivity, storage parameters and recharge requires further consideration in future model reviews.

CONCLUSION

The Coordinator-General has recommended a condition to be applied by the Commonwealth Minister for the Environment to guide the proponent in reviewing and updating the groundwater model to incorporate groundwater monitoring data and measured mine dewatering volumes.

Revisions of the model should contain the following updates:

- recharge modelling should be calibrated to episodic recharge rather than a percentage of rainfall
- sensitivity analyses should be considered for hydraulic conductivity, storage parameters, recharge rates and the confining layer of the Rewan Formation
- potential groundwater impacts on Alpha town (bores) need to be further refined.

The Coordinator-General requires the proponent to validate the following parameters relating to the model during the next project development stages:

- 20:80 split of layer 2, explaining the data that was utilised to support the representativeness of the split
- horizontal and vertical hydraulic conductivity
- values adopted for GHB and the adoption of identical GHB conditions for any depth at a given location
- specific yield value
- anisotropy ratios
- fracturing parameters.

IESC comment 2 – Subsidence modelling

Unlike the Bowen Basin, there is no precedent for subsidence outcomes from underground mining in the Galilee Basin. Therefore, subsidence modelling and impact prediction for underground mining in the Galilee Basin is still in its infancy.

The geology of the Galilee Basin differs to the Bowen Basin in that there is no supportive sandstone layer in the strata above the coal seams, which could act as a supporting bridge that may reduce subsidence impacts from underground mining. The geological layers above the coal seams at the Galilee Basin consist of shale, siltstone and unconsolidated sediments.

The following matters used in the project's subsidence model will be refined as further information is obtained from geotechnical surveys and from the mine's operation:

- parameters used to model fracturing caused by underground mining
- geotechnical properties of overburden
- the risk of direct hydraulic connectivity between the surface and coal seams
- quantities of potential surface water flow reductions.

The Coordinator-General requires the proponent to refine these matters in future updates of the model.

Without mitigation there is potential for a reduction in streamflow to Tallarenha Creek from subsidence, causing a series of long pools on tributaries in the upper catchment. Subsidence could result in impacts such as:

- reduced flow to the creek
- reduced flood plain inundation
- erosion and increased sediment export to the creek
- reduced connectivity to downstream ecosystems
- potential displacement on the project area overlying underground mining of arid-adapted species by generalists/pest species due to more regular availability of water in the landscape.

Subsidence as a result of the project may occur on almost 4570 ha (underground mine footprint) of the Tallarenha Creek catchment area. The impact area is located at the

head of the catchment and contains ephemeral tributaries. The proponent considers that subsidence impacts on downstream flow would be negligible, because the volume of flow from these tributaries is unlikely to significantly contribute to downstream flows.

The proponent has committed to establishing a subsidence monitoring plan over the underground subsidence area. The purpose of the plan will be to identify subsidence-induced changes to the floodplain drainage patterns that could prevent surface water flow draining downstream. The monitoring plan should include the number, depth and location of the monitoring sites in the shallow fracture zone, and prepare an adaptive management framework with management options.

The proponent has also committed to progressively re-establishing free drainage in the subsidence area and using clay to seal surface cracks within drains and waterways that have not naturally filled after approximately three storm events.

The Coordinator-General has set a condition for a subsidence management plan to be developed and implemented by the proponent. The objective of the subsidence management plan is to ensure that subsidence impacts are properly managed. It will need to be included in the EM Plan and its implementation will also be conditioned in the EA.

The subsidence management plan should include a monitoring program that details the direct measurement of borehole deformation and fracturing, as well as monitoring of changes to aquifer properties and enhanced vertical permeability. The program should aim to provide data regarding actual flow rates through the sub-surface fracture network.

The monitoring program should state the number, depth and location of the proposed monitoring sites in the shallow fractured zones, including some in proximity to surface drainage lines. The monitoring program needs to extend upstream and downstream of reaches and include head-cut erosion, streambed slope changes and the size of subsidence void/basin or ponding.

The proponent needs to justify how the subsidence impact management strategy to excavate the connecting channels along the flow path of Tallarenha Creek tributaries will provide connectivity with the natural watercourse. This justification needs to clarify how its strategy addresses:

- the progressive nature of subsidence through the life-of-mine operation
- the loss of the natural flow regime and connectivity
- the potential for upstream migration of an erosion head in response to steepening of the effective stream slope
- the impact that ponding of water would have on riparian and aquatic flora and fauna.

All outstanding matters relating to subsidence must be addressed in the revised environmental management plan (EM Plan) to be submitted to DEHP as part of the EA application. The Coordinator-General has set conditions for the proponent to monitor subsidence impacts on water resources annually, and implement management measures to minimise those impacts.

IESC comment 3 – Site water balance model

The Coordinator-General considers and DNRM experts agree that the site water balance model is adequate for this stage of the mine's design and approval process. However, further information is required to be provided during finalisation of the project's EM Plan and EA that will allow better definition of the mine's impacts on surrounding water sources. The proponent will need to update the site water balance model to extend site water balance sensitivity analysis to include higher long-term runoff coefficients for the hardstand and open-cut areas. The proponent needs to revise the water management strategy to include contingency provisions for variations in the actual volume of water to be managed and include this in the EM Plan.

The Coordinator-General does not consider surface water losses as a result of open-cut voids and subsidence to be a likely key impact of the project. The Tallarenha Creek tributaries that are likely to be affected by subsidence are ephemeral, have a hydrological character of loss at a maximum rate—meaning that they lose water to the groundwater system, and are located at the head of the catchment. Due to these characteristics of the tributaries, their total contribution to surface water flows downstream is expected to be minimal and any losses are unlikely to result in downstream impacts. The Coordinator-General requires the proponent to determine the baseline flows from the tributaries and mimic flow characteristics—quality, quantity and seasonality—with discharge from the mine site.

The Coordinator-General notes that the proponent has committed to provide water balance reports and to maximise re-use of water on site. A groundwater and surface water monitoring program will be implemented by the proponent from the commencement of earthworks and for the life of the project. The program will be included in the EM Plan and will be conditioned through the project's EA.

WATER MANAGEMENT SYSTEM

The Coordinator-General believes that external sourcing of a water supply for post-Epsilon-stage mining activities would not influence regional surface water or groundwater balances. Options for the region's long term water supply to support coal mining in the Galilee Basin are being considered by DNRM and DSDIP as part of the Galilee Basin Development Strategy. These options include allocations from existing dams or water plans. Details regarding the source and volume of the external water supply will need to be provided in the application for a water allocation permit under the *Water Act 2000*. The source of the external water supply for the site does not need to be considered at this stage.

It should be noted that the volume of any water supply sourced externally will include water required for make good arrangements, if needed, with affected stakeholders. The proponent acknowledges that the final water management system design will need to be confirmed before commencing the South Galilee mines stages of the project.

The proponent needs to provide further evidence that impacts to surface water quality due to discharges from mine containment structures would be negligible. The Coordinator-General expects the evidence to be supported by monitoring data and to

consider both water quality and the volume of flows from all mine containment structures and in the receiving creeks.

EM PLAN

The proponent will address the following items in the revised EM Plan, to inform the conditions in the EA in accordance with the requirement of the EP Act:

- environmental commitments related to decommissioning, subsidence and groundwater monitoring
- groundwater drawdown triggers
- locality information or maps for discharge points
- make good strategies
- water quality monitoring and management and infrastructure maintenance of clean water diversions
- site water balance model uncertainties and sensitivity analyses
- surface water losses
- mine water releases and discharge points
- water quality monitoring and management of clean water diversions, and infrastructure maintenance
- groundwater drawdown triggers
- make good arrangements with impacted water users
- locations, capacities and storage allowance
- within-site water balance transfer capabilities
- surface water and baseline monitoring sites and event-based sampling.

The EM Plan needs to describe the project's range of water discharges to each creek system and compare releases to the existing regime with appropriate thresholds adopted based on discharge volumes, timing and existing water quality. The EM Plan will describe the locations, capacities, storage allowances, within site water balance transfer capabilities, spillway locations and controlled discharge points, and controlled release strategies of regulated dams. It will also address surface water and baseline monitoring sites, release points and detail event-based sampling.

IESC comment 4 – Impacts to water-related assets

Many of the matters raised by the IESC in this comment set have been responded to in previous sections.

MONITORING PROGRAMS

Monitoring programs will be developed for the following features:

- groundwater
- receiving environment
- subsidence
- surface water.

These monitoring programs are to be detailed in the EM Plan and implemented in accordance with the EA. Surface water monitoring must be consistent with the *National Water Quality Management Strategy*. The EM Plan is to include triggers for mitigation and management measures.

All water monitoring data needs to be provided to the relevant administering authority when requested by the relevant administering authority or in accordance with the groundwater management and monitoring plan approved by DE.

The groundwater monitoring program must include bores in the GAB west of the mine (Clematis Sandstone) and shallow piezometers along Alpha Creek. The exact locations of these bores are to be determined by the proponent and agreed to by DEHP and DNRM. Data collected from these bores needs to be included in future updates of the groundwater model.

GROUNDWATER MODEL AND REGIONAL IMPACTS

The proponent's regional impact model assesses regional impacts of the South Galilee Coal project and Waratah Coal Pty Ltd's proposed Galilee Coal project, 47 km to the north. DNRM is satisfied with this approach.

The layer structure of the model needs to be further developed and calibrated during future model reviews to improve the model's ability to predict regional impacts. The model incorporated potential dewatering of open-cut and underground mining of the higher level B seam in the Bandanna Formation at the Waratah Coal Pty Ltd Galilee Coal project only.

DNRM has concerns that the existing regional model does not adequately simulate the removal of water from the B seam at the Waratah Coal Pty Ltd Galilee Coal project because the Bandanna Formation, which contains the B seam, is located in the same model layer as the Rewan and Dunda Beds (GAB aquitard). It is difficult to accurately simulate the dewatering effects of the B seam, underneath and adjacent to the Bandanna overburden and Rewan Formation, when all are in the one layer.

As discussed in previous sections, it is recommended that the layer structure be reviewed by the proponent as part of the overall groundwater model review, with the view to split the Bandanna from the Rewan and Dunda beds, particularly given the large impact that the Waratah Coal Pty Ltd Galilee Coal project is predicted to have on groundwater in the project area.

Despite these limitations, the Coordinator-General considers that the regional model provides a reasonable understanding of the potential impacts from the South Galilee Coal project alone. However, the regional model should be independently peer-reviewed and regularly updated with data from monitoring programs. The proponent will need to provide all modelling data to DNRM to contribute to the regional groundwater monitoring and assessment program that is being developed across the eastern Galilee Basin.

The regional groundwater monitoring and assessment program will address potential regional impacts on water resources in the Belyando-Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin. Conditions have been set to provide

monitoring data and pro-rata funding to contribute to the operation of the regional program. The Coordinator-General has recommended that DNRM develop and maintain a regional water balance model, which will:

- identify linkages between hydrogeological formations, the likely extent of aquifer connectivity and groundwater–surface water interactions, and characteristics of aquifer recharge
- use baseline monitoring and site water balance model data provided by project proponents
- have regard to relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Lake Eyre Basin
- determine potential impacts on groundwater resources and surface water flow conditions, environmental values and existing surface water users.

SUBSIDENCE MANAGEMENT

The Coordinator-General considers that while the project assessment documentation is adequate for this stage of the project's design and approval process, further information is required in the EM Plan to articulate management strategies that would effectively address impacts on surface water resources or ecological assets as a result of subsidence.

The Coordinator-General supports the IESC's suggestion for the proponent to develop and implement an adaptive management framework and has recommended a condition to address subsidence impacts on downstream environments. The details of the management framework are discussed in the previous subsidence section.

WATER-RELATED ASSETS

Water supply for Alpha town and landholders

The main groundwater use within the vicinity of the project is domestic use and stock watering. It is the main water supply for Alpha town. A survey of bores, conducted in 2009 for the EIS, found a total of 12 bores in use at the properties within and adjacent to the mine area including at Alpha town.

The proponent predicts a 0.1 metre drawdown at most bores and Alpha town due to the South Galilee mine alone and 3 metre of drawdown based on the combined impacts of the South Galilee Coal project and Waratah Coal Pty Ltd Galilee Coal project.

Within the area of drawdown in and around the mining area, 38 registered bores would potentially be affected by greater than a one metre drawdown. None of these bores supply water to Alpha town. Three of these bores are predicted to experience greater than 39m drawdown. They are located adjacent to the underground mines where dewatering will occur. Two other bores located north of the MLA may become dry as a result of the project. They target very thin and shallow areas of the alluvium and tertiary sediment formation and are prone to drawdown. The proponent has committed to establish make good arrangements with the owners of these bores and other

potentially affected stakeholders, including the BRC (Alpha town) for impacts associated with the project.

The proponent has committed to proactively engage with relevant key stakeholders, including landholders predicted to be impacted by mine dewatering, and the BRC, regarding groundwater throughout all future stages of the project and to establish make good arrangements to address stakeholder concerns regarding groundwater impacts from the project.

The proponent has committed to provide an alternative water supply from an external source if groundwater supplies for these users are materially impacted by the mine.

Groundwater-dependent ecosystems

DNRM agrees that the presence of the Joe Joe Formation to the east of the project under the tertiary sediments is likely to restrict any impacts of mine dewatering on GDEs. However, it is not clear how accurately that connection, or lack of connection, has been modelled. In particular, the apparent continuation of a depth of tertiary sediments through this area is unclear and how much that might transfer drawdown conditions.

Baseline data shows that the pre-mining depth to water table from the ground surface is greater than 10m in all areas of the project except for areas directly adjacent to the riparian zone of mapped streams. The proponent concluded that these riparian zones are supported by surface water stream flows following rainfall and do not rely on groundwater. Therefore, the proponent concluded that no groundwater-dependent ecosystems (GDEs) will be impacted due to the lowering of groundwater levels as a result of the project.

Despite this conclusion, the Coordinator-General considers that the proponent should install shallow piezometers along Alpha Creek, to determine the extent of surface water–groundwater interaction. Techniques from the Australian GDE Toolbox should be used to confirm groundwater discharge to surface water bodies.

The Coordinator-General requires the proponent to undertake further surveys before and during operations to identify GDEs, including targeted riparian surveys to determine the presence of GDEs. The Coordinator-General expects the proponent to identify the water requirements of identified GDEs and conduct ongoing monitoring for impacts if GDEs are present. Should groundwater levels fall to a level where adverse impacts occur, then the proponent is expected to implement management measures or provide an appropriate offset.

The revised EM Plan needs to identify downstream water-dependent fauna, flora and refugial habitat and the palustrine habitat that occurs in the lagoon adjacent to Alpha Creek. The Coordinator-General requires information to be included on:

- pre-mining condition of water-related assets
- water regime required to maintain assets
- impacts to the assets caused by a change to flow regime, water quality, channel morphology, habitat zones and erosion zones, considering seasonal variations and extreme events such as floods

- monitoring requirements with measurable thresholds and triggers
- options to minimise, mitigate or avoid impacts.

CONCLUSION

Additional mitigation and management measures to reduce impacts to water-related assets are required to be documented in the proponent's EM Plan. Further information will be collated before and during the mine's operation to improve understanding of potential impacts to water-related assets in the area.

The Coordinator-General has recommended a condition requiring the proponent to use data from monitoring programs to update the groundwater model, which should aim to adequately represent hydrology in the area—especially at Alpha town.

The Coordinator-General notes that the proponent has committed to establish make good arrangements with potentially impacted landholders and the BRC (Alpha town) in case they are unduly affected by impacts to groundwater.

The Coordinator-General requires the proponent to complete a targeted riparian survey to determine the presence of GDEs prior to commencement of construction.

IESC comment 5 – Impact on the Great Artesian Basin

Potential impacts on the GAB may only arise indirectly from groundwater draining via geological fault structures from the Clematis Sandstone through the Dunda Beds and the Rewan Formation into the aquifers of the Bandanna Formation and Colinlea Sandstone. This would require a reduction in head in the Colinlea Sandstone significant enough to induce the transfer of water from the Clematis Sandstone through the approximately 250-metre-thick Rewan Formation.

Drawdown in the Clematis Sandstone as a result of only the South Galilee mine was predicted to be less than one metre. The project is not likely to impact on the nearest GAB spring, which is over 100 km south-east of the mine.

As stated above in the Coordinator-General's response to IESC comment 4, structural deficiencies with the project's groundwater model layers inhibit the model's ability to predict regional impacts—particularly when viewing regional impacts to the GAB from multiple Galilee mines operating at the same time. Drawdown in the Clematis Sandstone is predicted to be 3-5m. DNRM considers that these results from the proponent's regional impact model lack certainty, due to the structural deficiencies. The model layers must be updated for future regional impact assessments and must address uncertainties regarding fracturing, hydraulic conductivity and resulting aquifer inter-connectivity.

DNRM has commenced the development of a regional groundwater model and an assessment of regional water impacts in the Galilee Basin in collaboration with the Commonwealth Office of Water Science, Geoscience Australia and the Bureau of Meteorology. The assessment will consider the combined impacts of five currently proposed coal mines on the Galilee Basin's groundwater budget and environmental assets, including the GAB. It is likely to improve the understanding of the risk to adjoining water entitlement holders and regional impacts on groundwater resources.

Coal mine proponents will be required to provide their groundwater and surface water monitoring results to DNRM for input into the regional water balance assessment.

Groundwater monitoring

The proponent needs to install monitoring bores in the Clematis Sandstone aquifer, which will form part of the groundwater monitoring program. GAB monitoring bores must be monitored for two years before construction of the box-cut commences.

Groundwater monitoring will monitor interaction between surface water and groundwater before mining commences and during operations.

Bore levels will be measured on a quarterly basis prior to mining commencing and during mining operations. Frequency of bore level measurements will reduce to an annual basis post mining. Monitoring data will be reviewed annually and will involve assessing data and suitability of the monitoring network.

Data collected from the groundwater monitoring program must be provided to DNRM when requested, to contribute to the regional monitoring and assessment program.

The Coordinator-General has recommended a condition for the proponent to monitor impacts to the GAB through the groundwater monitoring program and to provide the monitoring results to DNRM for input into the regional water balance model.

Appendix 7 Species recovery plans, conservation advices and threat abatment plans

Section 1 Species Recovery Plans

Part A Queensland Brigalow Belt reptile recovery plan 2008-2012

This plan aims to secure and improve the long term survival of the species and their key habitat, and to raise awareness of reptile conservation issues within the community. The specific objectives and action items to achieve this are as follows:

(a) Identify and protect key habitat and important populations on private and state controlled lands through the development of partnerships between relevant stakeholders by:

- (i) inspecting and identifying key habitat and important populations for each species and prioritise for management and for local government and community engagement
- (ii) identifying key threats and develop reptile habitat management guidelines for key habitat
- (iii) negotiating management agreements and voluntary conservation agreements for the protection of priority management areas and key habitat areas, and important populations in line with the recommended management guidelines.

(b) Reduce and manage the major threatening processes affecting threatened reptiles in the Queensland Brigalow Belt (QBB) by:

- (i) providing incentive mechanisms and facilitating community on-ground projects for the protection of threatened reptiles and their habitat across a suite of land tenures
- (ii) providing incentive mechanisms through resources and/or technical advice and facilitate the up-take of appropriate management of key habitat and threatening processes for QBB reptile species by industry stakeholders
- (iii) working with local governments to protect reptile habitat on the stock route network and shire roadsides and reserves
- (iv) incorporating environmental protection authority ecological fire management guidelines into property and reserve planning for key habitat areas
- (v) encouraging higher participation in integrated pest management activities.

(c) Ensure reptile conservation is incorporated into appropriate land management decisions within all levels of government, industry and community by:

- (i) working with key stakeholders to incorporate relevant information from the recovery plan into relevant management policies, strategies and plans
- (ii) working with natural resource management regional bodies to deliver region specific information necessary for the implementation of on-ground reptile recovery actions
- (iii) maintaining the recovery team to represent broad stakeholder support.

(d) Increase community participation, awareness and understanding in the conservation and management issues of threatened reptiles by:

- (i) preparing education material and undertake community extension
- (ii) incorporating reptile conservation in Indigenous cultural education activities
- (iii) maintaining a working relationship with the Indigenous community to progress Indigenous involvement in the recovery program.

(e) Increase knowledge and understanding of the species and their ecology necessary to affect their conservation and management by.

- (i) working with landholders and key stakeholders to undertake monitoring programs on selected sites

(ii) identifying gaps in species research, develop research priorities, provide research projects to tertiary and research institutions, and help support their implementation

(iii) incorporating information on the species listed in this recovery plan into the Wildnet database

(iv) establishing the taxonomic status of the Darling Downs population of the lizard presently known as *Tympancryptis pinguicolla*

(v) monitoring and evaluating the plan applying an adaptive management approach.

Part B National recovery plan for the black-throated finch southern subspecies (*Poephila cincta cincta*)

The southern subspecies of the black-throated finch (BTF) is currently listed in Appendix II of CITES, as 'endangered' under the EPBC Act, as 'endangered' under the schedules of the NSW *Threatened Species Conservation Act 1995* and 'vulnerable' under the Queensland *Nature Conservation Act 1992*.

The overall objective of the plan is to manage and protect the BTF and its habitat, and to promote the recovery of the southern subspecies. The actions listed in the plan seek to understand the relative importance of the known threats, to verify the suspected decline of the subspecies and protect and enhance existing habitat. Specific objectives of the plan and the actions proposed to achieve them are as follows:

(a) Identify and quantify threats by:
  (i) investigating breeding requirements and threats to key breeding areas
  (ii) investigating feeding and other habitat requirements.

(b) Quantify distribution and abundance by:
  (i) documenting sightings
  (ii) developing standard survey guidelines
  (iii) undertaking mapping and habitat modelling
  (iv) undertaking targeted surveys

(c) Protect and enhance habitat by:
  (i) securing selected sites for conservation
  (ii) addressing threats on grazing lands
  (iii) monitoring management effectiveness
  (iv) investigating development of other statutory planning instruments to minimise impacts of development on BTF.

(d) Investigate potential for captive birds contributing to a re-introduction project by:
  (i) determining suitability of birds currently in captivity for a reintroduction project.

(e) Increase public awareness by:
  (i) increasing public awareness of the status of and threats to the subspecies.

Guidelines for habitat management provided in the plan include:

1) management of overgrazing of the riparian grassland that is the main habitat of the species
2) management of clearing and fragmentation of woodland, riverside habitats and wattle shrubland
3) management practices aimed at minimising impacts on habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability
4) fire management
5) weed management strategies to minimise invasion of habitat by exotic weed species, including exotic grasses.

Section 2 Approved conservation advice

Part A Approved conservation advice for Brigalow (*Acacia harpophylla dominant and co-dominant*) ecological community

The following priority recovery and threat abatement actions can be done to support the recovery of the Brigalow *(Acacia harpophylla* dominant and co-dominant) ecological community:

Threat reduction/control

(a) Protect and conserve remnant and regrowth areas of the ecological community. Prevent clearance of this endangered ecological community and of nearby native vegetation including buffer zones and connecting corridors.

(b) Where further clearance is unavoidable:
  (i) mitigate the severity of impacts (e.g. avoid higher quality areas, avoid dissection of patches, act to minimise hydrological disruption and the spread of weeds)
  (ii) offsetting should consider the location and emulate qualities of affected patches.

(c) Manage areas of the Brigalow ecological community to reduce threats, including through:
  (i) fire management that considers brigalow conservation, protection, and ecological heterogeneity
  (ii) targeted weed and feral animal control with a particular focus on high biomass exotic grasses (buffel grass, Rhodes grass, green panic grass) and feral pigs.

(d) Manage all weeds appropriately within and close to the Brigalow ecological community; e.g. spot application of herbicides, rather than aerial spraying; avoid fertiliser application; minimise tree thinning and soil disturbance

(e) Manage foxes and cats (as well as feral pigs) using a coordinated approach, preferably among groups of neighbours and across regions

(f) Help woodland birds to avoid aggression from noisy miners by: encouraging and protecting shrubby understorey; managing grazing pressure so that it does not degrade native vegetation; and retaining dense stands of trees and regrowth.

Land management

(g) Encourage landholders to balance primary production and the conservation of native flora and fauna within and close to the ecological community. Examples of this are:
  (i) managing stocking rates, paddock numbers/sizes, grazing practices and livestock camp sites to avoid damage to woodland understorey and ground cover - this may include adopting rotational or cell grazing regimes; or, excluding grazing entirely from intact stands of brigalow where appropriate (e.g. unless managing fuel loads through grazing)
  (ii) leaving trees, or clumps of regrowth, in paddocks to maintain connections between patches of native flora and fauna habitat
  (iii) connecting shade-lines to one another and keeping them as wide as possible (ideally more than 100m)
  (iv) avoiding the application of fertiliser, or the aerial / broad scale spraying of herbicides
  (v) leaving dead trees standing and allowing dead timber and leaf litter to rot where it falls on the ground.

(h) Undertake regeneration of high value regrowth sites and revegetation of degraded sites

(i) Increase the area of the brigalow ecological community managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders

(j) Establish adequate buffer zones to protect remnants

(k) Devise and implement water management, sediment erosion and pollution control and monitoring plans.

Management for wildlife

(l) Undertake management actions that help to increase the diversity of species and their abundance; this requires thinking about habitat use at multiple scales. General management actions that benefit many fauna species include:
    (i) retaining fallen timber and leaf litter for small mammals and reptiles
    (ii) retaining standing dead trees or old trees with hollow limbs for nesting sites for birds, mammals and reptiles
    (iii) re-introducing micro-habitat features (e.g. rocks, logs and other woody debris) to sites disturbed during proposed work
    (iv) discouraging species like noisy miners and introduced predators by maintaining large patches of woodland with complex structure
    (v) avoiding clearing remnant vegetation; and retaining areas of brigalow regrowth.

(m) Encourage woodland regeneration close to areas of existing woodland.

Develop and propagate conservation information

(n) In consultation with land managers, local and state authorities and Indigenous groups
    (i) develop and propagate environmentally sustainable management guidelines and technical material to assist land managers, including measure to address inappropriate fire regimes, plant pathogens, invasive animal management, weed management and health and maintenance of the ecological community
    (ii) develop or support appropriate existing education programs, information products and signage to help the public recognise the presence and importance of the ecological community, and encourage compliance with their responsibilities under state and local regulations and the EPBC Act.

Part B Approved conservation advice for squatter pigeon (southern) (*Geophaps scripta scripta*)

The following priority recovery and threat abatement actions can be done to support the recovery of the squatter pigeon (southern):

(a) Habitat loss, disturbance and modification
    (i) Monitor known populations to identify key threats.
    (ii) Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
    (iii) Identify populations of high conservation priority.
    (iv) Manage threats to areas of vegetation that support important populations of the squatter pigeon (southern).
    (v) Protect populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure.

(b) Trampling, browsing or grazing
    (i) Develop and implement a stock management plan for key sites.
    (ii) Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern).

(c) Animal predation or competition
    (i) Implement the appropriate recommendations outlined in the Threat Abatement Plan for Predation by Feral Cats (EA, 1999a) and the Threat Abatement Plan for Predation by the European Red Fox (EA, 1999b) in areas inhabited by the squatter pigeon (southern).

(d) Conservation information

(i) Raise awareness of the squatter pigeon (southern) within the local community, particularly among land managers.

Part C Approved conservation advice for *Denisonia maculata* (Ornamental Snake)

The following priority recovery and threat abatement actions can be done to support the recovery of the Ornamental Snake:

(a) Habitat Loss, Disturbance and Modification

(i) Identify populations of high conservation priority

(ii) Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible

(iii) Minimise adverse impacts from land use at known sites.

(b) Animal Impacts

(i) Control introduced pests such as pigs to manage threats at known sites

(ii) Develop and implement a management plan for the control of Cane Toads in the region.

(c) Conservation Information

(i) Raise awareness of the Ornamental Snake and other reptiles found in the Brigalow Belt Bioregion within the local community.

Part D Approved conservation advice for *Furina dunmalli* (Dunmall's Snake)

The following regional priority recovery and threat abatement actions can be done to support the recovery of Dunmall's Snake:

(a) Habitat Loss, Disturbance and Modification

(i) Manage any disruptions to water flows and any modification of wetlands

(ii) Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.

(b) Conservation Information

(i) Raise awareness of Dunmall's Snake and other reptiles within the local community

(ii) Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

The following local priority recovery and threat abatement actions can be done to support the recovery of Dunmall's Snake:

(c) Habitat Loss, Disturbance and Modification

(i) Minimise adverse impacts from land use at known sites.

(d) Trampling, Browsing or Grazing

(i) If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and stocking density that does not detrimentally affect this species.

(e) Animal Predation or Competition

(i) Continue baiting to control population numbers of feral animals.

Part E Approved conservation advice for *Egernia rugosa* (Yakka Skink)

The following priority recovery and threat abatement actions can be done to support the recovery of the Yakka Skink:

(a) Habitat Loss, Disturbance and Modification
  (i) Monitor known populations to identify key threats
  (ii) Identify populations of high conservation priority
  (iii) Actively discourage the removal of fallen logs, leaf litter and rocks from known and potential habitat sites
  (iv) Ensure that road widening and maintenance activities and ripping of rabbit warrens in areas where the Yakka Skink occurs do not adversely impact on known populations
  (v) Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.

(b) Animal Predation or Competition
  (i) Develop and implement a management plan for the control of foxes and feral cats in the region.

(c) Fire
  (i) Develop and implement a suitable fire management strategy for the habitat of the Yakka Skink.

(d) Conservation Information
  (i) Raise awareness of the Yakka Skink, and other reptiles, within the local community
  (ii) Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

Section 3 Threat abatement plans

Part A Threat abatement plan for predation by feral cats

The goal of the feral cat threat abatement plan (TAP) is to minimise the impact of cats on biodiversity in Australia and its territories. The squatter pigeon is listed as a species of concern under this TAP. The five main objectives and associated recovery actions in order to achieve this goal are as follows:

(a) Prevent feral cats occupying new areas in Australia and eradicate feral cats from high-conservation-value 'islands' by:
  (i) collating data on offshore islands and developing and implementing management plans to prevent, monitor, contain and eradicate any cat incursions
  (ii) working with communities to prevent incursion
  (iii) monitoring native prey species in areas eradicated of cats.

(b) Promote the maintenance and recovery of native species and ecological communities that are affected by feral cat predation by:
  (i) identifying priority areas for cat control and conducting and monitoring regional cat control in these areas
  (ii) applying incentives to promote and maintain on private or lease hold land within or adjacent to priority areas.

(c) Improve knowledge and understanding of feral cat impacts and interactions with other species and other ecological processes by:
  (i) developing simple and cost effective methods for monitoring populations and impacts of foxes

(ii) investigating interactions between foxes and native carnivores

(iii) determining the nature of interactions between foxes and other pest animals

(iv) determining impacts of cat-borne diseases

(v) identifying unintended effects of fox control conducted in isolation.

(d) Improve effectiveness, target specificity, humaneness and integration of control options for feral cats by:

(i) developing an effective toxin-bait for cats

(ii) determining appropriate baiting strategies

(iii) ensuring habitat rehabilitation and management of potential prey

(iv) testing and disseminating information on exclusion fence designs regarding cost-effectiveness

(v) continuing to promote the adoption and adaptation of model codes of practice and standard operating procedures for the humane management of feral cats.

(e) Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage feral cats by:

(i) promoting understanding of the threat to biodiversity posed by feral cats and support for their control, including the use of humane and best-practice cost-effective controls

(ii) developing communication campaigns to accompany the release of new broad scale cat control techniques.

Part B Threat abatement plan for predation, habitat degradation, completion and disease transmission by feral pigs

The pig TAP sets out a national framework to guide the coordinated implementation of the objectives and actions considered necessary to manage the environmental damage caused by feral pigs to species and ecological communities affected by the process. The five main objectives and associated recovery actions in order to achieve this goal are as follows:

(a) To prevent feral pigs from establishing in areas where they currently do not occur or are in low eradicable numbers, and where they are likely to pose a threat to biodiversity, especially where they would impact on nationally listed threatened species and ecological communities by:

(i) identifying areas currently free from feral pigs or where they are eradicable

(ii) verifying presence or absence of feral pigs in priority areas and developing and implementing management strategies to remove feral pigs from priority areas

(iii) providing awareness programs to recreational hunters, bushwalkers and land managers

(iv) reviewing the adequacy and effectiveness of existing legislation.

(b) To integrate feral pig management plans and their implementation into natural resource planning and investment at the regional, state and territory, and national level through consultation and liaison with key stakeholders by:

(i) coordination between the department and relevant state and territory agencies to set out key concerns and issues to be included in natural resource management plans and to establish protocols and use funding and other relevant mechanisms to improve the consistency and coordination of actions across tenures and jurisdictions.

(c) To increase awareness and understanding of land managers and the general community about the damage that feral pigs cause and management options by:

(i) assessing the adequacy of available information and dissemination of appropriate material to target groups

(ii) supporting the completion, dissemination and adoption of the pest management component of the Conservation and Land Management Training Package being developed by the National Training Authority.

(d) To quantify the impacts feral pigs have on biodiversity (especially nationally listed threatened species and ecological communities) and determine the relationship between feral pig density and the level of damage by:

(i) identifying priority areas under threat by feral pigs

(ii) developing and implementing appropriate studies that aim to determine the impact of feral pigs on listed species and the level of control required to reduce the impact to a significant level.

(e) To improve the effectiveness, efficiency and humaneness of techniques and strategies for managing the environmental damage due to feral pigs by:

(i) assessing the need for the development of more effective and humane techniques and strategies when managing feral pigs

(ii) assessing these techniques and strategies through an analysis of costs and benefits, safety, potential impact on non-target species, legal issues and any other practical considerations, and formulate a regional best practice approach.

Part C Threat abatement plan for predation by the European red fox

The goal of the European red fox TAP is to minimise the impact of foxes on biodiversity in Australia and its territories by protecting affected native species and ecological communities, and preventing further species and ecological communities from becoming threatened. The specific objectives and action items to achieve this are as follows:

(a) Prevent foxes occupying new areas in Australia and eradicate foxes from high-conservation-value 'islands' by:

(i) collating data on offshore islands and isolated mainland 'islands', assess their conservation value, the likelihood of significant biodiversity impacts from foxes and, if there are no foxes present, rank the level of risk of foxes being introduced and establishing populations

(ii) developing management plans to prevent, monitor and, if incursions occur, contain and eradicate any fox incursion, for 'islands' with high conservation values

(iii) implementing management plans for high-conservation-value 'islands', including prevention and monitoring actions, and containment or eradication actions if incursions occur

(iv) eradicating established populations of foxes from 'islands' with high conservation values (including Tasmania) where this is cost-effective, feasible and a conservation priority.

(b) Promote maintenance and recovery of threatened species and ecological communities that are affected by fox predation by

(i) identifying priority areas for fox control based on:

(1) the significance of the population of the affected native species or of the ecological community

(2) the degree of threat posed by foxes to species and ecological communities relative to other threats

(3) the cost-effectiveness of maintaining fox populations below an identified 'damage threshold' in the region, and

(4) the feasibility of effective remedial action

(ii) conducting and monitoring regional fox control, through new or existing programs, in priority areas identified in Action 2.1

(iii) applying incentives (other than bounties), partnerships and negotiated agreements to promote and maintain on-ground fox control on private or leasehold lands within or adjacent to priority sites identified in Action 2.1.

(c) Improve knowledge and understanding of fox impacts and interactions with other species and ecological processes by:

(i) developing simple and cost-effective methods for monitoring populations of foxes and the impacts of foxes, including reliable methods for monitoring foxes and key native species at different densities, including very low densities

(ii) investigating interactions between foxes and native carnivores to identify the significance of competition and predation by foxes to these native species

(iii) determining the nature of interactions between foxes, feral cats, wild dogs and rabbits to effectively integrate fox control activities for all four species

(iv) Identifying any unintended effects that fox control may have if conducted in isolation from other management activities

(v) developing means for estimating the environmental and other associated costs of impacts arising from foxes.

(d) Improve the effectiveness, target specificity, integration and humaneness of control options for foxes by:

(i) conducting research and extension to improve the effectiveness, target specificity and humaneness of existing toxin-bait media and baiting methods

(ii) conducting further work on the development of new, or improvements to existing, control techniques

(iii) testing and disseminating information on exclusion fence designs and other control methods regarding their cost-effectiveness for particular habitats or topography

(iv) investigating the feasibility of control techniques to target foxes, but not dingoes, in some areas

(v) developing training programs to help land managers identify locally appropriate control method(s) and when (i.e. circumstances and times) to apply them in controlling foxes

(vi) ensuring that habitat rehabilitation and management of potential prey, competitors and predators of foxes are considered in fox control programs

(vii) continuing to promote the adoption and adaptation of the model codes of practice and standard operating procedures for humane management of foxes.

(e) Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage foxes by:

(i) promoting:

(1) broad understanding of the threat to biodiversity posed by foxes and support for their control

(2) support for the actions to be undertaken under this plan

(3) the use of humane and cost-effective fox control methods

(4) best-practice effective fox control in all tenures

(5) understanding of predation by foxes as a key threatening process.

Part D Threat abatement plan for competition and land degradation by rabbits

The goal of the rabbit TAP is to minimise the impact of rabbit competition and land degradation on biodiversity in Australia and its territories by protecting affected native species, broadscale vegetation and ecological communities, and preventing further species and ecological communities from becoming threatened.

To achieve this goal, the plan has five main objectives ad a set of actions, which, when implemented, will help to achieve the goal of the plan. They are as follows:

(a) Prevent rabbits from occupying new areas in Australia and eradicate rabbits from high-conservation-value 'islands' by:
    (i) collating data on all islands and on isolated mainland 'islands', assess their conservation value, the likelihood of significant biodiversity impacts from rabbits and, if there are no rabbits present, rank the level of risk of rabbits being introduced and establishing populations
    (ii) developing management plans to prevent, monitor and, if incursions occur, contain and eradicate any rabbit incursion, for 'islands' with high conservation values and into potential new habitats with high conservation values
    (iii) implementing management plans for high-conservation-value 'islands', including prevention and monitoring actions, and containment or eradication actions if incursions occur
    (iv) eradicating established populations of rabbits from 'islands' with high conservation values where this is cost-effective, feasible and a high conservation priority.

(b) Promote the maintenance and recovery of native species and ecological communities that are affected by rabbit competition and land degradation by:
    (i) identifying priority areas for rabbit control based on:
        (1) the significance of the regional population of the affected native species or of the ecological community
        (2) the degree of threat posed by rabbits to species and ecological communities relative to other threats
        (3) the cost-effectiveness of maintaining rabbit populations below an identified 'damage threshold' in the region
        (4) the feasibility of effective remedial action, and
        (5) the possibility of eradicating the rabbit population.
    (ii) conducting and monitoring regional rabbit control, through new or existing programs, in priority areas identified in action (b)(i)
    (iii) applying existing and new incentives to promote and maintain on-ground rabbit control on private or leasehold lands within or adjacent to priority sites identified in action (b)(i).

(c) Improve knowledge and understanding of rabbit impacts and interactions with other species and other ecological processes by:
    (i) developing simple and cost-effective methods for monitoring rabbit populations and the impacts of rabbits relative to other kinds of impact
    (ii) identifying the importance of rabbits for maintaining feral cat, fox and wild dog numbers, and the potential effects of the removal of predators, so that control of these species can be integrated to minimise risks to native species
    (iii) identifying any unintended effects that rabbit control may have if conducted in isolation from other management activities.

(d) Improve the effectiveness, target specificity, integration and humaneness of control options for rabbits by:
    (i) enhanceing current methods for poisoning, warren ripping and warren fumigation to ensure they are effective, target specific and humane, and develop alternatives as required
    (ii) developing programs to help land managers adopt locally appropriate control methods, including a process to prioritise warren ripping areas in the rangelands
    (iii) conducting research to maximise the effectiveness of existing biocontrols, and investigate new biocontrols
    (iv) continuing to promote the adoption of the model codes of practice and standard operating procedures for effective and humane management of rabbits.

(e) Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage rabbits by:

(i) Promoting:

(1) broad understanding of the threat to biodiversity posed by rabbits and support for their control

(2) support for the actions to be undertaken under this plan

(3) the use of humane and cost-effective rabbit control methods

(4) best-practice effective rabbit control in all tenures

(5) understanding of competition and land degradation by rabbits as a key threatening process.

Part E Threat abatement plan for reduction in impacts of tramp ants on biodiversity in Australia and its territories

The goal of this threat abatement plan is to minimise the impact of invasive tramp ants on biodiversity in Australia and its territories by protecting threatened native species and ecological communities and preventing further species and ecological communities from becoming threatened.

The six objectives and associated recovery actions in order to achieve this goal are as follows:

(a) Increase science-based knowledge and expertise, incorporate Indigenous traditional ecological knowledge, quantify impacts, and improve access to information for priority tramp ant species by:

(i) increasing science-based knowledge, innovation, and expertise for management of tramp ants in Australia and its territories

(ii) incorporating Indigenous traditional ecological knowledge into tramp ant management

(iii) assessing tramp ant impacts in Australia and its territories

(iv) creating a central repository or linked network for knowledge relevant to the management of tramp ants.

(b) Prevent entry and spread of tramp ants by increasing diagnostic capacity, offshore surveillance, inspection, treatment, and national and state and territory surveillance by:

(i) improving diagnostic capacity and service

(ii) improving offshore surveillance, inspection, and treatment

(iii) enhancing national and state/territory surveillance.

(c) Prepare for rapid response to tramp ant incursions and spread through risk assessment of tramp ant species and pathways of introduction, and development of contingency plans by:

(i) producing risk assessments for tramp ants, pathways, and regions and habitats susceptible to invasion and impact

(ii) developing generic, specific, and context-dependent contingency plans.

(d) Enhance emergency response to tramp ant incursions by improving reporting and response rates, and by developing tools for response and follow-up by:

(i) Improving reporting of new detections of tramp ants

(ii) Accelerating response to new detections of tramp ants

(iii) Developing effective control/delivery technologies and efficient monitoring/ surveillance protocols.

(e) Build stewardship by engaging, educating, and informing the Australian community about the impacts of invasive tramp ants and effective means of response by:

(i) building stewardship by engaging, educating, and informing all sectors of the Australian community about tramp ants and their impacts.

(f) Coordinate Australian Government, state and territory government, and local management activities in Australia and the region by:

(i) coordinate Australian Government, State, Territory, and local management activities for tramp ants in Australia

(ii) cooperation through bilateral agreements and partnerships within Australia's region.

Part F Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads

The goal of the cane toad TAP is to address the key threatening process (lethal toxic ingestion) of this species on native fauna in a feasible, effective and efficient manner. The three main objectives and associated recovery actions in order to achieve this goal are as follows:

(a) Identifying priority native species and ecological communities at risk from the impact of cane toads by:

(i) identifying native species, ecological communities and off-shore islands currently known to be at high to moderate risk

(ii) Iientifying the ways in which cane toads impact the native species and ecological communities listed in (a)(i)

(iii) establishing and supporting research where impacts are unknown but may be high, to further understand the impact of cane toads on the native species and ecological communities. Where appropriate, research ways to assist with the recovery of priority native species and ecological communities

(iv) developing a prioritisation tool to guide allocation of resources for protection of native species and communities. Apply it to native species and ecological communities identified: first from (a)(i), then from (a)(iii)

(b) Reducing the impact of cane toads on populations of priority native species and ecological communities by:

(i) focusing the management of cane toad impacts by Australian Government agencies on designated high priority native species and ecological communities, and seek cooperative action on priorities by jurisdictions and other stakeholders

(ii) implementing and monitoring emergency management of cane toad impacts for known high priority native species and ecological communities using currently available tools and techniques (e.g. trapping, fencing of small areas, manual removal from designated sites)

(iii) implementing or adjusting the management of cane toad impacts using available tools and techniques as new species and communities are added to the list of priority native species and ecological communities. Additional tools and techniques will become available with the registration of toxins for euthanasia of captured toads and development of other impact management or cane toad control techniques. Codes of practice and standard operating procedures for cane toad control will provide guidance on these techniques

(iv) preparing guidelines, including codes of practice and standard operating procedures that can be applied to both emergency responses and on-going management for high priority native species and ecological communities for endorsement by the VPC

(v) preparing and implementing management plans, (including identifying and addressing gaps in management techniques and tools) for designated high priority species and ecological communities on land managed by Australian Government agencies

(vi) providing the guidelines for emergency and on-going cane toad management to all stakeholders. Liaising with responsible jurisdictions/agencies to encourage the preparation and implementation of such plans in their areas of responsibility. Where mutual obligations exist the Australian Government will work cooperatively to prepare such plans

(vii) monitoring the development and implementation of guidelines and cane toad management plans for designated high priority species and ecological communities

(viii) monitoring the literature about the spread and impact of the cane toad and review/amend guidelines and develop new management plans as required

(ix) establishing guidelines for humane management actions to control cane toads for VPC and Animal Welfare Committee endorsement

(x) distributing guidelines to all Australian Government agencies with land management responsibilities

(xi) seek cooperative adoption of guidelines by states/territories including incorporation in state based regulations as appropriate.

(c) Communicating information about cane toads, their impacts and the TAP by:

(i) implementing a one-stop-shop webpage on the Department of Environment website with links to jurisdictional and stakeholder information on cane toads and including information on:

(1) the threat cane toads pose to biodiversity

(2) management actions to limit this threat

(3) guidelines for cane toad management

(4) information to help identify cane toads from other amphibians

(5) codes of practice and standard operating procedures

(6) management plans (as they are developed) for areas designated as high priority.

(ii) encouraging monitoring, evaluation and reporting on cane toad management actions is maintained and communicated to stakeholders

(iii) ensuring Australian Government fact sheets and other communications material on cane toads are current and reflect the strategy developed in this TAP.

Part G Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses

This national TAP has been developed to address the key threatening process (KTP) 'Ecosystem degradation, habitat loss and species decline due to invasion of northern Australia by introduced gamba grass (*Andropogon gayanus*), para grass (*Urochloa mutica*), olive hymenachne (*Hymenachne amplexicaulis*), mission grass (*Pennisetum polystachion*) and annual mission grass (*Pennisetum pedicellatum*)'. This TAP is considered to be a feasible, effective and efficient approach to abating the threat to Australia's biodiversity from the five listed grasses spreading across northern Australia.

The overarching goal of this TAP is to minimise the adverse impacts of the five listed grasses on affected native species and ecological communities. The six specific objectives and associated action items to achieve this goal are as follows:

(a) Develop an understanding of the extent and spread pathways of infestation by the five listed grasses by:

(i) undertaking mapping of the five listed grasses at a scale that allows for appropriate planning and an adaptive management approach

(ii) developing a better understanding of spread pathways.

(b) Support and facilitate coordinated management strategies through the design of tools, systems and guidelines by:

(i) encouraging complementary weed status for the five listed grasses across all jurisdictions to which the TAP applies to raise the profile of the problem, allow enforcement of management actions and help address border control issues

(ii) developing best-practice guidelines for use and/or management of the five listed grasses in agricultural and conservation contexts, and encourage their implementation to help minimise their adverse impacts

(iii) developing and implementing effective hygiene protocols, focusing on high-priority spread pathways, with increased stakeholder awareness and understanding of weed spread issues and spread-prevention techniques, including the importance of hygiene

(iv) further developing prioritisation tools to identify high-priority areas for monitoring and management actions to deliver the greatest benefits to biodiversity

(v) including strategic management of the five listed grasses in management plans for all affected land tenures, giving priority to identified key assets and encouraging land managers to address the control of these grasses in relevant management plans to contain existing infestations

(vi) improving and promote understanding of invasive grass control and land rehabilitation methods to maximise native vegetation restoration and minimise site damage

(vii) facilitating collaborative applied research that can be used to inform or support improved management of the five listed grasses.

(c) Identify and prioritise key assets and areas for strategic management by:

(i) identifying key assets for priority protection so that resources can be focused strategically to gain maximum benefit

(ii) identifying areas at risk of invasion, prioritise for monitoring and determine appropriate management actions preventing spread into these 'clean' areas.

(d) Build capacity and raise awareness among stakeholders by:

(i) developing and delivering communication strategies to raise awareness of the threats posed by the five listed grasses targeting groups, including:

(1) Indigenous communities

(2) pastoralists

(3) conservation agencies

(4) the general public

(5) relevant state and territory agencies.

(ii) better assisting the capacity of Indigenous people to participate in the management of the five listed grasses.

(e) Implement coordinated, cost-effective on-ground management strategies in high-priority areas by:

(i) fostering a coordinated partnership approach to the management of the five listed grasses. Facilitate information sharing and encourage coordination of the implementation of management and monitoring actions across all land tenures to maximise the efficiency and effectiveness of management programs

(ii) where feasible, implementing immediate management actions in high-priority areas around key assets and spread pathways

(iii) where feasible, implementing management actions in other infested areas to reduce the area and/or density of occupancy of the five listed grasses

(iv) where feasible, applying land rehabilitation methods to high-priority areas as they are cleared of the five listed grasses with restoration allowing for the return or protection of values such as ecosystem function, biodiversity, Indigenous heritage and amenity

(v) liaising with land managers of areas containing key assets to identify resources available for the implementation of priority actions.

(f) Monitor, evaluate and report on the effectiveness of management programs by

(i) ensuring that management plans for high-priority areas include recognition of the asset being protected as well as appropriate monitoring of managed sites. Encourage monitoring to enable the effectiveness of actions to be determined

(ii) reporting on progress and effectiveness of management programs against their goals.

Acronyms and abbreviations

Acronym	Definition
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AEIS	Additional information to the environmental impact statement
AEP	annual exceedence probability
AHD	Australian Height Datum
ALCAM	Australian Level Crossing Assessment Model
ANZECC	Australian and New Zealand Environment Conservation Council
AS/NZS	Australian Standard/New Zealand Standard
BOP	Biodiversity Offsets Plan
BRC	Barcaldine Regional Council
BTF	Black-throated finch
CAMBA	China-Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
CHPP	coal handling and processing plant
COAG	Council of Australian Governments
dB	decibels
DE	Department of the Environment
DEHP	Department of Environment and Heritage Protection
DIDO	drive-in, drive-out
DNRM	Department of Natural Resources and Mines
DSDIP	Department of State Development, Infrastructure and Planning
DTMR	Department of Transport and Main Roads (Qld)
EA	environmental authority
ESD	ecologically sustainable development
EIS	environmental impact statement
EM Plan	environmental management plan
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPP (Air)	Environmental Protection (Air) Policy 2008
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity
FIFO	fly-in, fly-out
GAB	Great Artesian Basin
GARID	DTMR's *Guidelines for Assessment of Road Impacts of Development*
GDEs	groundwater dependent ecosystems
GHB	general head boundary
GHG	greenhouse gas

Acronym	Definition
GMMP	Groundwater Management and Monitoring Plan
GQAL	good quality agricultural land
ha	hectares
HQH	high quality habitat
IAS	initial advice statement
ICH	Indigenous cultural heritage
IESC	Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development
IIESC	Interim Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development
JAMBA	Japan–Australia Migratory Bird Agreement
km	kilometres
m	metres
MCU	material change of use
ML	megalitres
MLA	mining lease application
MNES	matters of national environmental significance
MR Act	*Mineral Resources Act 1989* (Qld)
MRL	Mandatory reporting level
MWMS	Mine–site Water Management System
mtpa	million tonnes per annum
NAF	non-acid forming
NC Act	*Nature Conservation Act 1992* (Qld)
NGER Act	*National Greenhouse and Energy Reporting Act 2007* (Cwlth)
NICH	non-indigenous cultural heritage
NPA	National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development
NT Act	*Native Title Act 1993*
pa	per annum
PAF	potentially-acid forming
PM_{10}	particulate matter with equivalent aerodynamic diameter less than 10μm
$PM_{2.5}$	particulate matter with equivalent aerodynamic diameter less than 2.5μm
PMF	probable maximum flood
RE	regional ecosystem
RIA	road impact assessment
RMP	road-use management plan
ROM	run-of-mine
RPI Act	*Regional Planning Interests Act 2014*
RWBM	regional water balance model
SARA	State Assessment and Referral Agency

Acronym	Definition
SCR	state-controlled roads
SDA	state development area
SEWPaC	the former Department of Sustainability, Environment, Water, Population and Communities
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SDWPO Regulation	State Development and Public Works Organisation Regulation (Qld)
SGCP	South Galilee Coal Project
SIA	Social Impact Assessment
SP Act	*Sustainable Planning Act 2009* (Qld)
SPP	state planning policy
TAP	threat abatement plan
TECs	threatened ecological communities
TI Act	*Transport Infrastructure Act 1994*
TOR	terms of reference
TSMP	Threatened Species Management Plan
TSP	total suspended particles
WMP	water management plan
WPAMP	Weed and Pest Animal Management Plan

Glossary

Term	Definition
aquitard	A geological layer of non-porous rock or clay that restricts the flow of groundwater from one aquifer to another.
assessment manager	For an application for a development approval, means the assessment manager under the *Sustainable Planning Act 2009* (Qld).
bilateral agreement	The agreement between the Australian and Queensland governments that accredits the State of Queensland's EIS process. It allows the Commonwealth Minister for the Environment to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).
controlling provision	The matters of national environmental significance, under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), that the proposed action may have a significant impact on.
coordinated project	A project declared as a 'coordinated project' under section 26 of the SDPWO Act. Formerly referred to as 'significant projects'.
Coordinator-General	The corporation sole constituted under section 8A of the *State Development and Public Works Organisation Act 1938* and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
environment	As defined in Schedule 2 of the SDPWO Act, includes: a) ecosystems and their constituent parts, including people and communities b) all natural and physical resources c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).
environmental effects	Defined in Schedule 2 of the SDPWO Act as the effects of development on the environment, whether beneficial or detrimental.

environmentally relevant activity (ERA)	An activity that has the potential to release contaminants into the environment. Environmentally relevant activities are defined in Part 3, section 18 of the *Environmental Protection Act 1994* (Qld).
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for the condition.
initial advice statement (IAS)	A scoping document, prepared by a proponent, that the Coordinator-General considers in declaring a coordinated project under Part 4 of the SDPWO Act. An IAS provides information about: • the proposed development • the current environment in the vicinity of the proposed project location • the anticipated effects of the proposed development on the existing environment • possible measures to mitigate adverse effects.
matters of national environmental significance	The matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999*. The nine matters are: • world heritage properties • national heritage places • wetlands of international importance (listed under the Ramsar Convention) • listed threatened species and ecological communities • migratory species protected under international agreements • Commonwealth marine areas • the Great Barrier Reef Marine Park • nuclear actions (including uranium mines) • a water resource, in relation to coal seam gas development and large coal mining development.
properly made submission (for an EIS or a proposed change to a project)	Defined under section 24 of the SDPWO Act as a submission that: • is made to the Coordinator-General in writing • is received on or before the last day of the submission period • is signed by each person who made the submission • states the name and address of each person who made the submission • states the grounds of the submission and the facts and circumstances relied on in support of the grounds.
proponent	The entity or person who proposes a coordinated project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.
Significant project	A project declared (prior to 21 December 2012) as a 'significant project' under section 26 of the SDPWO Act. Projects declared after 21 December 2012 are referred to as ‘coordinated projects’.

stated condition	Conditions stated (but not enforced by) the Coordinator-General under sections 39, 45, 47C, 49, 49B and 49E of the SDPWO Act. The Coordinator-General may state conditions that must be attached to a: • development aptproval under the *Sustainable Planning Act 2009* • proposed mining lease under the *Mineral Resources Act 1989* • draft environmental authority (mining lease) under Chapter 5 of the *Environmental Protection Act 1994* (EPA) • proposed petroleum lease, pipeline licence or petroleum facility licence under the *Petroleum and Gas (Production and Safety) Act 2004* • non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EPA.
works	Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that: a) the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body is or may be authorised under any Act to undertake, or b) is or has been (before or after the date of commencement of this Act) undertaken by the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body under any Act, or c) is included or is proposed to be included by the Coordinator-General as works in a program of works, or that is classified by the holder of the office of Coordinator-General as works.

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