

Galilee Coal Project (Northern Export Facility)

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

August 2013

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Synopsis

The Galilee Coal Project (Northern Export Facility) Initial Advice Statement (IAS) defined the project as a new coal mine located near Alpha in the Galilee Basin of Central Queensland, a rail line between the mine and the Port of Abbot Point and new port facilities.

Subsequently, the proponent restricted the project and its environmental impact assessment to the mine and rail components. The project will be referred to by its gazetted title the Galilee Coal Project (GC project) in this Coordinator-General's evaluation report.

This report evaluates the project as assessed in the environmental impact statement (EIS) which involves:

- (a) a new coal mine with associated infrastructure located 30 kilometres (km) north of Alpha in the Galilee Basin, Central Queensland
- (b) a standard gauge rail link, assessed to 400 million tonnes per annum (Mtpa) capacity, from the mine to where it intersects the boundary of the Abbot Point State Development Area (APSDA).

The project is being developed by Waratah Coal Pty Ltd (the proponent), a privately owned Australian coal exploration and coal development company.

A Coordinator-General's report is an essential step in a coordinated project's assessment and approval chain and is fundamental to whether a project proceeds or not. It represents the conclusion of a whole-of-government assessment.

This report evaluates the EIS and environmental effects and social impacts of the GC project and sets conditions and makes recommendations that must be implemented in subsequent development approvals and licences. It has been prepared in accordance with section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act).

The Commonwealth is separately assessing the project by way of a parallel process.

The following provides an overview of the key issues arising from the EIS assessment together with conditions and recommendations that I have made to manage impacts.

Groundwater impacts

The GC project mine site is situated within the Galilee Basin, a geological basin in central Queensland located west of the Bowen Basin and immediately east of part of the Great Artesian Basin (GAB). The intake beds (aquifers) of the GAB in Queensland, form a continuous arc 50–100 km wide stretching from east of Goondiwindi through to the top of Cape York. Only the basal GAB formations are present within the mine site region. The Dunda Beds and Rewan Formation overlie the Permian coal measures that Waratah proposes to mine. The Rewan Formation is generally recognised as a regional aquitard that hydrogeologically separates the overlying GAB aquifers from the underlying Permian coal measures. The Clematis Sandstone is the key GAB aquifer closest to the GC project mine site that lies to the west of the mining lease area. Registered springs exist 30–40 km to the west of the GAB boundary within the

recharge zone and also to the west of the recharge zone in the Barcaldine Spring Complex.

The proponent has undertaken geophysical surveys, conducted existing user bore surveys, installed a network of monitoring bores and undertaken aquifer testing, stygofauna and water quality sampling. An 11-layer predictive transient numerical model that also models the fracture zone above the project's four underground mines was developed to assess the impact of the mine on the groundwater regime. A cumulative impact assessment was also conducted, having regard to the GC project combined with the Kevin's Corner and Alpha Projects to the immediate north and the South Galilee Project to the immediate south.

The assessment found that the regional groundwater cone of depression resulting from mining could extend from 12 km to 30 km from the mine and could adversely impact existing groundwater users within this area. No significant impact to GAB aquifers and associated springs is anticipated because of the presence of an effective aquitard in the Rewan Formation.

I have received conflicting advice from the Commonwealth Independent Expert Scientific Committee (IESC) and the Department of Natural Resources and Mines (DNRM) as to the likely integrity of the Rewan Formation to act as a regional aquitard because of possible faulting. DNRM, Waratah and other Galilee project proponents have all concluded from their individual groundwater assessments that the Rewan Formation does act as an aquitard in the lower Galilee Basin region. The IESC, in its advice to me, offers a different opinion. DNRM has indicated that there is no evidence of major structural faulting within the region of the mine site and minor faulting exists in only isolated locations. DNRM considers that the modelling work undertaken by the proponent is adequate to determine potential impacts and risks from mining operations. A sensitivity analysis conducted for the supplementary EIS (SEIS), where the Rewan vertical permeability was increased by two orders of magnitude, also showed no significant impact on GAB aquifers.

Having regard to all the information and advice provided to me, I believe it reasonable to conclude that the Rewan Formation will act as an effective aquitard and that mine dewatering will not significantly impact on the GAB aquifers and associated springs in the GAB intake beds and those in the Barcaldine Springs Complex.

However, I am mindful of the views of the IESC, and have adopted a precautionary approach by recommending to DNRM that additional monitoring of the Clematis Sandstone/Dunda Beds/Rewan Formation interface be undertaken by the proponent before and during mining operations and that appropriate trigger levels be set by DNRM for management actions should there be unexplained or unexpected changes to water levels and/or water quality in the Clematis Sandstone aquifer.

The IESC also raised concerns over the long-term impacts of possible multiple mining developments along a possible 300 km front adjacent to the GAB intake beds. The committee believes that a regional groundwater model should be developed and that approval conditions similar to those imposed for the Alpha Project should be imposed on the GC project to participate in and contribute to a regional groundwater monitoring and reporting program. I have recommended to DNRM that its existing work in this

area be expanded to develop a regional water balance model and that a regional groundwater and surface water monitoring program be implemented. Both of these initiatives will assist in future management of the State's water resources and are consistent with recommendations I have made for both the Alpha and Kevin's Corner projects. Since Alpha, I have approved the Kevin's Corner Project and my report for that project contains additional conditions similar to those in this report.

A number of existing groundwater user bores could be adversely affected by drawdown of the regional groundwater table, particularly those that have intake screens in deeper formations where depressurisation will be greatest. The Jericho and Alpha town water supply bores are not expected to be impacted by mining. Waratah has committed to enter into 'make good' arrangements with landowners in respect of impacted existing groundwater supplies and I have made a recommendation to DNRM that a condition of the water licence should require Waratah to conduct a thorough existing bore survey and to enter into 'make good' arrangements with landowners prior to mining activities commencing. This will ensure the mine does not impact on landowners' security of supply.

Railway line flooding

A number of submissions were received from landowners and community groups during the EIS public consultation stage concerned that the rail line could exacerbate flooding impacts, particularly for upstream landowners. These concerns centred on the increased extent of flood inundation through afflux, stock access to high ground during flooding, potential extended inundation times and changes in overland flow patterns that may adversely impact on property management.

The Waratah SEIS addressed these concerns by way of an assessment of impacts on existing flooding and drainage regimes and by proposing environmental design criteria for all cross drainage structures consistent with the Department of Transport and Main Roads (DTMR) *Road Drainage Design Manual*. Flood modelling was undertaken using the TUFLOW software package and preliminary designs undertaken for all major cross-drainage structures, with the design performance assessed against the environmental design criteria.

I recognise that the potential impact of the rail line on existing flooding and drainage regimes is a sensitive issue for land and infrastructure owners who could be affected. It is essential that the adopted environmental design criteria for cross drainage be 'best practice' and that landowners be consulted and agreement reached on mitigation actions to address flooding impacts prior to construction commencing.

In the absence of a nationally recognised drainage design guideline for railways, it is my view that the methodology outlined in DTMR's *Road Drainage Design Manual* be adopted for the Waratah rail line, adapted as necessary, to incorporate railway design best practice. I support the environmental design criteria proposed by Waratah in its SEIS but believe these should be reviewed, finalised and approved by the rail administering authority, particularly in relation to upper targets for afflux and inundation times. I have set a condition at Appendix 2 to reflect this requirement. The condition also sets targets for afflux, culvert exit velocity and inundation times consistent with my conditions for the Alpha Project.

I also require Waratah to consult with land and asset owners, including public agencies, in order for stakeholders to understand likely flooding impacts arising from proposed cross drainage designs and to aim to reach agreement with land and infrastructure owners on reasonable mitigation actions to address flooding impacts. I have further stipulated that a flood and drainage report, based on proposed final cross drainage designs that has regard to the views and agreements reached with land and asset owners, be submitted to the rail administering authority for approval prior to construction commencing. Should there be any dispute or failure to reach agreement, the Coordinator-General will be the final arbitrator on rail design and flood mitigation measures.

Bimblebox Nature Refuge

The 7912-hectare Glen Innes cattle property was purchased in 2000 by a group of people with financial assistance from the Commonwealth Natural Reserve System program. The property was purchased at a time when broad scale clearing in Queensland was a focus of public attention and the property, in part, had already been approved for clearing.

The property was gazetted a Nature Refuge under the Queensland *Nature Conservation Act 1992* (NC Act) in 2003 and allowed grazing to continue whilst protecting existing biodiversity values. These values were listed as intact native vegetation in excellent condition with high biodiversity values. Vegetation was listed predominantly as poplar box and silver-leaved ironbark woodlands with a wide variety of native grasses and fauna species.

Under the NC Act, a nature refuge is a lower order conservation tenure and a gazettal does not alter any existing or future rights to mineral or petroleum exploration and extraction on the land involved. At the time of gazettal of the Bimblebox Nature Refuge (BNR), the underlying coal resources were known but no coal exploration tenements had been issued.

The BNR will be significantly impacted by the GC project with approximately half of its area subject to direct clearing and open-cut mining and the balance largely underlain by underground mining and likely to be impacted by subsidence.

I am satisfied that Waratah has adequately assessed the environmental values of the BNR, identified impacts, proposed mitigation measures and committed to provide compensation for significant residual impacts by way of offsets. I am satisfied that project alternatives to avoid and minimise impacts to the BNR have been adequately considered. My conclusion is that the coal resource cannot be economically mined in this part of the Galilee Basin without access to the shallow coal seams underlining the BNR and that as a consequence of mining, the ecological integrity and conservation value of the BNR cannot be maintained.

I acknowledge the submissions throughout the EIS process drawing attention to the special or unique ecological, conservation and educational research values of the BNR. On the information before me, the value of the BNR lies not so much in the individual community, flora and fauna values, which in themselves are not considered of outstanding value nor are they unique, but in the sum of the parts as represented by a

relatively large tract of intact native vegetation, native fauna habitat and its educational and research value.

On balance, while I recognise the values of the BNR, I do not consider them sufficiently high or unique to find that the project should not proceed in the interest of saving the BNR. I do, however, recognise the loss that will result from disturbance of the BNR and require Waratah to compensate the State for the lost biodiversity, conservation and educational values by including in its offset proposal, a direct offset area of at least the size of the BNR and of equivalent or higher ecological value, capable of being secured as a nature refuge or higher conservation tenure. I am advised by DEHP that suitable offset sites of similar size and equal or better ecological value are available within the bioregion to replace the BNR. Waratah has committed to provide such an offset and I have imposed a condition to achieve this outcome, as part of my condition on offsets at Appendix 3, Part A, Schedule 1.

Impacts on the BNR could also trigger offsets in relation to Commonwealth matters of national environmental significance (MNES). To avoid overlaps and duplication, I will review the State's final requirements for BNR offsets after the Commonwealth has made its decision on the project. My minimum requirement is described above and in Appendix 3.

Rail impacts on Hancock/GVK mining tenements

Three options were considered at the EIS stage for the GC project rail alignment, either crossing or skirting around the Hancock/GVK Alpha and Kevin's Corner projects mining tenements. The options comprised the original IAS alignment (Option 1), an alignment 10 km to the east skirting around the tenements (Option 2) and an alignment in between, generally following the western boundary of adjacent grazing properties to the east (Option 3).

The EIS found that there was little difference between the options on purely environmental grounds but the Option 2 alignment could impact on two threatened ecological communities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Brigalow and Weeping Myall).

The Option 2 alignment is not supported by adjacent landowners on the eastern margin of the Hancock/GVK tenements whose properties would be bisected by the rail alignment. Concerns were expressed that the alignment would create management difficulties and could make grazing operations commercially untenable as well as impacting on safety. All potentially affected landowners prefer an alignment further west, closer to each property's western boundary (Option 3 alignment).

Acknowledging the unacceptability of the original IAS alignment (Option 1) and having regard to the negative feedback from landowners on the Option 2 alignment, Waratah adopted the Option 3 alignment for the SEIS as a compromise between the graziers' and Hancock's concerns. Waratah reports that the alignment traverses the western boundaries of the affected grazing properties and navigates clear of critical Hancock infrastructure.

In its submissions to me during the public review stage for the supplementary EIS (SEIS), Hancock/GVK raised concerns that the Option 3 alignment would have impacts on its planned mine infrastructure for both the Alpha and Kevin's Corner projects.

The State's Galilee Basin rail policy does not prohibit future approval and construction of the GC project rail (although it is not a preferred corridor at the present time), if the proponent can acquire all the necessary land. Should the GC project rail proceed to construction as either a stand-alone railway from the mine to Abbot Point or as a spur line from the GC project mine to the Hancock rail line or to another rail line, then a final decision will need to be made at that time on the appropriate rail alignment in the vicinity of the Hancock/GVK tenements.

Waratah has examined practicable alternatives for constructing its rail alignment either across or around the Hancock mining tenements and I acknowledge the potential competing objectives of minimising impacts to landowners, the environment and to future Hancock mining infrastructure. On balance, I conclude that the Option 3 alignment or a similar adjusted alignment provides the best outcome overall for the environment and landowners. However, having regard to the advice from Hancock/GVK and DNRM, I acknowledge, that the proposed alignment could have impacts on the Hancock/GVK mine infrastructure plans.

A final decision on the GC project rail alignment across/around the Hancock tenements should be made at a future time by the Coordinator-General when additional information is to hand and matters are more certain.

Social impacts

A social impact assessment (SIA) was completed for the project to assess the potential impacts arising from the project and the proponent's responses in relation to housing and accommodation, workforce management, health and community wellbeing, community and stakeholder engagement and local business and industry content.

The SIA identified potential adverse impacts relating to the:

- rising living costs associated with increases in house prices, rents and a range of goods and services
- labour market drain from other sectors into the mining industry
- increased demand on health and emergency services arising from population growth and increased traffic on highways and local roads
- heightened anxiety over the alignment of the railway line and the future direction of the local community and region as a result of mining activity
- decline in tourism due to the supply and high cost of temporary accommodation.

There were no key impacts identified that indicate the project should be delayed, postponed or re-structured due to potential social or local economic issues. The proponent has committed to a range of actions to enhance, avoid, mitigate and manage these and other impacts. Accordingly, I have imposed a condition for the proponent to report annually on the effectiveness of these actions during construction and for the first two years of operation at Appendix 3, Part A, Schedule 2.

The mine and rail components of the project's construction workforce are expected to peak at 3500 workers for the mine and rail components, and more than 2325 permanent employees and contractors will be required during the operational phase. The SIA found that the establishment of mining activity represents a significant change for local communities. However, the proponent's commitments to prioritising local employment, supporting the retention of workers in other industries, and providing local businesses with fair and reasonable opportunity to tender for project-related business should ensure that the project provides significant long term employment and training opportunities that support the diversification of the local economy.

Offsets

Waratah submitted a final offset proposal as part of additional supplementary information I requested. The proposal outlines:

- how the project has been designed and located to avoid and/or minimise the extent of clearing
- impacts of the project potentially requiring offsets, including impacts on the BNR
- an approach to offset delivery
- offset implementation, including landholder engagement, ecological equivalence assessments and development of offset area management plans.

Subject to my eventual decision on offsets, Waratah proposes offsets on a number of properties identified either wholly or partly as priority areas within the State's Galilee Basin Offset Strategy. A staged approach is proposed for offsetting impacts from underground mining because of the uncertainty of predicting future biodiversity impacts from subsidence. The proposal provides for upfront offsets for direct clearing associated with the mine and rail components and for the whole of the underground subsidence area for the first five years of underground mining. At the end of the first five years and at five-yearly intervals thereafter, field surveys of actual impacts would be conducted and future offset requirements reviewed and adjusted accordingly. As part of the offset proposal, Waratah has also committed to offset the loss of the conservation value of the BNR.

I acknowledge the assessment undertaken by Waratah to determine offset options and the comprehensive nature of the offset proposals. I note also that suitable land-based offset areas are available within priority areas identified within the Galilee Basin Offset Strategy for Waratah to acquit any identified offset obligations.

Waratah must now undertake relevant ecological equivalence assessment on the impacted sites and proposed offset sites as well as conclude offset arrangements with the Commonwealth on MNES. Once this work is completed, I will make my decision on the final state offset compensatory measures for the project. My decision will follow the Commonwealth's decision on the project and its determination of offsets to satisfy significant residual impacts on MNES.

I have imposed a condition at Appendix 3, Part A, Schedule 1 requiring Waratah to prepare a report for the Coordinator-General addressing the outcomes of the ecological equivalence assessments, Commonwealth offset obligations and a proposal for delivery of any additional state offsets to address any significant residual impacts.

Coordinator-General's conclusion

I consider that the environmental impact assessment requirements of the SDPWO Act for the GC project have been satisfactorily fulfilled and that sufficient information has been provided to enable a proper evaluation of the potential impacts of the project.

I conclude that there are significant local, regional, state and national economic benefits to be derived from the project, and that any negative environmental or social impacts can be acceptably managed by implementation of the measures and commitments outlined in the EIS documentation. Conditions and recommendations in this report have been formulated in order to further manage impacts through environmental authorities, development permits and Coordinator-General imposed conditions, or other policy, regulatory and licence arrangements.

Pursuant to section 35 of the SDPWO Act, I find that the GC project, as described in the EIS, SEIS and summarised in Section 2 of this report can proceed, subject to the conditions and recommendations contained herein and subject to Waratah obtaining subsequent statutory approvals and fully meeting its commitments listed in Appendix 5 of this report.



Barry Broe
Coordinator-General

8 August 2013

1. Introduction

This Coordinator-General's report evaluates the environmental impact statement (EIS) prepared by the proponent for the Galilee Coal Project (GC project).

The report assesses the key issues associated with the project's potential impacts on the physical, social and economic environment at the local, regional, state and national levels. It does not record all matters identified and addressed during the EIS process but concentrates on substantive environmental effects and related matters.

The report sets conditions that must be incorporated into subsequent approvals and licences required to be issued by various state authorities, including the Coordinator-General for some issues—for example, offsets. It also makes recommendations to state authorities for approval conditions in a number of other cases.

The report represents the conclusion of the Coordinator-General's impact assessment process pursuant to the *State Development and Public Works Organisation Act 1971* (SDPWO Act). For information on the EIS process, refer to Section 3 of this report.

2. About the project

2.1. The proponent

The proponent is Waratah Coal Pty Ltd (Waratah), a fully owned subsidiary of Mineralogy Pty Limited (Mineralogy). The project will be developed by China First Pty Ltd (China First) which has contractual rights with Waratah to develop the project and mine 1.4 billion tonnes of coal from tenements held by Waratah. China First is a fully owned subsidiary of Resourcehouse Limited, which in turn, is also held by Mineralogy.

Waratah holds a number of coal (EPC) and mineral (EPM) exploration tenements in Queensland and New South Wales with the bulk of these held in the Galilee Basin in Central Queensland. In total, the company has EPCs covering 21 561 square kilometres (km²) and EPC applications covering 3673 km².

2.2. Project description

2.2.1. Overview

The GC project assessed in this report comprises two key elements:

- (a) a new coal mine with associated infrastructure located 30 km north of Alpha in the Galilee Basin, Central Queensland
- (b) a standard gauge rail link between the mine and the Port of Abbot Point.

The EIS submitted to me for assessment addresses the mine and the rail components ending at the western boundary of the Abbot Point State Development Area (APSDA). My environmental evaluation of the GC project is restricted to these two components and is consistent with the proponent's expectation. Any future environmental assessment of the project's port component at Abbot Point (on-shore and offshore) will need to be undertaken by way of a separate process.

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

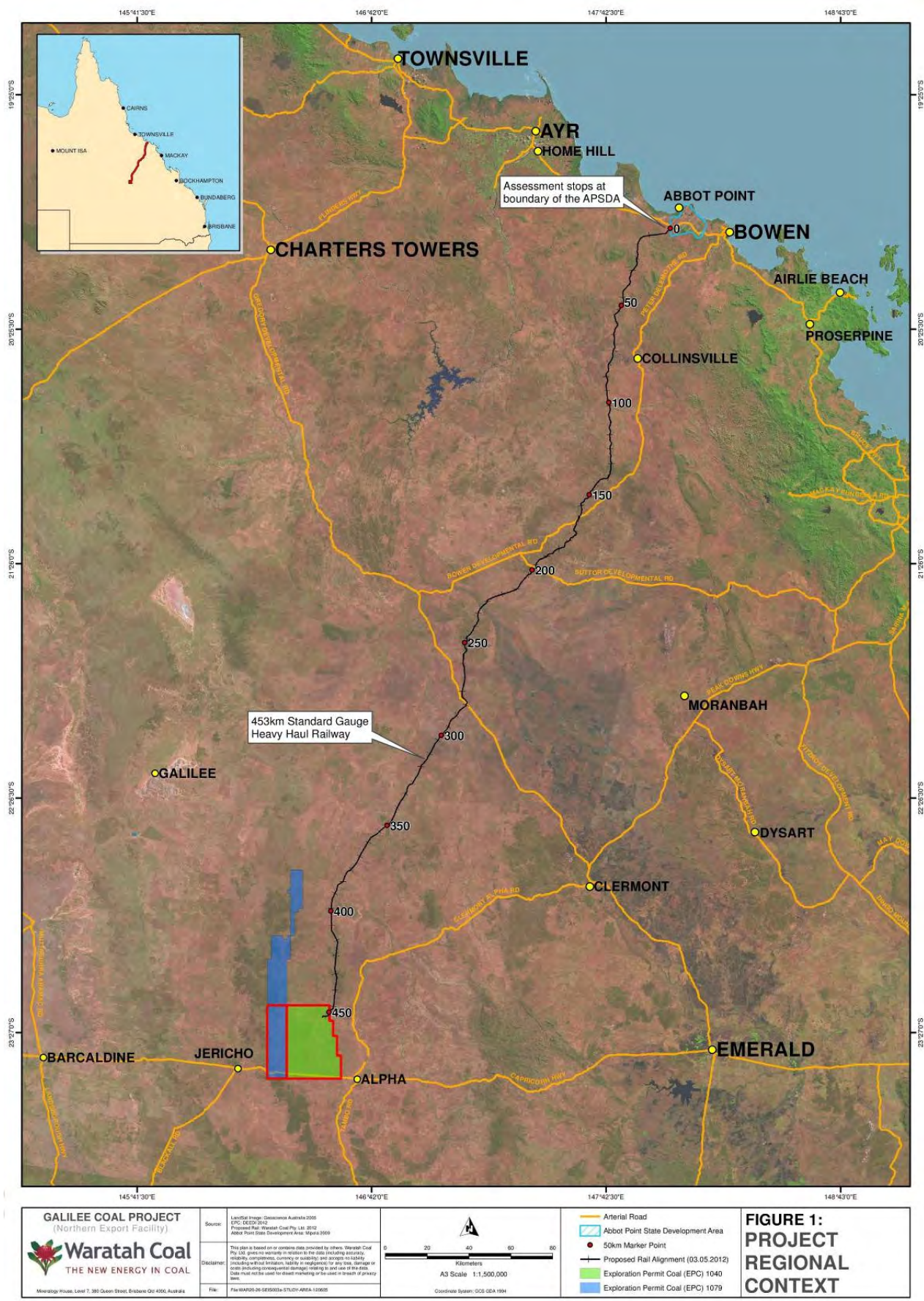


Figure 2.1. Project location and regional context

2.2.2. Components

Mine

Waratah proposes a new mine 30 km north of the township of Alpha in Central Queensland to mine 1.4 billion tonnes of raw coal from its existing tenements, EPC 1040 and part of EPC 1079. The company has applied for a mining lease (MLA 70454) which covers the bulk of these tenements.

The mine development will involve the mining of 20 million tonnes per annum (Mtpa) of coal from open-cut operations and 36 Mtpa from underground operations for a total run-of-mine (ROM) coal extraction of 56 Mtpa. Coal will be washed, with an overall product yield of 72 per cent producing 40 Mtpa of highly volatile, low sulphur, steaming coal for export. The mine layout is shown herein as Figure 2.2.

The proposed mine incorporates:

- open-cut mine 1 comprising two surface mining pits (north and south) mining the C and D seam resources producing 10 Mtpa in total
- open-cut mine 2 comprising two surface mining pits (north and south) mining the B seam producing 10 Mtpa in total
- longwall underground mines 1, 2, and 3 variously mining the C and D seam resources producing 27 Mtpa in total
- longwall underground mine 4, mining the B seam producing 9 Mtpa
- two coal preparation plants with a raw washing capacity of 28 Mtpa each
- two product coal stockpiles handling product coal to rail load-out facilities
- water management structures including raw water and environmental dams, creek diversions, levee banks/bunds, drainage channels and sediment traps
- tailings storage facilities and coarse spoil disposal areas integrated into the mine spoil pile areas
- a mine industrial area.

The surface mining method is to be a combination of walking draglines for overburden removal in conjunction with truck and shovel fleets for partings removal and coal recovery. An additional overburden removal system utilising large electric rope shovels loading onto overburden conveyors would also be used in conjunction with the draglines.

Underground mining will be undertaken by the longwall method involving seven-kilometre-long blocks with a 450-metre-wide longwall face. Extraction height of the longwall faces will vary from 1.8 m to 2.5 m depending on the constraints of seam geology.

The mine life is estimated at 25 to 30 years.

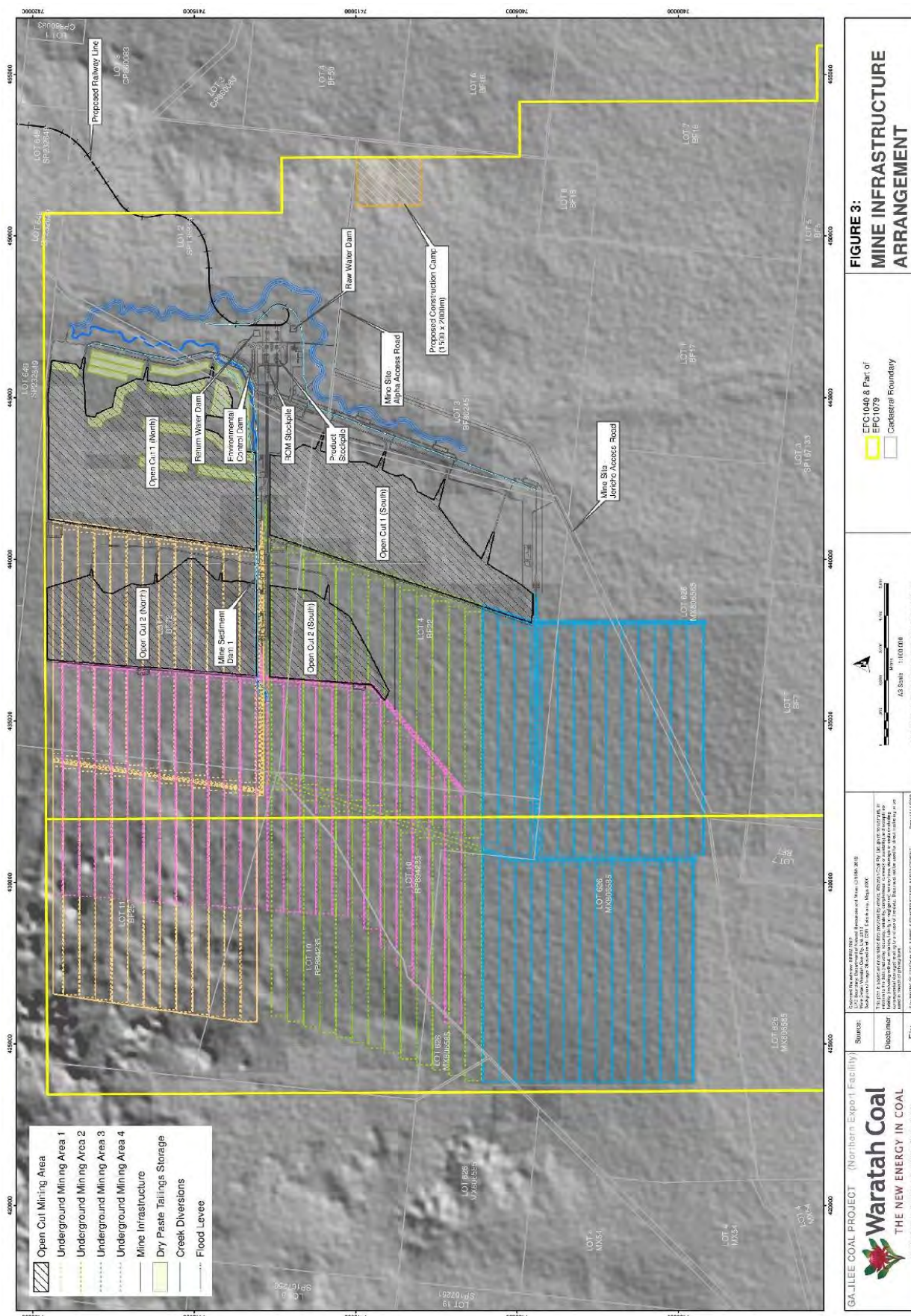


Figure 2.2. Mine layout

Rail

Processed coal would be transported by a new standard gauge railway system from the mine to the Port of Abbot Point. Waratah advises that the rail will initially be constructed to a capacity of 60 Mtpa on a single track with six passing loops and will be capable of being upgraded to dual track with an ultimate capacity of 400 Mtpa should there be support from other Galilee mine proponents to use the rail. The EIS has assessed rail impacts at the ultimate potential development level of 400 Mtpa.

In response to design issues and landowner considerations on the EIS, four minor adjustments to the alignment were made for the SEIS. Waratah has also settled on the Option 3 alignment of the three considered in the EIS, for the proposed alignment in the vicinity of proposed Alpha and Kevin's Corner project mine sites. This issue is considered in Section 6.3.3 of this report.

The final railway easement at the ultimate 400 Mtpa level is expected to be 50 m wide on average, but widths could exceed 150 m in isolated deep cuts. The easement includes the dual rail carriageway and a service road. Rail length from the mine to the western boundary of the APSDA is approximately 453 km.

A rail maintenance and provisioning facility is to be constructed on a site adjacent to the railway near the terminal end for refuelling and servicing of the locomotives, servicing of rolling stock and also to provide facilities for track and signalling workers.

Key design characteristics for the railway are outlined in Table 2.1.

Table 2.1. Key railway design parameters

Design speed	80 km/hr loaded, 100 km/hr unloaded
Nett tonnage per train	21,240 t (Standard Gauge)
Train length	3,200 m
Flood immunity	1 in 100 years (Q100)
Maximum grades	1 in 100 against loaded train, 1 in 80 against unloaded train
Signalling	Trains to be equipped with state of the art signalling technology with supervision of the drivers' actions by the safety system

Source: Based on Table 1, ch. 1, vol. 1. of EIS.

The proposed rail alignment traverses the Barcaldine, Isaac and Whitsunday Regional Council administrative areas.

Port facilities

At the time of declaration as a coordinated project, the Initial Advice Statement (IAS) nominated the then proposed multi-cargo facility (MCF) at the Port of Abbot Point as the preferred offshore export facility and also listed a stand-alone jetty as an

alternative in the event that the MCF did not proceed. Environmental assessment of the MCF was then under the control of the North Queensland Bulk Ports Corporation (NQBP).

In lodging its EIS in August 2011, Waratah reported a project change that involved dropping the stand-alone jetty option and committing solely to the MCF linked to another state initiative—a T4-7 multi-coal terminal also being managed by NQBP by way of a competitive tender process. Environmental assessment of both facilities was under direction of NQBP.

The T4-7 terminal and MCF proposals were subsequently not supported by the Queensland Government and in April 2012 were terminated by NQBP. Current port plans are for incremental smaller-scale expansion to meet emerging scalable port capacity demands, having regard to developers' capacity to secure infrastructure funding.

In early 2012, Waratah made an application for declaration of a new stand-alone jetty and coal terminal proposal as a coordinated project but this was not approved by the Coordinator-General. The proposal was also referred to the Australian Government and is being assessed as a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

For the purposes of this report, I have restricted my evaluation of the GC Project to the mine and rail components, which is consistent with the project as defined in the EIS and supplementary EIS (SEIS).

Ancillary infrastructure

A range of ancillary infrastructure will be required to support the operations of the GC project. This infrastructure includes:

- connections to the high voltage electricity distribution network
- raw water supply from external sources—if required
- specific location of workers accommodation facilities for the rail—to be determined when proponent's engineering, procurement and construction contractor is appointed
- fencing, roads and tracks
- telecommunications
- borrow pits and quarries—particularly for the rail component
- storage areas and depots.

The environmental impacts of ancillary infrastructure/services have generally either not been addressed or have been addressed in the EIS and SEIS at a strategic level only. Consequently, these impacts have not been evaluated in this report unless otherwise noted.

2.2.3. Development stages

Waratah has advised that the construction duration for each open-cut mine would be 18 months; each underground mine, 2 years; and the rail, 3 years. The proponent

believes that the whole project can be scheduled to reach initial commercial production of 5.5 Mtpa of export coal in three years following final approvals. Production would then be ramped up to reach an ultimate production of 40 Mtpa.

2.2.4. Dependencies and relationships with other projects

The GC project is one of six coal mining proposals in the Galilee Basin, that have been, or are currently the subject of environmental assessment by my office. I have completed assessments and released evaluation reports for two of these—the Alpha Coal Project (May 2012) and Kevin's Corner Coal Project (May 2013). The other projects are the South Galilee, Carmichael and China Stone projects. In addition, Aurizon Holdings has proposed a stand-alone rail project connecting Galilee coal projects to existing rail infrastructure.

Cumulative impacts of the GC project and other relevant Galilee Basin mine proposals have been addressed in the EIS and SEIS and are considered in this report at Section 7.6.

The GC project is not dependent on any of these mining projects; however a number of the proposals also include individual rail options. The Queensland Government's current Galilee Basin rail policy is for a single north–south rail corridor linking the central and southern Galilee Basin coal mines to the Port of Abbot Point. The policy therefore has implications for the GC project rail proposal. This matter is considered further in this report at Section 4.2 (State and local government approvals).

Waratah reports that the construction and operation of the GC project is dependent on a range of additional infrastructure and services. These additional facilities and services include the following that are currently, or may be, the subject of separate environmental approvals.

Galilee Basin Power Station

Galilee Power, a subsidiary of Waratah, proposes to construct and operate a 90-megawatt coal-fired power station that incorporates carbon capture and storage technologies. The power station is to be situated on the Waratah mining tenement immediately to the east of the proposed mine and will utilise waste coal from the coal preparation plant as power station feedstock. The project is a coordinated project under the SDPWO Act and terms of reference for an EIS were issued to the proponent in April 2013.

Galilee Basin Power Transmission Project

Electricity for mine construction and initial operation is proposed to be supplied by Powerlink Queensland to a substation near Surbiton Hill to service both the GC project and South Galilee Coal Project. Waratah sees this supply as a temporary supply, pending construction of the Galilee Basin Power Station. A 132-kilovolt feed line from the proposed substation to the northern boundary of the Waratah lease is also required. Waratah reports that applications for an unregulated electricity supply to both mines have been lodged with Powerlink by both proponents.

2.3. Project rationale

The GC 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 clearly announced its 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 could realise 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 revenues of \$4.6 billion per annum, or \$85 billion over the life of the project.

Commonwealth and state government revenue would also be increased through taxes and royalties of up \$360 million per annum (state) and \$700 million per annum (Commonwealth) respectively from the project.

The mine and rail components of the project could boost jobs growth in Central Queensland, creating approximately 3500 direct jobs during construction and 2325 permanent employees for the long-term operation of the mine, rail and port facilities. A flow-through benefit of an additional 70 000 indirect jobs is anticipated, with the majority of these expected to occur in Queensland. The project will also generate additional value to the regional economy as local suppliers, service providers and contractors participate in the project.

Waratah estimates the capital cost of the mine and rail at \$6.4 billion.

3. Impact assessment process

3.1. Overview

As outlined in Section 2.2 (Project description), this report evaluates the EIS, which covers the environmental impacts arising from the mine and rail components of the original project.

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

In undertaking this evaluation, I have considered the following:

- IAS
- EIS
- issues raised in submissions relating to the EIS
- supplementary information to the EIS (SEIS)
- technical reports
- advice from a range of government agencies
- comments and properly made submissions¹ from non-government organisations and members of the public.

Table 3.1 shows the steps taken in the project's EIS process.

¹ For a definition of a 'properly made submission', refer to the Glossary on page 265 of this report.

Table 3.1. Overview of EIS process

Date	Process
28 Oct 2008	Final IAS and request for project declaration received
28 Nov 2008	Project declared a coordinated project by Coordinator-General
20 Mar 2009	Australian Government determined project is a 'controlled action'
30 May 2009 to 29 Jun 2009	Submission period for draft terms of reference (TOR)
28 Aug 2009	TOR finalised
23 Aug 2011	Coordinator-General authorised extension of time for lodging EIS to 28 February 2012
31 Aug 2011	EIS lodged with Coordinator-General and Australian Government for evaluation
26 Sep 2011 to 7 Nov 2011	EIS released for public and agency comment (6-week period)
7 Nov 2011 to 19 Dec 2011	EIS public review period extended by 6 weeks
21 May 2012	Waratah advice lodged with the State on proposed responses to issues raised on the EIS
28 Jun 2012	Coordinator-General direction to Waratah for supplementary EIS (SEIS) work required for State
22 March 2013	SEIS provided to Coordinator-General for evaluation
8 April 2013	SEIS released for public information and agency review
6 May 2013	Advisory agency review period closes

3.2. Coordinated project declaration

On 28 November 2008, the Coordinator-General declared this project to be a significant project² under section 26(1)(a) of the Queensland *State Development and Public Works Organisation Act 1971* (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. Controlled action

On 20 March 2009, the delegate of the Commonwealth Minister for Environment, Heritage and the Arts determined that the project was a 'controlled action'³ under the EPBC Act (EPBC ref. 2009/4737).

² Following amendments to the SDPWO Act in December 2012, 'significant projects' are now referred to as 'coordinated projects'.

³ For a definition of 'controlled action', refer to the Glossary on page 265 of this report.

The relevant controlling provisions under the EPBC Act were listed as:

- section 12 and 15A—world heritage properties
- section 15B and 15C—national heritage places
- section 18 and 18A—listed threatened species and ecological communities
- section 20 and 20A—migratory species protected under international agreements
- section 23 and 24A—commonwealth marine areas.

The delegate also determined that the project should be assessed by way of an EIS under Part 8 of the EPBC Act in parallel with the State's assessment.

Each EIS process requires matters to be addressed for individual assessment by the Queensland and Australian governments and the project will require approval from both the Queensland and Australian governments before it can proceed.

This EIS evaluation report addresses matters of relevance to the State only and does not consider impacts to matters of national environmental significance (MNES). The Australian Government will separately assess impacts to MNES and will make a separate project approval decision. At the time of this report, Waratah had yet to lodge its final EIS addressing MNES with the Australian Government.

3.4. Terms of reference

Draft terms of reference (TOR) for the EIS were prepared and publically reviewed over a four-week period from 30 May 2009 to 29 June 2009. A total of 24 submissions were received, including 19 from advisory agencies and five from members of the public, conservation and other organisations.

The main issues raised in submissions related to:

- protection of sensitive environmental areas
- cumulative regional impacts
- coal dust and management measures
- groundwater
- social impacts
- impacts on existing landowners.

A final TOR was prepared having regard to submissions received and was issued to Waratah on 28 August 2009.

On 23 August 2011, the Coordinator-General granted an extension of time for Waratah to lodge its EIS until 28 February 2012, which otherwise would have lapsed on 28 August 2011—two years after the date the TOR was issued.

3.5. Review of the EIS

Waratah lodged its EIS on 31 August 2011 and it was approved for release by the Australian Government and by the Coordinator-General for a common public review period of six weeks from 26 September 2011 to 7 November 2011. The public review

process was managed by the office of the Coordinator-General on behalf of the Queensland and Australian governments and provided submitters with a single point for lodging submissions.

The public review period was subsequently extended for a further six weeks until 19 December 2011 when it was discovered late in the initial review period that some relevant material was not available for public access on the Waratah website. This situation was subsequently rectified for the extended review period.

A total of 325 submissions were received over the 12-week period, including 14 from government agencies, 39 from non-government organisations, 269 from individuals and three form letters containing a total of 1517 signatures. More than 90 per cent of submissions related to protecting the Bimblebox Nature Refuge (BNR) from mining.

Copies of all submissions were forwarded to Waratah, and to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) on behalf of the Australian Government, to allow SEWPaC to conduct its separate assessment of MNES under the EPBC Act.

In relation to the State's areas of responsibility, the substantive issues raised in submissions related to:

- impacts to groundwater including the Great Artesian Basin
- dust impacts and air quality
- protection of nature refuges from mining—the BNR in particular
- subsidence
- social impacts
- economic impacts on the manufacturing sector
- cumulative regional impacts.

Table 3.2 summarises the number of public and agency submissions on the EIS. For the Coordinator-General's assessment of the environmental impacts of this project, refer to sections 5, 6 and 7 of this report.

Table 3.2. Public and agency comments received on the EIS

Agency	No. submissions
Queensland Government	11
• Department of Communities • Department of Community Safety • Department of Employment, Economic Development and Innovation • Department of Environment and Resource Management • Department of Justice and Attorney General • Department of Local Government and Planning • Department of Transport and Main Roads • Queensland Health • Queensland Police Service • Queensland Treasury • Powerlink	
Local Government	3
• Barcaldine Regional Council • Isaac Regional Council • Whitsunday Regional Council	
Non-government organisations	35
Private individuals	272
Form letters	3 (1517 signatures)
TOTAL	324

3.6. Supplementary information

On 28 June 2012, I requested that Waratah submit supplementary information to the EIS (SEIS) to address the issues raised during the EIS public review period. Key areas where further information was requested included:

- Bimblebox Nature Refuge impacts
- flooding along the railway corridor
- clarifying economic impacts
- groundwater impacts—particularly to the GAB
- stream diversions
- subsidence impacts
- social impacts
- cumulative impacts.

Waratah submitted its SEIS on 22 March 2013, and it was released for public and advisory agency comment on 8 April 2013 for four weeks until 6 May 2013. Some 76 submissions were received including two form letters sponsored by the Bimblebox Nature Refuge website and submitted by 3921 supporters. A breakdown of submissions received on the SEIS is shown in Table 3.3.

Table 3.3. Public and agency comments received on the SEIS

Submitter	No.
Government agencies	14
Non-government organisations	14
Private	46
Form letters	2
TOTAL	76

Key issues raised in submissions included:

- Bimblebox Nature Refuge—objections to mining the refuge, loss of biodiversity (including the black-throated finch), difficult to offset
- social impacts
- offset proposal—further work required, particularly rail offset obligations, offset sites, Bimblebox Nature Refuge offset equivalence
- water—ongoing stability of creek diversions, need to refine the groundwater model
- rail—flooding impacts, loss of good quality agricultural land, impacts on stock routes
- cumulative impacts of Galilee Basin projects—particularly groundwater and ecological impacts
- economic impacts.

I have considered these submissions in preparing this evaluation report.

3.7. Advice from the Independent Expert Scientific Committee

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 Independent Expert Scientific Committee (IESC).

On 18 April 2013, I submitted to the IESC a request for advice on the GC project. The IESC considered the matter at its meeting of 21 May 2013 and its advice was provided to me on 30 May 2013.

I have considered key aspects of the IESC advice in Section 6.6 of this report (Water resources) and outlined my consolidated position on the full scope of matters raised in the IESC advice in Appendix 7.

4. Project approvals

4.1. General

On release of this evaluation report, Waratah will need to obtain a range of statutory approvals under State and Commonwealth law before the project can proceed to construction.

In regard to approvals under State law, I have stated conditions for managing environmental impacts on the mine site at Appendix 1 and set conditions for managing environmental impacts of the rail line off the mine site at Appendix 2. I have imposed other project conditions and made recommendations for other approvals at Appendix 3. Approving agencies may add further conditions to their approvals as provided under their governing legislation, but such additional conditions cannot be inconsistent with the conditions in this report.

4.2. State and local government approvals

4.2.1. Approval framework for mining projects

Key legislation governing mining development in Queensland includes:

Mineral Resources Act 1989

Waratah holds a number of mining tenements in the Galilee Basin. Before mining can commence, a mining lease must be granted by the Governor in Council pursuant to the *Mineral Resources Act 1989* (MRA).

Waratah has applied for a mining lease (MLA 70454) over parts of Exploration Coal Permit (EPC) 1040 and EPC 1079 held by the company as described in the EIS.

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) provides for control of environmentally relevant activities (ERAs) as defined under the EP Act and its regulations. Mining activities on a mining tenement are an ERA and environmental regulation is effected by way of an environmental authority (EA (mining activities)) under the EP Act. The EA (mining activities) also provides authority for other ERAs that occur on the mining lease.

Under section 49 of the SDPWO Act, the Coordinator-General may state conditions for the draft EA (mining activities). I have stated conditions for the draft EA (mining activities) for the GC project at Appendix 1.

Separate approval is required for any ERAs off the mining tenement.

Sustainable Planning Act 2009

The *Sustainable Planning Act 2009* (SPA) establishes the planning and development assessment system in the State and provides the Integrated Development Assessment System (IDAS) for development assessment and approval.

With few exceptions relating to heritage places and building approvals, SPA does not apply on a mining lease (Part 3, section 4A of the MRA). It does, however, apply to project development off the mining lease.

The GC project may require a range of development approvals off the mining tenement from local and state assessment managers that are initiated under SPA and lodged through the State Assessment and Referral Agency (SARA). Typically, these approvals relate to various elements of support infrastructure for mining projects such as water supply, power supply and accommodation camps. Development approval under SPA may also be required for the rail line off the mining tenement, depending on the final development approval mechanism chosen by the government—refer Section 4.2.2 below.

Under section 39 of the SDPWO Act, the Coordinator-General may state conditions for the assessment manager that must attach to a development approval under SPA. My conditions set for the rail off the mining lease in Appendix 2 are stated conditions under section 39 of the SDPWO Act (depending on the final development approval mechanism—refer Section 4.2.2 below).

Approvals under other legislation

Approvals may be required for project activities under other State legislation for components of the project that are not included in the EA (mining activities) or development approvals under SPA.

Under section 52 of the SDPWO Act, the Coordinator-General may recommend that the approval be refused or that stated conditions be imposed on the approval. I have made recommendations for conditions to be included for approvals under the *Water Act 2000* (Water Act) in Appendix 3, Part B, Schedule 1.

Approval conditions imposed under SDPWO Act

A project may have impacts requiring mitigation that cannot be appropriately stated as conditions in the EA (mining activities) or mining lease, or are not the subject of a development approval under SPA or any other statutory authority. Typical examples include social impacts and transport impacts.

Under section 54B of the SDPWO Act, the Coordinator-General may impose conditions on the project in such circumstances. I have imposed conditions on the GC project for social and traffic impacts at Appendix 3, Part A. In Appendix 4, I have nominated an appropriate entity to have jurisdiction for each imposed condition.

4.2.2. Approval framework for rail

Galilee Basin rail policy

In June 2012, the State Government announced a rail policy to guide and facilitate the orderly development of rail infrastructure to service the Galilee Coal Basin. The policy supports the development of a single north–south corridor to service mines in the southern Galilee Basin and a single east–west corridor to service mines in the central and northern Galilee Basin. The Hancock/GVK Alpha Project rail alignment was nominated as the preferred alignment for the north–south corridor and the Adani Carmichael Coal Project/Aurizon Central Queensland Rail Project rail alignment was nominated as the preferred alignment for the east–west corridor.

The Deputy Premier announced in Parliament on 4 June 2013 that the government would continue to encourage the consolidation of required infrastructure while recognising the need to support proposals that provide a ‘pit-to-port’ solution from proponents that have demonstrated financial capacity to commit to real development. Provided these proposals can be developed on a shared or multi-user basis and can demonstrate an ability to proceed to construction, the government has indicated a preparedness to support a ‘first mover advantage’ and assist in the acquisition of land for the corridors.

The GC project rail alignment is not a preferred alignment under the current policy and the government has given no commitment to assist with land acquisition. However, the government has not said it would prevent a proponent developing its own rail line if it could acquire all the necessary land and obtain all the necessary approvals.

Although mindful of the Galilee rail policy, I have conducted my environmental evaluation of the GC project in accordance with Part 4 of the SDPWO Act having regard to environmental matters relevant to the rail alignment proposed. The government policy on preferred corridors and proponent assistance with land acquisition are outside the scope of this EIS evaluation.

Approvals on mining tenement

For the portion of the rail line on the mining tenement, approvals and environmental management will be dealt with by conditions under the EA (mining activities).

In accordance with section 49 of the SDPWO Act, I have stated conditions for the draft EA (mining activities) as listed in Appendix 1.

Approvals off the mining tenement

There are a number of development approval mechanisms that could possibly be employed for the railway off the mining tenement. For this report, I have assumed the rail would be approved under the State’s transport regulations and I have nominated DTMR as the rail administering authority. Accordingly, to ensure proper environmental management of the railway, I have made recommendations for conditions to the rail administering authority in accordance with section 52 of the SDPWO Act at Appendix 2:

4.3. Commonwealth approval

The GC project was declared a controlled action under the EPBC Act (EPBC ref. 2009/4737) on 20 March 2009 to be assessed by way of an EIS under that Act in parallel with the state process. The approval of the Commonwealth Environment Minister under section 133 of the EPBC Act is required for the project in regard to impacts to MNES.

At the time of this report, Waratah is preparing an EIS addressing MNES for consideration by the Commonwealth.

4.4. Key project approvals

The approvals listed below in Table 4.1 represent the key approvals required for the project before it can legally proceed. The list is based on that provided by Waratah in the EIS at vol. 1, Chapter 2, and as further amplified in the SEIS.

Table 4.1. Key approvals and permits required for the GC project

Approval/permit/ licence	Legislation	Authority	Comments
Coordinator-General Evaluation Report Approval	SDPWO Act	Coordinator-General/ Department of State Development, Infrastructure and Planning (DSDIP)	Covered by this report
Offset conditions	SDPWO Act	Coordinator-General/ DSDIP	To be finalised and decided post Commonwealth decision
Controlled Action Approval	EPBC Act	Commonwealth Environment Minister	Project declared a controlled action on 20 March 2009
Level 1 EA (mining activities)	EP Act	Department of Environment and Heritage Protection (DEHP) (now SEWPaC)	Covers mining and associated activities on mining lease
Mining Lease (required to permit the conduct of specified mining activities within the defined lease location)	MRA	Minister for Natural Resources and Mines/Department of Natural Resources and Mines (DNRM)	
Preparation of appropriate Indigenous Cultural Heritage Management Plan (CHMP) and Duty of Care Statement	<i>Aboriginal Cultural Heritage Act 2003</i>	DNRM	
Water Licence to take or interfere with water, including from a watercourse or overland flow or groundwater for authorised mining activities	<i>Water Act 2000</i>	DNRM	
Riverine Protection Permit	<i>Water Act 2000</i>	DNRM	
Various permits for interfering with cultural or natural resources or wildlife protected under the <i>Nature Conservation Act 1992</i>	Nature Conservation (Wildlife Management) Regulation 2006 Nature Conservation (Wildlife) Regulation 2006	DEHP	

Approval/permit/ licence	Legislation	Authority	Comments
For off-mining lease infrastructure, Development Permits may be required for: • material change of use • operational works • building works • plumbing and draining works • reconfiguring a lot.	SPA <i>Regional Council Planning Schemes Building Act 1975 Building Code of Australia 2008</i>	Barcaldine Regional Council Isaac Regional council Whitsunday Regional Council	
Alteration or improvement to local government roads	SPA <i>Transport Planning and Coordination Act 1994</i> Regional Council Local Laws	Barcaldine Regional Council Isaac Regional council Whitsunday Regional Council	
Development permit to clear native vegetation (off mining lease)	SPA <i>Vegetation Management Act 1999</i>	DNRM	
Ancillary works and encroachment approval for State controlled roads	<i>Transport Infrastructure Act 1994</i>	Department of Transport and Main Roads (DTMR)	
Rail feasibility investigator's authority	<i>Transport Infrastructure Act 1994</i>	DTMR	
Approval to interfere with a railway line	<i>Transport Infrastructure Act 1994</i>	DTMR	
Rail manager/railway operator accreditation	<i>Transport Infrastructure Act 1994</i>	DTMR	

5. Evaluation of environmental impacts—mine

This section outlines the major environmental effects identified in the EIS, SEIS, submissions on the EIS and comments from advisory agencies and other stakeholders that relate specifically to the mine component of the project. The report provides comments on the effects and, where necessary, includes conditions or recommendations to mitigate adverse impacts.

5.1. Terrestrial ecology

5.1.1. Context

The project is located within the Desert Uplands bioregion of Queensland. The bioregion encompasses an area of about 70 300 km² and straddles the Great Dividing Range between Blackall and Pentland in central northern Queensland. It is dominated by sandstone ranges and sand plains and vegetation consists predominantly of eucalypt and acacia woodlands often with an open spinifex understorey. Most of the bioregion is under leasehold tenure and is used for cattle grazing and some sheep grazing in the west.⁴

The mine study area for ecological assessment is shown in Figure 5.1 (vol. 5B, Appendix 10, Figure 1 of EIS) and covers EPC 1040 and part of EPC 1079. In this area, the predominant land use is cattle grazing and a significant proportion of the area has been cleared of native vegetation and is maintained as cleared pasture. This is typified by Kia Ora station in the north and Hobartville in the east. Significant areas have been subject to blade ploughing and the introduction of exotic pasture grasses—predominately buffel grass (*Pennisetum ciliare*)⁵.

In contrast, areas of woodland habitats (including native remnant and native regrowth) have been retained including Glen Innes station within the central sector and parts of Cavendish and Lampton Meadows in the west and south-west. Generally, these wooded areas are also subject to cattle grazing, but less intensively. Glen Innes supports the Bimblebox Nature Refuge (BNR), gazetted in 2003 under the Nature Conservation (Protected Areas) Regulation 1994—refer to Section 5.2 for further information on the BNR.

Partially cleared sandstone escarpments with some areas supporting Lancewood-dominated woodlands are present in the north-west of the study area. To the east, the mine surface clearance footprint transects a riverine habitat comprising several ephemeral watercourses including Lagoon Creek.

⁴ EIS, vol. 2, ch. 6, p. 170.

⁵ EIS, vol. 5B, ch. 10A, p. 5.

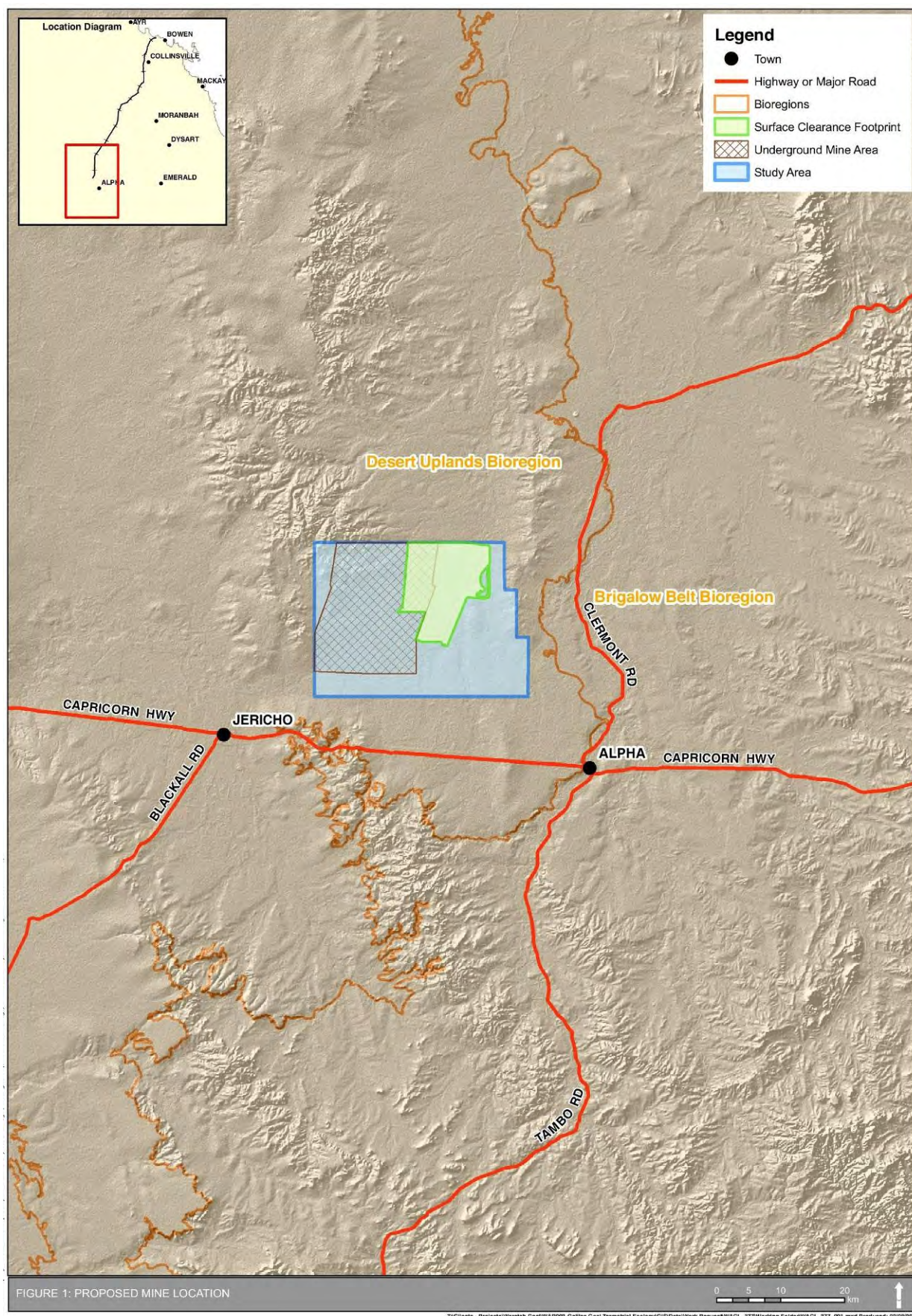


Figure 5.1. Mine study area

There are no Nationally Important Wetlands or Wetlands of International Importance (Ramsar sites) within or in the vicinity of the study area.

A desktop assessment of flora and fauna values and impacts was undertaken for the EIS, supplemented by field assessments and ground-truthing at 31 flora sites and eight fauna sites over a total of 20 days from October 2009 to April 2010. The sites were chosen to be representative of the three habitat types present, open woodland, riverine and buffel grass. Additional work was conducted in May 2011 as part of an ongoing site survey and habitat assessment program for the black-throated finch (southern) (*Poephila cincta cincta*). The EIS work was further supplemented by additional flora and fauna surveys undertaken for the SEIS, aimed largely at expanding coverage and further targeting threatened species.

5.1.2. Study findings

Vegetation communities and flora

Regional ecosystems

The EIS identified 21 regional ecosystems (REs) within the study area based on Queensland Herbarium mapping, as listed in vol. 5B, Appendix10, Table 2, of the EIS.

Of the 21 REs, none are listed as 'endangered' under the *Vegetation Management Act 1996* (VM Act), 2 are 'of concern' (RE 10.10.3 and RE 10.10.7) and 19 are listed as 'least concern'. The two 'of concern' REs are small areas confined to the north-west of the study area on the edge of the proposed underground mine component.

The project surface clearance footprint (open-cut mine and mine related infrastructure) will affect 'least concern' REs only. There are no areas of high value regrowth under the VM Act within the mine surface clearing footprint.

In terms of DEHP biodiversity status, the study area contains two 'endangered' REs (RE 10.3.25 and RE 10.4.3), six are listed 'of concern' and the remainder are listed as 'no concern at present'. Both of the 'endangered' REs and two of the 'of concern' REs (RE 10.3.4 and RE 10.3.27) will be impacted by the mine surface clearance footprint.

The desktop assessment did not identify any threatened ecological communities (TECs) listed under the EPBC Act as likely to occur within the project area and none were identified during field surveys.

The EIS reports that there are no Category A Environmentally Sensitive Areas (ESAs) occurring within the study area (the nearest is Cudmore National Park some 40 km to the north-west). Category B ESAs include the two small patches of 'endangered' REs (biodiversity status) RE 10.3.25 and RE 10.4.3 that exist within or are likely to be impacted by the mine surface clearance footprint. The 8000-hectare BNR is classified as a Category C ESA.

⁶ Sections 22LA, 22LB and 22LC of the VM Act provide and define three categories of REs: endangered, of concern and least concern. The classification of 'major vegetation groups' is provided in *Australia's Native Vegetation – A Summary of Australia's Major Vegetation Groups* (Department of Environment, Water, Heritage and the Arts 2007).

Flora species

The EIS reports that three flora species listed as threatened or near threatened under the NC Act were identified from database searches as occurring within or having ranges that overlap the study area. These are listed in the EIS at vol. 2, ch. 6, Table 1 (western rosewood, *Acacia spania*; large-podded tick-trefoil, *Desmodium macrocarpum*; and round-leaved myrtle, *Micromyrtus rotundifolia*). Both the western rosewood and large-podded tick-trefoil are listed as 'near threatened' under the NC Act and round-leaved myrtle is listed as 'vulnerable'.

Five populations of large-podded tick-trefoil have been previously recorded within the study site on the BNR by Worley Parsons (2009).⁷ Up to 53 individual plants were identified with approximately half being located within the mine surface clearing footprint. Field surveys undertaken for the EIS were unable to confirm the potential extent of the populations beyond these locations due to unfavourable seasonal conditions. Further work conducted at the SEIS stage⁸ indicated that up to 500 specimens could be located within the study area and that approximately 95 could be removed from the open cut area and potentially 39 from the underground subsided area.

Known occurrences of western rosewood and round-leaved myrtle species exist well outside the mine clearance footprint as does the prospect for a limited number of regionally significant flora species.

A total of 85 'least concern' native flora species were recorded during the field surveys, while eight non-native species were identified including three declared Class 2 weed species (rubber vine, *Cryptostegia grandiflora*, prickly pear, *Opuntia tomentosa*; and arsenic weed, *Senna obtusifolia*).

No threatened flora species listed under the EPBC Act were identified in the desktop searches or the field surveys.

Impacts to vegetation communities and flora species

The EIS identified potential direct and indirect impacts to vegetation communities and flora arising from:

- direct spatial reduction in remnant vegetation and flora species due to clearing
- increased edge effects through reducing the edge to area ratio and moving the edge and including the potential to increase the abundance of buffel grass and weeds
- potential for increased fire intensity if buffel grass densities are increased
- potential for changes to vegetation and hydrological characteristics for areas above underground mining areas arising from subsidence
- potential for dust to reduce the health of retained vegetation in the vicinity of the clearance footprint

⁷ Worley Parsons 2009, Flora and Fauna Survey Report – EPC 1040, Glen Innes, Central Queensland.

⁸ SEIS vol. 2, Appendix 17, Vegetation Report No 2.

- potential for temporary facilities, materials and equipment to damage areas outside the construction footprint
- potential for accidental and inappropriate release of pollutants.

Clearing of remnant vegetation

The estimated extent of remnant vegetation to be cleared within the mine surface footprint is set out in Volume 2, Appendix 17, Table 8, of the SEIS and is reproduced below in Table 5.1. The table also shows the VM Act status and biodiversity status for each RE and the area of each RE within the bioregion.

Table 5.1. Disturbance footprint of REs

RE	VM Act Status	Biodiversity Status	Open Cut Area (ha)	Subsided Area (ha)	Desert Uplands Bioregion (ha)
10.10.1	LC	NOC	0	170.536	91 739.28
10.10.3	OC	OC	0	11.665	2220.91
10.10.4	LC	NOC	0	443.596	70 530.11
10.10.5	LC	NOC	0	32.304	2309.72
10.10.7	OC	OC	0	16.152	2362.80
10.3.12	LC	NOC	74.369	0	32 853.64
10.3.14	LC	OC	0	17.825	144 101.89
10.3.27	LC	OC	1173.61	983.668	110 571.79
10.3.28	LC	NOC	127.978	469.53	610 798.04
10.3.3	LC	NOC	37.1845	30.641	31 742.12
10.4.3	LC	E	35.791	3.23	18 028.79
10.5.1	LC	NOC	0	999.669	882 476.38
10.5.10	LC	NOC	0	250.137	39 515.92
10.5.12	LC	NOC	342.949	884.824	141 547.88
10.5.4	LC	NOC	0	6.027	79 210.53
10.5.5	LC	NOC	3002.56	8014.54	940 367.59
10.7.3	LC	NOC	67.504	189.767	100 560.18
10.7.5	LC	OC	8.438	108.575	26 458.19
11.5.5	LC	NOC	7.109	0	2309.72
Totals	-	-	4877.49	12 632.69	3 329 705.48

Key to VM Act and Biodiversity Status Codes:

E	Endangered
OC	Of concern
LC	Least Concern
NOC	No concern at present

The 4877.49 ha of remnant vegetation clearance comprises 31 per cent of the total clearing required for the project. This vegetation represents eucalypt woodlands (in large part on the BNR) as well as riparian vegetation associated with Lagoon Creek. The remaining 69 per cent of clearing involves areas of cleared non-remnant vegetation (pasture land).

No threatened REs under the VM Act will be cleared—all clearing involves ‘least concern’ communities. In terms of biodiversity status, the more significant clearing impacts occur to RE 10.4.3 (‘endangered’—35.8 ha to be cleared and 3.2 ha potentially affected by subsidence) which represents 7.3 per cent at the local level but only 0.19 per cent at the bioregion level and RE 10.3.27 (‘of concern’ -1173.6 ha to be cleared and 983.7 ha potentially affected by subsidence) comprising 13.7 per cent at the local level and 1.65 per cent extent at the bioregional level. Also, RE 10.3.12 (‘not of concern’—74.4 ha to be cleared) comprises approximately 44 per cent at the local level but only 0.23 per cent at the bioregional level.

Subsidence ecological impacts

The underground component of the mine will not involve any significant surface clearing but the overlying area may be subject to subsidence.

Potential subsidence impacts can include redirection of surface flows, ponding, surface tension cracking, soil erosion, water quality and groundwater impacts. All of these effects have the potential to impact surface ecological values.

The SEIS reports that the total area to be affected by subsidence may be in the order of 34 000 ha. This impact area is confined principally to non remnant vegetation (improved pasture) and ‘least concern’ remnant vegetation with a small area of 30 ha of ‘of concern’ vegetation in the north-west of the site.

The EIS and SEIS reported that surface ecological impacts are not expected to be significant as the sandy nature of soils in the project area is anticipated to be largely self healing to tensile surface fracturing. Surface ponding is not expected to be a significant problem due to the natural cross-fall of the terrain.

Subsidence remedial works are outlined in the SEIS and include ripping, re-compaction and seeding of all tension cracks, reshaping of any internally ponding areas to drain externally by construction of contour drains, topsoiling and seeding of disturbed areas.

The EIS and SEIS reports that remedial work is not expected to be extensive and it is proposed to re-establish disturbed areas to pre-existing land uses and vegetative cover. Waratah has committed to prepare a subsidence management plan in liaison with effected landowners and the State for approval prior to commencing mining activities. The plan is to have an adaptive management focus based on prediction, monitoring, review and adjustment of management methods. The plan will comply with DNRM’s guideline: *Central west water management and use regional guideline*.

Surface water and groundwater impacts of subsidence are considered in this report at Section 5.4 (Water resources). Subsidence modelling is considered at Section 5.5.2.

Impacts on listed flora species

The SEIS has identified that up to 500 large-podded tick-trefoil (‘near threatened’) could occur within the study area of which approximately 134 would need to be removed from the open cut and subsided areas.

The NC Act is the primary legislation governing protection of threatened flora species in Queensland. Where there is a requirement for clearing of plants protected under the

NC Act, a clearing permit will be necessary and clearing undertaken only in accordance with the permit.

Waratah has committed to preparing a species management plan for threatened species including the Large-podded Tick-trefoil. It has also committed to provide offsets for the disturbance to the Large-podded Tick-trefoil, if required. My approach to determining offsets is outlined in Section 7.3 of this report.

Mitigation

Strategies and management measures to address impacts to terrestrial flora and communities are outlined in the EIS, SEIS and draft EM Plan. Specific commitments given in the SEIS are included in this report at Appendix 5. In summary, these strategies and management measures include development and implementation of:

- a Vegetation Clearance Management Plan aimed at identifying and managing areas to be cleared
- a Mine Rehabilitation and Closure plan to identify final land forms, uses, indicators, completion criteria and a commitment to rehabilitate to a native vegetation ecosystem as far as practicable
- an offset strategy that would compensate for unavoidable clearing and significant residual impacts
- a Subsidence Management Plan to manage impacts associated with subsidence associated with underground mining
- a Fire Management Plan, developed in liaison BRC and the Rural Fire Service
- a Weed and Pest Management Plan developed in consultation with BRC and Biosecurity Queensland
- an Erosion and Sediment Control Plan incorporating local management plans
- a Significant Species Management Plan for listed species under the NC Act and critical and high priority species under DEHP's 'Back on Track' prioritisation methodology. The plan will also include the Large-podded Tick-trefoil.

Terrestrial fauna

A desktop assessment and ground surveys undertaken for the EIS identified 10 threatened and near threatened fauna species under the NC Act and/or the EPBC Act as occurring or potentially occurring within the study area. These species comprised three reptiles, six birds and one mammal and are listed in the EIS at vol. 2, Chapter 6, Table 5. An additional 15 migratory or marine species listed under the EPBC Act were also identified as potentially occurring.

Additional fauna survey work was undertaken for the SEIS, aimed at extending the survey coverage of remnant vegetation areas, undertaking further target species surveys (black-throated finch (BTF) and threatened reptiles) and integrating existing survey data (mainly DEHP work) not considered in the EIS.

The SEIS reported the following results for the study area incorporating the work done in the EIS, SEIS and earlier survey work by other parties:

- A total of 297 native fauna species have been identified from surveys comprising 40 mammals, 57 reptiles, 15 frogs, and 185 bird species.
- A total of seven introduced fauna species have been identified: House Mouse (*Mus musculus*); Dog (*Canis familiaris*); Feral Cat (*Felis catus*); Rabbit (*Oryctolagus cuniculus*); Pig (*Sus scrofa*); Cattle (*Bos Taurus*); and Cane Toad (*Rhinella marina*).
- A total of 10 fauna species, listed as threatened under the NC Act and/or the EPBC Act have been identified either within the study site or surrounding area. These species comprise:
 - little pied bat (*Chalinolobus picatus*)—near threatened NC Act
 - Brigalow scaly-foot (*Paradelma orientalis*)—vulnerable NC Act and EPBC Act
 - cotton pygmy goose (*Nettapus coromandelianus*)-near threatened NC Act
 - freckled duck (*Stictonetta naevosa*)-near threatened NC Act
 - black-necked stork (*Ephippiorhynchus asiaticus*)-near threatened NC Act
 - square-tailed Kite (*Lophoictinia isura*)-near threatened NC Act
 - squatter pigeon (southern) (*Geophaps scripta scripta*)-vulnerable NC Act and EPBC Act
 - black-chinned honeyeater (*Melithreptus gularis*)-near threatened NC Act
 - black-throated finch (southern) (*Peophila cincta cincta*)– vulnerable NC Act , endangered EPBC Act
 - koala (*Phascolarctos cinereus*)—vulnerable EPBC Act
- A further five threatened species have been identified as having ranges that could possibly overlap the study area:
 - the skink (*Ctenotus capricorni*)—near threatened NC Act
 - yakka skink (*Egernia rugosa*)—vulnerable NC Act and EPBC Act
 - common death adder (*Acanthophis antarcticus*)—near threatened NC Act
 - ornamental snake (*Denisonia maculate*)—vulnerable NC Act and EPBC Act
 - northern quoll (*Dasyurus hallucatus*)—endangered EPBC Act.

Impacts to fauna species

Potential direct and indirect impacts on fauna are identified in the EIS and SEIS as:

- loss of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, refuge and foraging resources
- mortality—particularly species that are less mobile, or those that are nocturnal, restricted to tree hollows and/or burrowing species
- barrier and edge effects
- introduction of exotic weeds and pests
- alteration of fire regimes
- indirect changes to fauna habitat through subsidence impacts on land form and hydrology
- habitat connectivity impacts on linkages between areas to the west of Lambton Meadows and the north-east along Lagoon Creek.

Mitigation

The EIS outlines strategies and management measures to address impacts to terrestrial fauna at Section 6.1.3. These are summarised below and mitigation commitments given by Waratah for fauna are included in this report at Appendix 5:

- infrastructure will be located away from remnant vegetation areas whenever possible to avoid the potential to inadvertently cause or create additional edge effects
- pre-clearance surveys will be undertaken in advance of clearing and clearing boundaries to be clearly identified in the field to avoid inadvertent clearing of vegetation
- licensed spotter/catchers to be engaged during clearing
- reuse of cleared vegetation to create shelter habitat for fauna
- a Bushfire Management Plan will be developed and implemented in order to minimise the risk of bushfire associated with on-site infrastructure
- a Weed Management Plan will be prepared prior to construction
- education of all construction personnel through inductions to ensure compliance with environmental requirements
- watercourse diversion activities will be undertaken during the dry season and utilise best practice methods to minimise risk of impact upon terrestrial and aquatic flora and fauna
- an Erosion and Sedimentation Control Plan will be developed prior to construction to minimise sediment runoff. The plan will include a requirement to rehabilitate disturbed areas as soon as possible after disturbance
- dust monitoring will be undertaken and dust reduction measures will be implemented where necessary to avoid harm to flora and fauna species
- a Mine Rehabilitation and Closure Plan will be developed that includes final landform objectives for fauna and suitable completion criteria and indicators to measure rehabilitation progress
- development of species management plans where required for threatened species including the black-throated finch
- offsets to be provided for disturbed habitats of threatened fauna species known to occur or that may occur on the study site based on habitat modelling.

5.1.3. Issues

Bimblebox Nature Refuge

Many submissions were received at the EIS and SEIS public review stages on the impacts of the project on the BNR. I have separately dealt with the BNR at Section 5.2.

Black-throated finch

A number of public submissions were received in regard to the impact of the project on fauna and, in particular, the need to preserve habitat for the black-throated finch (southern) (*Peophila cincta cincta*) (BTF). A single sighting of a flock of 15 BTF in the

north-west of the BNR was reported by a member of Birdlife Australia (then Birds Australia) in May 2011, immediately prior to display of the EIS.

The BTF is listed as 'vulnerable under the NC Act and 'endangered' under the EPBC Act and is the subject of a recovery plan endorsed by the Commonwealth, Queensland and New South Wales Governments. The original distribution of the species extended from the Atherton Tablelands through eastern Queensland to northern New South Wales. However, over the last 20 years or so the range has contracted by up to 80 per cent and is now restricted to around the Townsville region and at scattered sites in central-eastern Queensland. Clearing, overgrazing and drought are considered the major reasons for this decline.

For the EIS and SEIS, Waratah conducted targeted surveys for the BTF in accordance with Commonwealth survey guidelines both within the study area and on the BNR in particular, but the species was not found. Reviews of public access data bases to locate records of sightings together with numerous fauna surveys (some targeted) by government agencies, consulting ecologists and Birdlife Australia between 1998 and 2012 have also failed to locate the species in the study area apart from the sighting by the Birdlife Australia member.

Waratah advised that the record site and surrounding area of the BNR was surveyed 12 days after the reported sighting and subsequently also during survey events through until mid-April 2012. On each occasion, Double-barred Finch, Plum-headed Finch and Zebra Finch were recorded along with some nests but none could be attributed to the BTF. The SEIS concludes that given the targeted survey effort and the extensive and repeated survey coverage dedicated to detecting the BTF, the flock of birds recorded in May 2011, by the Birdlife Australia member does not appear to be part of a resident or breeding population.

5.1.4. Coordinator-General's conclusions

Vegetation and flora

The nature and scale of the project means there will be unavoidable impacts to vegetation in the short to medium term, including loss of remnant and riparian vegetation and connectivity. Direct clearance of 4595 ha of remnant vegetation is estimated which is confined to the 'least concern' category under the VM Act. Subsidence may also impact up to 34 000 ha of remnant vegetation over the life of the mine.

Through the mitigation measures outlined in the EIS, SEIS and draft EM plan, I consider that impacts to vegetation communities have been minimised and that best practice mitigation and management measures as outlined in the draft EM Plan would be implemented.

Waratah has committed to rehabilitate the project site to a stable, self-sustaining native vegetation landscape as far as possible and for pre-mining cattle grazing land uses to be re-established. It has outlined rehabilitation goals, objectives, indicators and completion criteria in its draft EM Plan and these will need to be further refined at the

time of making its environmental authority (EA) application to meet the rehabilitation conditions I have stated for the EA at Appendix 1, Schedule F.

I acknowledge that indirect impacts to vegetation communities may also arise from subsidence of areas overlying the underground component of the mine. The extent of these impacts is difficult to quantify at this stage. However, 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 and can be effectively monitored and managed through an adaptive subsidence management plan in accordance with State guidelines. I have stated a condition in Appendix 1, Schedule F, requiring the preparation and implementation of a subsidence management plan prior to the commencement of activities that result in subsidence. I will consider any residual impacts to significant State biodiversity values as part of my final assessment of offsets.

In regard to listed threatened flora species under the NC Act, I am satisfied that impacts will likely be confined to a limited number of populations of 'near threatened' large-podded tick-trefoil plants on the BNR although it is accepted that other listed species may be encountered. To the extent that protected plants are to be permanently cleared, then a permit under the NC Act will be required. I will consider residual impacts to listed threatened flora as part of my final determination of offsets.

Cumulative impacts to vegetation and flora values are addressed in Section 7.6.2.

Fauna

I consider that the EIS and SEIS adequately identify likely impacts on native fauna. An extensive amount of survey effort by both Waratah and other parties has identified 15 threatened species under the NC Act and/or the EPBC Act that either do occur or could reasonably occur within the study area and surrounds and could be impacted. These impacts could be significant at the immediate local level as native vegetation habitat is progressively cleared from east to west in advance of mining. However, whilst habitat will be removed from cleared areas, significant habitat will remain in adjacent areas that will continue to provide habitat, albeit at lower value. Subsidence may also result in some losses in the longer term. I conclude that connectivity with native vegetated areas to the west and south-west will not be compromised but the existing disjointed connectivity to riparian areas to the north-east will be further compromised by the diversion eastwards of Lagoon Creek.

I consider that the proposed mitigation and management measures including a commitment to rehabilitate to pre-existing conditions as far as practicable, are appropriate to manage impacts and that the long-term viability of species or their geographical distributional range is not threatened. I have addressed cumulative impacts to fauna at Section 7.6.2.

On the question of the BTF, I note that extensive survey activities undertaken in the study area since 1998 by Government agencies, consulting ecologists and Birdlife Australia have failed to detect the species, apart from a single reported sighting in May 2011 by a member of Birdlife Australia. On balance, having regard to this earlier survey effort and the follow up survey work undertaken by the proponent immediately post sighting, I support the finding in the SEIS that the reported flock sighted is unlikely to be

part of any resident or breeding population in the local region. I do not discount the possibility however that the flock may have been momentarily in the area following the earlier favourable wet season.

Waratah has outlined and committed to implement a range of mitigation measures that I believe will adequately manage impacts to native fauna. I have made a recommendation to DEHP in Appendix 3, Part B, Schedule 2 requiring Waratah to prepare a significant species management plan for listed threatened listed species including the BTF.

The proponent has also committed to offset the extent of disturbed primary habitat of threatened fauna species as part of its offset proposal which I have discussed at Section 7.3 of this report.

5.2. Bimblebox Nature Refuge

5.2.1. Context

Nature refuges are a voluntary arrangement between the State and landowners to protect significant biodiversity values yet allow compatible land uses to continue. The arrangement is formalised under a conservation agreement between the parties which also specifies the duration of the agreement.

A nature refuge is declared by the Governor-in-Council by regulation and can be revoked by the Governor-in-Council in a similar manner unlike higher conservation tenures. A declaration does not alter any existing or future rights to mineral or petroleum exploration and extraction i.e. the *Mineral Resources Act 1989* and *Petroleum and Gas (Production & Safety) Act 2004* prevail over nature refuge tenure under Queensland law. Nature refuges are classified as a Category C environmentally sensitive area under DEHP's codes of environmental compliance.

The 7912-hectare Glen Innes cattle property was purchased in 2000 with financial assistance from the Commonwealth Natural Reserve System program. Commonwealth conditions, in part, permitted grazing to continue but the primary management focus was to be on maintaining/enhancing biodiversity values and for the land to be gazetted a Nature Refuge under the Queensland NC Act.

The property was purchased at a time when broad scale clearing in Queensland was a focus of public attention and the property, in part, had already been approved for clearing. The *Vegetation Management Act 1999* which regulates clearing in Queensland came into force in December 1999.

The property was subsequently gazetted a Nature Refuge under the NC Act in 2003 (Bimblebox Nature Refuge) and was subject to a conservation agreement between the owners and the State that allowed grazing to continue whilst protecting existing biodiversity values. These values were listed as intact native vegetation in excellent condition with high biodiversity values. Vegetation was listed predominantly as poplar box and silver-leaved ironbark woodlands with a wide variety of native grasses and fauna species.

The BNR is mapped as being of State Significance within the Desert Uplands Biodiversity Planning Assessment and is identified as containing 'Special biodiversity values' and of value as a 'Wildlife refugia'.

The property is currently used for low intensity cattle grazing, conservation and as a site for research projects conducted by private parties, State and Commonwealth agencies aimed largely at examining the interaction of sustainable grazing practices and the natural environment. The property is also utilised by Birdlife Australia for avian studies.

5.2.2. Impacts and mitigation

The BNR, which is fully contained within the Waratah mining tenements, would be significantly impacted by the proposed project.

Environmental flora and fauna values and impacts have been considered for the broader mine site area at Section 6.1.4. For the BNR specifically, major impacts can be summarised as:

- Direct clearing of approximately 3926 ha of native vegetation listed as 'least concern' under the VM Act (52 per cent of the total of 7526 ha of native vegetation on the BNR). No threatened ecological communities under the EPBC Act are to be cleared.
- Balance of the BNR native vegetation to remain uncleared (3600 ha) but may be subject to subsidence impacts. Vegetation in these areas is also listed as 'least concern' under the VM Act apart from 30 ha of 'of concern' vegetation in the north-west of the site. A small area of the BNR in the south-east will remain unaffected by mining. No Commonwealth threatened ecological communities will be impacted.
- Removal of approximately 19 'near threatened' plants (Large-podded Tick trefoil) under the NC Act by way of direct clearing or possible subsidence impacts. No protected plants under the EPBC Act will be impacted.
- Complete removal of fauna habitat from areas to be cleared and possible impacts to habitat in subsidence areas. Fifteen threatened fauna species listed under the NC Act and/or the EPBC Act are known to exist or may possibly exist in the area.
- Significant diminution of the conservation value of the BNR and its value as a site for ecological studies and research purposes through clearance of half the site and possible subsidence impacts on the balance.

Waratah proposes to address ecological impacts on the BNR within the context of the broader mine site area through avoidance, minimisation and mitigation as outlined in the EIS and SEIS. It proposes to provide offsets for significant residual impacts to meet State and Commonwealth requirements. As part of this, it proposes an offset for the conservation/ research value of the BNR by including a site twice the size of the BNR with an equivalent ecological value that would be suitable as a nature refuge.

5.2.3. Issues

A large number of submissions were received on the BNR at both the EIS and SEIS consultation stages from individuals (mainly form letters), organisations, conservation groups and government agencies.

Whilst the submissions canvassed a range of issues, common themes related to the ecological, educational and research values provided by the BNR and the adequacy of the assessment of conservation, flora and fauna values of the BNR within the EIS. Other points focused on perceived difficulty in finding an offset area of ecological equivalence, and the precedent for future development on other nature refuges should the project proceed.

In regard to the educational and research value, Waratah has responded in its SEIS that it acknowledges the loss of the BNR will result in a disruption to various research projects currently underway. By way of part mitigation from any loss of the BNR, it advises it would welcome the opportunity for such studies to continue on offset areas that it commits to provide. Waratah acknowledges that spatial variability in data sets would arise.

On the matter of ecological values and assessment, Waratah has conducted extensive additional surveys and assessments of both flora and fauna on the BNR during the SEIS.

Waratah proposes to offset significant residual impacts to State significant biodiversity values (SSBVs). Additionally, it has committed to offset the conservation value of the BNR in recognition of the loss of this value even though it has no legal obligation to do so under State or Commonwealth law. It commits further to relinquish any mining tenements that it holds on the nature refuge offset area.

5.2.4. Coordinator-General's conclusions

Through the EIS process, Waratah has assessed the values of the BNR, identified impacts, proposed mitigation measures and committed to provide compensation for significant residual impacts by way of offsets. I am satisfied that the work has been properly conducted and that project alternatives to avoid and minimise impacts to the BNR have been considered. The EIS conclusion is that the coal resource cannot be economically mined in this part of the Galilee Basin without access to the shallow coal seams underlining the BNR and that as a consequence of mining, the ecological integrity and conservation value of the BNR cannot be maintained.

I acknowledge the many submissions on the EIS drawing attention to the ecological, conservation and educational research values of the BNR. On the information before me, the value of the BNR lies not so much in the individual flora and fauna values, which in themselves are not considered of outstanding value or are unique, but in the value of a relatively large tract of intact native vegetation, native fauna habitat and its educational and research value. I note that while the BNR is mapped as being of 'state significance' under the DEHP Biodiversity Planning Assessment, the bulk of the Desert Uplands Bioregion has such a classification—refer to Figure 5.2. I am also mindful that flora and fauna ecological values similar to those on the BNR exist on nearby

properties such as Lambton Meadows, Corntop and Saltbush together with others further to the west and east of the mining site and elsewhere in the bioregion.

On balance, I recognise the values of the BNR but do not consider them sufficiently high or unique to find that the project should not proceed in the interest of saving the BNR. I do however, recognise the loss that would result from the disturbance of the BNR and will require Waratah to compensate the State for the lost biodiversity, conservation and educational values by including in its offset proposal a direct offset area of at least the size of the BNR and of at least equivalent ecological value capable of being secured as a nature refuge or higher conservation tenure. DEHP has advised me that suitable offset areas exist, some of which have significantly higher ecological values. Waratah has committed to provide an offset area twice the size of the BNR (16 000 ha), should this be required by me.

I accept that loss of the BNR may affect, educational and research activities on that site. However, current programs could be accommodated on other sites within the State's protected area estate.

On the question of on-going security provided by nature refuge conservation tenure, I note that the Queensland Parliament has legislated, through the NC Act, a range of conservation tenures that provide a range of protections depending on the ecological values being protected. The fact that nature refuge tenure does not exclude current or future mining activity, unlike a national park or conservation area tenure (unless special circumstances apply), gives the government the ability to consider future development on these tenures on a case-by-case basis. The gazettal of the BNR in 2003 was made in full knowledge of the coal resource underneath and in recognition that future exploration and mining was not precluded by the gazettal. I note also that Queensland has 412 nature refuges covering 2.9 million ha and that various mining or petroleum tenures exist on only 13 of these. I do not accept that mining of the BNR would necessarily initiate a 'domino effect' of mining on nature refuges. Future decisions on disturbance of nature refuges should continue to be considered on a case-by-case basis in the broader interest of the people of Queensland.

Biodiversity Significance of Galilee Basin

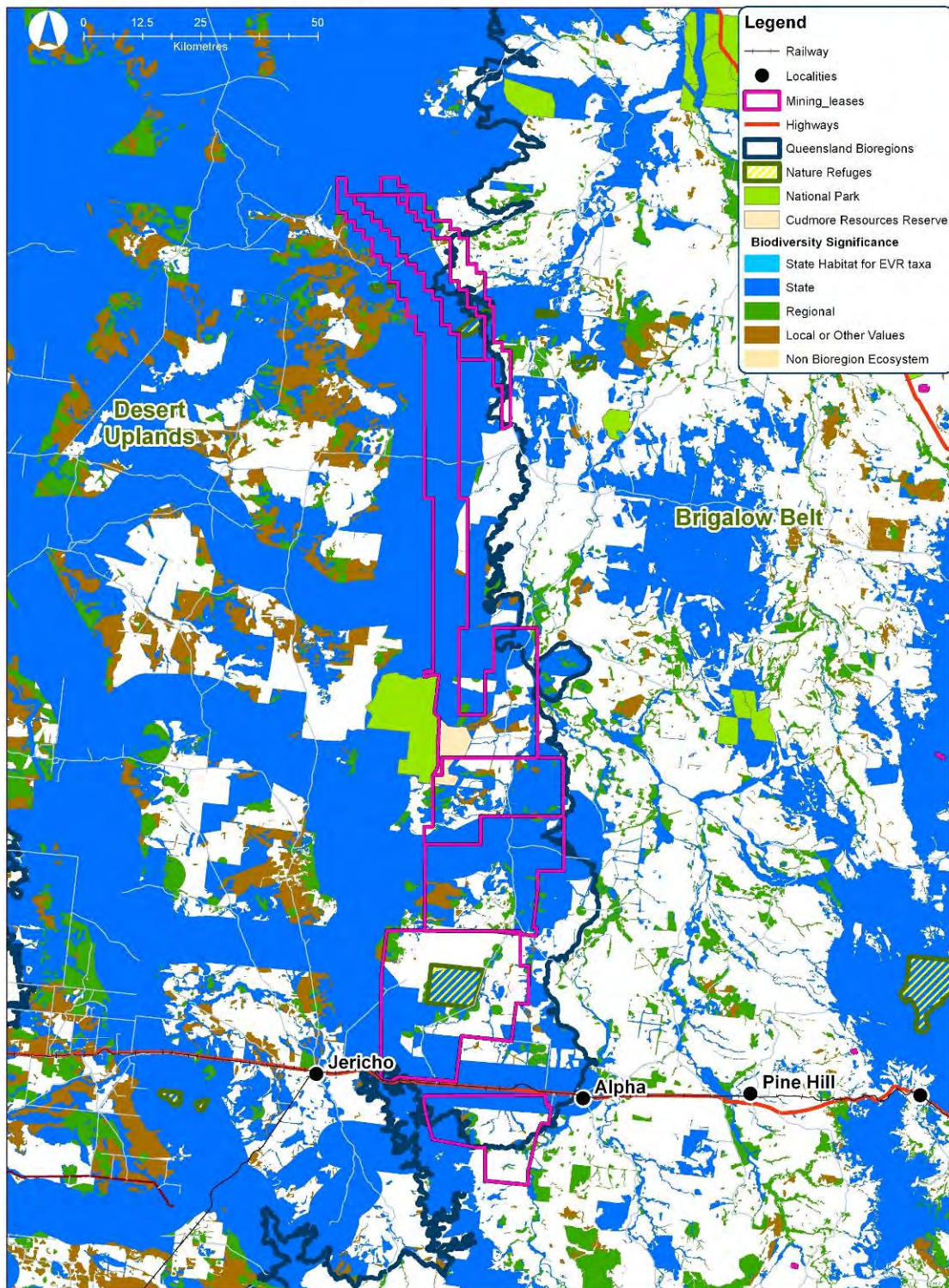


Figure 5.2. Desert Uplands Bioregion

5.3. Aquatic ecology

Context

The mine sits primarily within the Belyando River sub-basin of the Burdekin River catchment. The sub-basin is largely comprised of low relief floodplain, alluvial plains and wide braided channels. Much of the area covered by the mine is gently undulating plains with some hilly terrain located in the north east corner of the site. Key streams identified on the mine site include Tallarenha Creek, Beta Creek, Malcolm Creek, Pebbly Creek, Spring Creek and Lagoon Creek. All of the watercourses are ephemeral streams experiencing flows of short duration following rain events and extended periods of no surface flow. The south western corner of the site drains in a westerly direction to Jordan Creek and discharges into the Alice River some 40km downstream of the mine, part of the Cooper Creek catchment.

Study findings

Desktop and field investigations were undertaken to describe the aquatic ecological values of the mine area. The studies are presented in Volume 5, Appendix 13 of the EIS and Volume 2, Appendix 19 of the SEIS. In response to submissions received during the EIS comment period, further water quality monitoring and aquatic ecology studies were undertaken in the near mine environment. The studies found the 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, but given the inland location of the study area and ephemeral nature of the streams this was within expectations.

Fish community

Fish diversity was limited, comprising only potadromus species. The study concluded that potential impacts to the species that were found are more likely to result from any increases in turbidity or reductions in pH levels rather than by barriers to fish passage. No species of conservation or fisheries significance were found. One highly invasive exotic fish, Tilapia (*Oreochromis mossambicus*) was recorded and appears to be expanding in terms of its abundance and distribution. Though this trend is expected to continue, any impacts to the quality of receiving waters could exacerbate it.

Macro-crustacean community

The Red Claw Crayfish (*Cherax quadricarinatus*), a native but translocated species, was commonly recorded during the field surveys and may be replacing other native species such as the Common Yabby (*Cherax destructor*) and the Orange-fingered Yabby (*Cherax depressus*), which were not common in the study area. Other macro-crustaceans recorded include the Atyid Shrimp and Freshwater Prawns though these were largely confined to lagoon and dam habitat. Any increased turbidity in these habitats would likely affect these species by reducing periphytic algae food sources.

Macro-invertebrate community

Macro-invertebrate diversity was highest in Lagoon Creek and fell within the ranges expected in Central Queensland waterways. Dam and lagoon habitats on the site had

the lowest diversity. Other areas of low diversity were streams subject to cattle crossings, clearing of riparian vegetation and turbid water. Most recorded species were pollution tolerant and adapted to cope with changing water quality conditions of ephemeral streams while the least pollution tolerant taxa, Leptophlebiidae, were only found in Lagoon Creek, the main receiving water from the mine. To ensure diversity in this community is not further diminished, effective management of erosion, mine runoff and vegetation clearing will be required throughout all stages of the project.

Macrophyte community

Both aquatic plant cover and diversity were generally low in the study area with the exception of Spring Creek and SPC-Dam. Cyperaceae species were the dominant emergent forms with five species recorded and *Cyperus difformis* being the most widespread. No exotic or noxious species were recorded but several species including Para grass (*Urochloa mutica*) and Noogoora Burr (*Xanthium pungens*) are known to occur in the regions waterways.

Water Quality

Total concentrations of a number of metals exceeded guideline levels but based on dissolved concentrations only aluminium was above guideline levels, suggesting that the bioavailability of metals is generally limited in the waterways. Electrical conductivity, pH, turbidity and dissolved oxygen per cent were also routinely outside recommended ranges but in line with findings from other local studies.

Issues

A number of issues were raised in relation to aquatic ecology and water quality during the comment period of the EIS. Waratah has undertaken an additional field survey to address these and to provide a second round of water quality monitoring including sampling of prospective control monitoring sites. This additional field survey was undertaken in April 2012 to address the following issues:

- characterising the major waterways either on or draining the mine site
- characterising the different waterbody types located on or near the mine site
- undertaking greater intensity of sampling in Lagoon Creek
- undertaking sampling in areas associated with different mining activities on the mine site
- additional water quality monitoring using a wider range of parameters recommended by DEHP
- comparing the water quality results to levels outlined in relevant regional guidelines.

Potential impacts to near mine aquatic ecosystems are most likely to arise from erosion, mine runoff, clearing riparian vegetation and changes to water quality and turbidity. Activities planned to occur on the mine site with the highest risk of causing negative impacts include:

- diversions to Lagoon Creek, Malcolm Creek and Saltbush Creek
- clearing of vegetation and topsoils
- on-site chemical storage

- contaminated water storage
- altered drainage and recharge patterns arising from subsidence and creek diversions.

Coordinator-General's conclusion

I consider the likely impacts to aquatic ecosystems have been adequately identified in the EIS and SEIS. I note concerns from the IESC regarding the adequacy of baseline sampling for the project and that Waratahs' proposal to adopt interim water quality objectives used by the adjacent Alpha Coal mine is reasonable until site-specific objectives can be developed. The development of management plans with specific measures to minimise impacts associated with construction and operational activity have been outlined in the EIS, SEIS and draft EM Plan. I am satisfied the implementation of these plans, combined with an ongoing monitoring program will allow impacts to be mitigated to acceptable levels. To secure this outcome, I have stated a condition in Appendix 1, Schedule C, to ensure the proponent's commitments as detailed in the EIS, SEIS and draft EM Plan are implemented.

5.4. Water resources

5.4.1. Groundwater

Context

The project mine site is situated within the Galilee Basin, a geological basin in central Queensland located west of the Bowen Basin. The mine site lies immediately east of part of the Great Artesian Basin (GAB). The surface geology in the vicinity of the project is dominated by unconsolidated Cainozoic (Quaternary and Tertiary) sediments with thickness of up to 90 m in the eastern and central sections. Beneath the Cainozoic sediments are weathered remnant Tertiary volcanogenic material, Triassic sedimentary sequences and Permian coal measures.

To the west of the mine site lie the intake beds of the GAB. The intake beds in Queensland form a continuous arc, 50-100 km wide, stretching from east of Goondiwindi through to the top of Cape York. Only the basal GAB formations are present within the mine site, namely the Dunda Beds and Rewan Formation. These Triassic formations overlie the Permian coal measures and the Rewan Formation is generally recognised as a regional aquitard⁹ that hydrogeologically separates overlying GAB aquifers from the underlying Permian coal measures. The Clematis Sandstone is the nearest GAB aquifer to the mine site, that accepts rainfall recharge into the GAB. Refer to Figure 5.3 for mine site location in relation to the GAB and for surface geology (Figure 1.4, vol. 2, Appendix 43 of SEIS).

⁹ Habermehl MA and Lau JE, *Hydrogeology of the Great Artesian Basin Australia* (Map at scale 1:2,500,000), Australian Geological Survey Organisation, Canberra, 1997.

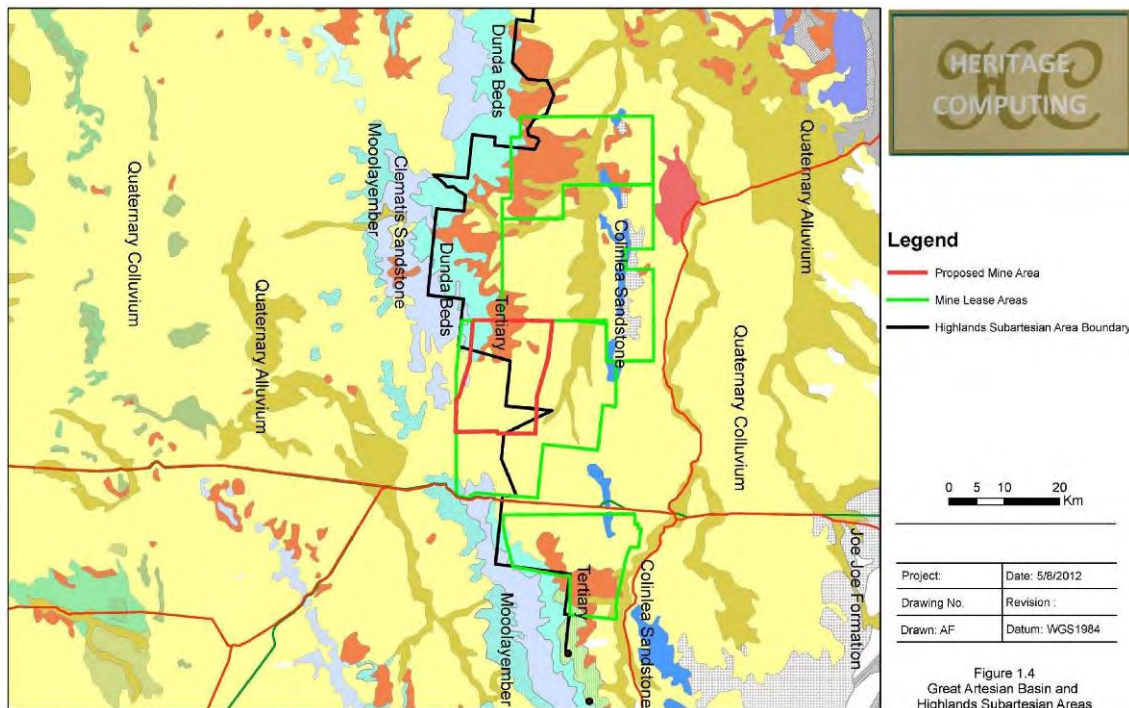


Figure 5.3. Mine site location in relation to the GAB

Registered springs exist 30-40 km to the west of the GAB boundary within the recharge zone and also to the west of the recharge zone in the Barcaldine Spring Complex.

The Permian coal measures dip at approximately 1-2 degrees to the west and the GC project is to target the B, C, DU, and DL coal seams. Regionally the geology is considered to be structurally benign with little faulting. Refer to Figure 5.4 for conceptual hydrogeological model (Figure 3.6, vol 2, Appendix 43 of SEIS).

Study findings

Assessment of groundwater impacts is presented in vol. 2, Chapter 8 of the EIS. The assessment approach involved a desk top review of available groundwater information and a range of field studies focused largely on geophysical surveys, existing bore surveys, installation and sampling of monitoring bores, aquifer testing and stygofauna sampling. Predictive numerical modelling was undertaken to assess the impact of the mine on the groundwater regime.

The EIS concluded that the groundwater cone of depression could extend from 12 km to 30 km from the mine and could adversely impact existing groundwater users within this area. No significant impact to GAB aquifers and associated springs was anticipated because of the presence of an effective aquitard in the Rewan Formation and Dunda Beds sequences to the immediate west of the mine that separates the GAB aquifers from the Permian coal measures. Groundwater mine inflows were estimated to be 12.3 Gigalitres (GL) per annum.

In response to comments on the groundwater assessment during the EIS consultation stage, extensive further work was undertaken for the SEIS with particular emphasis on

expanding the groundwater monitoring network to improve base-line data and in preparing a new predictive numerical model to assess groundwater drawdown, impacts and groundwater inflows to the mining operation.

The revised model extends 130 km from the west of Jericho to the eastern boundary of the Galilee Basin and extends 120 km in a north-south direction to ensure coverage of sensitive groundwater receptors—particularly the GAB springs. The model contains 11 vertical layers to model the stratigraphic sequence and complies with the Murray-Darling Basin Commission Groundwater Flow Modelling Guidelines and the Australian Groundwater Modelling Guidelines.

Initial modelling simulated steady-state conditions for worst-case impact prediction at the end of mining while the second stage included transient calibration and simulation of the transient progression of mining. The new model also included a fractured zone above the underground mines to account for this subsidence effect which is a refinement on earlier groundwater modelling done for some other proposed mines in the Galilee Basin. The conceptual hydrogeological model is shown at Figure 5.4.



Figure 5.4. Conceptual hydrogeological model

The findings from the SEIS groundwater assessment largely confirmed the conclusions reached in the EIS. Key findings included:

Great Artesian Basin

Groundwater drawdown from mining is not expected to have a significant impact on the GAB. The predictive modelling simulations showed negligible drawdown in the Clematis Sandstone aquifer for the worst case steady state modelling and for sensitivity tests in which the vertical permeability of the Rewan Formation/Dunda Beds aquitard was increased by two orders of magnitude. In the underlying Permian coal measures, there is expected to be significant drawdown in the west of the model area caused by project mining, but it is probable that this depressurisation will not propagate

to the GAB aquifer. A cumulative impact assessment based on the GC project and mining proposals immediately to the north (Alpha and Kevin's Corner Projects) and south (South Galilee Project) also indicated negligible impacts on the GAB from mining—refer to Section 7.6 of this report for my consideration of cumulative impacts.

Groundwater Dependent Ecosystems (GDEs)

The project is not expected to have significant impacts on GDEs:

- Wetlands and riverine vegetation along receiving waterways are associated with perched water tables and are expected to be largely unaffected by drawdown of the regional water table which is typically 20–60 m below surface level across the project site. No GDEs have been identified on the mine site.
- There are no identified springs within the immediate project area. Recharge springs exist 30-40 km to the west of the GAB boundary within the recharge zone and also to the west of the recharge zone, in the Barcaldine Spring Complex. The modelling predictive simulations showed negligible drawdown (much less than 1 m in the GAB aquifers) at the locations of the springs. Deep groundwater system drawdown of about 10 m (in the Permian coal measures) would occur beneath the springs as a result of the proposed mining, but it is highly unlikely that this depressurisation would propagate vertically and significantly impact on the springs.

Groundwater flow and quality

As mining progresses, the surface and underground voids could act as groundwater sinks and could cause a temporary change in groundwater flow direction until mining is completed and the groundwater system recovers to a new equilibrium. The two final open-cut voids could potentially act as mild groundwater sinks with the final equilibrium groundwater levels expected to be about 10 m lower than current groundwater levels near the western edge of the Open-cut 2 mine final voids. As the salinity in the void waters could increase with time due to evaporative concentration, there is a risk of the void lakes becoming flow-through systems and allowing conveyance of water down-gradient by means of lateral groundwater flow.

The model developed for the SEIS indicated mine inflows of 23 GL/annum to the underground mines and 2.6 GL/annum to the open-cut mines. This is a significant upwards revision of inflows compared to the findings of the EIS and work done for other Galilee mine projects where a fractured zone was not modelled in all cases.

Existing groundwater users

A number of existing bores will be adversely affected by drawdown of groundwater levels, particularly those that have intake screens in deeper formations where depressurisation will be greatest. A desktop bore survey conducted for the SEIS, utilising the DNRM groundwater database, identified 236 registered bores within the one-metre drawdown contour, including 123 bores within the 5-metre drawdown contour. Many of these bores will be investigation bores drilled for proposed mines in the immediate area and DNRM monitoring bores. Others will be private water supply bores. No attempt has been made at this time to categorise the various bores within the drawdown contours. Furthermore, not all of these bores will be impacted as it

depends on the position of the intake screens in relation to the depressurised aquifers. The screened lithologies of half of the bores are known to date and further work is required to determine bores that could be affected. The Jericho and Alpha town water supply bores are not expected to be impacted by mining. The SEIS commits Waratah to enter into 'make good' arrangements with landowners in respect of impacted existing groundwater supplies.

Issues

Base line data and monitoring network

In its submission on the SEIS, DNRM raised a concern on the limited availability and reliability of water level base line data. The IESC also commented on this in its advice to me.

DNRM indicated that insufficient monitoring bores were drilled initially for the EIS and were not continuously monitored until May 2012. The monitoring network was extended in late 2012 for the SEIS and equipped with vibrating piezometers, however some of these suffered stabilisation problems and produced questionable readings. Given the limited historical water level data to calibrate the predictive groundwater model, DNRM believes that the model should be updated in two years following the availability of additional base line data and that the results be peer reviewed. Waratah acknowledges this shortcoming and has committed to update the model and to the peer review once two years of continuous monitoring data is available and to regularly update the model and report to DNRM. It has also committed to further expand the monitoring bore network and implement a monitoring program that will enable improved calibration of the model and to check whether predicted drawdowns are realised.

Groundwater model assumptions

DNRM has raised some technical issues in relation to the modelling work including the pinch-out distance of the Rewan Formation, recharge rates and accounting for local groundwater use. DNRM acknowledge that the issues are not critical and could be addressed as part of the update of the model in two years. It believes the model currently provides adequate predictions for assessment of drawdown and impacts.

The IESC also raised a number of points in relation to the groundwater model conceptualisation and setting of parameters. I have considered these matters fully in Appendix 7.

Existing groundwater user impacts

Whilst acknowledging the bore field survey work undertaken, DNRM considers that a more detailed survey is required to identify all bores currently in use and aquifers being accessed in order to identify existing users likely to be impacted prior to impacts occurring. Further, DNRM sought a commitment from Waratah to enter into 'make good' agreements with potentially affected landowners prior to commencement of mining activities. Waratah has since given a commitment to conduct a thorough survey and to enter into 'make good' arrangements.

Cumulative impacts

The IESC raised a concern over the accuracy of the groundwater model in predicting cumulative impacts and the need to condition Waratah to participate in a regional assessment of groundwater impacts in line with that done for previous Galilee mining proposals. I have considered cumulative groundwater impacts in Section 7.6 of this report and set appropriate conditions.

Integrity of Rewan Formation

The IESC has raised a number of issues, related to the groundwater model conceptualisation and the integrity of the Rewan Formation to act as a barrier to interconnectivity between the GAB aquifers and underlying Permian coal measures. The IESC referred to evidence of local faulting in the Rewan Formation some distance from the mine site and advised that the groundwater modelling does not reflect this potential weakness, nor account for the findings of the Great Artesian Basin Water Resource Assessment report (GABWRA) of December 2012 prepared by CSIRO.

Similar issues were raised by the IESC in regard to the Kevin's Corner Project and I addressed these in my evaluation report for that project at the time. The IESC's current advice on the GC project pre-dates my release of the Kevin's Corner report. I have addressed each of the IESC's concerns on the GC project in Appendix 7 of this report. However in regard to the central questions of integrity of the Rewan Formation, modelling conceptualisation, and the GABWRA work I make the following comments:

- DNRM has advised me that the CSIRO work for the GABWRA looked primarily at GAB hydrogeological units of the Jurassic and Cretaceous periods. References to aquifers and leaky aquitards in the report in the broad region of the GC project are interpreted by DNRM as follows:
 - the Hutton Sandstone aquifer which supports a number of registered springs is understood to be the GAB formation (aquifer) directly overlying the basement.
 - the Triassic aged Moolayember Formation is interpreted as the formation (leaky aquitard) in contact with the base of the GAB as defined by CSIRO for the study.

The GABWRA work does not refer to the Clematis Sandstone aquifer/ Rewan Formation which are Triassic formations and the work makes no comment on the integrity of the Rewan Formation as an aquitard. DNRM advise that the GC project model conceptualisation is fit for purpose and adequately models the broader GAB and Permian stratigraphy for the purpose of providing predictions of drawdown and assessment of impacts.

- As to the issue of local faulting in the Rewan Formation, DNRM has advised that the nearest faulting identified in the GABWRA included the major Canaway fault located west of Longreach and some minor faulting located 40 km east of Barcaldine and 45 km west of Jericho. Two faults of limited extent within the Rewan Formation have been mapped by the Geological Society of Queensland to the north-west of the mine site and the EIS/SEIS regional mapping work indicated that no major structural features were found in the area. DNRM concludes that, given there is evidence of only minor faulting in isolated parts of the mine region, it is considered that the modelling work undertaken by the proponent is adequate to determine the potential

impacts and risks from mining operations. A sensitivity analysis conducted for the SEIS where the Rewan vertical permeability was increased by two orders of magnitude showed no significant impact on GAB aquifers.

Groundwater dependent ecosystems (GDEs)

In its advice on the SEIS, DNRM raised a concern that stygofauna sampling work was conducted in the deeper aquifers at the expense of shallower alluvial aquifers—stygofauna preferred habitat—and that annual surveys should be undertaken. Concern was also expressed that the overall GDE assessment was focused on stygofauna at the expense of other GDEs.

Waratah responded that stygofauna sampling was broadly undertaken in accordance with Western Australian protocols because DEHP does not have any established (published) protocols for sampling stygofauna in Queensland. In September 2012, Waratah conducted sampling on 18 bores of which 3 would likely have tapped alluvial aquifers. Results indicated the alluvial aquifers displayed poor stygofaunal abundance and diversity. Only two common stygofauna taxa were recorded which does not constitute a significant pre-construction baseline from which to launch an annual monitoring program with the aim of assessing trends in groundwater health. The recorded taxa occur locally and regionally outside the Waratah mining lease and will not be significantly affected.

In regard to GDEs other than stygofauna, Waratah has advised that work done for the EIS and SEIS found no evidence of GDEs on the mine site. Whilst there are vegetation communities containing *Melaleuca tamarascina* which could be considered to be an indicator of GDEs, these areas are mapped as RE 10.5.1g which is not classified as a wetland. Waratah reports that the species is known to be shallow rooted (Bruce Wilson, Qld Herbarium, pers. comm. 21 June 2013) and that the depth to the water table across the site suggests that this species is not dependent upon the regional water table on the project site.

Tailings and final void management

The IESC also raised concern over the 7 per cent of overburden samples that have the potential to be acid forming and the need for a static and kinetic testing program and tailings management plan. Concern was also raised over the possibility for tailings seepage into groundwater and implications of this for final void management.

These risks are acknowledged by Waratah which has committed to dispose of tailings by a dry paste process rather than by way of a conventional wet tailings storage facility. Tailings are to be dewatered using Phoenix filter press conveyors and the tailings paste and rejects trucked to impervious clay lined containment cells in the spoil piles and compacted by bull dozers to reduce permeability and risk of oxidation. Once full, containment cells are to be capped with a clay blanket. The approach is designed to contain harmful materials and greatly reduce the risk of seepage from the containment cells into the groundwater. Waratah has also committed to prepare a final void management plan as part of its rehabilitation plan and to monitor surrounding groundwater and containment cell embankment stability.

In terms of overburden and interburden disposal, assay testing by the proponent has found the majority of spoil materials to be benign. Potentially saline or oxidisable materials are to be placed in the central areas of spoil piles and buried.

5.4.2. Surface water

Context

The mine lies within the Burdekin River catchment; with the majority of the proposed mine lease area (MLA) draining to the Belyando River sub-basin. To the west, a small portion of the mine drains to the Cooper Creek basin. The topography is generally gently undulating plains with a section of strongly undulating to hilly land located in the north-east corner of the MLA. Key waterways intersecting the site include Beta Creek, Malcolm Creek, Pebbly Creek, Saltbush Creek, Spring Creek and Lagoon Creek which is the ultimate watercourse discharging from the MLA. All of these waterways are ephemeral in nature and can experience expansive flooding following sustained periods of heavy rain. Water extraction downstream is used for agricultural production and domestic uses. The Burdekin Falls Dam, located some 350km north of the MLA, is the only major impoundment structure located downstream of the mine. Immediately downstream of the mine is the Alpha Coal project, being developed by Hancock Coal.

The region has a clearly defined wet and dry season and an average annual rainfall of 532 mm (Alpha Post Office). Stream flow gauging stations on the nearby Mistake Creek and Native Companion Creek indicate an average annual runoff depth of 12 to 14mm, or 2 per cent of average annual runoff, is typical of catchments in the area. To comply with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DEHP, 2012), dams containing mine affected water are required to contain an entire wet season of rainfall. Rainfall records from Alpha Post Office (1889-2011) indicate the duration of the critical wet period is 90 days. This determined water containment requirements for a 1:100 Annual Exceedance Probability (AEP) and a 1:20 AEP were 850mm and 625mm of rainfall in a 90 day period respectively.

Study findings

Water Management System

The Water Management System proposed by Waratah is a conceptual level assessment of flood impacts and the mine's significant water management requirements with a focus on the separation of 'clean' and 'dirty' water. Water within the mine site has been characterised into four classes: contaminated water; dirty water; clean water and groundwater. Contaminated water is surface runoff from the CHPP, ROM, stockpile areas and water within open-cut pits. It will be managed to meet on site water demands and to prevent any discharge to receiving waterways. Dirty water is the surface runoff from spoil dumps and rehabilitated spoil areas that is not expected to contain elevated levels of contaminants but will be directed to sedimentation dams to settle suspended solids and only discharged to receiving waterways during significant rain events. Clean water, or surface runoff from natural catchments, will pass through the site via stream diversions and bunding of open-cut areas and will not be contained onsite. Groundwater will be available for uses including underground mining, onsite

coal processing and potable supply with treatment as necessary. It will be sourced through dewatering of underground operations and aquifer pre-drainage.

A revised assessment was prepared to address a range of concerns raised through the EIS consultation process and to manage greater groundwater inflows predicted by new groundwater modelling. Key features of the mine site water management system now include:

- preferential sourcing of mine or coal seam affected water for onsite demands
- the expectation that all water requirements can be met through groundwater inflows to underground and open-cut mines and through aquifer pre-drainage requirements
- additional water is expected to be available to meet 'make good' arrangements with property owners and to supplement the town water supply in Alpha
- large inflows to underground mines of low salinity water ($<1500 \mu\text{S}/\text{cm}$) are expected to meet all mine water demands, even during dry years. For Years 1 to 5 of the mines operation, aquifer pre-drainage will be used to meet raw water demands
- the project will have a positive water balance for the majority of its operating years and will dispose of excess mine affected water through the use of sprinklers. After Year 20, water will be transferred on-site from underground mines to open-cut pit 1 for storage and then disposal on-site during rehabilitation phases
- water discharges from the site will only occur from sediment dams following high intensity rain events or prolonged wet periods. This water is expected to be of dischargeable quality due to the progressive rehabilitation of spoil areas and retention of sediment in the dams. Long term water balance modelling indicates dams containing contaminated water will not discharge.

Geochemical characterisation of mine waste material from the Galilee Coal Project and the adjacent Alpha Coal Project indicate spoil material will be generally benign with runoff suitable for storage in sediment dams that will overflow after large rain events. Should future geochemical characterisation of spoil material suggest excessive saline or acidic runoff, the water management system will require further revision. The mine will require the construction of additional dams throughout the operational phase to cater for additional disturbance or underground mine subsidence.

Malcolm Creek Diversion

Malcolm Creek flows west to east through the mine site before discharging into Lagoon Creek. The headwaters are directly west of the mine and most of the catchment is covered by the MLA. The project proposes to divert Malcolm Creek through a 450m wide corridor running through open-cut mining areas to the Lagoon Creek floodplain. The corridor will also contain all of the infrastructure necessary to support open-cut and underground mines including underground mine portals, conveyors, open-cut ROM pads, administration and storage areas. DNRM raised concerns regarding the long term stability of the original diversion proposed for Malcolm Creek which included a linear section approximately 7 km long and resulted in a reduction in stream length of approximately 4 km. Subsequent to the SEIS, Waratah has undertaken a revision of the stream diversion design to increase stream length to only 800m less than the existing watercourse. This was achieved by providing for meandering of a low flow

channel within the high flow channel for the full length of the diversion, increased sinuosity of the high flow channel within the infrastructure corridor and through increased sinuosity of the diversion within the Lagoon Creek floodplain. Concerns related to the proximity of the diversion to the open-cut pits have been addressed by moving the high flow channel to the centre of the infrastructure corridor in order to minimise the risk of lateral movement of the diversion toward the final voids. Flood protection levees to protect infrastructure and open-cut pits will be provided and designed in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DERM, 2012).

In addition to the diversion of Malcolm Creek, diversions for Lagoon and Saltbush Creek on the eastern side of the mine are also proposed. While not affected by the same design restrictions as Malcolm Creek these diversions also have the potential to impact flow regimes and stream morphology. These impacts include:

- increased flow rates due to constriction of the floodplain through the diverted reaches
- increased flow velocities in the diverted reaches leading to increased erosion and sediment load to downstream waterways
- increases in upstream flood levels caused by constriction of the floodplain through the diverted reaches
- increase in downstream flood levels and velocities due to increased flow rates caused by the constriction of the floodplain through the diverted reaches.

Subsidence

An assessment of the impacts of subsidence on stream flows was prepared for the SEIS and identified potential significant changes to flow regimes in receiving waterways resulting from interception of overland flow by subsided landforms. Without mitigation works, over 90 per cent of stream flows in the Spring Creek catchment would be captured by subsidence ponding and flows to beyond the mine boundary would occur in only very wet years. Stream flows in Lagoon Creek would be reduced by 33 per cent in 50 per cent of years by runoff being captured in open-cut pits, dams and subsided areas. Jordan Creek would also be affected with an 8 per cent decrease in stream flows predicted for the majority of years.

To mitigate these impacts, Waratah has proposed excavation through the pillar zones to maintain connectivity of water and sediment movement along the waterways. The effect of these excavated drains was incorporated in a revision of the water balance mode, post-SEIS, to identify performance and final ponding areas within each catchment. The results of the modelling showing cumulative subsidence ponding volumes with and without mitigation earthworks are shown in Table 5.2. The revised water balance modelling showed a significant improvement in run-off from these streams. Flows in the Spring Creek catchment would be reduced by only 40 per cent at the northern mine boundary, Lagoon Creek stream flow would be reduced by only 21 per cent in 50 per cent of years and flows into Jordan Creek would be reduced by only 3 per cent in 50 per cent of years.

Table 5.2. Cumulative subsidence ponding volumes

Catchment	Cumulative Subsidence Ponding Volume (ML)—No Mitigation	Cumulative Subsidence Ponding Volume (ML)—With Mitigation	% Reduction in Subsidence Ponding Due to Mitigation Earthworks
Spring Creek	2089	23	–99
Lagoon Creek	3146	343	–89
Tributary of Jordan Creek	229	12	–95

A Subsidence Management Plan identifying trigger processes for the construction of drains through pillar zones affected by subsidence is to be developed under the EM Plan.

Issues

The most critical issues relating to surface water impacts and surface water management raised during the consultation periods of the EIS and SEIS related to the realignment and shortening of Malcolm Creek by diverting it through the open-cut mining area; the impacts of subsidence on overland flow and clean water discharge from the mine, particularly from the Spring Creek catchment; and the inclusion of additional groundwater inflows into a revised water balance model. Waratah has undertaken additional work to address these issues and committed to undertaking the following works prior to the detailed design phase and application for relevant water licenses:

- preparation of a Subsidence Management Plan identifying the expected impacts of subsidence and suitable mitigation measures in more detail
- a baseline monitoring assessment to determine the condition of waterways that are expected to be impacted by subsidence prior to the commencement of mining
- a baseline monitoring assessment of Lagoon Creek and Malcolm Creek using the procedure identified in the *Mine Site Creek Diversion and Flooding Report* (Engeny, 2012c)
- a detailed geomorphic and geotechnical investigation to inform the detailed design of the creek diversions to support the application for water licences.

5.4.3. Coordinator-General's conclusions

Groundwater

A central issue in the groundwater modelling and assessment of impacts is the integrity of the Rewan Formation to act as an effective aquitard to shield the overlying GAB aquifers from the lower dewatered Permian coal measures. The State (DNRM), Waratah and other Galilee project proponents have concluded that the Rewan Formation acts as an aquitard in the lower Galilee Basin region while the IESC in its advice to me is less comfortable on this matter. Having regard to all the information and advice before me, I believe it reasonable to conclude that the Rewan Formation will act as an effective aquitard and that mine dewatering will not significantly impact on the

GAB aquifers and associated springs in the GAB intake beds and the springs further west in the Barcaldine Springs Complex.

However, having regard to the views of the IESC, I have adopted a precautionary stance and recommended to DNRM that additional monitoring of the Clematis Sandstone/Dunda Beds/Rewan Formation interface be undertaken by the proponent before and during mining operations and that appropriate trigger levels be set for management action should there be unexplained changes to water levels and/or water quality in the Clematis Sandstone aquifer. This recommendation is included at Appendix 3, Part C, Schedule 1. Waratah's monitoring network presently includes two bores in the Clematis Sandstone/Rewan Formation interface and the company has committed to include a further two bores in this area as part of its commitment to expand the monitoring network by a further five bores.

I acknowledge the concerns raised variously by the IESC and DNRM on aspects of the modelling relating to the limited water monitoring data set and model conceptualisation. I have considered each of these concerns and conclude, based largely on the advice of DNRM that the work done is adequate to identify potential impacts and risks from the proposed mining operation. I accept the need for the modelling work to be further refined and updated in the light of additional water monitoring data and the need for an effective monitoring program to identify trends prior to any problems arising. To this end I have also made recommendations to DNRM for the predictive modelling work to be updated within two years and for the work to be peer reviewed and submitted to DNRM to further validate the groundwater model. These recommendations are included at Appendix 3, Part B, Schedule 1. Waratah has given commitments to this end in Appendix 5.

I accept that a more detailed existing user bore survey needs to be undertaken to identify users likely to be impacted by mining and the need for Waratah to enter into 'make good' arrangements prior to mining activity commencing. I have made recommendations to DNRM on these matters in Appendix 3, Part B, Schedule 1.

In regard to GDEs, I am satisfied that there is little risk of significant impacts to GAB springs and species that may utilise this habitat. I accept Waratah's findings that vegetation GDEs do not exist on site and if they did would not be impacted by groundwater drawdown as any such communities are likely associated with perched watertables and not the regional watertable at greater depth which is not available to such communities. I accept that stygofauna has limited abundance and diversity on the mine site and is represented off-site and will not be subject to significant impacts.

I have considered the issues of tailings management and final voids management elsewhere in this report and stipulated conditions for the preparation of appropriate management plans in Appendix 1, Schedule F. I am satisfied that these measures will properly manage any seepage of contaminants to groundwater.

Surface water

The surface water assessment has undergone significant revision to address concerns raised through the EIS and SEIS consultation periods. It has also been reworked subsequent to the SEIS, to cater for increased groundwater inflows estimated by groundwater modelling undertaken as part of the SEIS. I note concerns from the IESC

regarding the adequacy of the site water balance and the volume of raw water required to maintain planned operations. With additional estimated groundwater available, I am satisfied that the project's raw water demands can be met. The site Water Management System has been updated to account for increased groundwater inflows into underground operations. Regarding discharges to receiving waterways I have set a condition in Appendix 1, Schedule C to ensure impacts can be managed. Waratah will need to provide further details on locations of release points and trigger values of waters discharged from the site for the approval of DEHP prior to an application for a draft EA. Results of future groundwater monitoring and updates to the groundwater model will need to be included in updates to the site water balance model. In regard to the diversion of Malcolm Creek, I have made a recommendation to DNRM that a condition of the water licence require the proponent to prepare a strategy for the long term management of the creek, post mining.

5.5. Land

5.5.1. Soils and land suitability

Study findings

Soils

The EIS presented broad scale mapping of major soil groups at the mine site based on a desktop assessment of available information, supplemented by limited field work. Soil sampling and laboratory testing was undertaken at 10 sites covering all representative major soil groups. Visual observations were conducted at a further nine waterway sites to assess erosion potential. Field investigations and testing were aimed at characterising soil types, assessing depth and quality of useable soils, dispersivity, erosion potential and assessing potential as a regrowth medium.

Following comments on the EIS that the soil and land suitability assessment lacked detail, Waratah presented more detailed soil mapping in the SEIS addressing soil types, wind and water erosion susceptibility, agricultural land classification and land suitability classification. Additional soil sampling and testing was conducted at 27 sites within and adjacent to the open-cut footprint and a detailed soil investigation plan was outlined to provide future information at the design stage to accompany the application for an EA.

The soil work completed indicates that the mine site is dominated by Kandosol and Rudosol soils, mostly well drained, low in fertility with some moderately to highly saline. The soils are generally non sodic at the surface but sodicity increases with depth and the soils are considered to be moderately to highly prone to erosion due to dispersion. Waratah has outlined erosion control strategies and committed to prepare erosion and sediment control plans.

In the central and eastern portions of the site where the bulk of clearing and topsoil stripping will take place, useable topsoil resources are likely to be restricted to the top 300 mm of the soil profile and will likely require the addition of nutrients and appropriate seed stock to make the soils a suitable growth medium. Waratah has outlined topsoil

management strategies and committed to prepare a topsoil management plan as part of its plan of operations for the mine.

Land suitability

An assessment of good quality agricultural land and land suitability determined that no good quality agricultural land or strategic cropping land existed within the mine area. The land is classified predominately as Class C, pasture land, with some areas classified as Class D, non-agricultural land. Under the DME 1995 land suitability guidelines, the mine area land is classified as Class 4 -5, marginally suitable or unsuitable for agriculture. The area is currently used for cattle grazing on native and improved pasture together with nature conservation in the case of the BNR. Waratah has committed to rehabilitate the area for beef cattle grazing at the completion of mining.

5.5.2. Subsidence

Context

The GC project consists of two open-cut operations and four underground longwall operations. Each underground operation will utilise the retreating longwall extraction method, with panels being 470m wide and up to 7,000m in length. The project will involve 104 longwall panels all orientated in an east-west direction. Initially, one longwall mine will commence operations with the remaining three underground mines to come on line successively over six month intervals. The coal seams to be mined by the longwall operations include the B, DU and DL seams.

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. Subsidence develops progressively and is apparent on the surface in a wave across the active longwall panel and advances at the same rate as the longwall. The maximum point of subsidence occurs at the mid-line of the longwall panels and usually occurs within three months although it can occur over a longer period.

Study findings

The subsidence estimates in the EIS and SEIS were based on empirical two dimensional subsidence profiles. Maximum subsidence is expected to range between 1.2 m and 1.6 m over the four underground mines. However where mine 4 (B seam mined) overlies mines 1 and 2 (D seams mined), total subsidence is expected to be up to 3.2 m. This situation extends over approximately one third of the underground mining footprint.

The SEIS reports that the total area to be affected by subsidence may be in the order of 34 000 ha over a 30-year mine life period. This impact area is confined principally to non remnant vegetation (improved pasture) and 'least concern' remnant vegetation, with a small area of 30 ha of 'of concern' vegetation in the north-west of the site. Potential subsidence impacts could include redirection of surface flows, ponding, surface tension cracking, soil erosion, water quality and groundwater impacts. All of

these effects have the potential to impact surface ecological values. Subsidence impacts to ecological values are considered in Section 5.6.2 of this report and impacts to surface water and groundwater values are considered in Section 5.4.

The SEIS proposed that types of remedial works would include ripping and compacting compression cracks and creating run-off outlets from internally ponded areas formed through panel subsidence. The remedial works would extend to post subsidence blanketing and compacting of some water courses, preventing inflow of run-off into underground mining areas and maintaining environmental surface flows. Materials which have been investigated for use in compacted blankets include silty alluvium and impervious clay. On completion of remedial works, land will be returned to grazing or original activities.

Waratah has outlined a subsidence management strategy to manage impacts that has the following objectives:

- Outline the monitoring and measurement protocols
- Establish responsibilities for the management of subsidence related issues during and immediately following under-ground mining
- Satisfy the applicable regulatory requirements for subsidence management across the GC project
- Justify the relevance, suitability and adequacy of the proposed mine layout and mine sequence with respect to subsidence related issues
- Establish management priorities and detail the proposed mitigation/remediation and management measures
- Detail the review and reporting protocols.

5.5.3. Rehabilitation

The EIS describes broad strategies for progressive and final rehabilitation of areas disturbed by mining and associated infrastructure. The proposed final landform is a safe and stable mosaic of grazing land and self-sustaining vegetation communities made up of native tree, shrub and grass species. If an agreement can be reached with relevant authorities and the post-mining landowner regarding the on-going use of some supporting infrastructure components then they may be left to support future uses. Waratah has proposed decommissioning action plans or removal of the following structures following closure of the mine:

- mine industrial area, conveyors and accommodation facilities
- mine water storages
- mine water supply pipelines
- power supply and transmission lines
- waste management facility

A Final Void Plan will be prepared before completion of open-cut mining in the first pit and be informed by studies including an assessment of pit wall stability, groundwater hydrology and surface water hydrology. A void will remain after completion of mining in each of the four open-cut pits. To achieve long term stability, the banks and ramps will

be reshaped to match the surround wall slopes. The voids will be bunded and fenced to inhibit access to the area prior to mine closure.

Mine infrastructure areas will be returned to pre-mining landforms or to a similar landform profile suitable for grazing on improved pastures or dry land cropping.

In pit and out of pit overburden stockpiles will be progressively rehabilitated within two years of the land becoming available, to improve water quality runoff and reduce erosion potential. Stockpiles will be reshaped to stable landforms suitable for low intensity cattle grazing on low gradient sections. Landforms with steeper gradients will be used for nature conservation outcomes such as connectivity.

Creek diversions will be designed as stable landforms and will be established with riparian vegetation by the end of mine life. These will be retained in a stable and sustainable condition in accordance with a Creek Diversion Rehabilitation Plan to be developed under the EM Plan.

Water storage dams can either be removed and rehabilitated or retained for post mining agricultural use. If dams have contained saline water or other contaminants, they may require additional remediation works. Water storage areas that are not retained will be rehabilitated to land suitable for improved pastures and cattle grazing.

Rehabilitation of the tailings dam will involve capping the surface to prevent rainwater ingress and then topsoiling and revegetating the surface with native species. The final landform will have a low gradient and is proposed to be used for grazing or nature conservation purposes.

Haul roads and access tracks that are not required by future landowners or temporarily for rehabilitation works will be highly compacted and require a combination of deep ripping, profiling, topsoiling and revegetation. They will be rehabilitated to support improved pasture and cattle grazing uses.

Progressive rehabilitation will be guided by a Plan of Operations to be developed by Waratah detailing the types and areas of land to be disturbed and including a schedule of rehabilitation activities. Monitoring of progressive rehabilitation will be undertaken throughout the various phases of the project with regular review periods to assess whether objectives are being achieved.

5.5.4. Coordinator-General's conclusions

Soils and land suitability

I am satisfied that the soils and land suitability assessment deficiencies identified in the EIS have been adequately addressed in the SEIS for the purpose of assessing impacts. Further, I am satisfied that the mitigation and management strategies outlined in the EIS, SEIS and EM Plan will allow impacts to be suitably managed. To secure this outcome, I have stated conditions at Appendix 1, Schedule F for topsoil management.

Subsidence

I am satisfied that Waratah has properly investigated the likely levels of subsidence associated with its underground mining operations. I note its commitment to implement

a subsidence management strategy to manage the effects of subsidence. To ensure that this commitment is properly implemented, I have stated a condition in Appendix 1, Schedule F for the EA requiring the preparation of a subsidence management plan for the approval of DEHP prior to the commencement of mining activities.

Rehabilitation

I am satisfied the mine decommissioning and rehabilitation proposal has been outlined to a degree that will allow effective closure of mine operations and transfer to other land uses. The SEIS has adequately addressed issues raised in the EIS comment period by evaluating relevant case studies of successful rehabilitation of open-cut mines and management of post-mining landscapes. Specific criteria for decommissioning and rehabilitation success will need to be detailed in the Mine Closure Plan and draft EM Plan for all mine components, considering the results of ongoing rehabilitation monitoring, trials and research programs. Waratah has committed to preparing a Landscape Rehabilitation Plan in consultation with relevant Government agencies and the local community as well as a Rehabilitation and Decommissioning Plan. I have stated a condition in Appendix 1, Schedule F requiring the preparation of a rehabilitation management plan.

5.6. Waste

5.6.1. General waste

Context

The project will generate non-mineral waste during the construction and operational phases. These sources include:

- regulated waste including hydrocarbon waste (i.e. waste oil, oily water, oily sludge, grease, coolant, oil rags, oil filters, drums, detergents, solvents, batteries, tyres, paints and resins)
- general waste including food waste, packaging and food containers
- recyclable waste including paper, cardboard, plastics, glass and aluminium cans
- wood waste including timber, pallets, and off-cuts
- scrap metal from mine infrastructure areas including drums, cans, scrap, containers, nails, screws
- sewage effluent and sludge.

The proponent has committed to develop a waste management strategy which incorporates waste management into daily operations and implements efficient practices throughout the lifecycle of the project. Licensed contractors are proposed to be engaged to remove, track and record any regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) generated onsite.

Study findings

In its submission on the EIS, DEHP requested that the proponent clarify the project's requirements for a landfill site, identify its likely position in relation to the mining lease

and describe any potential impacts and environmental protection commitments within the EM Plan, in addition to potential rehabilitation requirements. Further information was provided by Waratah during the SEIS but no determination was made as to whether a landfill facility would be established on-site or general waste would be trucked to Barcaldine Regional Council (BRC) facilities.

In response to further requests for clarity on this issue, the proponent provided further advice, post-SEIS, advising that the project is expected to generate approximately 217,000 m³ of waste across the 34-year mine life, including the construction, operation and decommissioning phases. Further, Waratah has decided to construct a landfill facility on-site to accept all general waste. Regulated waste is proposed to be transported to the Barcaldine facility for treatment, and all recyclable material is to be transported to off-site facilities via licensed contractors.¹⁰

The majority of the mine workforce will be housed in purpose-built accommodation on the mining lease, which will be serviced by package sewage treatment facilities and treated to at least a Class C recycled wastewater quality. Treated wastewater will be discharged to absorption beds and/or irrigation fields, except during heavy rainfall events when it will be temporarily stored in an alternative location, to be discharged at a later date. Treated sludge is to be transported off-site by a regulated waste contractor to a regulated waste facility.

Waratah has advised that treated wastewater may be used in progressive revegetation works during the life of the project, and following the cessation of mining.

Waste oil is to be stored in drums on-site, and transported off-site by a waste contractor for reuse, recycling or disposal.

5.6.2. Waste rock characterisation and management

Study findings

Limited work was performed for the EIS in characterising overburden, interburden and coal rejects. Some 14 samples taken from boreholes in the open-cut area of the mine site, established for the groundwater investigation, were tested for acid producing potential and for a range of heavy metals. Waratah's view was that the limited sampling and testing was representative of the whole overburden layer because of the presence of uniform geology with little or no faulting.

Testing results indicated that the overburden materials were generally very low in sulphur content and were generally non acid forming (NAF), and not expected to pose a risk of causing acid rock drainage (ARD). Heavy metal concentrations were below environmental investigation levels for all tests apart from two samples of chromium. It was concluded that excavation and stockpiling of overburden would have a low risk of producing heavy metal contamination by leachate or surface runoff.

¹⁰ SEIS V1, Part C, Section 08

Issues

In its submission on the EIS, DEHP expressed the view that the completed mineral waste characterisation work was inadequate and that further detail was required including proposed approaches to identifying acid producing material as well as sodic and dispersive materials together with proposed management actions for dealing with these wastes.

In response to this advice, Waratah conducted further sampling and testing based on continuous stratigraphic sampling of four widely spaced bore holes in the underground mine area to provide additional information on acid producing potential, horizons of concern and distribution of PAF and NAF rock types. A total of 285 samples were collected and tested from the fresh Permian overburden and interburden sequences. The overlying weathered Cainozoic materials were not available for testing from the drill cores.

The additional work confirmed the results for the EIS that the vast majority of fresh overburden and interburden is likely to be NAF with significant excess buffering capacity. The main PAF horizon was identified as within 5 m of the C Seam roof and low capacity PAF material at the DU Seam roof and floor.

The SEIS also outlined management and monitoring strategies for saline and sodic/dispersion materials and for ARD control and the proponent has committed to conduct additional geochemical investigations for an additional 4 to 6 bore holes with continuous stratigraphic testing including the overlying weathered zone and for leach column kinetic testing.

5.6.3. Tailings management

Study findings

The GC project will mine 56 million tonnes of coal per annum (Mtpa) from the B, C and D Seams of the Permian Coal Measures producing rejects and tailings of 10.7Mtpa and 5.3Mtpa respectively.

Waratah has undertaken a range of hydrogeological and geotechnical studies to ascertain the best method for rejects and tailings disposal. The proponent's aim is to ensure geotechnical stability of containment structures, encase all rejects and tailings in impervious clay blankets and prevent any seepage of groundwater into the environment.

Options for the tailings storage facility investigated included trucking dry tailings, in pit disposal of dry tailings, conventional thickener and tailings dam, and thickened tailings disposal. The preferred option adopted in the SEIS is trucking tailings dry paste and rejects to disposal cells. Cells are to be designed and constructed for the initial five years in the out of pit box cut spoil area and thereafter in the in-pit spoil areas. A life of mine tailings emplacement strategy has been outlined in the SEIS.

Filter pressing is required to obtain a transportable tailings paste and Phoenix belt presses are proposed. Tailings and rejects will be trucked to the containment cells, dumped and then spread and track compacted by a dozer to reduce permeability and prevent oxidation. The SEIS reports that physical and chemical testing to date

indicates that the rejects and tailings will be benign. No oxidisable pyrite has been detected in any drill cores.

Monitoring techniques will include the use of piezometers, routine groundwater testing and survey monuments to ensure adequacy of the disposal cells. All cells will have the required design storage allowance and on completion of infilling they will be capped with impervious, compacted fill, topsoiled and seeded. Analyses have been completed for geotechnical stability of all cell batters.

5.6.4. Coordinator-General's conclusions

General waste

Treatment, storage and transport of regulated waste requires an approval under the EP Act due to its classification as an ERA. All applicable requirements and the persons responsible for each of the tasks are reflected in the project's Waste Management Plan (WMP), a component of the Mine EM Plan. The proponent must implement the Mine EMP for the project in accordance with the EP Act.

The movement of regulated waste in Queensland is subject to a waste tracking system under the EP (Waste) Regulation. All waste movement from the site will be tracked in accordance with the requirements of Schedule 2 of the EP (Waste) Regulation, as detailed in the WMP. This will include the completion of Waste Transport Certificates for the collection, transport and management of regulated wastes from the project.

Waratah has committed to work with local councils to determine current landfill capacities and accepted waste types and will work to assist with the planning of expansion and upgrade of waste facilities to ensure wastes generated from the mine can be accommodated if required.

Based on mitigation measures and management plans outlined in the Mine EMP and WMP, I am satisfied that general and regulated waste would be effectively managed over the life of the project. I have stated specific waste management conditions for the draft EA in Appendix 1, Schedule E and require Waratah to enter into an infrastructure agreement with BRC in regard to any upgrade of council's facilities at Appendix 3, Part B, Schedule 4.

Waste rock

In general terms, I accept that the waste rock characterisation deficiencies identified in the EIS have been addressed in the SEIS and that provided that the outlined ARD management strategies are appropriately implemented, there will not be any significant impact to the surrounding environment.

Geochemical kinetic testing of core samples is currently in progress and the proponent has committed to further testing which will further inform the management approach.

I have stated conditions for the draft EA to ensure that waste rock materials are properly managed at Appendix 1, Schedule F.

Tailings

I am satisfied that the proponent has adequately examined options for disposal of coarse rejects and tailings and that the management proposals outlined in the SEIS and mine EM Plan will ensure that impacts can be properly managed. To ensure this outcome, I have stated conditions in Appendix 1, Schedule F, requiring Waratah to prepare and implement a mining waste management plan prior to commencement of mining activities.

5.7. Air quality

5.7.1. Context

Impacts to the ambient air quality of the site and sensitive receivers have been assessed for the construction, operation and decommissioning phases of the project. The assessment is based on an annual ROM coal production of 56 Mtpa and 40 Mtpa of saleable coal. Potential impacts were assessed against Environmental Protection (Air) Policy 2008 (EPP (Air)) guidelines for ground level concentrations for total suspended particles (TSP), particles with a diameter of less than 10µm (PM₁₀) and particles with a diameter less than 2.5µm (PM_{2.5}). Dust deposition rates were also assessed against relevant guidelines. The study is presented in Volume 2, Chapter 10 and Volume 5, Appendix 18 of the EIS.

During the initial construction phase of the mine, pre-stripping of tertiary materials and construction of access portals to the underground mines will likely generate dust and potentially impact air quality. These impacts are expected to be transient in nature and significantly less than those associated with combined open-cut and underground mining during the operational phase. Dispersion modelling of dust related pollutants (TSP, PM_{2.5} and PM₁₀) was undertaken for the operational phase to assess air quality impacts. Other pollutants, sulphur dioxide, nitrogen dioxide, carbon monoxide and volatile organic compounds, are expected from mining activities but are considered unlikely to lead to exceedances of EPP (Air) objectives and were not quantitatively assessed. The majority of emissions are associated with the removal and transport of overburden material, hauling of coal and wind erosion of exposed areas. As emissions are expected to peak in year 19 of the projects life, this was used to assess worst case conditions. This year is also expected to coincide with worst case impacts from the Alpha Coal and Kevin's Corner mines and has been used to model worst case cumulative impacts.

No regulatory ambient air quality monitoring stations are located in the vicinity of the mine so background concentrations were estimated from air quality monitoring undertaken at West Mackay by DEHP and are likely higher than the background levels at the mine. Modelling results indicate exceedances for dust deposition, TSP, PM_{2.5} and PM₁₀ within the mine boundary. For TSP and dust deposition it is not anticipated that guidelines will be exceeded beyond the mine boundary. PM_{2.5} concentrations are expected to exceed guideline levels just beyond the northern boundary but do not affect any sensitive receptors. PM₁₀ concentrations are expected to exceed guidelines at five sensitive receptors in the region of the mine, two of which are located within the

mine boundary and one which is located within the boundary of a proposed neighbouring mine. The EIS notes that exceedances of the EPP (Air) guideline can be expected to impact human health and wellbeing at any sensitive receptors that remain inhabited during the mine operation. No exceedance of guideline levels is predicted for the townships of Alpha and Jericho.

5.7.2. Issues

The air quality model was revised to address issues raised in the EIS comment period. This included the addition of emission sources from coal crushing and sizing infrastructure, PM_{2.5} emissions from vehicle exhaust and background particulate matter estimates from the Alpha Coal and Kevin's Corner mines in a cumulative assessment model. Further detail on proposed dust control measures was also sought by DEHP. In addition, relevant best practice techniques described in the recent paper *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone Environmental, 2011) have been adopted since the EIS in regards to watering to control dust emissions, on site transport of coal and dragline drop heights.

Waratah has committed to preparing an Air Quality Management Plan detailing measures to ensure conditions at sensitive receptors are acceptable under the EPP (Air) guideline. Measures may be proactive, such as watering and rehabilitation, or reactive, such as relocating or ceasing an activity, and will cover construction, operational and decommissioning phases.

In order to avoid significant impacts, Waratah has proposed to acquire or relocate the following sensitive receptors:

- Kia Ora
- Monklands
- Spring Creek
- Glenn Innes.

Nearby sensitive receptors that do not meet acquisition criteria for predicted air quality impacts are Lambton Meadows, Hobartville and Cavendish. Continuous air quality monitoring at sensitive receptors will be conducted as part of an air quality monitoring plan. Landowners may request Waratah purchase the land if pollutant concentrations are above the EPP (Air) guideline.

5.7.3. Coordinator-General's conclusions

I am satisfied the additional work undertaken for the SEIS and the revision of the air quality model to include new information from the Alpha Coal and Kevin's Corner projects has adequately addressed issues raised in the EIS comment period. Waratah has proposed to meet air quality objectives to ensure the project does not adversely impact human health or ecological health of terrestrial flora and fauna through the following commitments:

- managing short term dust emissions during the construction phase through a comprehensive EMP

- achieving effective dust management during mining operations through appropriate planning and awareness of conditions during peak dust emissions. This includes minimal disturbance to the area being mined, minimising haul distances, and controlling vehicular speeds on haul roads and minimising mining activities during high wind speed events
- implementing dust control measures during mining operations, such as watering of haul roads, water spraying at stockpiles, fully enclosed conveyor systems, underground loading of coal at the preparation phase and facilities, wet coal handling facility and ongoing revegetation of stripped areas in the open-cut mines
- implementing a comprehensive dust monitoring program across the site that includes onsite and offsite dust monitoring points and a meteorological station to provide accurate measure of local weather conditions
- collaborating with other proposed large-scale mining developments across the region. A requirement to manage dust emissions to levels below the adopted air quality guidelines is necessary from all parties
- preparing specific dust control and mitigation measures as part of a mine decommissioning strategy.

Where significant impacts to air quality cannot be avoided I acknowledge that acquisition or relocation of a number of sensitive receptors may be necessary. In addition, ongoing monitoring at remaining sensitive receptors is required to assess whether further acquisitions or relocations are required for receptors that are not predicted to trigger acquisition criteria. I also note the proposed mine construction and operation camp has been located to achieve compliance with air quality guidelines. To ensure these outcomes, I have set a condition in regards to air quality in Appendix 1, Schedule B.

5.8. Noise

5.8.1. Context

An assessment of noise impacts for the mine was undertaken for construction and operational phases of the project. The proposed upgrade of the Alpha airport was not included in the study as it will be undertaken separately by other parties. “Acoustic quality objectives” that are conducive to human health and wellbeing, including the ability for individuals to sleep, study, relax and converse are defined in the *Queensland Environmental Protection (Noise) Policy 2008* (EPP (Noise)). The policy contains criteria for management of noise and vibration relevant to construction and operation activities impacting acoustic environmental values.

Aspects of the acoustic environment, such as variable, short-term and transient noise events, are managed in accordance with the *Ecoaccess Guideline: Planning for Noise Control*. The guideline also manages the control and prevention of a gradual cumulative increase in minimum noise levels generated by continuously operating noise sources. For the mine area this applies to a range of noise and vibration sources including construction activities, operation of machinery, blasting, vehicle traffic and rail operations. Baseline sampling was undertaken in April and July 2010, at four properties

selected to represent potentially affected residences nearest to the proposed mine site and haul road. Ground vibration assessment was undertaken using Year 20 to predict peak ground vibration levels from blasting operations. Results of these studies are presented in Volume 2, Chapter 11 of the EIS.

5.8.2. Study findings

The EIS identified sensitive receptors and assessed baseline ambient noise levels within the area of the proposed mine and quantified the potential change in noise and vibration environments as a result of the construction and operation of the mine site and its associated infrastructure. To assess impacts, noise and vibration modelling was undertaken for the mine area and associated ancillary infrastructure to predict noise propagation in all directions under favourable meteorological conditions. Noise and vibration modelling was undertaken for the mine area and associated ancillary infrastructure to assess impacts. While some of the potential noise sources can be attenuated; others by virtue of location and mobility would present difficulties for noise mitigation. Noise impacts from mine operations would be expected at locations Eureka, Lambton Meadows, Salt Bush and Cavendish with no impacts at Kiaora, Monklands and Hobartville as they are expected to be either acquired or relocated.

The study found that impacts arising from mine operations, blasting activities, construction and haul roads and mine access roads can be managed to comply with criteria set out in the EPP (Noise) Guideline due to the large intervening distance between sources and receptors and the allowable time per day for construction activities. Blasting operations are not expected to impact existing underground infrastructure, such as pipe work and telecommunication cables. Mine decommissioning is expected to result in similar noise and vibration emissions to those arising from construction activities.

The assessment for the mine site included potential impacts associated with the construction and operation of the mine and associated infrastructure, including the proposed new access road and the airport.

A detailed technical assessment of the potential impacts associated with noise and vibration emissions has been conducted and is presented at EIS vol. 5, Appendix 20. In response to the EIS submissions, the proponent has updated the noise and vibration assessment in SEIS vol. 2, Appendix 28.

5.8.3. Issues

Submissions received on the EIS raised issues in relation to the assessment of noise and vibration. Queensland Health identified the need to consider worker accommodation, stating that noise abatement measures must be incorporated if Environmental Protection Policy (EPP) Noise standards are likely to be exceeded.

Transient noise impacts are anticipated to arise from haul trucks and other mobile equipment, with the largest noise events being associated with blasting. Blasting is expected to occur approximately four times per week during the daytime to avoid potential sleep disturbance. The only residential location affected by significant noise increases is Monklands. Waratah will enter discussions with the property owner

regarding acquisition of the dwellings, potential relocation or use for a purpose other than a place of residence.

Mine construction will be regulated by an EA and supported by an EMP containing measures to mitigate impacts to sensitive receptors and acoustic environmental values. Waratah has committed to developing and implementing construction noise and vibration management plans to address potential impacts arising from the project. This entails modifying proposed earthworks to enable planning noise levels to be met; investigating techniques to attenuate noise from crushers; consulting with potentially affected property owners regarding the use of the affected residence for another purpose or acquiring the property; and conducting ongoing monitoring throughout both construction and operational phases of the project.

5.8.4. Coordinator-General's conclusions

I have considered the EIS submissions and how the SEIS responded to the issues raised. I am satisfied that the EIS has adequately assessed noise and vibration impacts for the project. I am satisfied that through the implementation of measures outlined in the draft EMP and compliance with the draft EA noise and vibration conditions, the predicted impacts of the project on sensitive receptors can be managed within acceptable limits.

Adopting best practice environmental management across all facets of the development will generally result in equipment selection that will not only minimise the risk of disturbance to in the temporary construction camp, but also reduce stress to fauna in the natural environment. Temporary accommodation facilities will be designed to achieve noise levels that protect workers' health and well-being. The proponent must meet the environmental conditions for all noise sources relevant to noise sensitive receptors, contained in Appendix 1, Schedule D of this report.

6. Evaluation of environmental impacts—rail

This section outlines the major environmental effects identified in the EIS, SEIS, submissions on the EIS and SEIS and advice from advisory agencies and other stakeholders that relate specifically to the rail component of the project. The report provides comments on the effects and, where necessary, includes conditions or recommendations to mitigate adverse impacts.

6.1. Terrestrial ecology

6.1.1. Context

The rail component of the project comprises a 453 kilometre (km) corridor from the mine to the Abbot Point State Development Area that will accommodate a 400Mtpa capacity dual rail line and service road. The majority of the corridor lies within the Brigalow Belt bioregion with the southern portion traversing the Desert Uplands bioregion. Biodiversity values in the lower lying areas of the Brigalow Belt have been particularly subject to pressures from land clearing and conversion to pasture, dry land agriculture and mining. Areas associated with upper slopes and more rugged topography remain relatively undisturbed. The Desert Uplands bioregion is dominated by sandstone ridges and sand plains. It supports a diversity of flora and fauna including a number of threatened species.

Desktop and field studies were undertaken to determine the key terrestrial flora and fauna values of the corridor and assess the potential impacts associated with its development. An initial dry season flora and fauna survey of the study area was conducted over 10 days in July 2010 by helicopter which ground-truthed 57 flora and fauna habitat sites, this study is presented in Volume 5, Appendix 11 of the EIS. The wet season flora survey was undertaken over six days in March 2013. Additional fauna surveys along the corridor were conducted over a total of 29 days in May 2011, April 2012, February 2013 and March 2013. Reports for these studies were provided after the submission of the SEIS.

The corridor study area covers 1731.39 ha, of which about 70 per cent is comprised of remnant vegetation. The clearance width for the rail corridor will range from 50 metres (m) in open flat terrain widening up to 150m where slopes require cutting and benching. Areas mapped as regional and State biodiversity significance in Biodiversity Planning Assessments are intersected by the rail. Most of the vegetation observed during the surveys was affected by grazing activities and had limited connectivity between remnant patches due to extensive historical clearing. The most significant connectivity in the study area is associated with riparian vegetation along major watercourses. As the landscape contains relatively little remnant vegetation cover, these areas remain as important habitat refuges.

6.1.2. Study findings

Vegetation communities and flora species

Regional ecosystems

Mapping by the Queensland Herbarium identified a total of 68 regional ecosystems (REs) intersected by the rail corridor including 49 classed as Least Concern, 16 as Of Concern and 3 as Endangered under the *Vegetation Management Act 1996* (VM Act). In terms of DEHP biodiversity status, 39 REs are classed as No Concern at Present, 22 as Of Concern and 7 as Endangered. Regional ecosystems of conservation significance found present in the study area are shown in Table 6.1.

Table 6.1. Regional Ecosystems of conservation significance

Regional Ecosystem	Status		
	EPBC	VM Act	Biodiversity
11.3.1	Endangered	Endangered	Endangered
11.4.5	-	-	Endangered
11.4.6	-	Endangered	Endangered
11.4.8	Endangered	Endangered	Endangered
11.4.9	Endangered	Endangered	Endangered
11.3.21	Endangered	Endangered	Endangered
11.3.2	-	Of Concern	Of Concern
11.3.3	-	Of Concern	Of Concern
11.3.4	-	Of Concern	Of Concern
11.3.5	-	Of Concern	Of Concern
11.3.25	-	-	Of Concern
11.3.25a	-	-	Of Concern
11.3.25d	-	-	Of Concern

Field surveys also confirmed the presence of two endangered Threatened Ecological Communities (TECs) protected under the EPBC Act within the study area. These are Brigalow (*Acacia harpophylla* dominant and co-dominant) corresponding to REs 11.3.1, 11.4.8 and 11.4.9, which was found in generally small remnant patches scattered across the extent of the corridor. The second TEC is Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin, which corresponds to RE 11.3.21. The grassland communities were observed in poor condition in surveyed sections of the alignment. Certified RE mapping shows approximately 52.2 ha of threatened Brigalow communities and 17.2 ha of threatened Natural Grasslands are located within the study area.

Areas of high value regrowth are also present within the rail alignment. These are areas of non-remnant woody vegetation that have not been cleared since 31 December 1989 but do not have the structural or floristic characteristics of remnant vegetation. The study area includes approximately 15.23 ha mapped as high value regrowth.

A number of Category B and Category C Environmentally Sensitive Areas (ESAs) are intersected by the corridor. There are 40 intersections with Category B ESAs (REs with Endangered biodiversity status) resulting in an impact area totalling 98.83 ha. Impact areas associated with Category C ESAs are 40.38 ha (Coastal Management District) and 1731.39 ha (Drainage Areas/Catchments). No Category A ESAs are intersected by the alignment.

Flora species

The combined wet and dry season surveys recorded 376 flora species in the study area. This included two threatened species: Black Ironbox (*Eucalyptus raveretiana*) listed as Vulnerable under the NC Act and EPBC Act; and Large-podded Tick-trefoil (*Desmodium macrocarpum*) listed as Near Threatened under the NC Act.

Eucalyptus raveretiana was observed at five study sites along the corridor on sandy creek lines and river banks. One significant population of 86 individuals in the vicinity of a waterway crossing was recorded during the wet season survey. Other sites identified as potential habitat for the species were not accessible during the survey period and will need ground-truthing before design phases of the project can commence.

Desmodium macrocarpum was recorded at one survey site on a floodplain with *Eucalyptus brownii* and *Eucalyptus populnea*.

Essential habitat for four flora species listed as threatened under the NC Act has also been mapped either within or near the study area. These are *Bonamia dietrichiana* (Near Threatened), *Croton magneticus* (Vulnerable), *Ozothamnus eriocephalus* (Vulnerable) and *Peripleura scabra* (Near Threatened). Desktop assessments revealed a total of 35 threatened species potentially occurring in the study areas. These species are shown in Table 6.2 below.

Table 6.2. Threatened flora species previously recorded in the study area

Scientific name	Common name	NC Act	EPBC Act
<i>Acacia arbiana</i>		NT	-
<i>Acacia armitii</i>		NT	-
<i>Acacia ramiflora</i>		-	V
<i>Aristida granitica</i>		-	E
<i>Bertya pedicellata</i>		NT	-
<i>Bonamia dietrichiana</i>	Dietrich's morning glory	NT	-
<i>Bulbophyllum globuliforme</i>	Miniature moss-orchid	-	V
<i>Cadellia pentastylis ooline</i>		-	V
<i>Cajanus mareebensis</i>		-	E
<i>Cerbera dumicola</i>		NT	-
<i>Corchorus hygrophilus</i>	Native jute	V	-
<i>Corymbia clandestina</i>		-	V
<i>Croton magneticus</i>	Magnetic Island croton	V	V
<i>Cycas ophiolitica</i>			E
<i>Desmodium macrocarpum</i>	Large-podded trefoil	NT	-

<i>Dichanthium queenslandicum</i>	King blue-grass	-	V
<i>Digitaria porrecta</i>	Finger panic grass	-	E
<i>Eucalyptus raveretiana</i>	Black ironbox	V	V
<i>Lepturus minutus</i>		V	-
<i>Leucopogon cuspidatus</i>		LC	V
<i>Livistona lanuginosa</i>	Waxy cabbage palm	V	-
<i>Marsdenia pumila</i>		V	-
<i>Omphalea celata</i>		-	V
<i>Ozothamnus eriocephalus</i>		-	V
<i>Paspalidium scabrifolium</i>		NT	-
<i>Peripleura scabra</i>	Tall fuzzweed	NT	-
<i>Peripleura sericea</i>	Hairy-seeded fuzz-weed	NT	-
<i>Phaius australis</i>	Lesser swamp-orchid	-	E
<i>Samadera bidwillii</i>		-	V
<i>Solanum adenophorum</i>		E	-
<i>Solanum sporadotrichum</i>		NT	-
<i>Streblus pendulinus</i>	Siah's backbone, Isaac Wood	-	E
<i>Taeniophyllum muelleri</i>	Minute orchid	LC	V
<i>Trioncinia patens</i>		E	-
<i>Trioncinia retroflexa</i>		E	-

LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered

Weeds

A total of 48 exotic or weed species were recorded during field surveys of the rail alignment. Of these, seven were weeds listed as Class 2 declared plants under *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act). These are rubber vine (*Cryptostegia grandiflora*), harrisia cactus (*Harrisia martini*), common pest pear (*Opuntia stricta*), parkinsonia (*Parkinsonia aculeate*), parthenium weed (*Parthenium hysterophorus*), giant Parramatta grass (*Sporobolus fertilis*) and lantana (*Lantana camara*). Landholders are obligated under the LP Act to try to keep their property free of all Class 2 pests. With the exceptions of harrisia cactus and giant Parramatta grass all of these species are also declared weeds of national significance.

Impacts to vegetation communities and flora species

Both construction and operational phases of the rail line will have a suite of direct and indirect impacts on flora and vegetation communities in the area. The project proposes to clear approximately 1162.37 ha of remnant vegetation in the rail alignment resulting in medium to high impacts on 2 Threatened Ecological Communities (EPBC Act), 3 Endangered REs, 15 Of Concern REs, 51 Least Concern REs and 14 threatened flora species protected under Queensland or Commonwealth legislation. Other potential impacts associated with the project include:

- habitat loss, landscape fragmentation and loss of ecological connectivity

- loss of individual threatened species and reduced viability of local populations
- increased edge effects such as increased abundance of weeds, feral animals and an altered fire regime
- changes to the hydrological characteristics of areas upstream and downstream of the rail alignment
- increased erosion and reduced health of vegetation from dust mobilisation
- accidental pollutant release and physical damage to vegetation outside the construction footprint from traffic and machinery
- degraded riparian habitat, aquatic habitat and suitability for terrestrial species from construction activities at major water crossings.

Table 6.3. Approximate clearing areas by VM Act class

Status	Area (ha)
Endangered	42.8
Of Concern	54
Least Concern	1065.57
Total	1162.37

Included in the estimated clearance area is 49.4 ha of the two Threatened Ecological Communities (TECs) found in the corridor alignment (Brigalow 42.8 ha, Native Grasslands 6.6 ha). An additional 15.22 ha of High Value Regrowth is proposed to be cleared this is comprised of 2.35 ha containing Endangered REs, 6.65 ha of Of Concern REs and 6.22 ha of Least Concern REs.

Threatened flora species have been identified at a number of locations along the corridor. Further field surveys in areas not covered by the existing body of work will be necessary during the design phases of the project to inform detailed mitigation strategies and any offset requirements arising from the development.

Cumulative impacts to ecological values in the region associated with the project are discussed in Section 7.6 of this report.

Mitigation

Mitigation measures to address the impacts to terrestrial flora species and vegetation communities are outlined in the EIS, SEIS, draft Rail EM Plan and Waratah Coal Rail Line Terrestrial Flora and Vegetation Study. Strategies and management measures to minimise the projects impact include:

- undertaking detailed surveys of the rail alignment during design phases to minimise clearing of remnant vegetation and impacts to communities and species of conservation significance through minor alignment changes
- developing and implementing a Significant Community and Species Management Plan for ecological communities and flora species listed under the EPBC Act, NC Act or in the Burdekin Back on Track Report potentially impacted by the project

- developing and implementing an Erosion and Sediment Management Plan prior to clearing and construction
- developing and implementing a Weed Management Plan for construction, rehabilitation and operation
- developing and implementing a Fire Management Plan prior to clearing and construction
- developing and implementing a Rehabilitation Plan detailing suitable completion criteria and benchmarked reference sites for impacted vegetation communities
- offsetting residual impacts which cannot be avoided or mitigated, in accordance with Coordinator-General requirements.

6.1.3. Fauna

A total of 318 vertebrate fauna species were recorded during the field surveys including 12 introduced species. The native fauna assemblage was comprised of 40 mammal, 54 reptile, 15 frog and 197 bird species. The field surveys recorded the presence of nine species listed as threatened or near threatened under the NC Act or EPBC Act at 64 different locations in the study area. Desktop and in-field habitat assessments have also determined the presence of an additional 14 threatened or near threatened species as either likely or possible. These detailed in Table 6.4 below.

Table 6.4. Threatened species recorded during field surveys

Common name	Scientific name	Status		Likelihood of occurrence
		EPBC Act	NC Act	
Koala	<i>Phascolarctos cinereus</i>	V	-	3 location records
Ornamental snake	<i>Denisonia maculata</i>	V	V	4 location records
Squatter pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V	25 location records
Little pied bat	<i>Chalinolobus picatus</i>	-	NT	14 location records
Cotton pygmy goose	<i>Nettapus coromandelianus</i>	-	NT	4 location records
Freckled duck	<i>Stictonetta naevosa</i>	-	NT	2 location records
Black-necked stork	<i>Ephippiorhynchus asiaticus</i>	-	NT	5 location records
Square-tailed kite	<i>Lophoictinia isura</i>	-	NT	4 location records
Black-chinned honeyeater	<i>Melithreptus gularis</i>	-	NT	3 location records
Northern quoll	<i>Dasyurus hallucatus</i>	E	-	Possible
Spotted-tailed quoll	<i>Dasyurus maculatus maculatus</i>	E	V	Possible
Striped-tailed delma	<i>Delma labialis</i>	V	V	Possible
Dunmall's snake	<i>Furina dunmali</i>	V	V	Possible
Brigalow scaly-foot	<i>Paradelma orientalis</i>	V	V	Likely
Yakka skink	<i>Egernia rugosa</i>	V	V	Possible
Skink species	<i>Ctenotus capricorni</i>	-	NT	Possible
Common death adder	<i>Acanthophis antarcticus</i>	-	NT	Possible
Rough frog	<i>Cyclorana verrucosa</i>	-	NT	Possible

Australian painted snipe	<i>Rostratula australis</i>	V	V	Possible
Red goshawk	<i>Erythrorhynchus radiatus</i>	V	V	Possible
Glossy-black cockatoo	<i>Calyptorhynchus lathami</i>	-	NT	Possible
Grey goshawk	<i>Accipiter novaehollandiae</i>	-	NT	Likely
Black-throated finch	<i>Poephila cincta cincta</i>	E	V	Likely

Thirteen bird species listed as Migratory under the EPBC Act were observed during the surveys. Desktop assessments also indicate a variety of bird species potentially occurring within the study area; however the proposed rail corridor and immediate surrounds are not considered 'important habitat' for any of these species.

Non native fauna species recorded in the rail corridor are: Horse *Equus caballus*, Swamp Buffalo *Bubalus bubalis*, Cattle *Bos taurus*, House Mouse *Mus musculus*, House Gecko *Hemidactylus frenatus*, Cane Toad *Rhinella marina*, Nutmeg Mannikin *Lonchura punctulata* and the Class 2 Declared pests Feral Dog *Canis familiaris*, Feral Cat *Felis catus*, Rabbit *Oryctolagus cuniculus*, Feral Pig *Sus scrofa* and Rusa Deer *Cervus timorensis*. Under the LP Act, landholders are obligated to control Class 2 Declared Pests occurring on their land.

Impacts to fauna species

A range of potential impacts on fauna and fauna habitat values arising from the development of the railway have been identified in the EIS and SEIS. These are both direct and indirect impacts and include:

- direct loss of habitat and resources for fauna species
- fragmentation of habitat and loss of fauna movement opportunities
- fauna mortality, particularly during construction
- increased edge effects and degradation of habitat adjacent to the corridor
- altered fauna behaviour from construction and operational activity
- introduction of exotic weeds and pest animals
- altered fire regimes.

Mitigation

In addition to the relevant strategies and management plans to be prepared for mitigating impacts to other terrestrial ecological values, Waratah has committed to the development and implementation of a Fauna Management Plan. It will detail strategies to protect and maintain long term habitat resources and condition, particularly habitat utilised by threatened species recorded during the field surveys, and identify a monitoring program to assess long term fauna occurrence in retained habitat areas. Details of the proposed mitigation strategies and measures can be found in Table 5.2 in the Rail Site Vertebrate Fauna and Threatened Species Assessments.

6.1.4. Coordinator-General's conclusions

Vegetation communities and flora species

The proposed rail corridor requires the unavoidable clearance of an estimated 1162.57 ha of remnant vegetation, including threatened flora species and vegetation communities. I accept the route selection methods and the mitigation measures outlined in the EIS, SEIS and draft EM Plan have minimised these impacts and where residual impacts to these values remain, Waratah has committed to offsets. Segments of the corridor, including areas potentially containing populations *Eucalyptus raveretiana*, still require field assessment. Discussion of the project's offsets proposal to compensate for the unavoidable loss of vegetation can be found in Section 7.3 of this report.

Fauna

I am satisfied that the additional information supplied with the SEIS addresses the potential impacts of the rail component on vertebrate fauna species and populations. Waratah has made a suite of commitments to avoid and mitigate the impacts arising from the rail development detailed in Table 5.2 in the Rail Site Vertebrate Fauna and Threatened Species Assessments report and Section 9 of the Terrestrial Flora and Vegetation Study of the rail line. I consider that any residual impacts to threatened fauna species habitat that cannot be avoided or mitigated can be offset as outlined in Section 7.3 of this report.

6.2. Aquatic ecology

6.2.1. Context

The rail alignment contains four broad types of aquatic habitat: estuarine, lacustrine, palustrine and riverine. Assessment of these habitats involved desktop and field work. An initial post wet season field survey was undertaken in May 2010 which sampled 14 sites between the mine and Abbott Point State Development Area. Waratah has undertaken additional work to address a number of issues raised through the public submission process on the EIS. This included a further field survey to undertake water quality monitoring using a wider suite of parameters recommended by DEHP, and a comparison of water quality results to relevant guidelines reflective of the environmental values of waterways intersected by the alignment. These studies are presented in Volume 5, Appendix 13 of the EIS and Volume 2, Appendix 23 of the SEIS. A total of 292 minor and ephemeral drainage lines have been identified along the rail alignment. Major crossings are required for the following waterways:

- Mistake Creek
- Lascelles Creek
- Sandy Creek
- Belyando River
- Upper Suttor River
- Lower Suttor River

- Elliot River
- Bogie River
- Sandy Creek
- Pelican Creek
- Bowen River

6.2.2. Study findings

Waterways in the rail corridor are in generally good condition but show some evidence of erosion, exotic weeds, understorey disturbance and cleared riparian vegetation. The predominant land use surrounding most of the aquatic sites surveyed was low intensity grazing. Localised sources of disturbance include bridges and causeways on a number of waterways however these show little evidence of affecting turbidity or bed and bank stability.

Fish community

Fish fauna recorded in the sampled streams primarily consisted of potadromus species, which is generally reflective of the streams inland location and ephemeral nature. A number of catadromus and anadromus species were also recorded, and as these fish tend to migrate to spawn, any activity impacting fish passage could effect local populations. Two species endemic to the Burdekin Catchment, Small-headed Grunter (*Scortum parviceps*) and Soft-spined Catfish (*Neosiluris mollespiculum*) occur in the corridor, both having a preference for low turbidity water. No species of conservation significance were sampled but several fisheries-significant species were recorded.

Macro-crustacean community

Macro-crustacean diversity along the rail corridor was low compared to the wider Burdekin Catchment but consistent with previous studies in the area. At least seven species inhabit the waterways intersected by the rail alignment.

Macro-invertebrate community

Macro-invertebrate diversity in the rail alignment is typical of overall diversity in the wider Burdekin Catchment. Samples collected from edge habitats were lower than expected taxa richness ranges for the region but composite habitat samples showed levels of diversity higher than expected. Pelican Creek has the most diverse macro-invertebrate community, likely attributable to more permanent flows, clear water conditions and instream habitat diversity.

Other aquatic vertebrates

The studies undertaken for this assessment did not specifically target aquatic vertebrates other than fish however a number turtle species were caught as by-catch. These were the Saw-shelled Turtle (*Wollumbinia latisternum*) and Krefft's Turtle (*Emydura maquaria krefftii*). Both species could be vulnerable to any increases in turbidity and riparian disturbance as algae and macrophytes are a food source. Disturbances to reed beds could also impact nursery habitat for these turtles.

Macrophyte community

Aquatic plant cover and diversity was generally low in the study area and typical of highly ephemeral streams which are not generally conducive to the growth of submerged and floating plants. Cyperaceae species were the most commonly recorded macrophytes during all survey periods. No exotic or noxious aquatic plants were recorded despite several species being known to occur in the area. One species of conservation significance, *Myriophyllum artemisium*, listed as Endangered under the NC Act, is known from the Burdekin catchment but is associated with artesian spring mounds and is unlikely to be impacted by the project.

Water quality

Existing water quality issues include routinely elevated EC levels, low dissolved oxygen percentage levels and exceedances of a number of total metals and dissolved aluminium. Ammonia, total nitrogen, total phosphorus and total alkalinity routinely exceeded guideline ranges for the protection of ecosystem values, likely as a result of agricultural activity adjacent to the sampling sites and from decomposing organic material deposited by high stream flows.

6.2.3. Issues

The aquatic ecosystems most vulnerable to impacts from the rail corridor development are Pelican Creek and the Bowen River. Both are clearwater streams with relatively permanent flows providing a diversity of instream habitat. Impacts arising from increased turbidity in waterways could potentially affect fish, turtle and macro-crustacean communities. Other disturbances resulting in bed movement could smother riffle habitat and reduce riffle associated macro-invertebrate diversity and abundance. Submerged aquatic flora and periphytic algae are also potentially vulnerable to turbidity increases though these communities are largely confined to Pelican Creek. Some construction activities may involve the creation of some temporary fish barriers that could affect the spawning success of a number of fish species. Other potential impacts associated with construction and operational phases of the rail alignment include:

- direct disturbance of watercourses and riparian zones from piling, culvert works and bridge construction
- sediment movement from disturbed riparian vegetation and banks
- fuel and other chemical spills from machinery
- increased noise, light and vibration disrupting normal behaviour of aquatic species
- major incidents during operation releasing contaminants into streams
- cumulative small releases of contaminants including oils and lubricants from passing trains.

To mitigate the impacts associated with the rail development, Waratah has committed to developing and implementing an Erosion and Sediment Control Plan, ensuring bridge and culvert designs allow for the passage of aquatic species and developing and implementing EM Plans incorporating ongoing aquatic ecology monitoring. Management measures proposed by Waratah to address freshwater ecology issues include:

- avoiding disturbance to high value habitat nodes, ecological corridors and riparian vegetation assemblages through the placement of site infrastructure
- elevating watercourse crossings to minimise dissection of habitat nodes and corridors
- incorporating wildlife underpasses into bridge and culvert designs
- revegetating clearing corridors across drainage lines after construction
- preferential use of vibrocorers over hammer pile drivers where water is present to reduce re-suspension of bottom sediments
- use of sediment control fences and bunding stockpiled material to prevent increased sedimentation of waterways
- limiting vehicle access to designated tracks during construction
- limiting lighting to what is required for operations and using directional guards to minimise lighting of non-target areas.

6.2.4. Coordinator-General's conclusions

Waratah has prepared a draft EM Plan to cover both construction and operational phases of the rail alignment detailing the mitigation and management strategies for freshwater ecology issues. I consider that issues raised through the EIS public consultation period have been adequately addressed. With the implementation of the strategies detailed in the EIS and draft EM Plan, impacts to aquatic ecosystems are expected to be minimal. In addition, a monitoring program tailored for each catchment will be put in place prior to any construction activity. I have recommended a condition in Appendix 2, Recommendation 2 to ensure the proponent's commitments as detailed in the EIS, SEIS and EM Plan are implemented.

6.3. Land

6.3.1. Quarrying/extractive materials

Construction of the rail component will require new quarry and sand extraction pits to provide the necessary base materials. At the northern end of the corridor where the railway travels through more mountainous terrain, significant quantities of excess cut may be generated which could be used as fill material for rail embankments. The EIS states that the preferred option for sourcing fill materials is to use existing local quarries where possible to minimise impacts to the road network. Where new quarries are needed they will be located along the length of the corridor.

Issues raised during the EIS consultation process relate to the specific location of hard rock and gravel quarries, the volume of quarry material required by the project and the potential cumulative demand for quarry material generated by other large proposed projects in the region. Waratah has responded by undertaking a geological survey along the length of the corridor identifying 29 potential quarry sites and 24 potential sand extraction sites. In addition, they have entered discussions with existing quarry operators in central west Queensland and potential commercial operators near Bowen regarding supply of rock and rail ballast. Overall volumes required for the railway

construction are dependent on final designs, however the EIS estimates these quantities as 1 million cubic metres of rail ballast, 90 000 cubic metres of aggregate and 45 000 cubic metres of sand.

As for impacts on existing and future customer bases, Waratah expect the opening of new quarry and extraction sites resulting from the development will satisfy demand from future customers rather than deplete existing resources. Relevant approvals will need to be obtained where new quarries and extraction pits are needed and site specific environmental assessments undertaken for each site. DAFF Forest Products is the approval agency responsible for the management and sale of State-owned quarry material under the provisions of the *Forestry Act 1959*. Development approval to commence quarrying operations must be sought under the provisions of the *Sustainable Planning Act 2009*.

6.3.2. Landowner issues

Issues

Landowners raised a number of issues relating to the construction of the railway line including:

- coal dust covering the grass the cattle eat
- water use and protection of water supply from potentially contaminating activities
- access to paddocks, water, fire fighting, fence maintenance
- weed management.

In addition to the above, submissions from landowners raised concerns with closure or relocation of stock routes, increase in flooding from construction of the rail across watercourses and floodplains, loss of biodiversity and good quality agricultural land. Biodiversity is discussed under Offsets in Section 7.3 below, good quality agricultural land under Section 6.3.4 (Soils and land suitability), stock routes is discussed on page 82, dust is included in Air Quality, Section 5.7 (Mine) and Section 6.4 (Rail) and flooding is discussed under Section 6.6 (Water resources). Each of these impacts could alter the way properties are managed by the landholders during and after construction of the railway. Landholders are generally expecting both adequate compensation and reconstruction of infrastructure, such as fencing and roadways, to enable the properties to continue operation as viable rural enterprises.

The proponent is managing these expectations by negotiating with each property holder on the compensation and facilities to be provided as part of the corridor acquisition process. The proposed easement is expected to have a moderate impact on existing land tenure and land use primarily through the fragmentation of the land required and the need to remove or relocate existing infrastructure such as fences, gates, dams and irrigation systems. Waratah has made commitments in Volume 3, Chapter 4 of the EIS to ensure potential impacts to land use by the development of the rail corridor are minimised by:

- consulting with relevant landholders in the area of the rail development
- consulting with government agencies and regulatory authorities regarding the acquisition of the easement and design of infrastructure within the easement

- consulting with utility operators and resource companies regarding the location of the easement and undertaking construction activities near existing utilities
- implementing the requirements of the EMP throughout the duration of the project.

Coordinator-General's conclusion

I recognise the concerns of landholders potentially affected by the development of the rail corridor and accept Waratahs commitments to minimise these impacts. To ensure impacts to land use and landholders are minimised I have imposed a condition regarding landholder engagement in Appendix 2 of this report.

6.3.3. Hancock/GVK mining tenements¹¹

Context

The rail alignment proposed in the GC project IAS exited the mine site at the north-east corner and generally followed a northerly direction across the adjoining Hancock mining tenements for the Alpha and Kevin's Corner Projects. At the time, these comprised exploration and development tenements only—MDL 333 and 285 and EPCA 1210.

Following further development of the Hancock and Waratah projects, subsequent representations from Hancock on potential impacts of the GC project alignment on its proposed mine infrastructure, and discussions with my officers, three rail alignment options for passing across/around the Hancock tenements were presented in the GC project EIS lodged in August 2011. The options comprised the original IAS alignment (Option 1), an alignment 10 km to the east skirting around the Hancock tenements (Option 2) and an alignment in between, generally following the western boundary of adjacent grazing properties to the east (Option 3).

The EIS reported on the environmental assessment of the three alignments (desk top study) and found that there was little to distinguish any of the options as a preferred alignment based on environmental considerations alone. The work did find however that the Option 2 alignment could likely impact on two threatened ecological communities under the EPBC Act (Brigalow and Weeping Myall).

In July 2011, Waratah lodged an application for a project infrastructure facility (PIF) for the GC project rail under the SDPWO Act which incorporated the Option 2 alignment skirting the Hancock tenements. The PIF application was publicly advertised in August and September 2011 and negative feedback was received from landowners on the eastern margin of the Hancock tenements whose properties would be bisected by the Option 2 alignment. Concerns were expressed that the alignment would create management difficulties and could make grazing operations commercially untenable as well as impacting on safety. All affected landowners indicated that an alignment further west, closer to the western boundary of each property would be a better (Option 3 alignment).

¹¹ Mining lease application 70425 for Kevin's Corner Project and mining lease application 70426 for the Alpha project

Having regard to the public feedback from the PIF application, the shorter rail length involved, and after further engagement with Hancock, the Option 3 alignment was incorporated into the GC project rail line at the expense of the other two options. This rail alignment was adopted by Waratah for the SEIS.

Figure 6.1 (SEIS, Appendix 40, Figure 2) shows the rail options in relation to the Hancock tenements and landowner boundaries.

Issues

In its submissions to me during the public review stage for the SEIS, Hancock raised concerns that the Option 3 alignment would have significant impacts on its planned mine infrastructure for both the Alpha and Kevin's Corner Projects. Specific concerns related to the accommodation village, air strip, light industrial area, access road and rail loop for the Kevin's corner project and the tailings storage facility, access road and rail loop for the Alpha Project. Similar concerns were raised also by DNRM together with general advice that it is preferable to avoid locating linear infrastructure on another party's mining tenement for reasons of potentially isolating mineral resources and imposing costs on the tenement holder. DNRM also indicated however that the GC project Option 3 alignment would not impact the commercially extractable coal resources on the Hancock tenements.

Waratah reported that the Option 3 alignment was developed as a compromise between graziers' and Hancock's concerns. The alignment traverses the western boundaries of the affected grazing properties and navigates clear of critical Hancock infrastructure. Waratah reported that it had engaged with Hancock and had adjusted the Option 3 alignment to provide adequate buffers between the GC project rail and Hancock mine infrastructure to minimise impacts. Waratah considers that concerns over the interaction between Alpha and Kevin's Corner rail loops with the GC project rail alignment are unwarranted as the State's Galilee Basin rail policy provides for only one rail corridor connecting the southern Galilee Basin to the port site of Abbot Point which will in fact require the interaction between all mine rail loops and the final rail alignment.

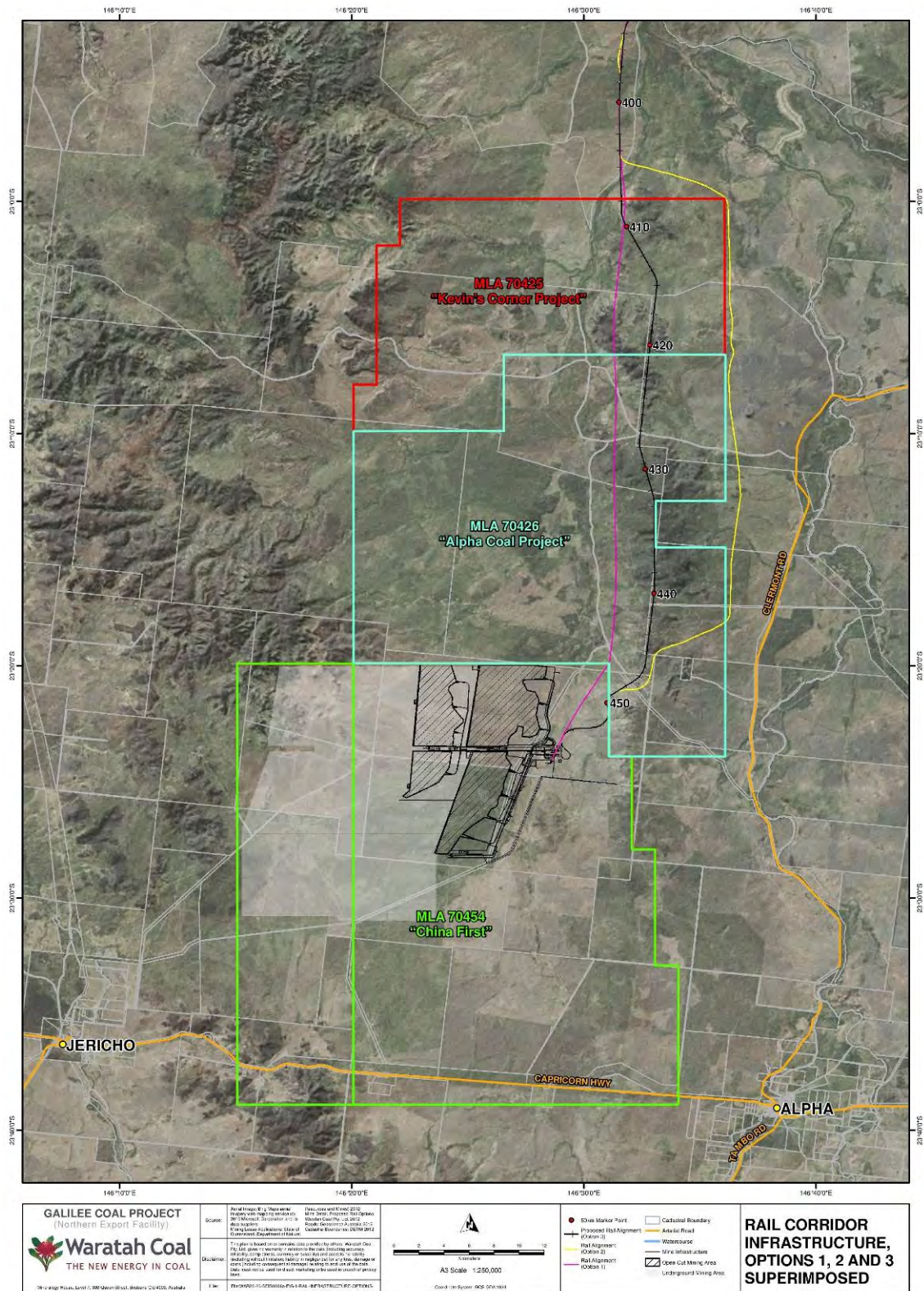


Figure 6.1. Rail options in relation to the Hancock tenements and landowner boundaries

Coordinator-General's conclusion

As discussed in Section 4.2.2 of this report, the State's Galilee Basin rail policy does not preclude future approval and construction of the GC project rail. At this time, however, the State has nominated the rail alignment on the Alpha Coal project as the preferred north–south corridor and has given no commitment to Waratah to assist in land acquisition to secure the GC project rail corridor. Should the GC project rail proceed to construction from the mine to Abbot Point or as a spur line from the mine to another rail line, then a final decision will need to be made on the appropriate rail alignment in the vicinity of the Hancock tenements.

I am satisfied that Waratah has examined practicable alternatives for its rail alignment in going either across or around the Hancock mining tenements. I acknowledge the potential competing objectives of minimising impacts to landowners, the environment and to future Hancock mining infrastructure. On balance, I conclude that the Option 3 alignment or an adjusted Option 3 alignment provides the best outcome for the environment and landowners. Having regard to the advice from Hancock and DNRM, I recognise that the proposed alignment may have impacts on the Hancock mines' infrastructure plans.

Given the lack of information at this time to make a definitive decision on the best alignment and given the uncertainty surrounding which Galilee Basin projects will proceed, their timing, final mine infrastructure layouts and final outcomes of the Galilee Basin rail policy, I believe a decision on the GC project rail alignment near the Hancock tenements should be taken at a future time when additional information is to hand and matters are more certain. At that time, the rail administering authority will be in a position to try to facilitate a negotiated settlement among the relevant stakeholders.

Should there be any dispute or failure to reach agreement, the Coordinator-General will be the final arbitrator on rail design and flood mitigation measures.

I have made a recommendation to the rail administering authority to pursue this course of action at Appendix 2.

6.3.4. Soils and land suitability

Context

Soil and land suitability studies for the rail corridor were undertaken primarily at a desktop level with limited field investigations. The EIS field survey collected 118 samples from 43 locations along the 453km alignment. In responding to concerns that the studies were not conducted to an acceptable level of detail, Waratah proposed a staged approach in the SEIS to assess soils along the rail corridor and on the mine site. The proposed assessment consists of the following stages:

- a desktop assessment to collate and review existing studies and available information. This has been completed and is presented in Appendix 7 of the SEIS
- preliminary soils mapping to locate likely Good Quality Agricultural Land (GQAL), Strategic Cropping Land (SCL) and land suitability classes. This has been completed and is presented in Appendix 7 of the SEIS

- field surveys involving 25 test pits, 30 hand auger holes or hand-dug pits and 45 field observation sites prior to the detailed design phase of the project
- targeted field investigations carried out in conjunction with detailed geotechnical surveys for the rail corridor during the design phase of the project
- assessment and reporting to EHP in accordance with *Soil Survey Methodology along Linear Features* (DERM, draft working document, 2011) and the *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (DME, 1995).

Findings from the preliminary desktop assessment indicate the rail alignment intersects 21km of Class A or B GQAL and 2.5km of SCL. Some of this area may be lost to agriculture permanently or temporarily with construction phases potentially creating a larger disturbance footprint than ongoing operations. Potential impacts to this land from the rail alignment include fragmenting agriculturally productive land, compaction of clay soils, topsoil disturbance and long term reductions in soil fertility.

Issues

Comments specific to land suitability along the rail alignment noted the sterilisation of potential Class A GQAL lands. It was also noted that the rail line has greater potential to destroy the value and productivity of GQAL than the mine development and that the impacts should be considered cumulatively. Further information about the impacts of the railway on landholders and agricultural activity during different stages of the projects development and operation was also sought. Mitigation measures are outlined in Volume 5, Appendix 6 of the EIS. These measures include:

- minimising erosion and slope failure by traversing less steep mid to lower part of hill slopes
- progressive clearing prior to construction to minimise the duration of soil exposure
- minimising earthworks during higher rainfall periods
- stripping topsoil for re-use in rehabilitation works
- using silt fences and sediment ponds to control short term erosion potential
- diverting overland flow around construction areas
- implementing scour protection mechanisms such as rock armouring to protect soils where culverts, channel diversions or table drains are proposed to control stream flows or runoff
- ripping, seeding and fertilising temporary construction and access tracks once construction is completed
- treating exposed dispersive or strongly sodic soils with gypsum/dolomite to minimise dispersion and sodicity.

Stock routes

The proposed rail line intersects the Stock Route Network (SRN) at thirteen points between the mine and the APSDA. A number of submissions were received from landholders raising the issue of insufficient weight being given to the importance of the SRN or proposed alternatives. Maintaining the utility and connectivity of the SRN was also raised as an issue by DNRM. In the SEIS, Waratah states that stock routes have

been allowed for within the rail design and there is no intention for access to the network to be severed. Specific impacts will be detailed during the projects design stage and existing access to the SRN will need to be maintained or improved. Similar to recently constructed rail crossings in central Queensland, where the rail line intersects a stock route, under track crossings that limit the 'tunnel effect' will be provided to ensure a safe and effective path for stock and stockmen. If the rail alignment cuts across the same stock route in several places within a relatively short distance, there may be an opportunity to realign the stock route along one side of the rail only, to provide a more effective stock route. Impacts to stock routes will need to be managed in accordance with requirements of DNRM and relevant councils and include consultation with affected pastoralists, drovers and graziers.

Coordinator-General's conclusions

As many of the potential impacts and soil characteristics have yet to be validated in detail by field surveys and laboratory analysis, only high level management strategies are proposed in the EIS. The staged approach proposed by Waratah is detailed in Appendix 7 of the SEIS, Soils and Land Suitability Report, along with a suite of commitments made by the proponent that I have included in Appendix 5 of this report. General strategies to protect areas of GQAL and SCL are listed in the EIS and SEIS and should be further developed under the EM Plan. I have set conditions regarding the management of impacts to soil and land suitability arising from the development of the rail line in Appendix 2. I believe that this approach will adequately identify and manage the impacts of the development and can be assessed by relevant agencies once completed.

In regard to impacts to the Stock Route Network I have set a condition that the utility and connectivity of the network must be maintained and where a re-alignment is required it will be re-established to meet the surrounding conditions and previous functions.

6.4. Air quality

6.4.1. Context

Much of the railway travels through uninhabited regions; however 19 sensitive receptors have been identified along the alignment, the closest of which is approximately 70m away from the rail and located near the proposed coal loading terminal at the APSDA. All other receptors lie at least 500m from the railway and are sufficiently buffered from dust impacts. A dispersion model was used to assess concentrations for total suspended particles (TSP), particles with a diameter of less than 10µm (PM₁₀) and particles with a diameter less than 2.5µm (PM_{2.5}) against Environmental Protection (Air) Policy 2008 (EPP (Air)) guideline levels. For the assessment undertaken, coal tonnage transported on the rail line was 400Mtpa. Background dust concentrations were estimated based on EHP air quality monitoring in West Mackay and are likely to be higher than actual levels along the rail alignment. During the construction phases, impacts to air quality will primarily be dust related as emissions of combustion pollutants such as nitrogen oxides from vehicles and

equipment are expected to be minor. Diesel and other combustion pollutants were estimated to contribute less than 1 per cent of emissions and were not included in the modelling. Construction activities leading to more significant dust emissions include:

- clearing vegetation and topsoil
- excavating and transporting earth material
- blasting
- vehicles travelling on unpaved roads
- vehicles and machinery exhausts, and
- activities from temporary hard rock and gravel quarries situated along the alignment that will be assessed separately.

Results from the modelling indicate that dust impacts drop very quickly with distance from the railway and no exceedances of the EPP (Air) guideline are expected for sensitive receptors along the alignment. However, where sensitive receptors occur within 500m of construction works, short term enhanced mitigation measures such as reducing vehicle speeds and minimising soil stockpiles may be required. To ensure air quality objectives are met, mitigation and management activities will be delivered through the EM Plan for construction and operational phases. The study is presented in Volume 5, Appendix 18 of the EIS.

6.4.2. Issues

The major source of emissions from the railways operation identified in the EIS was due to wind erosion of the coal surface of open coal wagons. Waratah has made commitments to manage impacts to air quality from its operational phase in Volume 3, Section 10.4 of the EIS including the use of dust monitoring equipment at sensitive receptor along the location along the corridor, developing and implementing a dust management plan for construction and collaboration with other large-scale mining developments in the region to manage dust emissions. In addition, Waratah has also made commitments in the SEIS to use tippler wagons with covered tops to ensure emissions are below the goals specified in the EPP (Air).

In response to concerns regarding the impact of dust on people and cattle during the railways construction, mitigation and management strategies adapted from other recent rail projects in Central Queensland will be implemented into the Rail EM Plan. These strategies include:

- water sprays on unsealed roads
- restricting vehicle speeds on unsealed haul roads to reduce dust generation (50km/hr)
- minimising haul distances between construction sites to spoil stockpiles
- treating or covering stockpiled material to prevent wind erosion
- regularly cleaning machinery and vehicle tyres to prevent wheel entrained dust emissions
- routing roads away from sensitive receptors wherever practical

- minimising topsoil and vegetation removal and revegetate disturbed areas as soon as possible
- ongoing visual monitoring of dust on a daily basis, with ramping down of activities in the instance of high dust emissions.

6.4.3. Coordinator-General's conclusions

I am satisfied the potential impacts to air quality have been adequately addressed in the EIS and SEIS and that the strategies outlined will mitigate impacts through all phases of the project. Implementation of these strategies through the Rail EM Plan will ensure impacts to sensitive receptors are managed within acceptable limits. The use of covered tippler wagons will negate the need for strategies to manage coal dust erosion and coal hang-up by transporting the coal in sealed containers. I note that Waratah will establish a line of communication between the local community and the rail construction contractor prior to any construction activity to document any complaints and investigate the source of any emissions giving rise to the complaint. To address potential impacts from coal dust along the rail alignment I have stated conditions in Appendix 2.

6.5. Noise

6.5.1. Context

An assessment of baseline ambient noise levels was undertaken to identify sensitive receptors and potential changes in noise and vibration environments as a result of the construction and operation of the railway. Baseline monitoring was undertaken in April 2010 and July 2010 at seven properties selected to represent potentially affected residences. Rail operation impacts include potential sleep disturbance for any nearby resident due to train pass-bys, and vibration impacts due to construction and blasting activities have the potential to affect residents and services such as buried pipe work, electrical and telecommunication cables.

Some of the potential noise sources can be attenuated; others by virtue of location and mobility may present difficulties for noise mitigation. Vibration due to construction and blasting activities has the potential to affect residents and services such as buried pipe work, electrical and telecommunication cables. When operating at the proposed initial capacity of 40 Mtpa, 14 train movements per day are required, increasing up to 134 movements per day for the ultimate capacity of 400 Mtpa. As these movements would be at a time of choice for the mining operations they could occur at any time during the day or night. The studies assessed impacts at sensitive receptors for both initial and ultimate capacity scenarios.

6.5.2. Study findings

A detailed technical assessment of the potential impacts associated with noise and vibration emissions is provided in Volume 5, Appendix 20 of the EIS. Noise monitoring was conducted in accordance with the *Australian Standard AS1055.1-1997 Acoustics – Description and measurement of environmental noise, Part 1: General procedures*, and

the *Queensland Noise Measurement Manual* (3rd Edition, 1 March 2000). Seven properties for monitoring were selected to represent potentially affected residences nearest to the proposed rail alignment.

The assessment for the rail has included potential impacts associated with construction and operation phases of the project. It found that to comply with night-time sleep disturbance criteria under the 24 hour use, 400 Mtpa scenario, residences at Hobartville, Riverview, Lenore Station, Salisbury Plains, Colinta Holdings, Bakara and Glenalpine would require some form of noise mitigation such as the upgrading of residential buildings, relocation of the residence or construction of noise barriers adjacent to the rail line. No adverse impacts to human comfort levels from vibration levels are predicted to occur at any sensitive receptors as a result of coal train pass-bys. If construction of the railway requires blasting, a detailed Blast Management Plan will need to be developed in accordance with the requirements of the EP Act and the *Ecoaccess Guideline: Noise and Vibration from Blasting*.

6.5.3. Issues

The EIS concluded that construction activities have a limited potential to cause significant impacts at the nearest sensitive receptors due to the nature of the construction activities required, the distances between receptors and noise sources and the timing of construction throughout the day. With the implementation of mitigation measures, operation of the rail corridor is not expected to result in significant noise or vibration impacts to sensitive receptors. Concerns raised during the EIS comment period related to additional assessment of rail vibration impacts, requests for information on the analysis of monitoring data and information recommended for inclusion in the draft rail EMP.

Waratah has proposed mitigation and management strategies to be developed and implemented through noise management plans and construction and operational EMPs in Volume 3, Section 11.6 of the EIS. The plans will mitigate noise and vibration impacts through a range of measures including:

- confining noise emitting construction activities to the period 0630–1830 on business days and Saturdays
- conducting regular ‘tool-box’ meetings to review and discuss mitigation measures with workers
- undertaking a community consultation program with sensitive receptors throughout the construction phase
- establishing a complaints register for the construction phase to investigate complaints and undertake suitable remedial action.

With respect to the noise of train pass-bys during operations along the rail corridor, Waratah has proposed the potential upgrading of the residential buildings to ensure that the internal sleep disturbance criterion is achieved, relocation of the residence or some other form of change of use for the residences so they would no longer be noise-sensitive locations, or attenuation of the rail noise through the use of noise barriers.

6.5.4. Coordinator-General's conclusions

I am satisfied that the work undertaken in the EIS and the updates provided in the SEIS have adequately assessed noise and vibration impacts for the project. I am satisfied that through the implementation of the project's EMPs, noise and vibration impacts of the project on sensitive receptors can be managed within acceptable limits. I have imposed a condition in Appendix 2, regarding the development of management plans for noise and vibration impacts in the rail construction and operational EMPs.

6.6. Water resources

6.6.1. Surface water

Flooding

Study findings

The proposed rail alignment runs from the mine site, north of the township of Alpha, in a north-easterly direction to the Abbot Point State Development Area and to the Port of Abbot Point. The rail alignment intersects two major drainage basins, the Burdekin River and Don River Basins and crosses 12 major waterways.

Preliminary flooding investigations undertaken for the EIS were aimed at determining flooding extent to help identify a preferred horizontal alignment. Additional work was also undertaken at major waterway crossings to determine the 100-year ARI flood level and flooding characteristics to assist in development of the vertical alignment of the railway. The EIS did not examine flooding impacts post rail development but this issue and cross drainage design was addressed in the SEIS.

Issues

A number of submissions were received from landowners and community groups during the EIS public consultation stage concerned that the rail line would exacerbate flooding impacts particularly for upstream landowners. These concerns typically centred on:

- increased extent of flood inundation through afflux (increase in flood height arising from a reduced waterway area at the railway cross drainage structure)
- the rail line blocking access for stock in reaching high ground during flooding events
- prolonged inundation times
- changes in connectivity to overland flow patterns that may adversely impact property management and the filling of farm dams.

Proponent response

The Waratah SEIS addressed these concerns by way of an assessment of impacts on existing flooding and drainage regimes. Details were provided on:

- proposed environmental design criteria for all cross drainage structures to minimise impacts to flow regimes and landholders

- preliminary designs for all major cross drainage structures based on the 100-year ARI flood event—12 major waterways including the Suttor and Belyando Rivers were addressed
- performance of major cross drainage structure designs against the proposed environmental design criteria.

Waratah reports that the railway is proposed to have flood immunity equivalent to the 100-year ARI flood event with additional provision for freeboard. It is understood that this design standard is consistent with that adopted for national road design in Australia as well as for some State controlled roads and is consistent with new rail design by Aurizon. It is noted that this level of flood design immunity has also been adopted by other Galilee Basin rail proponents apart from the Alpha Project rail proposal where the 50-year ARI event was chosen.

The SEIS also reports that there are currently no Australian national standards covering hydraulic/cross drainage design for railways although it is understood that the Rail Industry Safety and Standards Board is scheduled to prepare a standard in the near future. This contrasts with national highway design where standards exist within Austroads and at the state level. DTMR undertakes cross drainage design in accordance with its Road Drainage Design Manual which considers each waterway design according to a range of criteria having regard to economic implications, surrounding land use and environmental impacts.

Waratah's proposed cross drainage environmental design criteria have been developed to ensure that the railway will have appropriate immunity against flood inundation and that impacts of the railway on waterway functionality, fauna passage, landowners and the community will be minimised. Waratah advises that the adopted cross drainage design approach is consistent with the DTMR Road Drainage Design Manual. Criteria are proposed for afflux and inundation times, flow connectivity, fauna passage and land access as well as for flow velocity for a range of land uses/impacted environment including pasture/grazing/cropping, existing infrastructure and environmentally sensitive areas. It is noted that the criteria set a desirable upper limit on afflux at 0.5 m while no limit has been set for extended inundation times which is likely to be a sensitive issue for landowners where valued pasture or agricultural lands are involved. The proposed design criteria are reproduced below in 6.6.1 (SEIS, vol. 2D, Appendix 32, Table 2.1 – Environmental Assessment Criteria).

Table 6.5. Waratah's proposed cross drainage environmental design criteria

Assessment Criteria	Land Use			
	Pasture/Grazing/Cropping	Existing Infrastructure (Dwellings, Roads etc.)	Environmentally Sensitive Areas	No Defined Use
Design Event Afflux	Ensure afflux is typically no greater than 0.5m. Landholders to be consulted to seek agreement.	Ensure that any afflux is limited to areas that will not adversely impact existing infrastructure	Subject to site specific environmental conditions.	Ensure that afflux will not result in possible impacts to the hydrological regime of an existing system such as inducing breakouts into adjacent systems upstream.
	Ensure that afflux does not encroach on a property that was not previously identified as flood prone prior to the construction of railway.	Where the 100-year ARI flood currently enters properties the crossings design must fully consider the impacts of any afflux generated and design accordingly.	Ensure increase of inundation duration will not result in adverse impacts to existing vegetation.	Ensure that afflux does not encroach on a property that was not previously identified as flood prone prior to the construction of railway.
	Ensure increase in inundation depth or duration will not result in impacts to existing farming activities.			
Flow Connectivity	Ensure flow connectivity is maintained to existing farm water storages located downstream of the rail formation.	Flow connectivity to mimic natural conditions as much as possible to prevent the redirection of water to existing infrastructure.	Where practicable the bed of the culvert reproduce the natural conditions of the watercourse bed, and ideally be recessed below natural bed levels.	Where practicable the bed of the culvert reproduce the natural conditions of the watercourse bed, and ideally be recessed below natural bed levels.
			Where possible provide small diameter environmental culverts to prevent 'water shadow'.	Where practicable provide floodplain relief culverts at nominal spacing to mimic the natural floodplain and maintain connectivity of braided channels.
			Where practicable provide floodplain relief culverts at nominal spacing to mimic the natural floodplain and maintain connectivity of braided channels.	

Assessment Criteria	Land Use			
	Pasture/Grazing/Cropping	Existing Infrastructure (Dwellings, Roads etc.)	Environmentally Sensitive Areas	No Defined Use
Fauna Passage and Land Access	Large box culverts to be provided for passage of cattle and vehicles beneath railway formation. Requirements to be determined in conjunction with land holders.	Large box culverts or arches to be provided for passage of vehicles beneath railway formation. Requirements to be determined in conjunction with land holders.	Culverts located within the main channel of rivers and creeks should be depressed below the natural surface to prevent the need for fish to jump an obstruction.	Culverts located within the main channel of rivers and creeks should be depressed below the natural surface to prevent the need for fish to jump an obstruction.
			A minimum pipe diameter of 1200mm to be adopted to allow for fauna passage. Internal ledges within nominated culverts to be provided to allow for dry passage during low flow conditions.	A minimum pipe diameter of 1200mm to be adopted to allow for fauna passage. Internal ledges within nominated culverts to be provided to allow for dry passage during low flow conditions.
Flow Velocity	Maximum culvert outlet velocities based on site specific conditions: • 1.5 m/s for erodible of soils (sand, silty clay or loam); • 2.5 m/s for stiff clay or vegetated cover; • 4.5 m/s maximum velocity with appropriately sized scour protection; • 6 m/s maximum barrel velocity.	Maximum culvert outlet velocities based on site specific conditions: • 1.5 m/s for erodible of soils (sand, silty clay or loam); • 2.5 m/s for stiff clay or vegetated cover; • 4.5 m/s maximum velocity with appropriately sized scour protection; • 6 m/s maximum barrel velocity.	Velocities to be limited based on site specific soil characteristics to prevent sediment mobilisation and changes to existing geomorphic condition. Alternative energy dissipation structures to be provided where velocities may impact existing vegetation.	Velocities to be limited based on site specific soil characteristics to prevent sediment mobilisation and changes to existing geomorphic condition. Alternative energy dissipation structures to be provided where velocities may impact existing vegetation.
	Maximum velocities at bridges not to exceed existing velocity by more than 20%	Maximum velocities at bridges not to exceed existing velocity by more than 20%		

Waratah's assessment of major waterway crossing preliminary designs against the proposed design performance criteria demonstrates full compliance, apart from a few instances where afflux is marginally above the proposed 0.5 m limit. In most of these cases, the increase was localised and limited in extent to within 200 m upstream of the structure and generally occurred in areas where there was no farming activity or where infrastructure was unlikely to be impacted. It is noted however, that this was not universally true and that a farm house approximately 220 m upstream of the proposed lower crossing of the Suttor River flood plain would likely be impacted by afflux above the 0.5 m limit and would need further consideration and mitigation at the detailed design stage.

Coordinator-General's conclusion

The potential impact of the rail line on existing flooding and drainage regimes is a sensitive issue for land and infrastructure owners who may be impacted. It is essential that the adopted environmental design criteria for cross drainage be 'best practice' and have regard to this sensitivity and that land and infrastructure owners be consulted and agreement be reached on mitigation actions to address flooding impacts prior to construction commencing.

In the absence of a nationally recognised drainage design guideline for railways, it is my view that the methodology outlined in DTMR's Road Drainage Design Manual be adopted for the Waratah rail-line, adapted as necessary, to incorporate railway design best practice. I support the environmental design criteria proposed by Waratah in its SEIS but believe these should be reviewed and finalised with the rail administering authority particularly in relation to upper targets for afflux and inundation times. I have set a condition at Appendix 2 to reflect this requirement. I accept that Waratah's approach is generally consistent with that specified in the DTMR Road Drainage Design Manual.

In May 2012 I released my evaluation report of the EIS for the Alpha Project which gave guidance on specific drainage design criteria for that rail-line in the Galilee Basin. Design limits were specified for afflux, exit velocities and extended time of inundation. It is my intention to be consistent for all the Galilee rail proposals and for those limits to be used as guides in the case of the Waratah rail-line to be adapted as necessary to suit local circumstances applying at each waterway crossing along the Waratah alignment.

In regard to landowner consultation, the condition at Appendix 2 requires Waratah to consult with land and asset owners including public agencies in order for stakeholders to understand likely impacts arising from proposed cross drainage designs and on mitigation actions to address flood impacts for all reasonable concerns. I have further stipulated that a flood and drainage report based on proposed final cross drainage designs that have regard to the views and agreements reached with land and asset owners be submitted to the administering authority for approval prior to construction commencing.

On the question of railway flood immunity, I note that this is in large part, a commercial decision for the railway proponent having regard to the trade-off between costs and reliability. However, given the Queensland Government's desire for a common Galilee

Basin north-south corridor and potentially a multi-user rail-line servicing a number of mines, it is my view that a level of flood immunity consistent with best practice standards of 1 in 100 ARI is desirable.

6.7. Waste

6.7.1. Context

As outlined in the EMP Rail (June 2013) vegetation clearing and surplus earthwork/spoil material are likely to form the major portion of waste generated along the rail corridor. Waste will be minimised by reuse of material where possible throughout the rail alignment. Fill for the rail embankments will be sourced from material recovered from excavation of the railway cuttings.

Topsoil stripped along the entire railway will be stockpiled and spread on the outer edge of the railway and used for rehabilitation works. Unusable and surplus usable cut will be used to backfill borrow pits and quarries, stockpiled in spoil heaps along the railway or hauled to suitable dump sites by agreement with landowners or local council.

A review of the activities expected throughout the construction, operation and decommissioning phases of the rail alignment established that the majority of the waste streams are likely to occur throughout all phases. Table 11, Pg 95, EMP Rail displays the waste characteristics and potential disposal options for the waste streams associated with the rail alignment.

6.7.2. Issues

Isaac Regional Council lodged a submission on the SEIS requesting the proponent address the disposal of additional solid and sewage waste. The proponent acknowledged the rail line crosses through the Isaac Regional Council local government area and advised there would be package sewage treatment facilities at each of the worker's compounds. Water will be treated to Class C recycled standard or better, then discharged to 'land'. Sludge will be transported off-site by a regulated waste contractor to a regulated waste facility. Further liaison would occur with Isaac Regional Council and DEHP regarding approvals and facilities for acceptance of this waste.

6.7.3. Coordinator-General's conclusions

Treatment, storage and transport of regulated waste requires an environmental approval under the EP Act due to its classification as an Environmentally Relevant Activity (ERA). All applicable requirements and the persons responsible for each of the tasks are reflected in the project's Waste Management Plan (WMP). The proponent must implement the Rail EMP for the project.

The movement of regulated waste in Queensland is subject to a waste tracking system under the EP (Waste) Regulation. All waste movement from the site will be tracked in accordance with the requirements of Schedule 2 of the EP (Waste) Regulation, as

detailed in the WMP. This will include the completion of Waste Transport Certificates for the collection, transport and management of regulated wastes from the project.

I am satisfied that the Waste Management Plan will adequately address the issues raised during the EIS consultation period. To ensure this outcome I have imposed a condition in Appendix 2 requiring the development and implementation of a waste management plan for each of the construction and operational EMPs.

7. Evaluation of environmental impacts—whole project

This section outlines the major environmental effects¹² identified in the EIS, SEIS, submissions on those documents and comments from advisory agencies and other stakeholders that relate to the project as a whole that are not covered in Section 5—mine component and Section 6—rail component. This section provides comments on the effects and, where necessary, includes conditions or recommendations to mitigate adverse impacts that are additional to recommendations/conditions specified in sections 5 and 6.

7.1. Transport

The EIS has addressed transport impacts to the regional and local road network, the rail network and to the local aerodrome near Alpha. The impacts are those arising from the mine component and rail component of the project to the boundary of the Abbot Point State Development Area. Transport assessments are presented in the EIS at vol. 2, Chapter 13 (Mine) and vol. 3, Chapter 13 (Rail). The SEIS presents further information on road impacts in response to comments received on the EIS, at vol. 2, Appendix 29.

7.1.1. Road network

Mine component

Context

Local roads within the vicinity of the mine site are controlled by the Barcaldine Regional Council and are largely unsealed servicing local rural properties. Three State roads also exist within the vicinity and include the Capricorn Highway and Gregory Developmental Road (fully sealed State Strategic Roads) and Clermont – Alpha Road (part sealed Regional Road).

Study findings

Project traffic generation

Traffic generation figures for construction and operation were prepared for the EIS and updated in the SEIS. Key assumptions were:

- overburden material to remain on site and product coal to be transported to port by dedicated rail
- supply of equipment and material to the mine site is to be undertaken by road based on trip generation data available for existing mines in the Bowen Basin
- construction and operations to run 24 hours per day, 7 days a week

¹² For a definition of 'environmental effects', refer to the Glossary on page 265 of this report.

- 2500 workers (average) to be housed in an accommodation facility on-site during construction working a 12 hour on/12 hour off shift
- on-site staff to consist of 90 per cent fly-in fly-out (FIFO) and 10 per cent drive-in drive-out (DIDO) on a 13 day on/8 day off roster or similar
- FIFO staff to fly into Alpha and be bussed to site
- 95 per cent of construction staff to be accommodated on-site with 5 per cent of staff being locals and some sub-contractors accommodated locally and accessing the mine site by private vehicles
- 2000 staff required at the operations stage to be accommodated in a similar manner and working similar shifts as the construction stage.

Impacts

Road impacts have been addressed in the EIS and SEIS in accordance with DTMR's *Guidelines for Assessment of Road Impacts of Development (GARID)* having regard to road link and intersection capacity, pavement capacity, road safety and sensitive receptors.

The studies found that project induced increases in traffic would not have a significant impact on the road network and that a category 'A' level of service would be maintained during both construction and operation. Average Annual Daily Traffic volumes inclusive of background traffic growth are estimated at 1,200 vehicles per day (vpd) during construction and 1,500 vpd during operations. Heavy vehicle movements are estimated at 36 vehicle movements per day during construction and 22 vehicle movements per day during operations.

Intersections are expected to handle the increased project traffic and continue to operate efficiently although specific design requirements will be necessary for the intersection between the Capricorn Highway and Saltbush Road—the proposed mine access road.

A pavement impact analysis indicates that proponent contributions will be required to rehabilitate and maintain the Capricorn Highway between Jericho and Emerald.

The project will significantly impact a number of BRC roads on the mining tenement which will need to be re-located around the mining area. Principal amongst these is Monklands Road.

Mitigation

Waratah has committed to mitigate road impacts by:

- upgrading Saltbush Road as a new sealed mine access road linking to Hobartville Road in the north which will work to remove traffic from the surrounding unsealed road network and improve safety overall
- providing an appropriately designed intersection between the Capricorn Highway and the upgraded Saltbush Road
- reviewing the road impact analysis at the design stage when more detailed information is available and entering into arrangements with DTMR and BRC as necessary for road monitoring, maintenance and works to be undertaken

- preparing a road use management plan, traffic management plan and traffic control plans in liaison with relevant authorities at the project design stage.

Rail component

Context

The EIS reports that State controlled roads likely to be impacted by the project rail component include, Clermont – Alpha Road, Gregory Developmental Road, Bowen Developmental Road, Suttor Developmental Road and Bruce Highway. These roads are administered by DTMR.

In addition to State controlled roads, a number of mostly unsealed council and private roads will also be impacted.

Study findings

Project traffic generation

Traffic generation for the construction phase was prepared based on the following key assumptions:

- railway to be constructed in five sections each with its own construction camp
- 150–200 regionally based workers to be located at each camp on a drive-in/drive-out (DIDO) basis on a seven days on/seven days off work roster
- 80 per cent of workers residing in camps to access the work site by bus, 20 per cent (sub-contractors) by light vehicle
- a service road to be constructed within the railway easement is to be utilised for internal transport movements as far as possible—connected to public road network at approximately 50 km intervals
- bulk equipment and materials to be delivered to site in part by the public road network and in part along the partially completed rail corridor (rails, sleepers and ballast).

The estimated construction generated traffic is presented in the EIS at section 13.3.8. In summary, the EIS estimates a daily total of approximately 157 vehicle movements for each rail section, of which 117 will be heavy vehicles. Where quarry material is sourced from sites adjacent to the rail corridor, external heavy vehicle trips will be reduced to 30 vehicles per day.

Project generated traffic at the operational stage will be confined mainly to maintenance staff in predominately light vehicles and is expected to be minor and have little impact on the public road network. An estimated workforce of 60 permanent employees based in the Bowen area will be required to operate the railway.

Impacts

The EIS assessed road impacts in accordance with DTMR's GARID having regard to road link and intersection capacity, pavement capacity, road safety and sensitive receptors. In general it found that the project would add to traffic volumes, substantially in some cases, but from an existing low base and that an 'A' classified level of service would be maintained on all State roads. Intersections could handle the increased

project traffic and continue to operate efficiently with the possible exception of intersections on the Bruce Highway which may need some improvement. Waratah has committed to address this further at the design stage.

Some 17 State and Local Authority roads will be transected by the railway as well as approximately 190 private access roads and tracks.

Mitigation

Waratah commits to implement strategies aimed at minimising impacts on the existing road network through maximising use of the railway easement service road, use of buses to commute workers to and from the work site, locating quarries and workers camps as close as possible to the railway corridor and limiting the hours of heavy vehicle movements to within standard working hours where possible.

In regard to road crossings, the EIS proposes grade separation at the Gregory Developmental Road and Bruce Highway and level crossings elsewhere of minor State and local authority roads. Waratah has committed to further examine the crossings at the detailed design stage in conjunction with DTMR and local authorities and to complete an assessment of level crossings using the Australian Level Crossing Assessment Model (ALCAM). The SEIS reports that the rail line will terminate south of Queensland Rail's North Coast Line (NCL) and no crossing of the NCL by the Waratah rail line will be required—conveyors will carry coal over the NCL. This aspect will need to be addressed in the port component of the GC project.

A commitment is made to grade separation at private road and track crossings by way of road culverts under the rail. This will be undertaken in consultation with landowners and will permit personnel and stock movements under the rail corridor.

Waratah has also committed to undertake a pavement impact assessment along quarry haul routes during the design stage once quantities are refined and final quarry sites selected. It commits to enter into infrastructure agreements with DTMR and local authorities as appropriate for necessary works and asset maintenance and to re-assess road impacts at the design stage. It also commits to prepare a road use management plan and traffic management plans.

The above commitments are included in Waratah's compiled list of commitments included at Appendix 5 of this report.

Issues

Both DTMR and IRC in their submissions on the EIS indicated a desire for all crossings of the rail and surrounding road network to be grade separated in the interests of safety and operational efficiency and in accordance with *The Qld Level Crossing Safety Strategy 2011–2020*. In its response in the SEIS, Waratah advised that grade separation at minor roads is unwarranted because traffic volumes are low and conflict between road vehicles and trains infrequent. It has committed to grade separation of the rail at the crossing of the Gregory Development Road and proposes further assessment to determine if level crossings or grade separation is warranted. Waratah proposes to assess the road/rail crossings using the Australian Level Crossing Assessment Model (ALCAM). DTMR has also indicated that substantial investigation of the increased road/rail safety risk would need to be conducted to consider level rail

crossings at the other State-controlled roads—Bowen Development Road and the Suttor Development Road.

DTMR also raised concerns that the EIS had not addressed coal loss and coal dust deposition within the project rail corridor, on railway ballast fouling and impacts on safety and maintenance costs. In the SEIS, Waratah advised that it was changing its rail wagons from bottom dump to tippler wagons (gondola) and providing fibreglass wagon covers. Both initiatives are designed to virtually eliminate coal dust issues and improve aerodynamics leading to fuel efficiencies. I have discussed this matter further in section 6.4 of this report.

7.1.2. Rail network

Context

The EIS reports that the closest railway line to the proposed mine lies 25 km to the south. This is a passenger and light freight link between Longreach and Emerald (part of the Spirit of the Outback Line) that passes through Alpha and Jericho and has an estimated traffic volume of less than ten trains per week (west of Alpha). The railway lies immediately north of and generally runs adjacent to the Capricorn Highway. Traffic travelling to the mine from the south will need to cross this railway line which lies only 35 m north of the Capricorn Highway at the point of the proposed Saltbush mine access road.

The GC project rail line remains south of Queensland Rail's North Coast Line (NCL) and will not cross it. The project port component when finalised will need to address the crossing of the NCL by the coal loading conveyor system.

Study findings

Project traffic is not expected to impact the rail operations at the level crossing of the rail and Saltbush Road as the EIS projected vehicular/train exposure figure of 23 000 (vehicles/day x trains/week) is below 50 000—the figure usually used to trigger installation of signals and boom gates at level crossings.

The 35-metre queuing distance predicted between the rail and Capricorn Highway is a potential problem, particularly for heavy vehicles. Waratah proposes to address this by incorporating specially designed features into the Saltbush Road/Capricorn Highway intersection incorporating slip, merging and queuing lanes in an 'S' shape configuration. For additional safety Waratah proposes to install signals and boom gates at the railway level crossing.

The SEIS reports that the project rail component will not affect the operations of the NCL near Abbott Point as the project rail line will terminate south of the NCL.

7.1.3. Air transport

Context

The Alpha aerodrome is owned and managed by BRC and is rated for light aircraft only. Commercial aircraft use the regional airport at Emerald.

Study findings

The EIS identifies the Alpha Aerodrome as the FIFO destination for the project which will require two flights in and two flights out six days per week utilising an aircraft such as a DC-9. To meet these demands, existing facilities will require a significant upgrade including widening and extending the present runway, provision of vehicle parking and set-down areas for cars and buses as well as upgrading of the aerodrome access road from the Capricorn Highway.

Waratah reports that it has had discussions with BRC on the use and upgrading of the aerodrome but access and funding arrangements have yet to be concluded. Other proponents of coal projects in the southern Galilee Basin are also planning to use the Alpha Aerodrome as a FIFO destination and discussions have also taken place between these proponents and BRC.

Issues

In its submission on the EIS, BRC consider the aerodrome an essential regional asset that should remain in local government ownership. It is supportive of upgrading the facility to cater for mining FIFO requirements and to develop a community asset that would also improve accessibility to health services. The council is keen to engage with proponents to take the aerodrome upgrade project forward. Waratah is supportive of the aerodrome being upgraded and in contributing to an equitable share of the cost involved—preferably through appropriate ticketing or passenger levy arrangements.

7.1.4. Coordinator-General's conclusions

The road traffic impact analysis has concluded that the increase in traffic generated by the mine and rail during construction and operations will not have a significant impact on the road network.

Waratah has committed to grade separate the mine rail line at the Gregory Development Road and to review other road crossings at the design stage in conjunction with DTMR and relevant local authorities by way of an assessment using the ALCAM model. I support this approach and note that final decisions on the standards of road/rail crossings will be resolved by Waratah, DTMR and relevant local authorities through an infrastructure agreement, having regard to lawful requirements, appropriate best practice and the particular circumstances at each crossing. I have imposed a condition at Appendix 3, Part A, Schedule 1 requiring Waratah to undertake these assessments and reach agreement with DTMR and local authorities on infrastructure requirements prior to commencement of construction.

I agree with the EIS and SEIS findings that road impacts in the vicinity of the mine are also not expected to be significant and note that Waratah has committed to upgrade the Saltbush Road as a sealed mine access road and to address potential problems at the Capricorn Highway/Saltbush Road intersection and the Saltbush Road/ State rail level crossing. Waratah has also committed to re-evaluate the road impact assessment at the design stage when more detailed information is to hand and to prepare a road use management plan, and traffic plans, and reach agreement with DTMR and local authorities on works required and funding contributions. I have made a

recommendation to DTMR at Appendix 3, Part B to ensure these matters are addressed by way of approvals under the TI Act.

Based on the mitigation commitments in the EIS and SEIS, 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 will not be significant and can be suitably managed.

I accept the findings of the EIS that the project will not have a significant impact on the State's rail network.

In regard to air transport impacts, a number of proponents of coal projects in the southern Galilee Basin propose to utilise the Alpha Aerodrome as a FIFO destination at least in the early stage of mine construction and operation. I support the development of a single point for FIFO operations on the grounds of 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 involved should be borne equitably by participating companies that will derive the main benefit from the upgrade. Proponents must consult with and reach agreement with BRC, as the owner and operator of the aerodrome, on the scope of upgrade work, timings and method of cost apportionment. To achieve this outcome, I have recommended to BRC that an infrastructure agreement be produced with Waratah in regard to the upgrading of the aerodrome. This recommendation occurs at Appendix 3, Part B, Schedule 4.

I have considered cumulative transport impacts at section 7.6.4 of this report.

7.2. Greenhouse gas emissions and climate change

7.2.1. Context

The proponent is required to report on greenhouse gas (GHG) emissions under provisions of the *National Greenhouse and Energy Reporting Act 2008* (NGER Act) (Cwlth). The NGER Act prescribes an accounting methodology and requires publication of results.

Under the NGER Act, boundaries have been established to assist in determining emissions attributable to a project. In terms of emissions boundaries, three scopes have been identified:

- Scope 1 (also referred to as direct) emissions are GHG emissions which occur as a direct result of activities at a facility. They are emissions over which the entity has a high level of control.
- Scope 2 (also referred to as energy indirect) emissions cover GHG emissions from the generation of purchased electricity, steam, heating or cooling consumed by a facility. Scope 2 emissions are indirect emissions that entities can easily measure and significantly influence through energy efficiency measures.

- Scope 3 covers all indirect emissions that are not included in Scope 2. They are a consequence of the activities of the facility, but occur at sources or facilities not owned or controlled by the entity. NGER legislation does not cover reporting of Scope 3 emissions.

The ToR for the EIS required Waratah to undertake a climate and climate change adaption assessment. A climate change impact assessment was undertaken for the project. The TOR did not require Waratah to assess Scope 3 emissions.

7.2.2. Study findings

The EIS addressed GHG emissions in EIS vol. 3, Chapter 10 (Rail), EIS vol. 2, Chapter 10 (Mine) and SEIS vol. 2, Appendix 37.

The proponent has committed to minimise the amount of greenhouse gas generated by the project by measuring and reporting GHG emissions in compliance with the National NGERS, developing ongoing processes for minimising energy consumption and greenhouse gas emissions within the project, by investigating the use of renewable energy sources in the operation of the mine, and working with government on developing measures to address GHG emissions.

The proponent will minimise the release of GHG emissions for the life of the project based on the commitments outlined in the draft EMP (Rail).¹³

The climate change assessment is detailed in EIS at vol. 2, Chapter 2. The assessment was conducted in accordance with *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines* and considered impacts to range of variables including storms and cyclones, wind speed, annual rainfall and fire risk. The assessment concluded that impacts can be managed through proper infrastructure design and a sound workplace health and safety system.

7.2.3. Issues

A number of submissions were received objecting to the lack of assessment of Scope 3 emissions. In response, Waratah noted that Scope 3 emissions were not included in the TOR for the project nor in the reporting requirements of the NGER Act accountability methodology framework. The emissions generated by burning coal to produce electricity (Scope 3 emissions) are assigned to the end user and become their Scope 1 or Scope 2 emissions. As such, any use of the coal within Australia will be captured by the national greenhouse gas accounting system. If the annual Scope 3 emissions as a result of the mine were to be calculated and reported against the national greenhouse accounting system, it would be effectively double counting because these emissions are already represented. The burning of coal overseas is a matter for the recipient country under international reporting arrangements.

Barcaldine Regional Council requested, in a submission on the EIS, further detail on specific improvements in energy efficiency. The proponent responded with a list of energy efficiency measures including annual energy audits, ventilation systems,

¹³ SEIS vol. 2, Appendix 37

minimising requirement of lighting systems and implementation of an energy management system.¹⁴

7.2.4. Coordinator-General's conclusions

Based on the accounting methodology provided for by the NGER Act and the project TOR, I do not consider that Scope 3 emissions should be included in the proponent's assessment of GHG emissions.

I am satisfied that the proponent has made a proper assessment of the GHG emissions attributable to the proposed mining activities as required by the EIS TOR and in accordance with legislative requirements. I am also satisfied that the proponent has appropriately considered ways in which to reduce GHG emissions in the design, construction and operation of the project. The proponent has also committed to participate in the Commonwealth Energy Efficiency Opportunities Program to minimise energy consumption and will conduct ongoing assessments of energy efficiency.

I am further satisfied that impacts from climate change can be adequately managed through infrastructure design and implementation of a sound workplace health and safety system which Waratah has committed to implement.

7.3. Offsets

7.3.1. Coordinator-General's requirements and approval

The Queensland Government Environmental Offsets Policy (QGEOP) provides an overarching framework, that sets the principles and requirements for delivery of State offsets. Within this framework, specific-issue policies exist for managing offsets in relation to native vegetation clearance, loss of biodiversity, Koala impacts and fish habitat impacts.

However, the QGEOP does not bind the Coordinator-General in assessing coordinated projects or activities under the SDPWO Act. The Coordinator-General has the discretion to consider the need for and decide on all types of offset conditions (and conditions in general).

The Coordinator-General has the powers necessary to decide on offsets as part of his broad conditioning powers under the SDPWO Act. For example, sections 39 and 47C of the SDPWO Act provide the Coordinator-General with the general power to state conditions for development approvals and environmental authorities respectively.

The Coordinator-General can take advice from relevant state agencies on offsets and will consider existing State offset policies but is the sole decision-maker on coordinated projects and will determine and approve any State offset conditions that are considered necessary over and above Commonwealth requirements.

¹⁴ SEIS Part C, Section 01

The Coordinator-General will work with the Commonwealth to aim to agree on their offset requirements. Any additional requirements for offsetting non-MNES impacts over and above the Commonwealth's offsets and conditions will be considered by the Coordinator-General on a case-by-case basis, after the Commonwealth Minister's decision.

7.3.2. Offset proposal

At vol. 5, Appendix 27 of the EIS, Waratah presented a preliminary offset strategy aimed at identifying offset requirements, outlining an approach to meeting these requirements, and identifying potential offset areas.

Project impacts were assessed against the then offset policies of the State and Commonwealth to quantify the biodiversity values requiring offsets. Typical multipliers were assumed to provide an indication of offset liability and finally a desk top assessment was undertaken of the region to identify potential direct offset areas. In addition to State and Commonwealth offsets, Waratah provided a commitment to offset the conservation value of the Bimblebox Nature Refuge by providing a new nature refuge site of equivalent conservation value but twice the size of Bimblebox. The EIS concluded that substantial offsets areas were available to acquit the offset obligation by way of direct offsets with possibly some level of indirect offsets.

This work was reviewed and updated in the SEIS and a revised offset proposal (February 2013) was presented at vol. 2, Appendix 35 of that document. The revised proposal takes into account changes in offset policies of the State and Commonwealth since the EIS—in particular the introduction of the Queensland Biodiversity Offset Policy on 3 October 2011 as a specific-issue policy under the GEOP and the Australian Government's Offsets Assessment Guide. It also provides a staged approach for offsetting subsidence impacts and accounts for the strategic planning work done by the State by way of the Galilee Basin Offset Strategy. The Galilee Basin Offset Strategy aims to identify priority offset areas in the Galilee Basin to deliver the best biodiversity conservation outcomes from multiple mine development.

The final offset proposal details:

- how the project has been designed and located to avoid and/or minimise the extent of clearing
- identification of the impacts of the project requiring offsets, including impacts on the BNR and summation of offset requirements
- the approach to offset delivery including:
 - details of direct offset options having regard to the State's priority offset areas identified within the Galilee Basin Offset Strategy
 - confidential maps and property details provided to the Coordinator-General of direct offset options including the BNR replacement as well as back-up options (not available in SEIS public release)
 - details of the staged approach to offset delivery
- offset implementation, including landholder engagement, ecological equivalence assessments and development of Offset Area Management Plans (OAMPs).

Waratah proposes to acquit its offset obligations by way of direct offsets on a number of properties identified either wholly or partly as priority areas within the State's Galilee Basin Offset Strategy. Indirect offsets and/or compensatory measures are proposed in the event that direct offsets are unable to solely fulfil the offset requirements for a particular value.

A staged approach is proposed for offsetting impacts from underground mining because of the uncertainty of predicting the future impacts from subsidence. Essentially the proposal provides for up-front offsets for direct clearing associated with the mine and rail components and for the whole of the underground subsidence area for the first five years of underground mining. At the end of the first five years and at five yearly intervals thereafter, field surveys of actual impacts are to be conducted and future offset requirements reviewed and adjusted accordingly.

A final offsets proposal was submitted to me in June 2013 in response to comments raised by my office and DEHP on the February proposal. The final proposal updates the rail impact areas and offset requirements having regard to the wet season ecological surveys on the rail corridor which were completed after the release of the SEIS. It also confirms the offsetting approach in the February proposal and adds further certainty that offset areas are available to offset impacts to the whole underground subsided area should that unlikely outcome eventuate.

7.3.3. Coordinator-General's conclusions

I am satisfied with the assessment undertaken by Waratah to determine broad offset obligations under State policies and with the final offset proposal put forward. These obligations are effectively the maximum that I would impose on the project. I am also satisfied that suitable land-based offset areas are available within priority areas identified within the Galilee Basin Offset Strategy for Waratah to acquit those obligations.

Waratah has no obligation under State offset policies to replace the conservation estate of the BNR. However, as discussed in Section 5.2 of this report, every major project impact, including the mining of nature refuges, is an issue that needs to be considered on a case by case basis. I have concluded that mining can proceed so long as part of the compensatory offset measures include replacement of the BNR with a new conservation estate of at least the size of the BNR and of equivalent or higher ecological value, capable of being secured as a nature refuge or higher conservation tenure.

Waratah must now undertake relevant ecological equivalence assessment on the impacted sites and proposed offset sites and conclude offset arrangements with the Commonwealth on MNES. Once this work is completed I will make my final determination on State offsets.

I have imposed a condition at Appendix 3, Part A, Schedule 1, requiring Waratah to submit an offset plan, consistent with the proposal submitted to me in June 2013 and including the results of the ecological equivalence assessments and taking into account outcomes of the Commonwealth MNES assessment for my assessment and final approval on State offsets.

7.4. Economic impacts

7.4.1. Study findings

The EIS has assessed the economic impacts of the project on the local, regional, state and national economies as required by the terms of reference.

The mine and rail components of the project will involve a capital investment of approximately \$6.4 billion (including the port facilities—not covered by this evaluation) and provide direct employment for 3500 workers during construction for the mine and rail components and for 2325 workers during the project operations. Local and regional contracting opportunities will provide further employment.

Economic impacts were modelled using a general equilibrium model that estimated the net increase in demand generated by the project after accounting for resource constraints. The results indicate State output will increase by \$232 million per annum for each year during construction increasing to \$5.2–\$5.7 billion per annum during operations. State employment is projected to increase by 3,000 full time equivalents (FTEs) during construction and 4,000 FTEs during operations. All figures are relative to a base case of projections of the existing economy in the absence of the project i.e. the figures measure the difference at future times, between the with and without project cases.

Consistent with all major mining projects, the Galilee Coal project will see some structural adjustment of the local and Queensland economies as resources are drawn from other sectors of the economy into mining. This is likely to be most notable in the manufacturing and agricultural sectors given the relatively similar skill sets of employed labour. During the project operational period, State manufacturing output is expected to be \$1–1.2 billion per annum lower and employment 1600–2200 lower than would be the case in the absence of the project. In general terms, however, most industry sectors will see an increase in output and employment relative to the base case. These types of impact are common to mining projects in general, not just to the GC project.

The EIS estimates that State Government revenues will increase by \$365 million per annum and Australian Government revenues by \$710 million per annum relative to the base case, should the project proceed.

7.4.2. Issues

A number of submissions were received during the EIS public review period concerned with a range of matters from assumptions underlying the economic modelling, negative impact on certain industry sectors, effects on the CPI and interest rates. All issues raised have been addressed by Waratah in the SEIS.

A key concern raised in submissions was the potential negative impact of the project on the manufacturing sector which a number of submitters saw as a loss of existing jobs in the sector at the present time. Waratah has provided further explanation in the SEIS that the modelling projections are relative to a base case where a decrease in projected manufacturing jobs compared to the case of no project, simply means that increased demand for labour will result in a higher proportion of labour moving to the

mining sector than otherwise would be the case. Some of these workers will come from the manufacturing sector and consequently the sector will not grow as rapidly as it otherwise would.

7.4.3. Coordinator-General's conclusions

I am satisfied that Waratah has adequately modelled the economic impacts of the project and it could provide a significant boost to the local, regional and State economies, provide employment and opportunities for local businesses, and provide an increase in household incomes and increases in State and Commonwealth Government revenues.

I am satisfied the project will not have any long term significant impact on the manufacturing sector although I accept that there will be some structural adjustment of the Queensland economy in particular as mining becomes more dominant.

I note that Waratah has made commitments to develop plans to minimise the draw-down on labour in other sectors—particularly lower income paying sectors, develop local supply chains and minimise impacts on accommodation and property prices. These aspects are discussed further in the following section on Social Impacts.

7.5. Social impacts

7.5.1. Overview

The GC Project is located approximately 30 kilometres north-west of the township of Alpha in the Barcaldine Regional Council (BRC) area. At the time of the 2011 Census, Alpha had a resident population of 349 persons and is located 140 km from Barcaldine, the nearest community via key road networks with a population of over 1000 people. Emerald is located 170 km to the east of Alpha and is the closest major centre with over 12 000 people.

A social impact assessment (SIA) was completed in accordance with the TOR for the EIS. Matters considered in the SIA included the social and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts and mitigation measures and management strategies. Refer to Chapter 3 of this report for details of the consultation undertaken during the EIS process.

The potential social impacts identified with the mine and railway mainly relate to local economic change for individuals and communities. There were no key impacts identified that indicate the project should be delayed, postponed or re-structured due to potential social or local economic impacts.

Positive impacts identified in the EIS included:

- direct and indirect local, regional and Indigenous employment and training opportunities beyond traditional agricultural sector roles
- local and regional contracting and supply opportunities for individuals and businesses

- higher income levels from project related employment and increased business activity
- population growth and the potential to support improved infrastructure and services in local communities.

The subsections below provide more detail on the potential impacts identified in the SIA; the proponent's strategies to enhance, mitigate and manage the potential impacts arising from the project; along with my analysis, reporting requirements and conclusions.

7.5.2. Social impact assessment

The Queensland Government has committed to streamlining regulatory and approval processes, including the cost and complexity of the EIS process for coordinated projects, as a means of reducing costs to industry, clearly identifying specific outcomes and helping to grow a four-pillar economy.

In pursuing these objectives the Queensland Government will work with industry and local government through the *Managing the impacts of major projects in resource communities* framework to:

- streamline processes to provide greater certainty for proponents and reduce costs. SIA mitigation measures will focus on impacts identified through better social impact assessment.
- deliver better outcomes for resource communities through clear roles for state and local government, working closely with proponents.

The framework is available on the Department of State Development, Infrastructure and Planning website at: www.dsdip.qld.gov.au/resources/plan/managing-impacts-major-projects-resource-communities.pdf

As part of the framework, I have developed a new SIA Guideline to assist proponents to effectively identify, assess and propose measures to mitigate the social impacts of coordinated projects. Under the guideline, the requirement to complete a SIA as part of the EIS process remains unchanged. The components of a SIA include:

- community and stakeholder engagement
- workforce management
- housing and accommodation
- local business and industry content
- health and community wellbeing.

The guideline is available on the Department of State Development, Infrastructure and Planning website at: www.dsdip.qld.gov.au/assessments-and-approvals/social-impact-assessment.html.

Proponents were previously required to develop a Social Impact Management Plan (SIMP) for major resource development projects requiring an EIS, with associated imposed conditions from the Coordinator-General. As the GC Project EIS was initiated under these arrangements, the proponent provided a draft SIMP as Appendix 30 of the

SEIS outlining the potential impacts arising from the project and the proposed responses.

The proposed mitigation strategies and actions remain entirely relevant and have been assessed against the components of a SIA listed above, and summarised in Appendix 6 of this report.

The Queensland Government supports economic growth and infrastructure provision across regional communities through its Royalties for the Regions initiative. Royalties for the Regions has been designed to ensure regional communities receive genuine long-term royalty benefits through better planning and targeted infrastructure investment. The program provides support to local governments in responding to critical needs arising from resources sector growth, and will help regional communities better manage the consequences of resource sector development, seize economic opportunities and encourage growth.

7.5.3. Government policy

A SIA was conducted by the proponent in relation to the three key elements of the project—the mine, railway link and port facilities. The on-lease accommodation for the mining construction and operational workforces, three temporary accommodation camps along the proposed railway alignment for construction contractors and ancillary infrastructure to support the development and operation of the mine were also considered in the SIA.

As noted in Section 2.2.1, my evaluation of the project is limited to the mine and rail components. However, I have also considered ancillary infrastructure to the extent that particular items, such as workforce accommodation facilities, are relevant in the context of a potential social impact and the required response to that impact. Notwithstanding the exclusion of the port facility from my evaluation, potential impacts in Bowen arising from the mine and railway and the proponent's response have also been considered as required.

The local study area established for the SIA incorporates:

- the townships of Alpha and Jericho and surrounding regions within the BRC area in direct proximity to the mine site and railway infrastructure
- the towns of Clermont, Moranbah, Collinsville and Bowen within the Isaac Regional Council (IRC) and Whitsunday Regional Council (WRC) areas in proximity to the proposed railway alignment.

A broader local region including these three regional councils and the neighbouring Central Highlands Regional Council was also established primarily to capture any potential cumulative social impacts arising from this and other projects. The closest urban centres of Emerald, Rockhampton and Mackay were recognised as likely sources of employees, contractors and materials for the project, and potential State level impacts on the greater Brisbane metropolitan area were also considered.

The SIA identified and assessed social and economic impacts, defined the roles of the proponent, government, community and other stakeholders; and proposed measures to enhance or mitigate impacts throughout the construction, operation and

decommissioning phases of the project. Attachment 3 in Appendix 30 of the SEIS provides a summary of the main potential impacts, a rating of the significance of each impact derived from an impact assessment framework, and an overview of the proponent's strategies for enhancing, mitigating and managing the impacts.

Potential negative impacts requiring mitigation, management or monitoring include:

- rising living costs associated with increases in house prices, rents and a range of goods and services
- labour market drain from other sectors into the mining industry
- increased demand on health and emergency services arising from population growth and increased traffic on highways and local roads
- heightened anxiety over the alignment of the railway line and the future direction of the local community and region as a result of mining activity
- decline in tourism due to the supply and high cost of temporary accommodation
- economic decline following the closure of the mine.

The proponent's responses to the potential impacts identified through consultation during and after the EIS process are summarised in Appendix 6 of this report, based on the criteria that I have used in my assessment.

These actions will be supported by a number of plans, procedures and policies that address specific issues or impacts of both the mine and proposed railway alignment in greater detail including:

- Health and Emergency Services Strategy incorporating a Code of Conduct, Workforce Induction Procedure, Drug and Alcohol Policy, Fatigue Management Plan, Community Cohesion Strategy and Grievance and Dispute Resolution Mechanism
- hazard and risk management plans
- landholder and Indigenous engagement strategies
- cultural heritage management plans
- Road Impact Assessment Report
- Road Use Management Plan
- traffic management plans
- traffic control plans.

Further engagement with stakeholders is required to finalise the baseline data, targets and indicators needed to ensure that the actions and supporting documents listed above are further developed and implemented prior to the commencement of construction.

The following sections of this report consider the extent to which the actions and supporting documents enhance, avoid, mitigate and manage the impacts of the project.

7.5.4. Housing and accommodation

Large scale projects have the potential to drive up demand in housing markets where supply is limited, resulting in purchase price and rent increases that can be beyond the means of many households not employed in the mining industry. These impacts may

be evident prior to the commencement of construction and Alpha and Jericho, like other towns and centres throughout the broader region, have experienced increases in the cost of land and housing as a result of speculative investment in local housing markets.

The availability and affordability of temporary accommodation including motels, hotels, boarding houses and caravan parks may also be affected as projects with large workforces are developed. Employers in other industries can experience difficulties in attracting and retaining key workers as housing costs increase, including seasonal agricultural workers who traditionally rely on temporary and farm-based accommodation during peak periods.

The former Department of Employment, Economic Development and Innovation noted that tourism industry stakeholders are concerned that resource projects and related service industries are having a cumulative impact on the availability and affordability of temporary accommodation in regional communities. Limited vacancies and higher prices may deter tourists from staying overnight in the local area, or prompt caravan owners to park on the outskirts of town creating pressure on public facilities and waste collection services.

A recent housing market analysis for the Galilee Basin commissioned by the proponent found that housing affordability is not currently a pressing issue in the smaller townships across the region (including Alpha, Jericho and Collinsville) where sales and rental turnover were very low during 2011 and 2012. However, the limited supply of housing for sale and rent suggests that these areas have very little capacity to accommodate additional residents.

All operational rail employees will be located in Bowen. The higher rental vacancy rate in Bowen where rents have moderated since 2010 suggests that some capacity exists to absorb growth, and this has been confirmed in recent discussions between the proponent and the Whitsunday Regional Council.

The EIS identified rising living costs resulting from increased housing prices, rents and local goods and services in the local region surrounding the mine as an impact requiring mitigation. While the proponent's reliance on a predominantly fly-in/fly-out (FIFO) workforce with accommodation adjacent to the mine site will limit impacts in local and regional housing markets, the former Department of Communities suggested that alternative housing strategies for workers choosing to reside locally should be developed in consultation with Barcaldine Regional Council, not for profit housing providers and the State.

Coordinator-General's conclusions

I require the proponent to meet the housing and accommodation needs of the project's workforce during the construction and operation phases, while avoiding, managing or mitigating project-related impacts on housing supply and affordability in Alpha, Jericho and other centres in the region.

I note the proponent's intention to construct sufficient housing adjacent to the mine site to accommodate the entire mine construction and operation workforce for the life of the project. Part of this accommodation will also house some railway construction

employees, with the balance to be accommodated in an existing camp at Merinda (near Bowen) and temporary camps along the proposed railway alignment. This approach, together with the proponent's commitment to construct 50 new dwellings during the early operational phase for mine employees choosing to reside in Alpha, should manage local and regional housing impacts.

The number of mine employees residing in Alpha, and operational rail employees residing in Bowen, along with property prices, rents and rental vacancy rates in both locations will be actively monitored and made publicly available by the proponent.

Speculation over resource projects proceeding has already contributed to increases in the price and availability of land and housing in Alpha and Jericho, although there is evidence to suggest that price increases and sales activity have moderated in recent times. Further impacts on local and regional housing markets could occur if construction or operational workers choose to move into the region for the term of their employment or permanently.

For this reason, I have imposed a condition (Appendix 3, Part A, Schedule 3, Condition 1) requiring the proponent to provide an annual report to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period, and for two years following the commencement of mining operations. The report must describe the actions and adaptive management strategies to avoid, manage or mitigate project-related impacts on local and regional housing markets.

7.5.5. Workforce management

The mine will be developed over three years and a construction workforce of approximately 2500 workers will be required at peak construction period. A proposed workforce of 2000 workers will be required during mine operations. The small population base and limited workforce experience in the local study area, and the labour demands likely to arise from other resource project, present significant challenges for sourcing the mine workforce locally.

The proponent has proposed that the mine workforce during the construction and operational stages will be predominately FIFO, with some opportunity for bus-in/bus-out (BIBO) arrangements from centres in the region and drive-in/drive-out (DIDO) commuting for employees residing locally. Accommodation will be provided at a purpose built 2500 person workers village adjacent to the mine site. Not all of the 2500 mine workers will be in residence at once, however, the village will also house some of the rail construction workers. The mine development is expected to operate on a two shift, seven day rotating roster.

The railway will be constructed over the same three year period and require approximately 1000 workers. The construction workforce is expected to be based in camps at the mine site and at Merinda, and in temporary camps at designated points along the proposed railway alignment. The temporary construction camps are each expected to accommodate between 150 to 500 workers, who are likely to work 12 hour shifts on a FIFO basis (e.g. 21 days on 7 days off). Around 325 workers are expected to operate and maintain the railway network during operations, and the proponent intends to base these employees in Bowen.

The project represents a significant opportunity to pursue local and regional economic development outcomes by:

- matching employment opportunities to the existing local workforce
- sourcing employees from areas with relatively higher levels of unemployment
- considering workforce training requirements to avoid skill shortages over the life of the project.

The origin, gender and level of training provided to all employees, including the employees of contractors, will be actively monitored and reported during the construction and operational stages of the project.

Coordinator-General's conclusions

I require the proponent to maximise local employment opportunities over the life of the project, including opportunities for local Indigenous people and other disadvantaged groups, and provide training and development opportunities for people locally and regionally to increase their skills and gain employment in the mining sector.

The proponent's workforce commitments to the local area and region includes the engagement of up to 20 new apprentices each year, 50 per cent of whom will be recruited from Central Queensland and the Whitsunday, Isaac and Mackay regions. I also note that the proponent will fund local businesses to engage and manage another five apprentices each year to offset the potential impacts of a skills drain into the mining industry, and will work with local recruitment and employment agencies to identify suitable employees from the local area including people from disadvantaged groups and people with a disability.

The proponent has committed to developing workforce management strategies that respond to these issues and opportunities. Actions will include:

- establishing a preferred employment hierarchy prioritising the local area and region
- implementing Indigenous workforce engagement and participation strategies, and appointing an Indigenous Liaison Officer to oversee these strategies once construction commences
- establishing relationships with local schools and vocational training providers to provide career pathways for local residents and employees
- participating in government-led initiatives to recruit workers from areas in Queensland that have relatively high levels of unemployment.

These measures represent a satisfactory response to local and regional workforce issues. However, as the workforce requirements of the project will change over time, I have imposed a condition (Appendix 3, Part A, Schedule 3, Condition 1) requiring the proponent to provide an annual report to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period, and for two years following the commencement of mining operations. The report must describe the actions to enhance local and regional employment, training and development opportunities.

7.5.6. Health and community wellbeing

The local community in Alpha and the surrounding region regard mining as an important source of employment and a means of diversifying the local economy. While the EIS found that the project will itself have only a modest direct impact on local infrastructure and services, there are concerns that failure to plan for the growth and change that may arise from mining activity could erode the family-friendly rural lifestyle that is highly valued by local residents.

Incomes in the local area are significantly lower than in surrounding regional centres and Queensland as a whole, predominantly because of the reliance on agricultural wages. Higher mining incomes provide opportunities for individuals to improve their standard of living, and support improvements to services and facilities that benefit all residents in rural communities.

An influx of higher wages can, however, lead to higher housing and living costs that impact more acutely on lower income earners in other sectors, and create income and wealth disparities in the local communities. The former Department of Communities suggested the development of strategies to support local businesses, enhance social capital, and provide long term benefits for the entire community as a means of addressing this issue.

Good access between the isolated townships in the region and larger centres is a critical component of the rural lifestyle that is highly valued by the community. The establishment of the mine may lead to an increase in heavy vehicle traffic on State-controlled roads including the Capricorn Highway from Rockhampton to Alpha, particularly during the construction period. Traffic on local roads may also increase if BIBO and DIDO employees and contractors choose to access the mine from a number of local and regional centres, while the movement of rail construction workers from accommodation camps to worksites could also impact on local traffic movements.

Queensland Health noted that motor vehicle accidents associated with heavy vehicle traffic, fatigue and DIDO workforces are an established issue in the Bowen Basin, citing greater risks to other road users including grey nomads and other tourists. Any increase in accidents occurring as a result of the project, particularly on the roads linking Alpha to Clermont and Emerald, could also place additional demands on police, health and emergency service providers. The Department of Community Safety expressed the concern that the mine may impact on the staffing resources of the Alpha Queensland Fire and Rescue Service auxiliary service, which would be the primary respondent to any local traffic accidents.

Coordinator-General's conclusions

I require the proponent to:

- avoid, manage or mitigate project-related impacts on local community services, social infrastructure and community safety and wellbeing
- minimise the impact on emergency services in the region during the life of the project and optimise the safety of the mine and its employees
- facilitate positive interaction between the workforce and local community on and off the project site.

The establishment of mining activity represents a significant change for communities in the local area. The proponent's reliance on a predominantly FIFO workforce, together with the provision of on-site accommodation, medical and recreational facilities will limit the project's impact of workers living locally and drawing on local and regional services and infrastructure.

The Community Development Fund established for the Alpha Coal Project is also intended to be utilised for the Galilee Coal Project and other projects in the Galilee Basin. The fund will be jointly managed with BRC and will be available to contribute to social infrastructure priorities identified by the community. I note that the proponent has committed to ongoing contributions to the fund to contribute to social infrastructure priorities in the region, and refer to my comments in relation to cumulative impacts in Section 5.6.4.

Individuals and local communities have the potential to gain economic benefits associated with the establishment of mining activity. I note, however, that higher wages have the potential to increase the cost of living, and to impact adversely on households not benefiting directly from this activity. The proponent has committed to finalising a Community Cohesion Strategy prior to the commencement of construction to support strong and productive relationships between the project, its workforce and local communities. Key aspects of the strategy will include:

- promoting local training and employment opportunities
- providing assistance for employees and their families choosing to relocate to Alpha such as flexible work arrangements
- implementing a code of conduct for all employees and contractors to minimise any adverse social impacts in the community
- undertaking effective community engagement with a wide range of stakeholders.

Accident and emergency situations arising from the project, either on or off-site, may impact on the delivery of existing emergency services, and compromise the safety and amenity of other road network users. While the predominantly FIFO workforce will reduce local traffic impacts that otherwise may occur in the vicinity of the mine and the proposed railway alignment during construction, the proponent's commitments to enhance community safety include:

- providing a bus service between nearby regional centres and the mine site for employees, should a sufficient number of employees reside in a nearby regional centre
- preparing traffic management plans in consultation with DTMR, relevant regional councils and QPS
- including safe driving and fatigue management strategies for employees and contractors who will drive to or from work
- inviting local emergency service providers to participate in the preparation and practicing of emergency procedures
- establishing aero-medical and retrieval services prior to the commencement of construction, and to investigate options for working with other proponents in the region to extend these services to the Alpha community.

I have imposed a condition (Appendix 3, Part A, Schedule 3, Condition 1) requiring the proponent to provide an annual report to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period, and for two years following the commencement of mining operations. The report must describe the actions to avoid, manage or mitigate project-related impacts on local community services, social infrastructure and community safety and wellbeing.

7.5.7. Community and stakeholder engagement

The proponent prepared a consultation plan during the early stages of the EIS process for all three elements of the project. The plan identified a broad range of key stakeholders and included a program of meetings with (Commonwealth) and State Government agencies, regional councils, local communities, affected property owners and Indigenous groups. A number of alternative communication channels were also established including a project website and email address, 1800 free call number and a free post comment form.

Community aspirations vary considerably across the study area, with residents in all regions generally supportive of mining development. The Barcaldine region has experienced population decline over an extended period, and many residents regard mining as an opportunity to diversify local economies, provide employment opportunities, and act as a catalyst for improved infrastructure and services. The most common issue raised by residents in the vicinity of the mine was the potential impact on groundwater, followed by the extent to which the mine would contribute to the orderly development of local infrastructure and services in Alpha without eroding the established rural lifestyle.

The EIS identified three options for the proposed rail alignment which differ only in the vicinity of the mine site. The potential social and local economic impact of each option on neighbouring property owners varies considerably from limited (Option 1) to significant (Option 2). During the SEIS stage the proponent settled on Option 3 which represents a compromise between the concerns of neighbouring property owners and the proposed Alpha and Kevin's Corner project mine sites. I support Option 3 based on the work completed during the EIS. This aspect of the project is considered in Section 6.3.3 of this report.

In the Isaac region where mining activity is well established, particular interest was expressed in the location of the proposed rail alignment and accommodation camps, and concern was raised that grazing practices and property values could be adversely affected. Residents were also interested in the extent to which local roads would allow contractors to access and service the mine site. Residents from Collinsville and Bowen in the Whitsunday region were interested in the proximity of the proposed rail alignment to residential areas, and the potential impacts of FIFO workforces on economic development, local businesses and housing markets.

A report on the public consultation process and the outcomes during the EIS stage is provided as Appendix 25 in Volume 5 of the EIS. Stakeholder engagement during the SEIS stage focused on State agencies and regional councils, along with participation in a Community Reference Group meeting in Alpha on 7 November 2012. The public

consultation process informed a range of technical studies included in the EIS and SEIS, and directly contributed to the development of the project.

Coordinator-General's conclusions

My requirement is that the proponent will:

- engage with the community openly and transparently, ensuring it is informed about the project's impacts and its concerns are considered in reaching decisions
- collaborate with other proponents, local authorities, state agencies and other stakeholders as required to maximise opportunities, address impacts and promote agreed regional outcomes.

I acknowledge the proponent's efforts during the SIA to engage with stakeholder groups, and I consider these efforts sufficient to identify potential impacts arising from the project. The proponent has developed actions and strategies to ensure that stakeholder engagement continues in an effective manner including the Landholder and Indigenous Engagement Strategies, Community Cohesion Strategy and Grievance and Dispute Resolution Mechanism.

I note the potential for anxiety arising from uncertainty about the location of the proposed rail alignment, particularly amongst those landholders who may be directly affected. While the actual land requirement of the alignment would not lead to significant loss in the area of cattle grazing land, the location of the railway could impose additional time and labour costs on individual landholders forced to negotiate barriers to cattle movement, establish alternative watering points and realign fences and farm roads. Dust from coal trains could reduce the willingness of cattle to graze near the railway potentially reducing the carrying capacity of adjacent properties.

To this end, I note the proponent's commitment to compensate affected landholders for the impacts of the railway, and to provide the services of a farm management consultant, if requested, to assist property owners to plan for changes as a result of mine and/or rail infrastructure. In addition to this assistance, there may be opportunities for landholders to provide services during the construction and operation of the railway alignment (including fencing and weed or fire control) to supplement income and enhance the economic viability of their properties.

I expect the proponent to continue to engage as required with all project stakeholders to complete their commitments, actions and supporting documents, and that the baseline data, targets and indicators that will demonstrate the effectiveness of these actions will be made publicly available.

For this reason, I have imposed a condition (Appendix 3, Part A, Schedule 3, Condition 1) requiring the proponent to provide an annual report to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period, and for two years following the commencement of mining operations. The report must describe the actions to inform the community about project impacts and show that community concerns about project impacts have been taken into account when reaching decisions.

7.5.8. Local business and industry content

The nature of economic activity varies significantly throughout the three regional councils included in the local study area. The BRC area depends heavily on livestock production and slaughtering as the dominant source of local economic activity and employment, although road-based tourism has become increasingly important for a number of centres throughout the region.

The livestock industry has continued to decline in recent years due to decreasing margins and drought, with many young people being forced to seek employment in larger regional centres or on the coast. Mining activity is regarded as an avenue for economic diversification, growing local businesses and providing stable employment opportunities to support population growth.

There are, however, local concerns that the establishment of the mine and railway infrastructure could exacerbate existing labour shortages, as workers leave to pursue opportunities in the resource sector. Aside from having to compete with the higher wages paid to mine employees, local businesses may face additional recruitment and training costs as they seek to maintain staff levels during seasonal peak periods.

Clermont and Moranbah in the IRC area have benefited from mining activity over a prolonged period, leading to population growth, high employment and income levels, and improved infrastructure and services. Collinsville in the WRC area also has a number of mines in close proximity, but some residents feel that FIFO workforce arrangements have limited the town's growth and prosperity with workers invariably choosing to live in Bowen.

The project presents local business opportunities for established suppliers and contractors throughout the local study area, and in the centres of Emerald and Mackay, including those seeking to establish a base in Alpha or Jericho.

Coordinator-General's conclusions

I note the community's support for mining as the basis for economic diversification, along with the challenges that these changes may pose for local communities and businesses including attracting and retaining qualified staff. The proponent has committed to a number of strategies to assist local businesses and communities to benefit from the project including:

- advertising procurement and contracting opportunities locally and holding briefing sessions for local businesses and contractors
- packaging contracts to ensure local businesses and contractors are able to submit competitive bids
- giving preference to locally-based businesses and contractors, particularly those with staff permanently residing in the local area
- actively monitoring and reporting on the number and value of contracts awarded locally.

The project also has the potential to improve local access to vocational training, thereby assisting with the retention of school-aged children and young people and I

refer to my conclusions in section 7.5.8 regarding the proponent's local training strategies.

The Queensland Resources and Energy Sector Code of Practice for Local Content 2013 was introduced in March 2013 to provide Queensland suppliers, contractors and manufacturers with full, fair and reasonable opportunity to tender for project-related business opportunities. Proponents adopting the code will submit an annual Code Industry Report to the Queensland Resources Council demonstrating how the principles and framework of the code have been applied.

I have imposed a condition (Appendix 3, Part A, Schedule 3, Condition 2) requiring the proponent to prepare an annual report outlining local content actions that satisfies the requirements of the Code Industry Report, and to make the report publicly available.

7.5.9. Coordinator-General's conclusions

The proponent has adequately addressed the requirements of the TOR for the Galilee Coal EIS to undertake a SIA. I conclude that the SIA has been completed to a satisfactory standard having regard to the project's social and cultural area of influence, community engagement, a social baseline study, a workforce profile, potential impacts, and mitigation and management strategies.

I note that the proponent has committed to provide the local community with open and transparent engagement mechanisms to discuss matters arising from or related to the construction and operation of the project. This commitment is reflected in the condition that I have imposed on the proponent to report annually to the Coordinator-General on their community engagement actions and strategies during the construction and early operations phase of the project.

7.6. Cumulative impacts

7.6.1. Context

The TOR for the EIS required the cumulative impacts of the project be considered and assessed, in combination with other proposed mining projects on the biodiversity and ecological function of the region. The proponent has undertaken this assessment having regard to other projects known at this time that have a reasonable possibility of proceeding to construction and within a broadly similar timeframe. The assessment was conducted for all environmental values and, in large part, was done on a qualitative basis. Study findings in key areas are discussed below.

7.6.2. Ecology

The Brigalow Belt bioregion has been subject to extensive historical clearing for agricultural purposes. Primarily focussed on the most arable parts of the landscape, land clearing has left the majority of remnant vegetation in areas less suitable for agriculture. These areas tend to coincide with the regions coal resources and have experienced further development pressures from more recent expansion in mining activity.

Collectively, the Galilee mining project areas provide important habitat values and landscape linkages. All projects contain areas of State, Regional and Local Biodiversity significance as mapped in the Desert Upland and Brigalow Belt Biodiversity Planning Assessments. Cumulative impacts of the projects on nature conservation values are assessed as 'high' in the EIS with direct and indirect impacts to sensitive environmental areas including Endangered, Of Concern and Least Concern regional ecosystems and a suite of native fauna and flora species. A total disturbance footprint from open-cut and underground operations was available for four of the five projects considered in the SEIS Updated Cumulative Impact Assessment. Without including the open-cut Alpha Coal Project, for which no data was available at the time of Waratah's assessment, 79974.85 ha of remnant vegetation will be affected by the Galilee projects comprising 46215.19 ha cleared for open-cut mining and 33759.66 ha will be affected by underground mining.

With regards to impacts on stream health and aquatic habitat values, the Galilee mines cover a relatively large proportion of the Belyando River catchment and require a number of creek diversions affecting natural flow heights, flow characteristics and water quality. Some uncontrolled discharge will likely be associated with prolonged wet periods although this water is expected to be of dischargeable quality and would be adversely affected under natural conditions.

An increased incidence of weeds and pest animals is identified in the EIS with movement of infrastructure along the rail corridor potentially resulting in the spread of invasive species. The Queensland Government has committed to having one rail alignment from the southern Galilee basin to the Abbott Point State Development Area thus cumulative impacts from multiple rail developments are unlikely. Potential impacts from the construction and operation of the Galilee Coal Project rail line are discussed in Section 6 of this report.

7.6.3. Water

Groundwater

A quantitative cumulative impact assessment of mine impacts was conducted for the SEIS having regard to the GC project acting in concert with the South Galilee Coal Project immediately to the south and the Alpha Project to the north.

The modelling indicated a drawdown cone of depression that is about 30 km wide and over 100 km in length along a north-south axis, as defined by the 2 m drawdown outline. The eastern limit of drawdown is well defined, as it is controlled by outcropping geology and the erosion of coal measures. There is some expansion of the drawdown limit to the west (compared to GC project assessment), including a small tongue crossing the GAB geological boundary in the area where the GAB formations are hidden by Quaternary cover. However, the westerly expansion is not substantial and the cumulative assessment concludes there is little risk of impact to the Clematis aquifer or the GAB springs reflecting the findings of the GC project assessment.

The SEIS found there was little likelihood of cumulative impacts to groundwater quality from mining owing to a depressed regional groundwater table and individual mine management measures to address the risk from spills, leaks and coal rejects disposal.

In regard to the rail, the SEIS found there may be isolated local groundwater impacts but the rail is unlikely to contribute to any cumulative impacts.

Surface water

The Waratah SEIS considered cumulative impacts on surface water arising from four potential mines in the southern Galilee Basin together with the proposed Carmichael Mine in the central Galilee Basin. The work concludes that local stream diversions will comply with hydraulic and geomorphic standards set in DNRM and DEHP guidelines and there should be no cumulative impacts arising.

In regard to mine site water management, subsidence ponding impacts and reductions in runoff and stream flows, the SEIS found significant impacts in the Tallarenha/Lagoon Creek sub-catchment as a result of the GC project and those projects upstream and downstream as the proportion of the catchment taken up by mines will be relatively large. However, there are no licences to take water until well downstream in the Belyando River. Aquatic ecological values were found to be generally limited, and not considered unique and the sensitivity of the receiving environment was considered low. The cumulative reduction to mean annual stream flow downstream in the Belyando River at the Gregory Development Road is estimated at 1.1 per cent.

The SEIS found there would be no significant impacts arising from the rail component of the project given the rail line's separation from other infrastructure and the State's single north-south rail corridor policy.

Water issues

In its advice to me, the IESC raised concerns over the long term impacts of multiple mining developments along a 300 km front adjacent to the GAB intake beds and perceived shortcomings with the GC project numerical model in accurately predicting cumulative drawdowns and impacts on the GAB. The committee believes that a regional groundwater model should be developed and that approval conditions similar to those imposed for the Alpha Project should be imposed on the GC project to participate in and contribute to a regional groundwater monitoring and reporting program.

DNRM has advised me that it has completed a preliminary regional scale water balance assessment of the eastern Galilee Basin to assist it in managing future applications for mine dewatering in the Galilee Basin. Both DNRM and DEHP are supportive of further developing a regional water balance model to address groundwater and surface water impacts in conjunction with a regional groundwater and surface water monitoring program. I have made recommendations to DNRM for the regional water balance work to be further developed and to both DNRM and DEHP for a regional groundwater and surface water quality monitoring program to be implemented to assist in future management of the State's water resources. These recommendations are contained in Appendix 3.

7.6.4. Transport

A number of submissions were received at the EIS stage on potential cumulative impacts on the road network arising from multiple coal mining proposals in the lower

Galilee Basin. A strategic cumulative assessment was subsequently undertaken by Waratah for the SEIS based on four proposed Galilee Basin mines—GC project, South Galilee Project, Alpha and Kevin's Corner Projects and Waratah's proposed IGCC power plant project. The assessment found that cumulative impacts are unlikely to be a problem for local and lower order state roads but may be significant in the longer term for sections of the Capricorn Highway and Gregory Developmental Road. The SEIS recommended that the State undertake a regional transport assessment to address cumulative road impacts and to determine an equitable basis for apportioning costs among proponents to mitigate these.

I agree that further work needs to be undertaken to identify regional cumulative impacts and to determine a basis for apportioning costs that otherwise may fall to the State and local authorities. I believe that DTMR is the appropriate agency to oversee this assessment and I have made a recommendation at Appendix 3, Part A, Schedule 1 for this work to be done once reasonable traffic and transport information is available from proponents. I have also imposed a condition at Appendix 3, Part A, Schedule 1 requiring Waratah to participate in any cumulative road impact assessment that DTMR may commission. I have previously set a similar condition in respect of the Kevin's Corner Project.

7.6.5. Social

The TOR for the EIS established a requirement for a cumulative impact assessment for a range of issues including social issues. The proponent's Updated Cumulative Impact Assessment is provided as Appendix 42 in Volume 2 of the SEIS.

A number of local and regional stakeholders including Barcaldine Regional Council identified the potential social cumulative impacts arising from this and other projects in the region during all stages of the consultation process. The range of positive and negative impacts included:

- continued growth in employment opportunities
- increased demand for locally available goods and services required for mine construction and operations
- local skill shortages in other industries
- in-migration and increased demand for housing and temporary accommodation leading to higher housing costs
- increased traffic and road safety concerns
- increased demand on social, emergency and commercial services.

The Alpha Coal Project report identified the establishment of the Galilee Basin Roundtable as the primary mechanism for identifying and addressing cumulative impacts as multiple projects commence in the region.

The roundtable or a similar instrument will include all proponents operating or intending to operate in the Galilee Basin whose project has been declared a 'coordinated project' by the Coordinator General. Membership will evolve as other projects in the region are declared and DSDIP will work to include representatives from State agencies and

regional councils. DSDIP will assist in prioritising and infrastructure program around Alpha.

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 will be delivered through partnerships between industry, communities, and local governments and State agencies, and will inform and align with regional planning priorities.

7.6.6. Waste

In its SEIS submission, BRC raised the issue of a cumulative waste management and the possibility of a central facility.

There are a number of other coal projects proposed within the Galilee Basin, including some with adjacent leases to the GC project. Each of these projects, if they proceed, will produce similar quantities and types of waste. BRC has advised that rather than each of these projects building separate on-site landfills, a regional waste management strategy (RWMS) could be developed to address the cumulative generation of waste. The RWMS would involve a large-scale waste disposal facility capable of receiving (at a minimum) general waste from each of the projects, with costs split between the projects based on the quantity of the waste contributed.

There is the potential for the RWMS facility to be designed with excess capacity so that it can accommodate future waste generated within the BRC. If the facility is designed to also accept regulated waste, then this will reduce the demand on the Barcaldine landfill to accept this waste.

7.6.7. Coordinator-General's conclusions

Ecology

Should all of the large scale projects proposed in the Galilee basin go ahead then the potential cumulative impacts to the ecological values of the region could be significant, although the bulk of vegetation communities involved are of least concern. All projects impacting these values and requiring the removal of vegetation will be required to mitigate impacts or provide offsets where appropriate. The offsets proposed by Waratah are all located within the strategic footprints outlined in the draft Galilee Basin Offset Strategy, prepared by DEHP. In addition to offsetting significant unavoidable impacts, Waratah has committed to minimising its contribution to regional cumulative impacts by minimising impacts to sensitive areas in the final design stage, undertaking progressive rehabilitation of impacted areas, employing strict weed hygiene and pest animal management regimes, developing and implementing Species Management Plans and undertaking targeted species monitoring programs.

Water

Having regard to the cumulative groundwater impact modelling work done by Waratah and by Hancock/GVK in relation to the Alpha and Kevin's Corner Projects and the advice from DNRM, I am satisfied that cumulative groundwater impacts from multiple mines in the southern Galilee Basin are unlikely to present a significant threat to the

GAB and to the GAB springs. I do recognise the concern raised by the IESC as to some long term uncertainty surrounding cumulative water impacts and believe that the State should expand on the preliminary regional groundwater assessment completed by DNRM and develop a regional water balance model for the eastern part of the Galilee Basin that will enable further refinement of regional impacts to both groundwater and surface water resources. I am also of the view that a regional groundwater and surface water monitoring program should be implemented to further inform the water balance assessment to allow a refinement of predicted impacts on a regional scale. This approach is consistent with my approach in the Alpha and Kevin's Corner projects and I have made recommendations to DNRM to undertake this work. These recommendations are listed at Appendix 3, Part C, Schedule 1. I have also made recommendations to DEHP in the same schedule to develop environmental values, water quality objectives and model water conditions for the Belyando-Suttor sub-catchment in the Galilee Basin to assist in future assessment of impacts to water quality.

I have imposed conditions on Waratah at Appendix 3, Part A, to ensure the proponent contributes to the regional groundwater and surface water monitoring and assessment program when it is established, including pro-rata funding. This is consistent with a similar condition imposed on the Alpha and Kevin's Corner projects.

Social

The cumulative impacts arising from multiple projects in the Galilee Basin have the potential to place additional demand on a range of essential services and facilities. The EIS clearly establishes the importance of identifying, assessing, managing and monitoring cumulative impacts.

Cumulative impacts are significant for two main reasons. Firstly, they cannot be fully identified or managed by focusing on the activities of an individual project or development. Secondly, because cumulative impacts result from the activities of multiple projects and proponents, effective management is often only possible through coordination. Maximising the benefits for local and regional communities, and mitigating the negative impacts of this and other projects will require cooperation between proponents, regional councils and state agencies.

While proponents are only responsible for the impacts arising from individual projects, I note the commitment by the proponent of the GC project to engage with all stakeholders through the Galilee Basin Roundtable to consider cumulative issues and work collaboratively to address all the issues associated with projects and promote good regional outcomes. I also refer to my comments in Section 7.5.9 regarding the Queensland Government's initiatives to assist regional towns impacted by resource activities.

Waste

I support the view of BRC that the feasibility of a regional waste management facility should be further investigated to address the cumulative generation of waste as an alternative to proponents developing individual facilities. Accordingly, I have made a recommendation to BRC for the proposal to be further examined and require Waratah

to participate in this. This recommendation is included in Appendix 3, Part B, Schedule 4.

8. Environmental management plans

An EM plan proposes environmental management strategies, actions and procedures to be implemented during the construction and operation of a project, in order to mitigate adverse and enhance beneficial environmental and social impacts. The plan becomes a key reference document that converts undertakings and recommendations of environmental studies into actions and commitments to be followed by the designers, constructors and future operators of the project.

Under transitional provisions of the amended EP Act arising from the *Greentape Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012* a final EM Plan for the mine site is a requirement before a draft EA can be issued by DEHP.

Under the EP Act, an EM plan must contain the following sections:

- section 1—provides a description of all elements of the proposal including the relevant mining leases and land tenures; describes potential adverse and beneficial impacts on the environmental values likely to be affected by mining activities; and states any code of environmental compliance environmental protection commitments and any other information to allow the administering authority of the EP Act (DEHP) to decide the application and conditions to be imposed on the EA.
- section 2—outlines how the environmental protection commitments and objectives are to be measured and audited, and includes control strategies to ensure the objectives are achieved.
- section 3—states the rehabilitation objectives and identifies rehabilitation indicators against the environmental protection objectives described in section 2.
- section 4—states that the indicators described in section 3 may vary for different parts of the land that have different types of disturbance.

Waratah has prepared a draft EM Plan for the mine component of the project which may be further developed during the detailed design phase and accompany any application for a draft EA to DEHP.

It has also developed a draft EM Plan for the rail component of the project which will be submitted to the administering authority for the rail. I have set a condition at Appendix 2 requiring Waratah to prepare a rail EM Plan for the approval of the administering authority.

Waratah has a health, safety and environment (HSE) management system accredited under ISO 14001. All approved EM plans prepared for the project will be incorporated within the company's HSE management system.

9. Conclusion

I am satisfied that the EIS process meets the requirements for impact assessment in accordance with the SDPWO Act. The EIS process provided sufficient information to allow an informed evaluation of the project's potential environmental impacts.

In reaching a conclusion on the acceptability of the mitigation measures to address the potential impacts of the GC project, I have had regard to commitments given in the EIS, SEIS and in the EMPs and have stated conditions and imposed conditions, in addition to making recommendations that Waratah and State agencies must implement.

These matters are covered in the report as follows:

- imposed conditions, made under the SDPWO Act (refer to Appendix 3, Part A)
- stated conditions, made under the SDPWO Act (refer to Appendix 1)
- recommendations, made under the SDPWO Act, for consideration by the entities nominated under each recommendation, and general recommendations (refer to Appendix 3, parts B and C)
- a list of proponent commitments (refer to Appendix 5).

I conclude that the project could deliver significant benefits to the region and the State and that environmental impacts can be appropriately managed.

In accordance with the SDPWO Act, I find that the GC project can proceed, subject to:

- complying with the conditions and recommendations listed in Appendices 1–3
- gaining subsequent statutory approvals (including those listed in Appendices 1–3)
- implementing the commitments listed in Appendix 5.

If there are any inconsistencies between the project (as described in the EIS and SEIS) and the conditions in this report, the conditions prevail. The proponent must implement the conditions of this report and all commitments presented in the EIS, SEIS and EMPs.

Copies of this report will be issued to the following parties in compliance with various sections of the SDPWO Act:

- Waratah
- Minister for Environment and Heritage Protection
- DEHP
- DNRM
- DTMR
- Barcaldine Regional Council
- Isaac Regional Council
- Whitsunday Regional Council

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

Appendix 1. Stated conditions—mine environmental authority

This appendix includes the Coordinator-General's stated conditions¹⁵ for the draft EA (mining lease) for the Galilee Coal project under the *Environmental Protection Act 1994*. The conditions are stated pursuant to section 47C of the *State Development and Public Works Organisation Act 1971*. Any subsequent EA must be consistent with these conditions.

The appendix is structured as follows:

Schedule A—General

Schedule B—Air

Schedule C—Water

Schedule D—Noise

Schedule E—Waste

Schedule F—Land

Schedule G—Regulated structures

Schedule H—Sewage treatment

Schedule I—Water treatment

Schedule J—Figures

Schedule K—Definitions

Attachment A—Rehabilitation requirements

Attachment B—Watercourse subsidence

Schedule A—General

- A1** This environmental authority set limits on 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** In carrying out the mining activity authorised by this environmental authority, the holder of this environmental authority must comply with *Table 1: Mining Domains, and figures indicating the layout of each domain*.¹⁶

¹⁵ For a definition of 'stated condition', refer to the Glossary on page 265 of this report.

¹⁶ Details of figures and tables are yet to be finalised

Table 1: Mining Domains

Mine Domain	Description	Location	Maximum disturbance areas
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

A3 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.

Monitoring

- A4** Except where specified otherwise in another condition of this authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than 5 years.
- A5** The holder of this environmental authority must implement a monitoring program that enables the holder and the administering authority to determine compliance with the environmental authority conditions.

Financial Assurance

- A6** The holder of this environmental authority must provide to the administering authority, financial assurance for the amount and in the form acceptable to the administering authority in accordance with the most recent edition of the administering authority's Guideline—Calculating financial assurance for mining projects, before the proposed mining activities can commence.
- A7** The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.

Risk Management

- A8** The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirements of the *Standard for Risk Management (ISO31000:2009)*, or the latest edition of an Australian Standard for risk management, to the extent relevant to the environmental management, within three months from the date of issue of this environmental authority.

Notification of emergencies, incidents and exceptions

- A9** The holder of this environmental authority must notify the administering authority of any non-compliance with any condition of this environmental authority within 24 hours after becoming aware of the non-compliance.

(Note: a notification of an exceedance under condition C18 does not require additional notification under condition A9)

- A10** 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 not to be in accordance with, the conditions of this environmental authority.
- A11** 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

- A12** The holder of this environmental authority must record all environmental complaints received about the mining activities including the following details:
- (a) name, address and contact number for/of the complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint;
 - (d) investigations undertaken;
 - (e) conclusions formed;
 - (f) actions taken to resolve the complaint;
 - (g) any abatement measures implemented; and
 - (h) person responsible for resolving the complaint.
- A13** 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

A14 The holder of this environmental authority must:

- (a) within 1 year of the commencement of this authority, obtain from a suitably qualified and experienced third party a report on compliance with the conditions of this environmental authority;
- (b) obtain further such reports at regular intervals not exceeding three years from the completion of the report referred to above; and
- (c) provide each report to the administering authority within 90 days of its completion.

A15 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 to provide a better environmental outcome, subsequent to the issue of this environmental authority, the holder 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 where the amendment or change relates specifically to regulated structures referred to in Schedule G and the time specified in that condition; 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;

unless the holder can demonstrate that the existing system provides compliance with the intent of this EA and the proposed changes do not impact on the validity of existing background information.

Coal Extraction

A16 The environmental authority holder is approved for a coal extraction rate of up to 56¹⁷ million tonnes per annum (Mtpa) of run-of-mine (ROM) ore in accordance with this environmental authority.

¹⁷ Maximum coal extraction rate to be advised

Schedule B—Air

- B1** The proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that dust and dust and particulate 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*.
 - (b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than 5 exceedences recorded each year, when monitored in accordance with the most recent version of either:
 - (i) 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
 - (ii) Australian Standard *AS3580.9.9 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} low volume sampler – Gravimetric method*.
 - (c) A concentration of particulate matter with an aerodynamic diameter of less than 2.5 micrometres ($PM_{2.5}$) suspended in the atmosphere of 25 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.10 *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM (sub)2.5(/sub) low volume sampler – Gravimetric method*.
 - (d) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method*.

Schedule C—Water

Release of Contaminants

- C1** Contaminants that will or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

Discharge of Mine Affected Water

- C2** Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in Table 2: Mine Affected Water Release Points, Sources and Receiving Waters and as depicted in (relevant figure: Mine Affected Water Release Points)¹⁸.

Table 2: Mine Affected Water Release Points, Sources and Receiving Waters

Release Point (RP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Contaminant Source and Location	Monitoring Point	Receiving Waters Description
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

- C3** The release of mine affected water to internal water management infrastructure that is installed and operated in accordance with a Water Management Plan that complies with conditions C34 to C39 inclusive is permitted.
- C4** The release of mine affected water to waters in accordance with condition C2 must not exceed the release limits stated in *Table 3: Mine Affected Water Release Limits*, when measured at the monitoring points specified in *Table 2: Mine Affected Water Release Points, Sources and Receiving Waters*, for each quality characteristic.

Table 3: Mine Affected Water Release Limits

Quality Characteristic	Release Limit	Monitoring Frequency
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

- C5** The release of mine affected water to waters from the release points must be monitored at the locations specified in *Table 2: Mine Affected Water Release Points, Sources and Receiving Waters* for each quality characteristic and at the frequency specified in *Table 3: Mine Affected Water Release Limits* and *Table 4: Release Contaminant Trigger Investigation Levels*.

¹⁸ Figure to be finalised.

- C6** If quality characteristics of the release exceed any of the trigger levels specified in *Table 4: Release Contaminant Trigger Investigation Levels* during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in *Table 4: Release Contaminant Trigger Investigation Levels* and:
- (a) where the trigger values are not exceeded then no action is to be taken; or
 - (b) where the downstream results exceed the trigger values specified in *Table 4: Release Contaminant Trigger Investigation Levels* for any quality characteristics, compare the results of the downstream site to the data from background monitoring sites and:
 - (i) if the result is less than the background monitoring site data, then no action is to be taken; or
 - (ii) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
 - details of the investigations carried out; and
 - actions taken to prevent environmental harm.
- (Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C6 b) ii. of this condition, no further reporting is required for subsequent trigger events for that quality characteristic)
- C7** If an exceedance in accordance with condition C6 b) ii. is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

Table 4: Release Contaminant Trigger Investigation Levels

Quality Characteristic	Trigger Level ³	Monitoring Frequency
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Mine Affected Water Release Events

- C8** The holder of this environmental authority must ensure a stream flow gauging stations is/are installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in *Table 5: Mine Affected Water Release during Flow Events*.
- C9** Notwithstanding any other condition of this environmental authority, the release of mine affected water to receiving waters in accordance with condition C2 must only take place during periods of natural flow events in accordance with the receiving water flow criteria for discharge specified in *Table 5: Mine Affected Water Release during Flow Events* when measured at the monitoring points

specified in *Table 2: Mine Affected Water Release Points, Sources and Receiving Waters*.

- C10** The release of mine affected water to receiving waters in accordance with condition C2 must not exceed the Electrical Conductivity and Sulphate release limits or the Maximum Release Rate (for all combined release points flows) for each receiving water flow criteria for discharge specified in *Table 5: Mine Affected Water Release during Flow Events* when measured at the monitoring points specified in *Table 2: Mine Affected Water Release Points, Sources and Receiving Waters*.

Table 5: Mine Affected Water Release during Flow Events

Receiving Waters	Release Point (RP)	Gauging Station ¹	Gauging Station Latitude (decimal degree, GDA94) ¹	Gauging Station Longitude (decimal degree, GDA94) ¹	Receiving Water Flow Recording Frequency	Receiving Water Flow Criteria for discharge (m ³ /s)	Maximum Release Rate for all Combined RP flows (m ³ /s)	Electrical Conductivity and Sulphate Release Limits
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

- C11** The daily quantity of mine affected water released from each release point must be measured and recorded at the monitoring points in *Table 2: Mine Affected Water Release Points, Sources and Receiving Waters*.

- C12** Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Cessation of Release

- C13** During the release of mine affected water to receiving waters from the release points, the receiving waters must be monitored at the locations specified in *Table 6: Receiving waters release limits* for each quality characteristic and at the frequency specified in *Table 6: Receiving waters release limits*.
- C14** Notwithstanding any other condition of this environmental authority, the release of mine affected water:
- must not commence if the water quality at the upstream site exceeds the water quality characteristics in *Table 6: Receiving water release limits*; and
 - must cease if the water quality characteristics at the downstream or the upstream sites in *Table 6: Receiving waters release limits* are met and or exceeded.

Table 6: Receiving waters release limits

Monitoring Point	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)	Quality Characteristic (EC S/cm)	Limit	Monitoring Frequency
Upstream					
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage					
Downstream					
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage					

C15 In accordance with conditions C14(b), the release of mine affected water may recommence after a cessation if the water quality characteristics in *Table 6: Receiving waters release limits* are at levels below the water quality characteristics at the downstream and upstream sites in *Table 6: Receiving waters release limits*.

(Note: If the release of mine affected water is ceased under condition C14, and the water quality within the receiving environment drops below the water quality characteristic limit in Table 6: Receiving water release limits, the release may recommence if all other release conditions are complied with)

Notification of Release Event

C16 The environmental authority holder must notify the administering authority as soon as practicable, and no later than 24 hours, after commencing to release mine affected water to the receiving environment.

Notification must include the submission of written advice to the administering authority of the following information:

- (a) release commencement date/time;
- (b) expected release cessation date/time;
- (c) release point/s;
- (d) release rate and volume (estimated);
- (e) receiving water/s including the natural flow rate; and
- (f) details (including available data) regarding likely impacts on the receiving water(s).

(Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local administering authority via email or facsimile)

C17 The environmental authority holder must notify the administering authority as soon as practicable (nominally within 24 hours after cessation of a release event) of the cessation of a release notified under condition C16 and within 28 days provide the following information in writing:

- (a) release cessation date/time;

- (b) natural flow volume in receiving water;
- (c) volume of water released;
- (d) details regarding the compliance of the release with the conditions of Schedule C: water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);
- (e) all in-situ water quality monitoring results; and
- (f) any other matters pertinent to the water release event.

(Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions C17 and C18, provided the relevant details of the release are included within the notification provided in accordance with conditions C16 and C17.

Notification of Release Event Exceedance

- C18** If the release limits defined in *Table 3: Mine Affected Water Release Limits* are exceeded, the holder of the environmental authority must notify the administering authority within 24 hours of receiving the results.
- C19** The authority holder must, within 28 days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:
- (a) the reason for the release;
 - (b) the location of the release;
 - (c) all water quality monitoring results;
 - (d) any general observations;
 - (e) all calculations; and
 - (f) any other matters pertinent to the water release event.

Monitoring of Water Storage Quality

- C20** Water storages containing mine affected water which are accessible to livestock must be monitored for the water quality characteristics and at the monitoring frequency specified in *Table 7: On-site Water Storage Contaminant Limits*.
- C21** In the event that water storages exceed the contaminant limits defined in *Table 7: On-site Water Storage Contaminant Limits*, the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Table 7: On-site Water Storage Contaminant Limits

Quality Characteristic	Water Storage Contaminant Limit	Monitoring Frequency
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage		

Receiving Environment Monitoring and Contaminant Trigger Levels

C22 The quality of the receiving waters must be monitored at the locations specified in *Table 8: Receiving Water Upstream Background and Downstream Monitoring Locations* and shown in *Figure 9: Receiving Water Upstream Background and Downstream Monitoring Locations*¹⁹ for each quality characteristic and at the monitoring frequency stated in *Table 9: Receiving Waters Contaminant Trigger Levels*.

Table 8: Receiving Water Upstream Background and Downstream Monitoring Locations

Monitoring Point (MP)	Receiving Waters Location Description	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)
Upstream Background Monitoring Locations			
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage			
Downstream Monitoring Locations			
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage			

Table 9: Receiving Waters Contaminant Trigger Levels

Quality Characteristic	Receiving Water Trigger Level	Monitoring Frequency
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage		

C23 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in *Table 9: Receiving Waters Contaminant Trigger Levels* during a release event the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

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

¹⁹ Figure to be finalised.

- (b) where the downstream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
 - (i) details of the investigations carried out; and
 - (ii) actions taken to prevent environmental harm.

(Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C23 b) of this condition, no further reporting is required for the subsequent trigger events for that quality characteristic)

Receiving Environment Monitoring Program (REMP)

C24 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

For the purpose of the REMP, the receiving environment is the waters of <insert the name/s of receiving environment waters²⁰> and connected or surrounding waterways within 10km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

C25 The Receiving Environment Monitoring Program (REMP) must:

- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality); and
- (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
- (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release (as a minimum, the locations specified in *Table 8: Receiving Water Upstream Background and Downstream Monitoring Locations*;
- (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines* (2009). This should include monitoring during periods of natural flow irrespective of mine or other discharges;
- (e) include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in *Table 3: Mine Affected*

²⁰ To be finalised

Water Release Limits and Table 4: Release Contaminant Trigger Investigation Levels;

- (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ (2000), Simpson et. al.(2005) Handbook for Sediment Quality Assessment (CSIRO Environmental Trust) and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);
- (g) include, where appropriate, monitoring of macro invertebrates in accordance with the AusRivas methodology;
- (h) apply procedures and/or guidelines from ANZECC and ARMCANZ (2000) and other relevant guidelines and documents;
- (i) describe sampling and analysis methods and quality assurance and control; and
- (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

C26 A Receiving Environment Monitoring Program (REMP) Design Document that addresses each criterion presented in Conditions C24 and C25 must be prepared and submitted to the administering authority prior to commencement of mining activities. Due consideration must be given to any comments made by the administering authority on the REMP Design Document and subsequent implementation of the program.

C27 A report outlining the findings of the Receiving Environment Monitoring Program, including all monitoring results and interpretations in accordance with conditions C24 and C25 must be prepared annually and made available on request to the administering authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Water Re-use

C28 Mine affected water may be piped, trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks; or used directly at properties owned by the environmental authority holder; or a third party for the purpose of:

- (a) supplying stock water subject to compliance with the quality release limits specified in *Table 10: Stock Water Release Limits*; or
- (b) supplying water for construction and/or road maintenance in accordance with the conditions of this environmental authority.

Table 10: Stock Water Release Limits

Quality Characteristics	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	5000

- C29** If the responsibility of mine affected water is given or transferred to another person in accordance with C28:
- (a) the responsibility for the mine affected water must only be given or transferred in accordance with a written agreement (third party agreement); and
 - (b) the third party agreement must be signed by both parties to the agreement.
- C30** All determinations of water quality and biological monitoring must be:
- (a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;
 - (b) made in accordance with methods prescribed in the latest edition of the administering authorities Monitoring and Sampling Manual;
 - (c) collected from the monitoring locations identified within this environmental authority, within 6 hours of each other where possible;
 - (d) carried out on representative samples; and
 - (e) analysed at a laboratory accredited (e.g. NATA) for the method of analysis being used.
- C31** The release of any contaminants as permitted by this environmental authority, directly or indirectly to waters, other than internal water management infrastructure that is installed and operated in accordance with a Water Management Plan that complies with conditions of this environmental authority, must not:
- (a) produce any visible discolouration of receiving waters; and
 - (b) produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.
- C32** 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 with each annual return:
- (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 results of all monitoring and details of any exceedances of the conditions of this environmental authority; and
- (f) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Water Management Plan

C34 A Water Management Plan must be developed and implemented prior to the commencement of mining activities.

C35 The Water Management Plan must:

- (a) provide for effective management of actual and potential environmental impacts resulting from water management associated with the mining activity carried out under this environmental authority; and
- (b) be developed in accordance with the administering authorities guideline *Preparation of water management plans for mining activities* and include:
 - (i) a study of the source of contaminants;
 - (ii) a water balance model for the site;
 - (iii) a water management system for the site;
 - (iv) measures to manage and prevent saline drainage;
 - (v) measures to manage and prevent acid rock drainage;
 - (vi) contingency procedures for emergencies; and
 - (vii) a program for monitoring and review of the effectiveness of the water management plan.

C36 The Water Management Plan must be reviewed each calendar year and a report prepared that must:

- (a) assess the plan against the requirements under condition C35;
- (b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and
- (c) identify any amendments made to the Water Management Plan following the review.

C37 The holder of this environmental authority must attach to the review report required by condition C36, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority holder on stated dates, to:

- (a) ensure compliance with this environmental authority; and
- (b) prevent a recurrence of any non-compliance issues identified.

C38 The review report required by condition C36 and the written response to the review report required by condition C37 must be submitted to the administering

authority with the subsequent annual return under the signature of the appointed signatory for the annual return.

- C39** A copy of the Water Management Plan must be provided to the administering authority on request.

Saline Drainage

- C40** The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

Acid Rock Drainage

- C41** The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

Stormwater and Water Sediment Controls

- C42** 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.
- C43** Stormwater, other than mine affected water, is permitted to be released to receiving 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 C42;
 - (b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with conditions C34 through C39, for the purpose of ensuring water does not become mine affected water.
- C44** The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.

Overflow of Mine Affected Water from Regulated Structures

- C45** The overflow of mine affected water from one or more of the dams listed in *Table 17: Location of Regulated Structures* must only occur if:
- (a) the holder has complied with **ALL** conditions listed in *Schedule G – Regulated Structures* of this environmental authority; and
 - (b) the overflow is a direct result of rainfall events which since November 1 have generated a total rainfall depth in excess of that determined under the Design Storage Allowance (DSA) annual exceedance probability (AEP) event listed in *Table 17: Location of Regulated Structures* for the relevant dam (or network of linked containment systems);
 - (c) the dam and release point is listed in *Table 11: Overflow Release to the Receiving Environment*;

- (d) the holder has taken all reasonable and practicable measures to prevent an overflow from the relevant dam; and
- (e) the overflow of mine affected water does not cause serious or material environmental harm.

C46 Any release of mine affected water resulting from an overflow from one or more of the dams listed in *Table 17: Location of Regulated Structures* and *Table 11: Overflow Release to the Receiving Environment* to receiving waters must be monitored at the locations specified in *Table 11: Overflow Release to the Receiving Environment* and *Table 12: Monitoring Locations for Overflow Releases* for those quality characteristics and at the frequencies specified in *Table 13: Release Contaminant Trigger Investigation Levels – Overflow Releases*.

Table 11: Overflow Release to the Receiving Environment

Release Point (RP)	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)	Contaminant Source and Location	Receiving waters description
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage				

Table 12: Monitoring Locations for Overflow Releases

Monitoring Point (MP)	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)	Associated release point	Monitoring Point description	Location description
Upstream					
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage					
Downstream					
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage					

Table 13: Release Contaminant Trigger Investigation Levels—Overflow Releases

Quality Characteristic	Trigger Level ³	Monitoring Frequency
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage		

C47 If quality characteristics of the release exceed any of the trigger levels specified in *Table 13: Release Contaminant Trigger Investigation Levels—Overflow Releases* during an overflow release, the holder must compare the downstream results in the receiving waters to the trigger values specified in *Table 13: Release Contaminant Trigger Investigation Levels—Overflow Releases* and:

- (a) where the trigger values are not exceeded at downstream locations then no action is to be taken; or
- (b) where the downstream results exceed the trigger values specified in *Table 13: Release Contaminant Trigger Investigation Levels—Overflow Releases* for any quality characteristics, compare the results of the downstream site to the data from background monitoring sites and from the release point and:
 - (i) if the result is less than the background monitoring site data, then no action is to be taken; or
 - (ii) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 28 days of the cessation of the release, outlining:
 - details of the investigations carried out; and
 - actions taken to prevent environmental harm.

(Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C47b) ii. of this condition, no further reporting is required for subsequent trigger events for that quality characteristic)

C48 The holder must notify the administering authority as soon as practicable and no later than 24 hours after the commencement of an overflow release of mine affected water to the receiving environment in accordance with conditions C46 and C47 of this environmental authority. Notification must include the submission of written advice to the administering authority of the following information:

- (a) release commencement date/time;
- (b) release points;
- (c) receiving water/s; and
- (d) any details (including available data) regarding likely impacts on the receiving environment.

C49 The holder must notify the administering authority as soon as practicable and no later than 24 hours after the cessation of a release notified under condition C48. Notification must include the submission of written advice to the administering authority of the following information:

- (a) release cessation date/time;
- (b) volume of water released;
- (c) all in-situ water quality monitoring results; and
- (d) any other matters pertinent to the water release event.

(Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purposes of compliance with conditions C48 and C49, provided the relevant details of the release are included within the notification provided in accordance with conditions C48 and C49)

C50 Within 28 days of a release notified under condition C48, the holder must provide a report to the administering authority demonstrating compliance with condition C45.

Groundwater

- C51** A groundwater monitoring program must be developed by an appropriately qualified person and implemented that will determine compliance with the environmental authority conditions, prior to the commencement of mining activities.

Table 14: Groundwater Quality Triggers and Limits

Parameter	Unit	Contaminant Triggers		Contaminant Limits		Groundwater Level
		Minimum	Maximum	Minimum	Maximum	

Alluvium, Bandanna Formation, Colinlea Formation, Rewan Formation, Tertiary

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

- C52** Contaminant triggers and contaminant limits as per *Table 14: Groundwater Quality Triggers and Limits* must be finalised and submitted to the administering authority prior to the commencement of mining activities.
- C53** If quality characteristics of groundwater exceed any of the trigger levels stated in *Table 14: Groundwater quality triggers and limits* at any of the monitoring locations identified in *Figure 10: Groundwater Monitoring Locations*²¹, the holder of this environmental authority must complete an investigation into the potential for environmental harm and notify the administering authority within 28 days of receiving the analysis results.
- C54** Results of monitoring of groundwater must not exceed any of the limits defined in *Table 14: Groundwater quality triggers and limits*.
- C55** Groundwater must not exceed any of the limits defined in *Table 14: Groundwater quality triggers and limits* at lease boundary.
- C56** The construction, maintenance and management of 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.
- C58** No impact to groundwater levels within the groundwater aquifers defined in *Table 14: Groundwater quality triggers and limits* is to occur other than where authorised under an approval of the *Water Act 2000*.

Schedule D—Noise

- D1** Noise from mining activities must not exceed the levels specified in *Table 15: Noise Limits—Mine Noise* when measured at a sensitive place or commercial place.

²¹ Figure to be finalised.

Table 15: Noise Limits—Mine Noise

Noise Level dB(A) (outside)	Monday to Sunday		
	7 am – 6 pm	6 pm – 10 pm	10 pm – 7 am
L _{Aeq} , adj 15 mins	45	35	33
L _{A1} , adj 15 mins	55	50	40

Vibration

D2 Vibration from mining activities must not exceed the following levels when measured at any sensitive place:

- (a) 10 mm/s for ground vibration of no more than 35 Hz; and
- (b) 25 mm/s for ground vibration of more than 35 Hz.

Airblast Overpressure

D3 Airblast overpressure from mining activities must not exceed the following levels when measured at any sensitive place or commercial place:

- (a) 115 dB(Z) Peak for 9 out of 10 consecutive blasts; and
- (b) 120 dB(Z) Peak for any single blasts.

Schedule E—Waste**Landfill**

E1 General and regulated waste, other than tyres, must only be disposed of into the landfill facility located on ML70454 or removed from the site.

(Note: It is an offence under the Stock Act 1915 and subordinate legislation to allow or fail to take every reasonable measure to prevent stock access to animal matter or animal-contaminated matter)

E2 The landfill facility must be located within the area identified in Table 16: Landfill Facility (Waste Disposal)²².

Table 16: Landfill Facility (Waste Disposal)

Waste Disposal Facility Name	Latitude (Decimal Degree GDA94)	Longitude (Decimal Degree GDA94)
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage		

E3 Landfill gas must not exceed the following levels:

- (a) 500 parts per million of methane at a height of 50mm above the final and intermediate cover surface including the batter slopes of the landfill facility;

²² The requirement for a landfill on the mine site yet to be confirmed

- (b) 25 per cent of the lower explosive limit when measured in facility structures (but excluding facility structures used for landfill gas and leachate control and landfill gas and leachate recovery system components); and
- (c) the lower explosive limit at the landfill facility boundary.

E4 Notwithstanding any condition of this approval, the following waste materials are not permitted or allowed to be deposited in the landfill unit:

- (a) liquid or semi-liquid waste other than liquid or semi-liquid waste which has been produced in carrying out the environmentally relevant activity identified as Waste Disposal;
- (b) hot ash;
- (c) material that is smouldering or aflame;
- (d) material containing a substance which is corrosive, reactive or toxic (other than materials containing a toxic substance from domestic premises) unless this material is to be deposited into a dedicated monocell approved in writing by the administering authority;
- (e) all radioactive wastes, unless otherwise approved under the *Radiation Safety Act 1999* or contaminated soil;
- (f) explosive(s); or
- (g) ammunition, other than ammunition that no longer contains explosives, pyrotechnics or propellants apart from trace residues that are no longer capable of supporting combustion or an explosive reaction.

Tyres

E5 Scrap tyres are authorised to be stored awaiting disposal or disposed of on Mining Lease 70454⁹ in a manner that minimises environmental harm.

(Note: For the disposal and storage of scrap tyres, reference to *Operational policy – Disposal and storage of scrap tyres at mine sites EM729* should be made)

Burning Waste

E6 Unless otherwise permitted by the conditions of this environmental authority, or with approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.

E7 The holder of this environmental authority may burn vegetation, in accordance with condition E8, cleared in the course of carrying out resource activities provided the activity does not cause environmental harm at any sensitive or commercial place.

E8 Vegetation must not be burnt at the landfill facility.

Schedule F—Land

Rehabilitation

- F1** Land disturbed by mining activities must be rehabilitated in accordance with *Appendix A: Rehabilitation Requirements* and *Figure A1: Rehabilitated Final Landform*¹⁰.
- F2** Rehabilitation must commence progressively as areas become available and in accordance with the Plan of Operations.
- F3** A rehabilitation management plan must be developed by an appropriately qualified person and implemented prior to the commencement of mining activities other than mineral development maintenance activities.
- F4** The rehabilitation management plan must:
- (a) provide for the effective management of actual and potential environmental impacts and for the rehabilitation of significantly disturbed land resulting from the mining activities;
 - (b) be developed in accordance with the administering authorities Guideline – *Rehabilitation requirements for mining projects*.
- F5** The rehabilitation management plan must be reviewed each calendar year and a report prepared by an appropriately qualified person. The report must:
- (a) assess the plan against the requirements under condition F4;
 - (b) include recommended actions to ensure actual and potential environmental impacts and areas of significantly disturbed land are effectively managed for the coming year;
 - (c) identify any amendments made to the rehabilitation management plan; and
 - (d) be submitted to the administering authority with the subsequent annual return.
- F6** A rehabilitation monitoring program must be conducted on a yearly basis and include sufficient spatial and temporal information to enable statistically valid conclusions to be drawn.

Infrastructure

- F7** All buildings, structures, mining equipment and plant erected and/or used for the mining activities must be removed from the site prior to surrender, except where agreed in writing by the administering authority and the landowner.

Contaminants

- F8** The mining activity must not result in a contaminant, other than a contaminant authorised to be released under condition C2, being deposited:
- (a) in waters; or
 - (b) at another place, and in a way, so that the contaminant could reasonably be expected to wash, blow, fall or otherwise move into waters.
- F9** The mining activity must not result in a contaminant, other than a contaminant authorised to be released under condition C2 or meeting the requirements of condition B1, being deposited:

- (a) off Mining Lease 70454²³; or
- (b) at another place, and in a way, so that the contaminant could reasonably be expected to wash, blow, fall or otherwise move off Mining Lease 70454²⁴.

F10 Before applying for surrender of a mining lease or a progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease/application area which has been used for notifiable activities or which the landholder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use in accordance with the rehabilitation requirements.

Mining Waste

F11 A Mining Waste Management Plan must be developed by an appropriately qualified and suitable person and implemented prior to the commencement of mining activities.

F12 The Mining Waste Management Plan must include:

- (a) programs for progressive characterisation of overburden tailings and coarse reject waste prior to disposal for net acid producing potential and the following contaminants: Iron (Fe), Aluminium (Al), Copper (Cu), Magnesium (Mg), Manganese (Mn), Calcium (Ca), Sodium (Na) and Sulphate (SO₄);
- (b) identification of environmental issues and potential environmental impacts from the Overburden and CHPP waste;
- (c) control measures for routine operations to minimise the likelihood of environmental harm;
- (d) contingency plans and emergency procedures for non-routine situations;
- (e) a program for monitoring and review of the effectiveness of the Mining Waste Management Plan.
- (f) the process for the quantification of availability or leachability of metals from the tailings;
- (g) the keeping of records of:
 - (i) disposal to indicate locations and characteristics of coarse reject waste disposed of within mining waste emplacement areas.
 - (ii) mining waste emplacements to indicate locations and characteristics of mining waste.
- (h) placement strategies of tailings material within the Tailings Storage Facility;

²³ To be finalised

²⁴ To be finalised

- (i) the progressive 3D survey of all tailings disposal locations within the mining waste emplacement areas;
- (j) placement strategies of coarse reject waste in the mining waste emplacement area to enable successful rehabilitation outcomes in accordance with conditions of this environmental authority;
- (k) the process for the identification and quantification of Potentially Acid Forming (PAF) mining waste;
- (l) management actions for mining waste that has been identified as having a high availability or leachability of metals in accordance with condition F12a;
- (m) management actions for mining waste that has been defined as Potentially Acid Forming (PAF), including a review of the potential impacts on rehabilitation;
- (n) where the acid producing potential of mining waste material has not been conclusively determined, geochemical kinetic testing to indicate oxidation rates, potential reaction products and effectiveness of control strategies; and
- (o) an overburden waste emplacement area operational plan in accordance with condition F18.

F13 The Mining Waste Management Plan must be reviewed each calendar year and a report prepared by an appropriately qualified person. The report must:

- (a) assess the plan against the requirements under condition F12;
- (b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and
- (c) identify any amendments made to the Mining Waste Management Plan following the review.

F14 The holder of this environmental authority must attach to the review report required by condition F13, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority holder on stated dates:

- (a) to ensure compliance with this environmental authority; and
- (b) to prevent a recurrence of any non-compliance issues identified.

F15 The review report required by condition F13a and the written response to the review report required by condition F14 must be submitted to the administering authority with the subsequent annual return under the signature of the appointed signatory for the annual return.

F16 A copy of the Mining Waste Management Plan must be provided to the administering authority on request.

F17 The mining waste emplacement areas shall be designed to prevent environmental harm arising from contaminants being released to the environment.

F18 An operational plan must be developed and implemented prior to commencement of mining activities and maintained for the mining waste emplacement areas. The operational plan must include, but not be limited to:

- (a) description of landform development stages of the mining waste emplacement areas;
- (b) description of placement techniques for mining waste and coarse reject waste from the coal handling and processing plant;
- (c) identification of areas that are, or are proposed, to contain Potentially Acid Forming mining waste emplacements;
- (d) identification of areas that are, or are proposed, to contain coarse rejects within mining waste emplacements;
- (e) identification of areas that are, or are proposed, to contain tailings within mining waste emplacements;
- (f) demonstration of how operations of the mining waste emplacement areas are consistent with the accepted design plan for the facility; and
- (g) decommissioning and rehabilitation strategies for the mining waste emplacement areas that demonstrate consistency with the conditions of this environmental authority.

F19 The mining waste emplacement areas within the open pit must be designed to ensure all seepage from the mining waste is appropriately confined and contained prior to decommissioning and rehabilitation.

F20 The disposal of all PAF coarse reject waste, identified by condition F12, must be encapsulated with Non Acid Forming (NAF) mining waste and disposed in a manner such that the coarse reject waste will not cause significant harm to the environment for the foreseeable future.

F21 All tailings must be disposed of within an authorised Tailings Storage Facility.

Subsidence

F22 A Subsidence Management Plan must be developed by an appropriately qualified person(s) and implemented by the holder of this environmental authority prior to the commencement of activities that result in subsidence.

F23 The Subsidence Management Plan must:

- (a) provide for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority;
- (b) be developed in accordance with relevant guidelines;
- (c) describe the proposed impacts of subsidence on any land, watercourse and floodplain including but not limited to:

(i) physical condition of surface drainage:

- erosion;
- areas susceptible to higher levels of erosion such as watercourse confluences;
- incision processes;
- stream widening;
- tension cracking;
- lowering of bed and banks;
- creation of instream waterholes;
- changes to local drainage patterns;

(ii) overland flow:

- capture of overland flow by subsided long-wall panels;
- increased overbank flows due to lowering of high bank of watercourses;
- the portion of local and large scale catchment likely to be captured by subsided long-wall panels and the associated impacts on downstream users;

(iii) water quality:

- surface water;
- groundwater;

(iv) land condition: current land condition to be impacted by subsidence;

(v) 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;

(d) propose options for mitigating any impacts associated with subsidence and how these mitigation methods will be implemented;

(e) describe cumulative impacts on watercourses or catchments;

(f) describe impacts on groundwater;

(g) describe contingency procedures for emergencies; and

(h) include a program for monitoring and review of the effectiveness of the Subsidence Management Plan

F24 The Subsidence Management Plan must be reviewed each calendar year and a report prepared by an appropriately qualified person. The report must:

(a) assess the plan against the requirements under condition F23;

(b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and

(c) identify any amendments made to the Subsidence Management Plan following the review.

F25 The holder of this environmental authority must attach to the review report required by condition F24, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority on stated dates:

(a) to ensure compliance with this environmental authority; and

(b) to prevent a recurrence of any non-compliance issues identified.

F26 The review report required by condition F24 and the written response to the review report required by condition F25 must be submitted to the administering authority upon request.

Annual Inspection of Subsidence

F27 The holder of this environmental authority must arrange for each subsided longwall panel to be inspected annually by a suitably qualified and experienced person, in accordance with conditions F28 through F30.

F28 The annual inspection must be conducted between 1 April and 1 November each year.

F29 At each annual inspection, the condition of each subsided longwall panel must be assessed, including the structural, geotechnical and hydraulic adequacy of the subsided longwall panel and the adequacy of the works with respect to the Subsidence Management Plan.

F30 For each inspection, copies of a report certified by the suitably qualified and experienced person, including any recommendations to ensure the integrity of each subsided longwall panel must be provided to the administering authority upon request.

Overland Flow

F31 The subsided longwall panels must not result in the capture of overland flow and must allow water to drain from the panel.

Schedule G—Regulated Structures

- G1** The hazard category of any structure must be assessed by a suitably qualified and experienced person:
- (a) in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*; and
 - (b) in any of the following situations:
 - (i) prior to the design and construction of the structure; or
 - (ii) prior to any change in its purpose or the nature of its stored contents; and
 - (iii) in accordance with the *Manual for assessing Hazard Categories and Hydraulic Performance of Dams*.
- G2** A hazard assessment report and certification must be prepared for any structure assessed and the report may include a hazard assessment for more than one structure.
- G3** The holder must, on receipt of a hazard assessment report and certification, provide to the administering authority one paper copy and one electronic copy of the hazard assessment report and certification.
- G4** 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 Hazard Categories and Hydraulic Performance of Dams*.
- G5** The holder must take reasonable and practical measures so that each dam associated with the mining activity is designed, constructed, operated and maintained in accordance with accepted engineering standards and is fit for the purpose for which it is intended.
- G6** 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 Hazard Categories and Hydraulic Performance of Dams*.
- G7** Construction of a regulated structure is prohibited unless the holder has:
- (a) submitted a hazard category assessment report and certification to the administering authority;
 - (b) commissioned a suitably qualified and experienced person to prepare a design plan for the structure; and
 - (c) received the certification from a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- G8** 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 Hazard Categories and Hydraulic Performance of Dams*.
- G9** Regulated structures must:

- (a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*;
- (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - (i) floodwaters 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.

G10 The design plan for a regulated structure must include, but is not limited to:

- (a) certification that the design plan:
 - (i) is in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, including subsidiary certifications if necessary; and
 - (ii) addresses the requirements in G10(b) to (h)
- (b) A design report which provides:
 - (i) a description of all the documents which constitute the design plan;
 - (ii) a statement of:
 - A. the applicable standards including engineering criteria, industry guidelines, relevant legislation and regulatory documents, relied upon in preparing the design plan; and
 - B. all relevant facts and data used in preparing the design plan, including any efforts made to obtain necessary facts and data, and any limitations or assumptions to facts and data used in preparing the design plan;
 - C. the hazard category of the regulated structure; and
 - D. setting out the reasoning of the suitably qualified and experienced person who has certified the design plan, as to how the design plan provides the necessary required performance;
 - (iii) documentation of hydrological analyses and estimates required to determine all elements of the design including volumes and flow capacities;
 - (iv) detailed criteria for the design, operation, maintenance and decommissioning of the regulated structure, including any assumptions;
 - (v) design, specification and operational rules for any related structures and systems used to prevent failure scenarios;
- (c) Drawings showing the lines and dimensions, and locations of built structures and land forms associated with the regulated structure;

- (d) Consideration of the interaction of the pit design with the levee or regulated dam design;
- (e) An operational plan that includes:
 - (i) normal operating procedures and rules (including clear documentation and definition of process inputs) used in calculating the Design Storage Allowance (DSA));
 - (ii) 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;
- (f) A plan for the decommissioning and rehabilitation of the regulated structure at the end of its operational life;
- (g) Details of reports on investigations and studies done in support of the design plan;
- (h) Any other matter required by the suitably qualified and experienced person.

G11 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.

G12 Where a regulated dam is to be managed as part of an integrated containment system and the DSA volume is to be shared across the integrated containment system, the design and operating rules for the system as a whole must be documented in a system design plan that is certified by a suitably qualified and experienced person.

G13 The system design plan must contain:

- (a) the design plans, and
- (b) the 'as constructed' plans, and
- (c) the operational rules for each individual regulated dam that forms part of the integrated system, and
- (d) the standards of serviceability and accessibility of water transfer equipment or structures, and
- (e) the operational rules for the system as a whole.

Operation of a Regulated Structure

G14 Operation of a regulated 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 G7, and

- (ii) a set of 'as constructed' drawings and specifications, and
 - (iii) certification of those 'as constructed drawings and specifications' in accordance with condition G8, and
 - (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
- (b) the requirements of this authority relating to the construction of the regulated structure have been met; and
- (c) relevant details for regulated structures have been included in *Table 17: Location of Regulated Structures* and *Table 18: Basic Details of Regulated Dams of this authority*.

G15 Each regulated structure must be maintained and operated in a manner that is consistent with the current design plan, the current operational plan, and the associated certified 'as constructed' drawings for the duration of its operational life until decommissioned and rehabilitated.

G16 The holder must take reasonable and practicable control measures to prevent the causing of harm to persons, livestock or wildlife through the construction and operation of a regulated structure. Reasonable and practicable control measures may include, but are not limited to:

- (a) the secure use of fencing, bunding or screening; and
- (b) escape arrangements for trapped livestock and fauna.

Mandatory Reporting Level

G17 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.

G18 The holder must, as soon as practical and within forty-eight hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

G19 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.

Annual Inspection Report

G20 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

G21 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed:

- (a) against the most recent hazard assessment report and design plan (or system design plan);
- (b) against recommendations contained in previous annual inspections reports;
- (c) against recognised dam safety deficiency indicators;

- (d) for changes in circumstances potentially leading to a change in hazard category;
- (e) for conformance with the conditions of this authority;
- (f) for conformance with the 'as constructed' drawings;
- (g) 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);
- (h) for evidence of conformance with the current operational plan.

G22 A suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and including recommended actions to ensure the integrity of the regulated structure.

G23 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. (Feb 2012)

G24 The holder of this environmental authority must:

- (a) upon receipt of the annual inspection report, consider the report and its recommendations and take action to ensure that the regulated structure will safely perform its intended function; and
- (b) within twenty (20) business days of receipt of the annual inspection report, notify the administering authority in writing, of the recommendations of the inspection report and the actions being taken to ensure the integrity of each regulated structure.

G25 A copy of the annual inspection report must be provided to the administering authority upon request and within ten (10) business days of receiving a request from the administering authority under this condition.

Design Storage Allowance

G26 On 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).

G27 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 Design Storage Areas volume on 1 November of any year, notify the administering authority.

G28 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 Design Storage Area volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Performance Review

- G29** 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.
- G30** The holder must take action to modify its water management or linked containment system so as to ensure that the regulated dam or linked containment system will perform in accordance with the requirements of this authority, for the subsequent November to May period.

(Note: Action may include seeking the necessary approvals for physical modification of a regulated dam)

Transfer Arrangements

- G31** 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, hazard assessment, design plan and other supporting documentation, to a new holder and the administering authority on transfer of this authority.

Decommissioning and Rehabilitation

- G32** Prior to the cessation of the environmentally relevant activity, each regulated structure must be decommissioned such that:
- (a) ongoing environmental harm is minimised by the regulated structure:
 - (i) becoming a safe site for humans and animals at the completion of rehabilitation; and
 - (ii) becoming a stable landform, that no longer contains flowable substances and minimises erosion impacts; and
 - (iii) not allowing for acid mine drainage; and
 - (iv) being approved or authorised under relevant legislation for a beneficial use; and
 - (v) being a void authorised by the administering authority to remain after decommissioning; and
 - (b) the regulated structure is compliant with all other relevant rehabilitation requirements of this authority.

Regulated Structures Location and Performance

- G33** Each regulated structure named in Column 1, *Table 17: Location of Regulated Structures* must be wholly located within the control points noted in columns 2 and 3 of *Table 17: Location of Regulated Structures*, for that structure.
- G34** Each regulated dam named in Column 1 of *Table 17: Location of Regulated Structures* must be consistent with the details noted in Column 2 through to and including Column 7 of *Table 18: Basic Details of Regulated Dams*, below, for that dam.

- G35** Spillway Level (mAHD) to be finalised based on final design plans and submitted to the administering authority 20 business days prior to commencement of construction of the regulated structure.
- G36** Each regulated dam named in Column 1 of *Table 17: Location of Regulated Structures*, must meet the hydraulic performance criteria noted in Column 2 through to and including Column 4 of *Table 19: Hydraulic Performance of Regulated Dams*, for that dam.
- G37** Each regulated levee named in Column 1 of *Table 17: Location of Regulated Structures*, must be consistent with the details noted in Columns 2 through to and including Column 6 of *Table 20: Basic Details of Regulated Levees*, for that levee.
- G38** Design Flood Level (mAHD) and minimum Levee Level (mAHD) to be finalised based on final design plans and submitted to the administering authority 20 business days prior to commencement of construction of the regulated structure.

Table 17: Location of Regulated Structures

Column 1	Column 2	Column 3	Column 4 Levees only
Name of Regulated Structure	Latitude (decimal degree GDA 94)	Longitude (decimal degree GDA 94)	Unique Location ID

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Table 18: Basic Details of Regulated Dams

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Name of Regulated dam	Hazard Category	Surface area of dam at spillway (ha)	Max. volume of dam at spillway (ML)	Max. depth of dam at spillway (m)	Spillway Level (mAHD)	Use of dam

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Table 19: Hydraulic Performance of Regulated Dams

Column 1	Column 2	Column 3	Column 4
Name of Regulated dam	Spillway Capacity AEP	Design Storage Allowance AEP	Mandatory Reporting Level AEP

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Table 20: Basic Details of Regulated Levees

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Name of Regulated Levee	Design AEP	Design Flood Level1 (mAHD)	Minimum Levee Level1 (mAHD)	Schedule D Table 1 Location ID1	Use of levee

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Schedule H—Sewage Treatment

- H1** Treated effluent from the sewage treatment plant must only be discharged from the authorised discharge points, as specified in *Table 21: Effluent Discharge Locations* and discharged to the areas shown in *Table 23: Effluent Irrigation Locations* or used for dust suppression, in compliance with the limits and at the frequency stated in *Table 22: Effluent Release Limits to Land* and the conditions of this authority.

Table 21: Effluent Discharge Locations

Authorised Discharge Point	Sewage Treatment Plant	Location	Effluent Irrigation Area	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Table 22: Effluent Release Limits to Land

Quality Characteristic	Release Limit			Frequency
	Minimum	Median	Maximum	

Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Table 23: Effluent Irrigation Locations

Authorised Discharge Point	Effluent Irrigation Area	Location	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

- H2** Subject to condition H1, releases of effluent must not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.

H3 Treated effluent must not be released from the site to any waters or the bed and banks of any waters.

H4 Water or storm water contaminated by sewage treatment activities must not be released to any waters or the bed and banks of any waters.

Land Disposal

H5 The application of treated effluent to land must be carried out in a manner such that:

- (a) vegetation is not damaged;
- (b) there is no surface ponding of effluent; and
- (c) there is no run-off of effluent.

H6 If areas irrigated with effluent are accessible to employees or the general public, prominent signage must be provided advising that effluent is in use and care should be taken to avoid consuming or otherwise coming into unprotected contact with the effluent.

H7 All sewage effluent release to land must be monitored at the frequency and for the parameters specified in *Table 22: Effluent Release Limits to Land*.

H8 The daily volume of effluent released to land must be measured and records kept of the volumes of effluent released.

H9 When circumstances prevent the irrigation of treated sewage effluent such as during or following rain events, water must be directed to a wet-weather storage or alternative measures must be taken to store/lawfully dispose of effluent.

H10 Treated sewage effluent must only be supplied to another person or organisation that has a written plan detailing how the user of the treated sewage effluent will comply with their general environmental duty under section 319 of the *Environmental Protection Act 1994* whilst using the treated sewage effluent.

H11 A minimum area of XX²⁵ of land, excluding any necessary buffer zones, must be allocated for the irrigation and/or beneficial reuse of treated sewage effluent.

²⁵ Land area to be finalised.

Schedule I—Water Treatment²⁶

- I1** Brine and any contaminated water generated from the water treatment plant must only be released from the authorised discharge points specified in *Table 24: Brine Water Management Infrastructure* to the water management infrastructure specified in *Table 24: Brine Water Management Infrastructure*.

Table 24: Brine Water Management Infrastructure

Discharge Point	Latitude (decimal degree GDA94)	Longitude (decimal degree GDA94)	Water Management Infrastructure
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

Schedule J—Figures²⁷

Figure 1: Overall Site Layout Domain Plan

Figures 2–7: Site Layout for each Domain

Figure 8: Mine Affected Water Release Points

Figure 9: Receiving Water Upstream Background and Downstream Monitoring Locations

Figure 10: Groundwater Monitoring Locations

Schedule K—Definitions

Words and phrases used throughout this licence are defined below except where identified in the *Environmental Protection Act 1994* or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

‘20th per centile flow’ means the 20th per centile of all daily flow measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th per centile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

‘accepted engineering standards’ in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the Australian National Committee on Large Dams (ANCOLD), guidelines published by Queensland government departments, and relevant Australian and New Zealand Standards.

²⁶ The requirement for a water treatment plant to be confirmed

²⁷ To be finalised

‘acid rock drainage’ means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.

‘administering authority’ means the Department of Environment and Heritage Protection or its successor.

‘AEP’ means the Annual Exceedance Probability.

‘airblast overpressure’ means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

‘ambient noise’ at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

‘annual exceedance probability’ means the probability that at least one event in excess of a particular magnitude will occur in any given year.

‘ANZECC’ means the *Australian and New Zealand Guidelines for Fresh Marine Water Quality 2000*.

‘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 relative to the subject matter using the relevant protocols, standards, methods or literature.

‘artesian bore’ includes a shaft, well, gallery, spear or excavation, and any works constructed in connection with the shaft well, gallery, spear or excavation, that taps an aquifer and the water flows, or has flowed, naturally to the surface.

‘assessed’ or **‘assessment’** by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- (a) exactly what has been assessed and the precise nature of that assessment;
- (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

‘associated works’ in relation to a dam, means:

- (a) operations of any kind and all things constructed, erected or installed for that dam; and
- (b) any land used for those operations.

‘authority’ means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

‘bed and banks’ for a waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam means land over which the water of the waters, lake, lagoon, pond, swamp, wetland or dam normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed and banks that is from time to time covered by floodwater.

‘beneficial use’ in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

- (a) of benefit to that owner in that it adds real value to their business or to the general community;
- (b) in accordance with relevant provisions of the *Environmental Protection Act 1994*;
- (c) sustainable by virtue of written undertakings given by that owner to maintain that dam; and
- (d) the transfer and use have been approved or authorised under any relevant legislation.

‘bioregion’ has the meaning defined in the *Queensland Biodiversity Offset Policy*.

‘biosolids’ means the treated and stabilised solids from sewage.

‘blasting’ means the use of explosive materials to fracture:

- (a) rock, coal and other minerals for later recovery; or
- (b) structural components or other items to facilitate removal from a site or for reuse.

‘brine’ means saline water with a total dissolved solid concentration greater than 40,000 mg/L, generated through water treatment activities.

‘brine dam’ means a regulated dam that is designed to receive, contain or evaporate brine.

‘bunded’ means within bunding consistent with Australian Standard 1940.

‘coal handling and processing plant waste’ means coarse reject and tailings.

‘certification’ means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).

‘certifying’ ‘certify’ or ‘certified’ have a corresponding meaning as ‘certification’.

‘class 1 pest’ has the meaning given to it under the *Land Protection (Pest and Stock Route Management) Act 2002*.

‘class 2 pest’ has the meaning given to it under the *Land Protection (Pest and Stock Route Management) Act 2002*.

‘commencement of mining activities’ means the commencement of activities permitted by the issue of a mining lease under the *Mineral Resources Act 1989* for the operational land not including early works.

‘commercial place’ means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees’ accommodation or public roads.

‘competent person’ means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

‘completion criteria’ means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The completion criteria indicate the success of the rehabilitation outcome or remediation of areas which have been significantly been disturbed by the mining activities. Completion criteria may include information regarding:

- (a) vegetation establishment, survival and succession;
- (b) vegetation productivity, sustained growth and structure development;
- (c) fauna colonisation and habitat development;
- (d) ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
- (e) microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
- (f) effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
- (g) resilience of vegetation to disease, insect attack, drought and fire; and
- (h) vegetation water use and effects on ground water levels and catchment yields.

‘construction’ or **‘constructed’** in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.

‘contaminate’ means to render impure by contact or mixture.

‘contaminated’ means the substance has come into contact with a contaminant.

‘contaminant’ A contaminant can be –

- (a) a gas, liquid or solid; or
- (b) an odour; or
- (c) an organism (whether alive or dead), including a virus; or

- (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
- (e) a combination of contaminants.

‘control measure’ means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

‘costeaning’ means the digging of a trench or put across the seam or ore body for exposing, sampling and mapping of the ore body.

‘cover material’ means any soil or rock suitable as a germination medium or landform armouring.

‘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. A dam does not mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

‘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 (eg via spillway).

‘declared pest’ has the meaning given to it under the *Land Protection (Pest and Stock Route Management) Act 2002*.

‘design plan’ is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

‘design storage allowance’ means an available volume, estimated in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* published by the Department of Environment and Heritage Protection (or its successor), that must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that manual.

‘designer’ for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.

‘direct offset’ has the meaning given to it in the *Queensland Biodiversity Offset Policy*.

‘domain’ means land management units within a mine site, usually with similar geophysical characteristics.

‘dwelling’ means any of the following structures or vehicles that is principally used as a residence –

- (a) a house, unit, motel, nursing home or other building or part of a building; or
- (b) a caravan, mobile home or other vehicle or structure on land; or

(c) a water craft in a marina.

‘effluent’ treated waste water discharged from sewage treatment plants.

‘emergency action plan’ means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact details that are part of the plan, and to comprehensively review the plan at least every five years.

‘end of pipe’ means the location at which water is released to waters or land.

‘environmental authority holder’ means the holder of this environmental authority.

‘factor of safety’ means the ratio of resisting forces to driving forces. The resisting force is the friction developed in a material along a potential failure plane under given loading conditions. The driving force is primarily gravity but can also include vibration loading and unbalanced groundwater pressures.

‘financial assurance’ means a security required under the *Environmental Protection Act 1994* by the Administering Authority to cover the cost of rehabilitation or remediation of disturbed land or to secure compliance with the environmental authority.

‘financial surety’ has the meaning defined in the *Queensland Biodiversity Offset Policy*.

‘floodwater’ means water overflowing, or that has overflowed, from waters, river, creek, stream, lake, pond, wetland or dam onto or over riparian land that is not submerged when the watercourse or lake flows between or is contained within its bed and banks.

‘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.

‘foreseeable future’ is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptable probability of failure before that time.

‘hazard’ in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

‘hazard category’ means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*.

‘holder’ means any person who is the holder of, or is acting under the environmental authority.

‘hydraulic performance’ means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *Manual of Assessing Hazard Categories and Hydraulic Performance of Dams*.

‘infrastructure’ means water storage dams, roads and tracks, buildings and other structures built for the purpose of mining activities but does not include other facilities required for the long term management of mining impacts or the protection of potential resources. Such other facilities include dams, waste rock dumps, voids, or ore stockpiles and buildings as well as other structures whose ownership can be transferred and which have a residual beneficial use for the next owner of the operational land or the background landowner.

‘LA 10, adj, 15 mins’ means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10 per cent of any 15-minute measurement period, using Fast response.

‘LA 1, adj, 15 mins’ means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1 per cent of any 15-minute measurement period, using Fast response

‘lake’ includes –

- (a) lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- (b) the bed and banks and any other element confining or containing the water.

‘land’ in Schedule F: Land of this document means land excluding waters and the atmosphere.

‘land capability’ as defined in the *DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*.

‘land suitability’ as defined in the *DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*.

‘land use’ term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

‘landfill’ means land used as a waste disposal site for lawfully putting solid waste on the land.

‘leaf litter’ means the uppermost layer of organic material in a soil, consisting of freshly fallen or slightly decomposed organic materials such as leaves, twigs and sticks, which have accumulated on the ground surface.

‘legally secured’ has the meaning defined in the October 2011 version of the *Queensland Biodiversity Offset Policy*.

‘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 hazard dam’ means any dam that is not a high or significant hazard category as assessed using the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams.

‘lower explosive limit’ means the lowest per cent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure.

‘mandatory reporting level’ means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* published by the administering authority.

‘mg/L’ means milligrams per litre.

‘Mining activities’ are defined as ‘prospecting, exploring or mining, processing minerals, a directly associated activity that may cause environmental harm, rehabilitating or remediating environmental harm, and action to prevent environmental harm because these activities, where the activity is authorised under the *Mineral Resource Act 1989* to occur on land to which a mining tenement relates’ (as defined in the Environmental Protection Act 1994).

A **‘Mining project’** is defined as ‘all mining activities carried out, or proposed to be carried out, under 1 or more mining tenements, in any combination, as a single integrated operation’ (as defined in the *Environmental Protection Act 1994*).

‘mineral’ means a substance which normally occurs naturally as part of the earth’s crust or is dissolved or suspended in water within or upon the earth’s crust and includes a substance which may be extracted from such a substance, and includes—

- (a) clay if mined for use for its ceramic properties, kaolin and bentonite;
- (b) foundry sand;
- (c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil there from;
- (d) limestone if mined for use for its chemical properties;
- (e) marble;
- (f) mineral oil or gas extracted or produced from shale or coal by in situ processes;
- (g) peat;
- (h) salt including brine;
- (i) shale from which mineral oil may be extracted or produced;
- (j) silica, including silica sand, if mined for use for its chemical properties;
- (k) rock mined in block or slab form for building or monumental purposes;

But does not include—

- (a) living matter;

- (b) petroleum within the meaning of the *Petroleum Act 1923*;
- (c) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes) to be used or to be supplied for use as such, whether intact or in broken form;
- (d) water.

‘mine affected water’ means the following types of water:

- (a) pit water, tailings dam water, processing plant water;
- (b) 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 other than effluent or brine;
- (c) 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 runoff containing sediment only, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
- (d) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
- (e) groundwater from the mine’s dewatering activities;
- (f) a mix of mine affected water (under any of paragraphs (a)-(e)) and other water.

‘mining waste’ means waste rock, spoil, overburden, tailings and course reject material.

‘modification’ or **‘modifying’** see construction.

‘MRL’ means Mandatory Reporting Level.

‘natural flow’ means the flow of water through waters caused by nature.

‘nature’ includes:

- ecosystems and their constituent parts; and
- all natural and physical resources; and
- natural dynamic processes.

‘non-artesian exploration drill hole’ means an exploration drill hole that does not intersect aquifers of an artesian basin.

‘noxious’ means harmful or injurious to health or physical well being.

‘offensive’ means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

‘operational land’ means the land associated with the project for which this environmental authority has been issued.

‘operational plan’ for a dam means a document that amongst other things sets out procedures and criteria to be used for operating a dam during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

‘offset’ means either a direct land based offset or offset transfer or offset payment or any combination, acceptable to the Coordinator-General.

‘offset payment’ has the meaning given to it in the Queensland Biodiversity Offset Policy.

‘offset transfer’ has the meaning given to it in the *Queensland Biodiversity Offset Policy*.

‘palletised’ means stored on a movable platform on which batteries are placed for storage or transportation.

‘peak particle velocity (ppv)’ means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms-1).

‘PMF’ means probable maximum flood.

‘probable maximum flood’ means the flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in a particular drainage area.

‘protected area’ means:

- (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.

‘progressive rehabilitation’ means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

‘public utility works’ means:

- (a) the replacement, modification or relocation of public utilities required as a consequence of the project; and
- (b) the construction of new utility infrastructure required for the project.

‘receiving environment’ means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

‘receiving waters’ means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

‘reference site’ means an unmined feature against which a mined and rehabilitated feature may be compared. A reference site may reflect the original location or adjacent area of a disturbed area, where representative control plots are established, as nominated by the environmental authority holder. Reference sites must be:

- areas of similar chemical and physical characteristics to the proposed rehabilitated areas;

- established in typical areas of each pre-mining regional ecosystem (vegetation community);
- not impacted by the mining activity;
- acceptable to the administering authority prior to use;
- in a similar ecological setting;
- utilised in a similar capacity as the proposed post mine land use; and
- under a similar fire regime as the proposed rehabilitated areas.

Rehabilitation must be compared with those reference sites that most typically reflect the pre-mining regional ecosystem that the environmental authority holder is seeking to redevelop in the rehabilitation.

‘recycled water’ means appropriately treated effluent and urban stormwater suitable for further use.

‘regulated dam’ means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* published by the administering authority.

‘regulated structure’ means either a regulated dam or levee.

‘rehabilitation’ means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the completion criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

‘representative’ means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

‘residual void’ means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

‘saline drainage’ means the movement of waters, contaminated with salt(s), as a result of the mining activity.

‘self sustaining’ means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

‘sensitive place’ means:

- a dwelling, residential allotment, mobile home or caravan park or other residential premises; or
- a motel, hotel or hostel; or
- an educational institution; or
- a medical centre or hospital;
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- a public park or gardens.

‘sewage’ means the used water of person's to be treated at a sewage treatment plant.

‘spillway’ means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

‘stable’ in relation to land, means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

‘stock’ has the meaning given to it under the *Stock Act 1915*.

‘storm water’ means all surface water runoff from rainfall.

‘subartesian bore’ includes a shaft, well, gallery, spear or excavation (excluding the mining pits), and any works constructed in connection with the shaft, well, gallery, spear or excavation, that taps an aquifer and the water does not flow and never has flowed naturally to the surface.

‘subartesian water’ means water that occurs naturally in, or is introduced artificially into, an aquifer, which if tapped by a bore, would not flow naturally to the surface.

‘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, and 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 and integrated containment system that shares the required DSA volume across the integrated containment system.

‘void’ means any constructed, open excavation in the ground.

‘water’ means –

- (a) water in waters or spring;
- (b) underground water;
- (c) overland flow water; or
- (d) water that has been collected in a dam.

‘water bore’ means an artesian bore or a subartesian bore.

‘water monitoring bore’ means a water bore used for monitoring impacts on underground water caused by the mining activities.

‘water quality’ means the chemical, physical and biological condition of water.

‘water year’ means the 12 month period from 1 July to 30 June.

‘watercourse’ has the same meaning given in the *Water Act 2000*.

‘waters’ includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater.

‘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.

‘g/L’ means micrograms per litre

‘s.cm-1’ means microsiemens per centimetre

Attachment A—Rehabilitation Requirements

Table A1: Rehabilitation Completion Criteria

Domain	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
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Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage

NOTE: It is an offence under the Land Protection (Pest and Stock Route Management Act) 2002 to fail to control Class 1 or Class 2 pests on a Mining Lease or to move or transport a vehicle containing the reproductive material of a declared pest plant.

Table A2: Void Design Criteria

Mine Domain	Feature	Slope Range (degrees)	Approximate Surface Area (ha)
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage			

Table A3: Subsidence Design Criteria

Mine Domain	Feature	Subsidence panel slope (degrees)	Approximate Surface Area (ha)
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage			

Table A4: Landform Design Criteria

Mine Domain	Feature	Slope Range (degrees)	Approximate Surface Area (ha)
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage			

Table A5: Reference Sites

Reference Site	Mine Domain	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Description
Details to be supplied by proponent and agreed with DEHP at the environmental authority application assessment stage				

Appendix 2. Approval for rail off mining tenement

This appendix contains recommendations for approval of the rail component of the project located off the mining tenement. Environmental management of the rail on the mining tenement will be covered by the environmental authority (mining lease).

The recommendations are made to the rail administering authority under section 52 of the SDPWO Act. While the recommendations guide the administering authority in assessing development applications, they do not limit its ability to seek additional information nor limit its power to set conditions on any development approval required for the project. However, the Coordinator-General requires that development approvals should not be unreasonably withheld and the intent of this report should be implemented in practice. The Coordinator-General has the ability to use the prescribed project powers under the SDPWO Act.

The following recommendations are made to DTMR as the nominated rail administering authority.

Recommendation 1. Compliance auditing and performance review

Third Party Auditor

- (a) An assessment of compliance with conditions (a compliance audit) of this approval in respect of the rail project must be carried out in accordance with AS/NZS ISO 19011:2003 Guidelines for quality and/or environmental management systems auditing by a person (an auditor) who is suitably qualified and independent.

Frequency of auditing

- (a) An audit report under subsection (a) must be submitted to the rail administering authority:
 - (i) within three months of commencement of construction of the railway of the rail project and six monthly thereafter during construction, and
 - (ii) within three months of commencement of operation of the railway of the rail project and at least every five years thereafter during operation.

Conducting follow-up audit

- (b) If an audit report makes recommendations for, but not limited to, corrective and/or preventative action, a follow up compliance audit must be conducted by an auditor under subsection (a) and a report (*a follow up audit report*) must:
 - (i) be submitted to the rail administering authority, within 30 days after completion of implementing the recommendations, and
 - (ii) verify the completion and effectiveness of the recommendations.

Declaration to accompany an audit report

- (c) An audit report and follow up audit report submitted to the rail administering authority must be accompanied by a statutory declaration made—
 - (i) if the auditor is an individual- by the individual, or
 - (ii) if the auditor is a corporation- by an executive officer of the corporation.
- (d) A statutory declaration made by the auditor must state the following:
 - (i) that the auditor has not knowingly included false, misleading or incomplete information in the audit report;
 - (ii) that the auditor has not knowingly failed to reveal any relevant information or document to an rail administering authority;
 - (iii) the audit report addresses the relevant matters for evaluating compliance with the conditions of the Coordinator-General's report and is factually correct;
 - (iv) the opinions expressed in the audit report are honestly and reasonably held.

Financial costs of audits

- (e) The proponent or whoever carries out the rail project must pay the costs incurred in:
 - (i) a compliance audit; and
 - (ii) an audit report; and
 - (iii) a follow up audit report.

**Recommendation 2. Environmental management plans (EMP)—
Construction and Operation**

- (a) Three months before the commencement of any construction work for the rail project, a Construction EMP (the *CEMP*) for all construction activities of the rail project must be developed and a copy submitted to the rail administering authority.
- (b) Three months before the railway of the rail project is scheduled to commence operations, an Operational EMP (the *OEMP*) for the operation of the railway of the rail project must be developed and a copy submitted to the rail administering authority.
- (c) The CEMP and OEMP must be developed and implemented in accordance with:
 - (i) the GC Project EIS
 - (ii) the SEIS
 - (iii) the draft rail EMP dated 26 June 2013
 - (iv) the proponent's commitments listed in Appendix 5
 - (v) relevant best practice environmental management.

Management plan

- (d) Each of the CEMP and the OEMP must include a sub-plan (a *management plan*) for each of, but not limited to, the following:
- (i) lighting and visual amenity
 - (ii) soils, erosion and sediment control
 - (iii) native flora and fauna—*with respect, but not limited to, terrestrial ecosystems and aquatic ecosystems, including vegetation communities, and loss of fauna habitats.*
 - (iv) fauna passage—*with respect, but not limited, to the free movement of local terrestrial and aquatic fauna across the rail corridor.*
 - (v) weeds and pests
 - (vi) surface waters—*with respect, but not limited, to rivers and creeks including ephemeral streams and groundwater and quality of water on land and the quantity and quality of water storages used for farming and agricultural purposes.*
 - (vii) surface flood waters—*with respect, but not limited, to maintaining and protecting the natural and existing hydraulic processes (drainage or overland flow) in relation to preconstruction conditions of the land and its existing surface waters and flooding characteristics.*
 - (viii) dust and air quality—*with respect, but not limited, to vegetation clearing, earthworks, road dust from vehicle movements.*
 - (ix) coal dust—*with respect, but not limited to, coal dust from haulage trains*
 - (x) noise and vibration
 - (xi) waste management
 - (xii) stock routes—*with respect, but not limited, to interference and/or alteration of stock route crossings*
 - (xiii) agricultural land integrity
 - (xiv) existing transport and utility infrastructure
 - (xv) rehabilitation of disturbed areas—*including, but not limited to, protection of topsoil.*
 - (xvi) non-Indigenous cultural heritage—*including, but not limited to, an archaeological management plan*
 - (xvii) decommissioning and rehabilitation
 - (xviii) hazard and risk

Content of management plan

- (e) A management plan must contain:
- (i) management objectives

- (ii) performance criteria
- (iii) implementation strategies
- (iv) monitoring and auditing
- (v) reporting
- (vi) corrective actions.

All reasonable and practicable measures be taken

- (f) All reasonable and practicable measures to prevent or minimise the environmental impacts to the greatest extent practicable must:
 - (i) be included in each management plan
 - (ii) be taken.
- (g) If an aspect of an environmental impact is not prevented or minimised to the greatest extent practicable, in the opinion of the chief executive of the rail administering authority, the relevant management plan must be:
 - (i) amended to include all reasonable and practicable measures in the circumstances current at that time
 - (ii) implemented.
- (h) To remove any doubt, a management plan of the CEMP or the OEMP of which a copy has been submitted to the rail administering authority does not limit the application of subsection (g) if particular circumstances at the time of that submission to the rail administering authority have changed.

References in environmental impact report and its supplementary report and conditions for the rail project

A document reference in the EIS and SEIS and in these conditions for the rail project must be taken to be a reference to the most recent version or current edition of the document.

Recommendation 3. Publication of documents on website

- (a) The proponent or whoever carries out the rail project must have a website and must publish for a duration of not less than seven years on that website the following within the specified timeframes:
 - (i) the CEMP—within one month of being finalised
 - (ii) the OEMP—within one month of being finalised
 - (iii) a management plan amended under subsection (g) of Condition 2. —within one month of being finalised
 - (iv) an audit report—within one month of being finalised
 - (v) a follow up audit report—within one month of being finalised.

Recommendation 4. Good quality agricultural land (GQAL)

- (a) The placement of any permanent and temporary project infrastructure and facilities outside the footprint of the rail infrastructure corridor must not cause disruption to ongoing agricultural activities on Class A GQAL.

Recommendation 5. Erosion and Sediment Control

- (a) The proponent must, prior to commencement of construction work for the rail line, complete detailed soil (soil profiles and soil chemistry) and geotechnical investigations which accurately identify and map those soil types that were recognised in the broad-scale land systems mapping as soils at increased risk of erosion or salinity.
- (b) The proponent must include in the CEMP and OEMP an erosion and sediment control plan to prevent adverse impacts on natural waters or adjacent lands.
- (c) The erosion and sediment control plan must reflect a recognised guideline such as International Erosion Control Australasia 2008, *Best Practice Erosion and Sediment Control*, and any local government guidelines that may apply.

Recommendation 6. Acid Sulfate Soils

- (a) The proponent must prepare to the satisfaction of the rail administering authority, an acid sulfate soil management plan for the rail.

Recommendation 7. Fauna passage

- (a) The proponent must develop fauna management procedures that include fauna passage designs for the approval of the rail administering authority.
- (b) The proponent must liaise with and have regard to advice from relevant government agencies including DEHP, DTMR and DAFF.
- (c) Where practicable, the fencing of the rail corridor is to be designed so as to direct fauna into underpasses at bridges and culverts, and, where necessary, exclude cattle.
- (d) The proponent must undertake an ongoing monitoring program to determine the effectiveness of the fauna passages.

Recommendation 8. Coal dust management

- (a) The proponent must develop, in consultation with DEHP, a comprehensive coal dust management plan (CDMP), incorporating covers on loaded coal wagons in accordance with the commitment given in Appendix 5.
- (b) The CDMP must be approved by the rail administering authority.

Recommendation 9. Land holder engagement

- (a) Prior to commencement of construction for the rail the proponent must:
 - (i) develop to the reasonable satisfaction of the rail administering authority a land access protocol for visiting personnel, consultants, contractors
 - (ii) reach agreement with each landholder on the provision of cattle, vehicle and machinery crossings (such as occupational level crossings, underpasses, drainage culverts) to connect both sides of the corridor

- (iii) reach agreement with each landholder and relevant local government on providing service conduits at nominated locations under the railway to allow the laying of water pipes and other services
- (iv) fence the corridor boundaries as rail construction progresses
- (v) pay financial compensation for property severance and any reduced economic viability
- (vi) provide 24 hour 7 days a week a safety and operational contact phone number.

Recommendation 10. Biodiversity surveys

The proponent must complete biodiversity field surveys along the proposed rail line route prior to final route selection, and submit the surveys to the rail administering authority at least three months before the commencement of any construction activities on the rail corridor.

Recommendation 11. Flooding

- (a) Cross drainage environmental design criteria must be developed and submitted to the rail administering authority for approval. The environmental design criteria must:
 - (i) have regard to procedures in the DTMR Road Drainage Design Manual and best practice railway design
 - (ii) have regard to the draft criteria in the SEIS
 - (iii) be similar to the design criteria set by the Coordinator-General for the Alpha Coal Project.
- (b) Prior to commencement of construction, Waratah must consult with relevant land and asset owners including public agencies likely to be impacted by changes to the existing flooding/drainage regime in order for stakeholders to understand likely impacts. Waratah must implement reasonable mitigation actions agreed with landowners and asset owners.
- (c) A flood and drainage report must be submitted to the rail administering authority and the Coordinator-General for approval prior to final drainage design. The report must detail the proposed final cross drainage designs, the results of consultations with land and asset owners and how any concerns have been addressed.
- (d) The final drainage designs must incorporate any changes required by the rail administering agency to mitigate flooding impacts and be approved by the rail administering authority.
- (e) The Coordinator-General will be the final decision-maker and arbitrator on flooding issues and rail design.

Recommendation 12. Rail alignment across/around the Hancock/GVK tenements

- (a) Prior to the commencement of rail construction activities for the project, the proponent must provide to the rail administering authority an options report for a proposed rail alignment through the GVK/Hancock Alpha and Kevin's Corner project tenements that includes:
 - (i) an analysis of the three options discussed in the GC project EIS and SEIS
 - (ii) details of consultation with Hancock/GVK and affected landholders on the benefits and impacts of each option
- (b) The rail administering authority must decide on an appropriate alignment for the rail corridor taking into account:
 - (i) the proponent's report referred to in (a)
 - (ii) the state government position at that time on Galilee Basin rail
 - (iii) the timing of any proponent financial investment decision to proceed to construction
 - (iv) consultation with Waratah, GVK/Hancock and affected landholders
- (c) Should the rail administering authority support an option for the GC project rail corridor that crosses the GVK/Hancock project tenements, the rail administering authority must:
 - (i) facilitate a negotiated settlement between the stakeholders to implement the option
 - (ii) refer the issue to the Coordinator-General for resolution if a negotiated settlement is not achievable within 3 months
 - (iii) work with the Coordinator-General to acquire the GVK/Hancock resource interest necessary for the option to proceed, using appropriate legislative powers if necessary.

Appendix 3. Other project conditions

This appendix contains conditions and recommendations that also apply to the project apart from the conditions in Appendix 1 and Appendix 2. It is arranged as follows:

Part A. Imposed conditions

Part B. Recommendations for other approvals

Part C. General recommendations

Part A. Imposed conditions

This part includes conditions imposed by the Coordinator-General under section 54B of the SDPWO Act.²⁸ 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.

In accordance with section 54B(3) of the SDPWO Act, I have nominated the relevant entities to have jurisdiction for the conditions in this schedule. These entities are shown in Appendix 4.

Schedule 1. Traffic and transport

Condition 1. Participation in regional road network assessment

DTMR is to have jurisdiction for this condition.

The proponent must:

- (a) participate in any regional road network assessment directly associated with the project conducted or commissioned by DTMR and cooperate with DTMR and any study consultants associated with the project and provide all RIAs and draft RMPs to DTMR as inputs to the assessment
- (b) where consultants are engaged to assist with the assessment, contribute financially to the cost involved as determined by DTMR
- (c) implement the findings of the assessment as determined by DTMR after consultation with stakeholders, both in finalisation of RMPs and any infrastructure agreements regarding road infrastructure, which may be required to address the regional road impacts of the GC project.

Schedule 2. Offsets

Condition 1. Offset plan

The Coordinator-General is to have jurisdiction for this condition.

- (a) Waratah must prepare and lodge an offset plan with the Coordinator-General that must include:

²⁸ For a definition of 'imposed conditions', refer to the Glossary on page 265 of this report.

- (i) ecological equivalence assessments of the impacted project sites and proposed offset sites to address impacts to State significant biodiversity values
 - (ii) an offset site of at least the size of the BNR and of at least equivalent conservation value that is suitable for declaration as a nature refuge under the NC Act
 - (iii) details of offset requirements required by the Commonwealth to address MNES
 - (iv) proposed offsets to address significant residual impacts that are not covered by Commonwealth requirements.
- (b) The offset plan must be lodged with the Coordinator-General no later than 60 days after a Commonwealth decision on offsets to address MNES.

Schedule 3. Social impacts

Condition 1. Social impact assessment reporting requirements

The Coordinator-General is to have jurisdiction for this condition.

The proponent must provide an annual report to the Coordinator-General from the commencement of construction up to and including the peak construction workforce period, and for two years following the commencement of mining operations describing:

- (a) the actions and adaptive management strategies to avoid, manage or mitigate project-related impacts on local and regional housing markets
- (b) the actions to enhance local and regional employment, training and development opportunities
- (c) the actions to avoid, manage or mitigate project-related social impacts on local community services, social infrastructure and community safety and wellbeing
- (d) the actions to inform the community about project impacts and show that community concerns about project impacts have been taken into account when reaching decisions.

Condition 2. Proponent local content actions

The Coordinator-General is to have jurisdiction for this condition.

The proponent will prepare an annual report outlining local content actions that satisfies the requirements of the Code Industry Report under the Queensland Resources and Energy Sector Code of Practice for Local Content 2013, and make the report publicly available.

Schedule 4. Regional water assessment

Condition 1. Proponent contribution to regional water balance modelling, monitoring and assessment programs

DNRM is to have jurisdiction for this condition.

To address potential cumulative impacts on water resources in the Belyando-Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin,²⁹ the proponent must, when requested by DNRM:

- (a) prepare, to the satisfaction of DNRM, 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 by the State pursuant to my recommendations in Appendix 3, Part C, Schedule 1 of this report
- (b) 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 program pursuant to my recommendations in Appendix 3, Part C, Schedule 1 of this report
- (c) make monitoring results from the project surface water and groundwater program publicly available on the proponent's website within six months of collection
- (d) contribute to the ongoing operation of the regional groundwater and surface water monitoring and assessment program pursuant to my recommendations in Appendix 3, Part C, Schedule 1 of this report including pro-rata funding.

Condition 2. Apportionment of pro-rata funding—regional water balance modelling, monitoring and assessment programs

The Coordinator-General is to have jurisdiction for this condition.

The apportionment of pro-rata funding pursuant to Condition 1(d) will be determined by the Coordinator-General in consultation with:

- (a) Galilee Basin²⁹ proponents of projects that have been declared coordinated projects under the *State Development and Public Works Organisation Act 1971*
- (b) Galilee Basin²⁹ proponents that have made an application for a mining lease or petroleum lease
- (c) The Department of Natural Resources and Mines
- (d) The Department of Environment and Heritage Protection.

²⁹ Defined as the outcrop area on the eastern edge of the Galilee Basin, extending a distance to the west.

Part B. Recommendations for other approvals

This part includes recommended conditions for other approvals, made under section 52 of the SDPWO Act.

While the recommendations guide assessment managers³⁰ in assessing development applications, they do not limit their ability to seek additional information nor limit their power to set conditions on any development approval required for the project. However, the Coordinator-General requires that development approvals by assessment managers should not be unreasonably withheld and the intent of this report should be implemented in practice. The Coordinator-General has the ability to use the prescribed project powers under the SDPWO Act.

Schedule 1. Approvals under the *Water Act 2000*

The following recommendations are made to DNRM as the administering authority for the *Water Act 2000* (Water Act).

Recommendation 1. Groundwater level monitoring plan

- (a) At least 12 months prior to commencement of mining activities that may significantly affect groundwater, Waratah must present a groundwater monitoring plan for acceptance by DNRM that must address:
 - (i) monitoring bore locations
 - (ii) targeted aquifers
 - (iii) monitoring method and frequency
 - (iv) bore installation dates.
- (b) The monitoring plan must provide for the installation of monitoring bores in the Clematis Sandstone/Rewan Formation interface to provide early warning of any potential changes in groundwater levels caused by the proponent's operations.
- (c) The monitoring plan must provide for the installation of monitoring bores in the Tertiary sediments.

Recommendation 2. GAB aquifer management plan

- (a) Prior to commencement of mining activities that may significantly affect groundwater and provided 12 months of groundwater monitoring data has been obtained and analysed from monitoring bores in the Rewan Formation and Clematis Sandstone, the proponent must present for the acceptance of DNRM, a management plan to deal with any future unexplained change in water levels in the Clematis Sandstone/Rewan Formation interface, including trigger levels to initiate management action. The plan must provide for lower and upper trigger levels.

³⁰ For a definition of 'assessment manager' refer to the Glossary on page 265 of this report.

- (b) If, after an allowance for seasonally adjusted levels, the lower trigger level (low impact) is reached in any Rewan Formation or Clematis Sandstone bore, the proponent must notify the administering authority within 30 days and conduct an investigation of the causes of the lower water levels.
- (c) If the upper trigger level (high impact) is reached in any Rewan Formation or Clematis Sandstone bore, the proponent must complete an independent investigation to determine the cause and provide a written report to the administering authority within 30 days.
- (d) If found to be caused by the proponent operations, the proponent must fully investigate and model the potential impact upon the Great Artesian Basin and obtain any necessary approvals to address the impact as a result.
- (e) If the upper trigger level is reached the proponent may be required to construct additional monitoring bores.

Recommendation 3. Update groundwater modelling

- (a) The proponent must update the groundwater model no later than 12 months after the commencement of mining activities and it must be based on a minimum of two years of continuous monitoring data.
- (b) The updated model must be peer reviewed to the satisfaction of DNRM and a report prepared and submitted to DNRM for review.
- (c) The model must be regularly updated and a report submitted to DNRM.

Recommendation 4. 'Make good' for existing users

- (a) Prior to the commencement of mining activities, the proponent must carry out a detailed field bore survey to determine which bores are in use and the likely aquifer/s being accessed.
- (b) The proponent must provide a commitment to DNRM to enter into agreements, prior to mining commencing, with those landowners predicted to be impacted and with others as additional information indicating impacts or potential impacts, becomes available. The commitment must include replacing diminished groundwater with the same quantity and quality or better.

Recommendation 5. Malcolm Creek diversion final alignment strategy

A strategy for the long-term outcome of the Malcolm Creek diversion must be developed and submitted to the administering authority at least 18 months prior to the final coal processing on site. The strategy must, at a minimum:

- (a) Provide recommendations on the most appropriate long term outcome of the Malcolm Creek Diversion by considering the decommissioning of all mining and flood protection infrastructure not required for final void flood protection within the Malcolm Creek Diversion floodplain.

- (b) Include a review of outcomes from the operational monitoring results completed in accordance with the accepted Monitoring and Evaluation Plan (submitted as part of the detailed design documents of the Malcolm Creek diversion) to assess the stability and performance of the diversion against the authorised detailed design.
- (c) Review permanent design solutions where it is identified that operational constraints during mine life (mining and flood protection infrastructure) and post-mine life (permanent levee banks, separation distance to final voids and rehabilitated spoil piles) result in unacceptable risk that the diversion will meander and intercept such infrastructure.
- (d) Form part of the final rehabilitation and post-closure plans.

Schedule 2. Approvals under the *Nature Conservation Act 1992*

The following recommendation is made to DEHP as the administering authority for the relevant provisions of the NC Act.

Recommendation 1. Species management plan

- (a) Waratah must prepare a Species Management Plan for fauna species listed under the NC Act where impacts have been identified as likely or possible. The plan must be approved by the administering authority prior to construction or clearing of any vegetation. Species to be covered by the management plan are listed in Table A3.1.

Table A3.1: Threatened species to be managed under the Species Management Plan

Species	NC Act Status
Birds	
Black-throated finch (<i>Poephila cincta cincta</i>)	Vulnerable
Squatter pigeon (<i>Geophaps scripta scripta</i>)	Vulnerable
Cotton pygmy goose (<i>Nettapus coromandelianus</i>)	Near Threatened
Freckled duck (<i>Stictonetta naevosa</i>)	Near Threatened
Black-necked stork (<i>Ephippiorhynchus asiaticus</i>)	Near Threatened
Square-tailed kite (<i>Lophoictinia isura</i>)	Near Threatened
Black-chinned honeyeater (<i>Melithreptus gularis</i>)	Near Threatened
Australian painted snipe (<i>Rostratula australis</i>)	Vulnerable
Red goshawk (<i>Erythrorhynchus radiatus</i>)	Vulnerable
Glossy-black cockatoo (<i>Calyptorhynchus lathamii</i>)	Near Threatened
Grey goshawk (<i>Accipiter novaehollandiae</i>)	Near Threatened
Mammals	
Little pied bat (<i>Chalinolobus picatus</i>)	Near Threatened
Spotted-tailed quoll (<i>Dasyurus maculatus maculatus</i>)	Vulnerable
Reptiles	
Brigalow scaly-foot (<i>Paradelma orientalis</i>)	Vulnerable

Species	NC Act Status
Striped-tailed delma (<i>Delma labialis</i>)	Vulnerable
Dunmall's snake (<i>Furina dunmalli</i>)	Vulnerable
Yakka skink (<i>Egernia rugosa</i>)	Vulnerable
Common death adder (<i>Acanthophis antarcticus</i>)	Near Threatened
Skink (<i>Ctenotus capricorni</i>)	Near Threatened
Amphibians	
Rough frog (<i>Cyclorana verrucosa</i>)	Near Threatened

- (b) The Species Management Plan must identify relevant guidelines, policies and plans (e.g. Recovery Plans) and undertake the following:
- (i) detail species' on-site habitat requirements
 - (ii) identify impacts on that species during each project phase and how impacts will be avoided and/or mitigated and managed. Impacts must include relevant direct and indirect impacts of the project including but not limited to
 - (A) clearing vegetation for mining, infrastructure and rail alignment areas
 - (B) subsidence from underground mining
 - (C) mine dewatering impacts on perched aquifers
 - (D) hydrological changes due to stream diversions, flood levees, culverts and waterway crossings
 - (E) weeds and pests
 - (iii) identify relevant site rehabilitation measures, timeframes, standards and methods
 - (iv) identify potential conflicts between the objectives of the Species Management Plan and the objectives of other management plans and strategies to eliminate or mitigate potential impacts to significant species
 - (v) identify management strategies to protect and maintain habitat resources and conditions to support long-term site usage by each species
 - (vi) identify specific monitoring and reporting requirements to be implemented
 - (vii) specify performance criteria to be achieved through implementation of the Species Management Plan.

Schedule 3. Approvals under the *Transport Infrastructure Act 1994*

Recommendation 1. Final road impact assessment

This recommendation is made to DTMR.

At least six months prior to the commencement of significant project construction works the proponent must:

- (a) update the road impact assessment (RIA) based on the proponent's latest project road and rail traffic generation projections, to identify and deal with the transport impacts on the safety and efficiency of state-controlled roads in accordance with *Guidelines for Assessment of Road Impacts of Development* (2006), and any road/rail crossings in accordance with Australian Level Crossing Assessment Model (ALCAM)
- (b) submit the updated RIA to DTMR's Central Queensland Region (Barcaldine) Office for review and approval.

Recommendation 2. Road-use management plan

This recommendation is made to DTMR.

At least six months prior to the commencement of significant project construction works the proponent must:

- (a) prepare a road-use management plan (RMP) for all use of state-controlled and local roads for each phase of the project, in consultation with the regional DTMR office contact and relevant regional councils, and in accordance with DTMR's *Guide to Preparing a Road Use Management Plan*. The RMP must summarise:
 - (i) latest traffic generation (vehicle numbers/routes etc.)
 - (ii) finalised assessment of impacts on safety, efficiency and condition at intersections, on road links, pavements, intersections, road/rail crossings
 - (iii) updated impact mitigation strategies both 'hard' (infrastructure, such as adequate project access to state-controlled roads) and 'soft' (such as road safety strategies—dealing with worker/driver fatigue), and any other necessary improvements or contributions towards road maintenance
- (b) the RMP must be approved by DTMR prior to its finalisation and implementation.

Recommendation 3. Completion of required roadworks

This recommendation is made to DTMR.

All road works required to mitigate impacts of GC project traffic must be completed before commencement of significant project construction traffic unless otherwise agreed.³¹

³¹ Significant project construction traffic means an increase of 5 per cent or more in traffic numbers (AADT) or axle loadings (measured in equivalent standard axles [ESAs]).

Recommendation 4. Road infrastructure agreements

This recommendation is made to DTMR.

- (a) Prior to the scheduled commencement of construction, the proponent must conclude infrastructure agreements with DTMR on upgrading, access and contributions for the mitigation of road impacts as determined by the final RIA and RMP. The agreements must address:
 - (i) upgrade of intersections/accesses as determined and agreed with DTMR and relevant local authorities as well as GC project rail/road crossings
 - (ii) rehabilitation, maintenance and bring-forward contributions and/or works required to mitigate impacts of project construction and operational traffic as calculated and agreed upon with DTMR and relevant local authorities
 - (iii) relevant licences and permits under the *Transport Infrastructure Act 1994* for works within the State-controlled road corridor.
- (b) Where DTMR and the proponent are unable to conclude an infrastructure agreement within a reasonable time, either party may refer the matter to the Coordinator-General for resolution.

Recommendation 5. Traffic Management Plans

This recommendation is made to DTMR.

- (a) Three months prior to the scheduled commencement of any significant construction works the proponent must present traffic management plans for review by DTMR, the Queensland Police Service and Barcaldine Regional Council, Isaac Regional Council and Whitsunday Regional Council and take account of the reviews and actions recommended by these agencies. The traffic management plans must incorporate provisions on:
 - (i) road safety from the increased level of vehicle movements, and intersection traffic
 - (ii) community awareness of construction and transport activities
 - (iii) traffic management arrangements, lane closures, speed limits
 - (iv) driver behaviour and fatigue management
 - (v) necessary permits for any excess mass or over-dimensional loads associated with the project as required under the Transport Operations (Road Use Management) Act (Qld) 1995.
- (b) The proponent must implement the traffic management plan during construction and commissioning of the project and construction of all access road intersection/s and other works to be undertaken within a state-controlled road corridor.

Schedule 4. Approvals under the *Sustainable Planning Act 2009*

This recommendation is made to BRC.

Recommendation 1. Transport Infrastructure

BRC is to have jurisdiction for this condition.

- (a) Prior to the commencement of mining activities, the proponent must execute a transport infrastructure agreement with the BRC to address the maintenance, upgrade and construction of any new transport infrastructure to support the construction and operation of the project. Matters to be considered in the development of this agreement include but are not limited to:
 - (i) maintenance and upgrading of local roads
 - (ii) maintenance, upgrading or rebuilding of the Alpha Aerodrome.

Recommendation 2. Waste Disposal Infrastructure

This recommendation is made to BRC.

- (a) Prior to the commencement of mining activities, the proponent must execute an infrastructure agreement with the BRC to address for the construction and operation of the project:
- (b) use of existing and/or development of new domestic and/or regulated waste transfer, treatment or disposal facilities
- (c) use of existing and/or development of sewage treatment facilities.

Part C. General recommendations

This part lists general recommendations made in the report that must be considered by State agencies and/or the proponent and must not be unreasonably rejected.

Schedule 1. Cumulative water impacts

The following recommendations are made to address potential cumulative impacts on water resources in the Belyando-Suttor sub-catchment and the aquifers of the eastern part of the Galilee Basin³².

Recommendation 1. Regional water balance model

This recommendation is made to DNRM as the administering agency for the Water Act.

- (a) Develop and maintain 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

³² Defined as the outcrop area on the eastern edge of the Galilee Basin, extending a distance to the west.

- (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 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.

Recommendation 2. Local water quality objectives

This recommendation is made to DEHP as the administering agency for the EP Act.

- (a) Develop Belyando-Suttor sub-catchment environmental values and water quality objectives for the Galilee Basin. Water quality objectives should have regard to:
 - (i) impact assessment, baseline monitoring and site water balance model data provided by project proponents
 - (ii) results of the regional water balance model (Recommendation 1) and any ongoing regional surface water and groundwater monitoring and assessment program (Recommendation 3)
 - (iii) relevant key deliverables expected from the Australian Government's proposed Bioregional Assessment for the Lake Eyre Basin
- (b) Develop model water conditions for coal mines and coal seam gas projects in the Galilee Basin to form the basis of Environmental Authority conditions and any other related decisions the administering authority under the *Environmental Protection Act 1994* may be required to make in relation to cumulative impacts on water quality.

Recommendation 3. Regional groundwater and surface water monitoring and assessment program

This recommendation is made to DNRM in consultation with DEHP and Galilee Basin mine proponents.

- (a) Ensure the development of an ongoing effective 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 an agreement 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 1

- (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 1, adopt 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 success 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.

Schedule 2. Cumulative road network impacts

Recommendation 1. Regional road network assessment

This recommendation is made to DTMR as the administering authority for the TI Act.

- (a) A regional road network assessment be undertaken of the central and southern Galilee region in partnership with relevant local councils and Galilee Basin mining proponents to address:
 - (i) Impacts of all project generated traffic on the road network and apportionment of costs to address major impacts and implement mitigation measures
 - (ii) The feasibility of funding a strategic road upgrade program in lieu of contributions to road maintenance and rehabilitation
 - (iii) The delivery of a road network that will support the construction and operation of the proposed Galilee Basin mines.

Appendix 4. Jurisdiction for imposed conditions

Table A4.1 lists the organisations/agencies responsible for each of the Coordinator-General's imposed conditions listed in Appendix 3, Part A.

Table A4.1. Entities with jurisdiction for Coordinator-General imposed conditions

Schedule	Condition no.	Approval	Entity with jurisdiction
1	1	Traffic and transport	DTMR
2	1	Offset Plan	The Coordinator-General
3	1–2	Social Impacts	The Coordinator-General
4	1	Regional water assessment	DNRM
4	2	Apportionment of costs for regional water balance modelling, monitoring and assessment programs	The Coordinator-General

Appendix 5. Waratah commitments

This Appendix provides a summary of the commitments Waratah Coal has made throughout the EIS and SEIS.

Project Approvals

Licences permits and approvals

Waratah Coal will obtain the necessary licences, permits and approvals set out in the Approvals Pathway in the Appendices—Volume 2 of this SEIS, which details the licenses that are required to be obtained.

EM Plan (Mine) and EMP (Rail)

The Draft EM Plan for the Mine and the Draft EMP for the Rail will be finalised.

The EM Plan and the EMP will include a review of all relevant mining activities including a list of anticipated Environmentally Relevant Activities (ERAs) for the site based on existing information. Completion of the specialist studies, particularly in relation to infrastructure arrangements will confirm the ERAs to be carried out. At this stage it is proposed to outsource a number of project elements that would trigger ERAs if Waratah Coal were to undertake the activity themselves (e.g. concrete batching, extraction and screening etc.).

Climate Change And Climate Change Adaptation

In order to manage potential impacts of climate and climate change associated with the project, Waratah Coal will:

- incorporate adaptive management approach to climate change throughout the life of the mine
- incorporate climate change adaption strategies into the design process
- co-operate with government, other industry and other sectors to address adaptation to climate change.

Land

Mine

Waratah Coal commit to undertaking the following actions:

- identification of specific access areas to minimise disturbance areas
- managing lay down areas in a manner that will not result in a reduction in land quality
- a Rehabilitation and Decommissioning Plan will be prepared prior to construction commencing, based on practicable and relevant best practice techniques that have been successfully implemented in similar mining operations and environments where available. The Rehabilitation and Decommissioning Plan will cover all closure domains on the mine site, including potential areas of subsidence, and will appropriately define the conceptual final land uses proposed for each domain
- the rehabilitation and decommissioning plan will allow for:

- ongoing and progressive rehabilitation of the disturbed areas against the agreed criteria rehabilitation to occur throughout the life of the mine with the aim to return the land to the pre mining land uses
- inclusion of a Biodiversity Enhancement Program focusing on the re-establishment of Desert Uplands Ecosystems throughout the life of the mine and for five years post cessation of mining activities
- the Final Rehabilitation and Decommissioning Plan will provide more information as to the final landforms, including voids, to be remaining on site come closure. A Rehabilitation and Decommissioning section of the Draft Mine EM Plan has been prepared (see Appendices—Volume 2 of SEIS)
- rehabilitation planning will ensure the total area of disturbance at any one time is minimised to reduce the potential for wind-blown dust, visual impacts and increased sediment-laden run-off. Rehabilitation will be designed to achieve a safe and stable final landform compatible where practicable and possible with the surrounding environment. This will involve the reshaping of the majority of overburden emplacement slopes to $<10^\circ$. Where slopes are $>10^\circ$, additional drainage and revegetation works will be carried out to achieve the necessary erosion/sediment control and groundcover establishment
- a subsidence management program will be developed in accordance with the Department of Natural Resources and Mines (DNRM) guideline and in liaison with DNRM to control the surface effects of mine subsidence
- land usage post subsidence will be returned to similar pre-subsidence land usage at completion of remedial works
- The use of natural re-contouring will be incorporated in rehabilitation design and construction and treed vegetation will be retained where possible along the toe of rehabilitation areas. Where ever possible vegetation will be retained unless an unacceptable safety or erosion risk remains
- waterways and diversions on the project site will be rehabilitated to a pre-determined post-mining standard. This will include the use of endemic native trees, shrubs and grasses where suitable
- the conceptual final landform for the entire site will be determined through consultation with relevant Government agencies and the local community. Once a conceptual design is finalised, a detailed Landscape Rehabilitation Plan, based on the desired post-mining landform will be developed and submitted to Government for consideration
- the Draft Mine EM Plan will outline weed management measures including control strategies for environmental weeds such as Parthenium and Buffel Grass
- Erosion and Sediment Control Plans (ESCPs) will be developed and put in place prior to the commencement of construction works for all areas of the project that may cause erosion and implemented measures will be monitored and maintained
- prior to construction, Waratah coal will carry out soil sampling at waterways to better identify erosion risk and put in place appropriate management measures

- prior to construction, Waratah Coal will undertake soil resistivity surveys of high risk areas, record the current salinity status of these areas and implement measures to ensure no further significant salinisation occurs due to the project activities
- topsoil management measures will be documented, monitored and maintained with a reconciliation of top soil excavation and rehabilitation maintained. Excess topsoil will be used in project areas with topsoil deficits. Waratah coal will source further top soil (if required) from local suppliers in the project area
- establish a set of environmental investigation protocols to manage gross or previously unidentified contamination encountered during project construction
- works to be undertaken for the contaminated land study, and the subsequent technical reports, will outline the requirements for further contaminated land works for mining activities, including preparation of Site Management Plans, notification, engagement of a third party reviewer (TPR), etc. The commissioning of a TPR will be undertaken if considered necessary following the outcomes of the contaminated land investigations (i.e. works to follow the Phase 1 assessment works)
- if contamination is present within the project footprint, Waratah Coal will enter into agreements with the owner of the contamination to assess and appropriately manage or remediate the contamination
- where contamination is identified it will be managed and/or remediation under the EP Act with Department of Environment and Heritage Protection (DEHP) approved Site Management Plans (SMPs) and/or Remediation Action Plans (RAPs) in order to make the sites suitable for the proposed use
- any building/structures to be demolished will be assessed for hazardous material content with preparation of demolition management plans for the appropriate demolition and disposal of the hazardous materials
- Waratah Coal will appoint a third party reviewer to assess all contaminated land assessment and remediation work
- any Notifiable Activities that are required for the project will be implemented and managed under relevant legislation and guidelines once construction commences and also during the operational phase
- mine closure will achieve the agreed rehabilitation success criteria
- final voids will be designed to a standard whereby they are safe, stable and sustainable
- prepare a final void management plan as part of its rehabilitation plan and to monitor surrounding groundwater and containment cell embankment stability

Other commitments relevant to land and land use are presented in the Waste section.

Land Use and Tenure

To ensure potential impacts to land use are minimised, Waratah Coal commits to:

- minimising the land required for the open cut mine development to the extent practicable
- undertaking consultation with relevant landholders in the area of the proposed development

- implementing the requirements of the Environmental Management Plan (EM Plan) throughout the life of the project.

Landscape And Visual Amenity

- Waratah Coal commits to undertaking actions that will reduce potential impacts through a proactive rather than reactive approach to changes in the landscape character and perceived visual amenity
- plants will be used to provide a buffer and screen will be established pre-construction, and in the initial stages of construction and maintained during development to ensure effective screening by the commencement of operations
- flood and site lighting will be designed by a lighting specialist to ensure that light pollution from the mine to surrounding areas is minimized to the greatest extent possible
- existing topsoil from the site should be stripped and placed into temporary stockpiles prior to construction to provide additional visual buffering.

Rail

To ensure appropriate management of soils and land are conducted during the construction and operation of the rail, Waratah Coal commits to doing the following:

- identifying specific access areas and determine goals for rehabilitation of disturbed land to minimise areas that will have lower land use quality post-mining
- preparing and implementing Erosion and Sediment Control Plans (ESCPs) which will be developed and put in place prior to the commencement of construction works for all areas of the rail that may cause erosion
- topsoil management measures which will be documented, monitored and maintained with a reconciliation of top soil excavation and rehabilitation maintained. Excess topsoil will be used in project areas with topsoil deficits. Waratah coal will source further top soil (if required) from local suppliers in the project area
- prior to construction carry out soil sampling at waterways, to better identify erosion risks and to put in place appropriate management measures.

Land Use And Tenure

To ensure potential impacts to land use are minimised Waratah Coal commits to:

- undertaking consultation with relevant landholders in the area of the proposed development
- undertaking consultation with Government bodies and regulatory agencies in regard to the acquisition of the easement and the design of infrastructure within the easement
- undertaking consultation with utility operators and resource companies regarding the location of the easement and undertaking construction activities nearby to existing utilities
- implementing the requirements of the EMP throughout the life of the project
- stock routes have been allowed within the rail design, and will be specified in detail during the detailed design stage. It is not intended to severe any stock routes

- Waratah Coal will liaise with Department of Agriculture, Fisheries and Forestry (DAFF) Forest Products in detail regarding quantities of sand and borrowed material upon finalisation of design and quantities required.

Visual Amenity

Waratah Coal commits to undertaking actions that will reduce potential impacts through a proactive rather than reactive approach to changes in the landscape character and perceived visual amenity. Waratah Coal commits to the implementation of the following management measures:

- topography changes will be minimal to maintain visual landscape character and existing vegetation will be maintained where possible. Endemic plant species mixes will be used to provide buffering and will be established pre-construction and maintained during project development to ensure effective screening by the commencement of operations
- the most highly impacted of the homesteads will be buffered by extensive planting, mounding or both with consultation with their owners
- flood and site lighting should be designed by a lighting specialist to ensure that surrounding areas do not experience light pollution from the rail
- where all other mitigation measures fail to alleviate the visual impact, homesteads identified as having high visual exposure will be relocated to a less sensitive location further from the rail
- existing topsoil from the site should be stripped and placed into temporary stockpiles prior to construction to provide additional visual buffering
- grade separated crossings will include planting on batters to create vegetated regions at these crossings. The Clermont Alpha Road will gain a 1km vegetation buffer between road and rail to maintain the visual landscape character of the area
- the rail alignment will be designed to cross level crossings of minor roads at right angles and not be aligned parallel to roads on approach
- vehicle wash-downs will continue as standard practice and wash-downs will be located at strategic points along the rail alignment and at all entry points from construction camps
- the working rail corridor will be limited to as little as topography permits (generally around 40-50m), and any clearing outside this width during development will be re-vegetated using 'best-practice' re-vegetation techniques.

Rail Construction Camps

- rail work camps will be located along existing roads, and placed on existing cleared land, or in areas where quick re-vegetation may occur
- once a rail-camp is finished in an area, that area will be returned to the pre-use landscape character, or the naturally occurring local vegetation character
- site lighting for the rail and workers camps will be designed by a lighting expert to minimise light pollution and strict light-use management regimes shall be abided by all workers at these places

- colour and style of existing built form will be investigated and used in rail camps to best blend into the landscape character. Non-reflective materials will be used to reduce glare.

Land Contamination

To minimise risks associated with existing contamination and to minimise the risk of causing contamination from the construction and operation of the rail, Waratah Coal commits to doing the following:

- where possible the project footprint will be re-aligned to avoid areas of potential or identified contamination
- where contamination is present within the project footprint, Waratah Coal will enter into agreements with the owner of the contamination to assess and appropriately manage or remediate the contamination
- any building/structures to be demolished will be assessed for hazardous material content with preparation of demolition management plans for the appropriate demolition and disposal of the hazardous materials
- where the project footprint cannot be re-aligned, DEHP compliant Stage 1 and 2 ESAs will be undertaken to assess the scale and extent of contaminant impacts
- where contamination is identified it will be managed and/or remediation under the EP Act with DEHP approved SMPs and/or RAPs in order to make the sites suitable for the proposed use
- Waratah Coal will appoint a third party reviewer to assess all contaminated land assessment and remediation work
- any Notifiable Activities that are required for the project will be implemented and managed in accordance with relevant guidelines and legislation once construction commences and also during the operational phase.

Land Rehabilitation

To minimise risks associated with rehabilitation, Waratah Coal commit to:

- undertaking rehabilitation works in a progressive manner
- identifying specific access areas and determine goals for rehabilitation of disturbed land to minimise areas that will have lower land use quality post construction of the rail
- prepare and implement rehabilitation management plans for areas disturbed during construction activities
- manage lay down areas in a manner that will not result in a reduction in land quality
- prepare and implement erosion control measures and continue to monitor and maintain the measures implemented
- erosion and sediment control plans will be developed and put in place prior to the commencement of construction works for all areas of the rail that may cause erosion that affects rehabilitation works.

The Draft Rail EMP will outline weed management measures including control strategies for environmental weeds such as Parthenium and Buffel Grass.

Acid Sulfate Soils

Based on the results of the preliminary assessments, Waratah Coal commits to the following:

- Acid Sulphate Soils (ASS) investigations will be conducted on creek and stream channel crossings below 20m AHD where acid sulfate soils may be present at or above the 5m AHD contour
- where ASS are identified within the rail corridor, a detailed ASS Management Plan (ASSMP) will be developed including monitoring, treatment, verification testing and reporting for the individual construction works.

Terrestrial Ecology

Mine

To avoid and reduce potential impacts on terrestrial ecology associated with the construction, operation and decommissioning of the mine, Waratah Coal will:

- finalise the draft Biodiversity Offset Strategy which compensates for unavoidable clearing as well as makes voluntary compensation in the form of offsets for impacts to the Bimblebox Nature Refuge, in consultation with DEHP and Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)
- Regarding compensation for the Bimblebox Nature Refuge, properties that provide for an impact to offset ratio of 1:2 will be pursued as a priority and any mining tenements that Waratah Coal holds on the offset area for the Bimblebox Nature Refuge will be relinquished
- Provide opportunity for research studies that currently exist on the Bimblebox Nature Refuge to continue on offset areas that it commits to provide.
- Additionally, it has committed to offset the conservation value of the BNR in recognition of the loss of this value even though it has no legal obligation to do so under State or Commonwealth law
- Ecological equivalence will be determined based on the Ecological Equivalence Methodology Guideline (Version 1) to ensure that the offset sites have ecological functionality
- Waratah Coal will develop an overarching Biodiversity Management Plan (BMP)
- a Fauna Management Plan will be prepared for the site and, for selected species, specific Species Management Plans will be developed in consultation with DEHP and SEWPaC
- a DEHP accredited spotted/catcher will be on-site immediately prior to vegetation clearance to inspect habitat trees (i.e. trees with hollows, fissures or with substantial food resource, mature trees or stag trees) to determine the presence of significant fauna and to implement a relocation plan for any fauna found
- native vegetation removal will be conducted only after clearance surveys have been conducted

- Project persons operating vehicles in and adjacent to the Project site will be made aware of the presence of threatened species and the potential for them to be encountered on vehicle tracks
- develop a Vegetation Management Plan for the remaining vegetation overlying the underground mine area and, for selected species, specific Species Management Plans will be developed in consultation with DEHP and the Commonwealth
- a Weed Management Plan will be developed as part of the BMP prior to the commencement of activities at the site. The plan will describe the management strategies for weed species listed under the LP Act or Local Government requirements for weeds not listed under the LP Act
- a Pest Management Plan will be developed as part of the BMP prior to the commencement of activities at the site. The BMP will describe the management strategies for pest species listed under the LP Act, quarantine requirements or Local Government requirements for pest species not listed under the LP Act
- develop a Fire Management Plan, working with BRC and the Rural Fire Service
- rehabilitation and subsidence management plans will be developed in consultation with DEHP (see land section) and will include specific measures in relation to improving habitat linkage in both riparian and terrestrial systems
- develop and implement a biodiversity specific Mine Recovery, Remediation Rehabilitation and Monitoring plan trees, shrubs and other vegetation will only be removed where required (and appropriate approvals sought where necessary). Vegetation outside mining and infrastructure areas will where ever possible remain undisturbed
- where possible, infrastructure will be placed in areas to minimise the disturbance of existing native vegetation.
- Existing tracks and cleared areas will be utilised, where possible
- cleared areas will be progressively rehabilitated in accordance with the Project rehabilitation strategies, including the incorporation of revegetation works in the Erosion and Sediment Control Plan
- cleared vegetation will be managed in a manner consistent with the waste hierarchy
- as part of rehabilitation activities, a biodiversity enhancement program focusing on the re-establishment of Desert Upland ecological systems will be developed and implemented through the life of the mine and for five years post cessation of mining activities
- species used in rehabilitation will where possible be taken from the species listed to be agreed with DEHP.

Rail

Waratah Coal commit to undertaking the following actions:

- delivering comprehensive updated rail flora and fauna assessment reports (in accordance with assessment methodologies agreed upon with officers from DEHP) to the Coordinator-General (CoG) by mid-2013

- develop Significant Community/Species Management Plans in accordance with Commonwealth and State legislation for those values or species where unavoidable impacts will have a significant impact on their habitat
- develop and implement an Erosion and Sediment Control Plan (ESCP) prior to the commencement of construction in accordance with the relevant local planning policies and the relevant State planning policy
- ensure bridge and culvert design allows for the passage of aquatic species implement mitigation measures designed to preserve the existing water quality values within and downstream of the rail corridor
- provide for terrestrial fauna crossings through the provision of fauna friendly culverts, finalise the Biodiversity Offset Strategy in consultation with DEHP and SEWPaC, develop a Fire Management Plan in accordance with the relevant local planning policies, the relevant State planning policy and in consultation with the Rural Fire Service
- develop and implement a Weed and a Pest Management Plan in consultation with Biosecurity Queensland and the various regional councils, implement vehicle, equipment and plant wash down procedures as outlined in the EMP.

Aquatic Ecology

Mine

Waratah Coal commit to undertaking the following actions:

- develop an ESCP prior to the commencement of construction
- develop surface water and storm water management plans for the mine site
- utilise the interim water quality objectives for waterways outlined in the Mine Water Quality Monitoring Plan contained in the SEIS, prior to implementation of a robust monitoring program designed to collect additional data to support setting of more localised interim water quality objectives
- A water and sediment quality monitoring program will be prepared based on the results and a review of the current monitoring program to provide sufficient data to help inform the development of the Environmental Authority for the project.

Rail

Waratah Coal commits to undertaking the following actions:

- developing an ESCP prior to the commencement of construction
- ensuring bridge and culvert design allows for the passage of aquatic species
- developing an EMP incorporating monitoring requirements for surface waters.

Surface Water Resources

Mine

Waratah Coal commits to undertaking the following actions:

- implement an erosion and sediment control plan prior to the commencement of construction activities on site

- construct, monitor and maintain all sediment and erosion control devices throughout the construction phase of the Project
- undertake all monitoring and sampling techniques in accordance with the DEHP's Water Quality Sampling Manual and applicable Australian Standards
- obtain and operate in accordance with riverine protection permits and/or relevant guidelines (as required) for all in stream works as part of construction
- construct all creek diversions with an appropriate establishment period prior to the commencement of operations
- design and operate a site water management system to ensure containment and reuse of contaminated water on site
- design and operate a site water management system with a focus on clean water diversion through the use of creek and drainage diversions such that existing downstream water users are not adversely impacted
- rehabilitate disturbed areas as soon as practicable to minimise sediment mobilisation to receiving waters
- design and operate hazardous dams as regulated structures in accordance with regulatory requirements
- undertake additional baseline water quality modelling prior to the commencement of operations
- design and operate a site water management system to minimise demand on external water resources
- not release contaminants from the site water management system that have the potential to cause environmental harm
- operate and monitor the site water management system in accordance with the site's environmental authority
- develop and implement a receiving water environment management plan prior to the commencement of operations
- design and maintain creek diversions to achieve equilibrium with existing water course
- design and construct flood levees for the protection of people and infrastructure with a 1 in 1000 year ARI flood level of immunity
- operate and maintain flood protection levees as regulated structures
- implement a monitoring program for creek diversions to assess long term performance for relinquishment at the cessation of operations
- investigate all substantiated water related complaints and implement corrective actions as necessary
- liaise with DNRM on the determination of watercourses as defined under the Water Act 2000 at the time of permitting
- Waratah Coal considered the following documents in the design of the watercourse diversions. These will be considered further considered during the detailed design, construction and monitoring of the watercourse diversion:
 - ACARP Project "Project C8030 (Stage 1) – Maintenance of Geomorphic Processes in Bowen Basin River Diversions"

- ACARP Project “Project C9068 (Stage 2) – Monitoring Geomorphic Process in Bowen Basin River Diversions”
- ACARP Project “Project C9068 (Stage 3) – Design and Rehabilitation Criteria for Bowen Basin River Diversions”
- The DNRM Regional Guideline entitled ‘Watercourse Diversions – Central Queensland Mining Industry’ dated 15/03/2011
- with specific regards to the Water Resource (Burdekin Basin) Plan 2007 (WRP), Waratah Coal will ensure that the Project achieves the objectives of the WRP as detailed below:
 - sustainable outcomes for management of water to an acceptable level in accordance with the WRP
 - to introduce performance indicators and objectives and strategies for achieving those objectives for environmental flow, water allocation security
 - where unallocated water is identified that a ‘continue moratorium and interim arrangement’ is made
 - granting interim water allocation/s as required
 - obtain the relevant resource operation licenses and distribution operations licenses for water allocation, infrastructure operations and water supply arrangements
 - obtain water entitlements as required
 - ensure that water allocations/licenses are in place or obtained to take or interfere with un-supplemented water
 - compliance with this Act, the *Sustainable Planning Act 2009* and the *Environmental Protection Act 1994* with respect to the regulation of overland flow water. Where overland flow water is to be taken or interfered with, the relevant authorisations, water licenses under the resource operations plan and development permits will be obtained by the nominated assessing authority
- for sewage, a detailed site assessment, including of site opportunities and constraints, soils and local climatic conditions will be coupled with MEDLI mass balance modelling to determine sustainable irrigation loads for the site, coupled with a suitably sized wet weather storage and buffer storage systems to manage variable loads and low irrigation demands during wet periods
- the Drinking Water Treatment Plant (DWTP) will be developed and managed such that output water will meet the Australian Drinking Water Guidelines, and will operate under a Drinking Water Management Plan which will be developed prior to commissioning the plant, and based on the system chosen for the site
- a rehabilitation plan for these creek diversions will be prepared and will include the rehabilitation of the diverted creeks and specification of riparian habitats. The use of locally propagated native flora species will be implemented where practicable to maintain habitat characteristics and prevent the spread of weed and pest flora species
- the final Rehabilitation and Decommissioning Plan for the site will identify the closure actions required for the various surface water management structures including the

watercourse diversions. At this stage, it is considered that the diversions would remain (Section 1.3 of the existing EIS): given the operational life of the project

- the diversions will be functioning as natural watercourses by closure, hence re-establishment of the original watercourse could potentially result in additional impact downstream.

Rail

- Waratah Coal commits to undertaking the following actions throughout the construction and operation of the rail:
- where required, developing Acid Sulphate Soil Management Plans (ASSMP) and ESCPs prior to the commencement of construction
- construct, monitor and maintain all sediment and erosion control devices throughout the construction phase of the Project
- developing storm water management plan prior to construction. This will consider the use of storm water tanks and re-use of grey water
- conducting sediment sampling where works are to be carried out within the waterways (i.e. piling for creek crossings and the coal conveyor) to identify potential contaminants including pesticides and herbicides
- undertake all monitoring and sampling techniques in accordance with the DEHP's Water Quality Sampling Manual and applicable Australian Standards
- obtain and operate in accordance with riverine protection permits and/or relevant guidelines (as required) for all in stream works as part of construction
- rehabilitate disturbed areas as soon as practicable to minimise sediment mobilisation to receiving waters
- undertake additional baseline water quality modelling prior to the commencement of construction
- not release contaminants associated with construction activities that have the potential to cause environmental harm
- investigate all substantiated water related complaints and implement corrective actions as necessary.

Groundwater Resources

Mine

- a groundwater monitoring network and program has already been installed to establish background groundwater level and quality conditions providing a basis for mine impact assessment
- the groundwater monitoring bore network and program has been configured to facilitate assessment of potential impacts to surrounding groundwater users and other sensitive areas.

Waratah Coal commits to:

- expand the monitoring network by a further five bores and develop and implement a groundwater monitoring program

- update the groundwater model and submit for peer review once two years of continuous monitoring data is available
- the groundwater monitoring network and program will be regularly updated over time to cater for evolving mine influence during operation and post closure and reported to DNRM
- groundwater monitoring will be conducted in accordance with recognised standards (i.e. AS/NZS 5667.11:1998)
- groundwater monitoring data will be maintained in an appropriate data base with data being reviewed within two weeks of receipt and validated by a qualified and experienced hydro geologist to facilitate timely response to any issues or potential issues identified
- a formal review of all groundwater monitoring data will be conducted annually by a qualified and experienced hydro geologist and will include recommendations for any modifications to the program and ameliorative measures considered necessary
- the implementation of long term pumping tests of bores in the mine area to assess impacts on local users
- updating the conceptual model with data obtained during the monitoring to assess any potential impacts on the mine on groundwater ecosystems
- collection of mine inflows for reuse
- developing ESCP prior to the commencement of construction to reduce impacts on groundwater
- implementation of management plans and containment structures for potential contaminants
- remediation of any groundwater contamination caused by the project
- site specific investigation of the areas identified from geotechnical review
- a data base of surrounding groundwater users potentially influenced by the mine will be established including relevant bore details as available
- records of any complaints (including basis for the complaint and actions taken) from surrounding groundwater users will be maintained for internal and potential third party/regulatory use
- entering into agreements with surrounding landowners regarding monitoring of impacts and make good provisions should impacts occur.

Rail

To minimise potential impacts to groundwater, Waratah Coal commit to:

- developing ESCPs prior to the commencement of construction to reduce impacts on groundwater
- implementation of management plans and containment structures for potential contaminants
- remediation of groundwater contamination should it be caused by the Project
- geotechnical assessment of the rail alignment to assess areas where construction requirements (i.e. excavation or blasting) have potential for impacts to groundwater
- site specific investigation of the areas identified from geotechnical review

- entering into agreements with surrounding landowners regarding monitoring of impacts and make good provisions where impacts occur.

Air Quality And Greenhouse Gas

Mine

Waratah will meet air quality objectives by:

- managing short term dust emissions during the construction phase through a comprehensive EMP
- achieving effective dust management during mining operations through appropriate planning and awareness of conditions during peak dust emissions. This includes minimal disturbance to the area being mined, minimising haul distances, and controlling vehicular speeds on haul roads and minimising mining activities during high wind speed events
- implementing dust control measures during mining operations, such as watering of haul roads, water spraying at stockpiles, fully enclosed conveyor systems, underground loading of coal at the preparation phase and facilities, wet coal handling facility and ongoing revegetation of stripped areas in the open cut mines
- implementing a comprehensive dust monitoring program across the site that includes onsite and offsite dust monitoring points and a meteorological station to provide accurate measure of local weather conditions
- collaborating with other proposed large-scale mining developments across the region. A requirement to manage dust emissions to levels below the adopted air quality guidelines is necessary from all parties
- use of industry best practice techniques to reduce dust emissions from the site
- preparing specific dust control and mitigation measures as part of a mine decommissioning strategy
- particulate matter from the coal mine will be continuously monitored
- preparation of a reactive Air Quality Management Plan and Dust Management Plan for the operational mine that details actions that must be taken when high dust levels are monitored near the mine boundary and at the closest sensitive receptors (residences)
- Waratah Coal will use the dust management plan to control emissions and to mitigate impacts surrounding the mine once the mine is operational. The dust management plan will incorporate best practice measures to reduce emissions from wheel generated dust on haul roads
- the Project will meet the Ambient Air Monitoring program requirements
- the Project will investigate all substantiated dust complaints
- the Project will implement corrective action resulting from complaints investigations as required
- all monitoring and sampling techniques will be consistent with the DEHP's Air Quality Sampling Manual and applicable Australian Standards.

In minimising the amount of GHG emissions generated by the mine, Waratah Coal commits to:

Appendix 5: Waratah commitments

Galilee Coal Project (Northern Export Facility):

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

- measuring and reporting GHG emissions in compliance with the National Greenhouse and Energy Reporting System (NGERS)
- developing ongoing processes for minimising energy consumption and GHG emissions within the mine, by investigating the use of renewable energy sources in the operation of the mine
- working with government on developing measures to address GHG emissions.

Rail

In managing potential air quality impacts and implementation to various control measures in the reduction of dust emissions associated with the operation phase of the proposed rail easement, Waratah will meet air quality objectives by:

- providing a cover to the top of the wagons. It is intended these covers will be made of fibreglass
- use tippler wagons (gondola) rather than the more traditional bottom dump coal wagon to eliminate or reduce to negligible levels coal hang-up
- managing locomotive speed and train performance requirements along the rail easement (operational efficiencies reduce fuel emissions)
- implementation of control measures for dust load such as coal loading systems designed to minimise exposed areas and coal spillage
- continue ongoing consultation with the community.
- The short term dust emissions associated with construction are to be effectively managed through a dust management plan for construction
- instigating cleaning and monitoring programs for coal wagons of spilled coal and dustiness of coal being transported;

In minimising the amount of GHG generated by rail easement, Waratah Coal commits to:

- developing ongoing processes for minimising energy consumption and GHG emissions within the Project, by investigating the use of renewable energy sources in the operation of the proposed rail easement
- measure and report GHG emissions in compliance with the National Greenhouse and Energy Reporting System
- working with government on developing measures to address GHG emissions.

Noise and Vibration

Mine

To manage potential impacts of noise and vibration during construction and operation of the mine, Waratah Coal will develop and implement construction noise and vibration management plans that address potential impacts. Specifically, Waratah Coal commits to undertaking the following:

- investigate techniques to attenuate noise from crushers and modify proposed earthworks where required and where practicable to enable design planning noise levels to be met

- in locations where noise attenuation, vibration and air blast modifications are impractical, Waratah Coal will consult with the affected property owner with a view to potentially using the dwelling(s) for a purpose other than residential use or with the possibility of acquiring the property
- ongoing monitoring of noise and vibration will occur during the construction of the operation of the mine and associated facilities to ensure compliance with the EMP
- the Project will investigate all noise and vibration related complaints
- corrective actions resulting from complaints investigations will be implemented.

Rail

To manage potential impacts of noise and vibration during construction, Waratah Coal will implement the following:

- using the Construction Noise Management Plan recommended to be prepared and implemented, potential noise impacts during construction (including blasting, if required) will be minimised at noise sensitive locations
- with respect to the noise of train passbys during operations along the rail corridor, the following mitigation measures will be considered for implementation at suitable locations
- upgrading of the residential buildings to ensure that the internal sleep disturbance criterion is achieved. This may include upgrade of the bedroom facades (particularly the windows) along with the installation of some form of mechanical ventilation to ensure that the ventilation requirements could be achieved with external windows and doors closed
- relocation of the residence or another form of change of use for the residences so they would no longer be noise- sensitive locations, or
- attenuation of the rail noise through the use of noise barriers adjacent to the rail. Heights and their locations would be determined during the detailed design of the rail.

Waste

Mine

Waratah Coal will meet waste management objectives through:

Non-Mineral Waste

- a non-mineral waste management plan (NMWMP) will be prepared that will address the management of all waste streams from the mine, with the exception of mineral wastes (i.e., waste rock, topsoil and tailings), dust, combustible emissions, and stormwater runoff, as these will be addressed within other management plans for the project
- the NMWMP will describe the waste anticipated for the site and measures for the management, reduction, segregation, and removal of waste (regulated and non-regulated waste) from the site. This process will include negotiations and collaboration with local government and relevant stakeholders on appropriate waste infrastructure

- developing and implementing a detailed waste management guideline utilising the principles of the waste management hierarchy
- working with local councils to determine the current landfill capacities and accepted waste types and will work with councils to assist with the planning of expansion and upgrade of landfills to ensure wastes generated from the mine can be accommodated if required
- establishing contracts with companies encouraging sustainable waste management practices
- encouraging the procurement of pre-fabricated materials where practicable
- encouraging local businesses to take advantage of opportunities for re-use and recycling, if available, or through initiating recycling opportunities
- regularly reviewing the waste management plan including the marketability of wastes and the results of waste audits to improve waste management
- a register of all chemicals stored on the mine site will be maintained
- the storage and handling of flammable and combustible liquids will be in accordance with AS 1940 – Storage and Handling of Flammable and Combustible Liquids
- all regulated waste will be appropriately disposed of to a facility licensed to receive such wastes and, where required, be tracked
- as part of the staff awareness and induction program, re-use and recycling will be encouraged.

Mining Waste

- geochemical investigations will be made in an additional 4 to 6 holes with continuous stratigraphic testing including the overlying weathered zone and for leach column kinetic testing
- all spoil will be placed at angle of repose for geotechnical stability and will be further flattened prior to final rehabilitation. Containment cells will have geotechnically stable batters of 1 (vertical) on 3 (horizontal) and will be lined with impervious clay blankets
- dried coarse rejects and filter pressed tailings will be trucked to containment cells, dumped and track compacted in layers by dozer. All containment cells will be capped with impervious clay, prior to topsoiling and seeding
- tailings will be disposed of by a dry paste process rather than by way of a conventional wet tailings storage facility.
- the tailings solids will be monitored to determine pH, electrical conductivity, sulphur species and acid neutralizing capacity initially on a monthly basis until geochemical trends have been established. Monitoring will then continue on an annual basis
- to monitor for the unlikely event of any seepage from containment cells, pit water down-dip of the cells will be initially monitored on a monthly basis and tested for pH, electricity conductivity and total dissolved solids. Testing for major anions, cations and trace elements will be initially completed every three months and then annually
- groundwater level and quality will be monitored for the duration of tailings disposal operation as well as after the closure of the mine and infrastructure, as part of an on-going closure plan. Groundwater monitoring bores will be installed and strategically positioned adjacent to disposal areas

- embankment monitoring instrumentation will be installed within the tailings containment embankments to monitor performance. This will ensure stability of the embankments during operations and embankment raising. Piezometers will be installed to check groundwater levels
- survey monuments will be installed along each embankment. These monuments would be surveyed on a regular basis to detect any embankment movements. The information derived from both piezometers and monuments will be used to assess the overall stability of the embankments
- a meteorological station will be installed near the containment cells to monitor and record rainfall and evaporation data
- during rehabilitation of spoil piles, all slopes will be flattened to be geotechnically stable and erosion resistant.
- All spoil surfaces will then be topsoiled and seeded with appropriate vegetation cover. Vegetation growth will be monitored and if necessary, re-seeding will be carried out.

Sewage

- For sewage, a detailed site assessment, including of site opportunities and constraints, soils and local climatic conditions will be coupled with MEDLI mass balance modelling to determine sustainable irrigation loads for the site, coupled with a suitably sized wet weather storage and buffer storage systems to manage variable loads and low irrigation demands during wet periods. A management system will be developed (as a Site Based Management Plan (SBMP) or similar) to manage the treatment system and infrastructure, irrigation and required monitoring program to ensure the scheme remains sustainable over the long term.

Rail

To manage potential impacts associated with the creation and management of waste associated with the rail, Waratah Coal will implement the following commitments:

- undertaking actions that will reduce potential impacts through a proactive rather than reactive approach to waste generation and minimisation
- preparing a project specific Waste Management Plan to be incorporated into the rail Environmental Management Plan. The EMP will be prepared in accordance with legislative requirements and any conditions imposed by the Coordinator-General
- where practicable and possible, have materials prefabricated to reduce waste streams from the construction of the Project
- carrying out waste management in a manner that will have the most benefit to the local community. This includes:
- throughout the life of the rail Waratah will work with the regional councils and other relevant groups to determine existing capacities and accepted waste types of their landfills and where required assist with the planning of expansion and upgrade of landfills to ensure wastes generated from the Project can be accommodated
- when sourcing waste contractors preference will be given to local businesses employing sustainable waste management practices

- work with local businesses so that they can take advantage of opportunities for re-use and recycling.

Traffic And Transport

Mine

The following commitments are made in relation to traffic for the Project:

- road works identified in the control strategies will be implemented to mitigate the traffic impacts of the Project
- a privately-operated transport service will transport the workforce between the accommodation village and the mine
- continue to work with DTMR to ensure a practical solution to intersection upgrades
- upgrade the Saltbush Road as a sealed mine access road and to address potential problems at the Capricorn Highway/Saltbush Road intersection and the Saltbush Road/ State rail level crossing
- re-evaluate the road impact assessment at the design stage when more detailed information is to hand and to prepare a road use management plan, traffic plans and reach agreement with DTMR and local authorities on works required and funding contributions
- promote safe driving over long distances (fatigue management) in consultation with the local road action group.

Further to the EIS Waratah Coal makes the following commitments to develop the following documents:

- Road Impact Assessment Report
- Road Use Management Plan
- Traffic Management Plans
- Traffic Control Plans.

These plans will cover key safety and logistical issues such as:

- signage and traffic control requirements, including requirements for bypasses if necessary
- development of temporary access routes and intersections to the Department of Transport and Main Roads (DTMR) standards
- heavy vehicle movements and operating requirements, including appropriate routes, hours of operation, vehicle wash-down and operational restriction mitigation works and monetary contributions to be made to road authorities to provide a safe and efficient road network
- relevant contacts within the project
- issue identification and responses
- planning and permit requirements including those needed for over-dimensional vehicles and transport of dangerous goods
- processes for community information and responses.

Rail

To manage potential impacts to traffic and transport associated with the construction and operation of rail, Waratah Coal will implement the following commitments:

- during the detailed design phase, the increased safety risk of this level crossing, as well as all level crossings, will be assessed for both the construction phase and operation phase. Waratah Coal intend to use the Australian Level Crossing Assessment Model (ALCAM) to carry out this safety assessment
- locations where grade separation is not warranted (as conflict between trains and vehicles will be very infrequent) will have a detailed field assessment to determine if suitable sight distance is achievable. If not, measures such as clearance of obstructions and providing amended road alignments will be considered before resorting to signals and boom gates
- A commitment is made to grade separation at private road and track crossings by way of road culverts under the rail or, if suitable, providing amended road alignments
- as suppliers for materials and equipment which require over-dimension transport to the site are identified, further route assessment and application for appropriate permits will be undertaken. This shall include a review of the DTMR Conditions of Operation Database, which provides an updated source of restrictions for OD vehicles, including around temporary roadwork
- Waratah commits to enter into infrastructure agreements with DTMR and local authorities as appropriate for necessary works and asset maintenance and to re-assess road impacts at the design stage

Waratah Coal will make the following commitments to develop the following documents:

- Road Impact Assessment Report
- Road Use Management Plan
- Traffic Management Plans
- Traffic Control Plans.

These plans will cover key safety and logistical issues such as:

- signage and traffic control requirements, including requirements for bypasses if necessary
- development of temporary access routes and intersections to DTMR standards
- heavy vehicle movements and operating requirements, including appropriate routes, hours of operation, vehicle wash-down and operational restriction
- mitigation works and monetary contributions to be made to road authorities to provide a safe and efficient road network
- relevant contacts within the project
- issue identification and responses
- planning and permit requirements including those needed for over-dimensional vehicles and transport of dangerous goods
- processes for community information and responses.

Indigenous Cultural Heritage

Mine

The following commitments are made in relation to the preservation of Aboriginal cultural heritage and non-Indigenous heritage values associated with the Project area:

- Waratah Coal commits to continued engagement and negotiations with endorsed Aboriginal Parties; and, to developing (where not already developed) and implementing approved Cultural Heritage Management Plans (CHMP)
- Waratah Coal commits to notifying the Coordinator-General of the completion and registration of any Cultural Heritage Management Plans that are being finalised after the Coordinator-General's Evaluation Report has been issued
- control strategies in the EIS will be implemented to manage known and potential cultural heritage sites and values located within the Project site
- conduct regular cultural heritage education sessions/trainings to employees
- Waratah Coal commits to appointing an Indigenous Liaison Officer during construction and for this position to continue once the mine becomes operational and for the life of the mine.

Rail

To manage potential impacts to Indigenous and non-Indigenous cultural heritage, Waratah Coal will implement the following commitments:

- Waratah Coal commits to continued engagement and negotiations with endorsed Aboriginal Parties; and, to developing (where not already developed) and implementing approved Cultural Heritage Management Plans (CHMP).
- Waratah Coal commits to notifying the Coordinator-General of the completion and registration of any Cultural Heritage Management Plans that are being finalised after the Coordinator-General's Evaluation Report has been issued.

Non-Indigenous Cultural Heritage

Waratah Coal commits to implementing procedures during site activities that aim to identify, assess and record undetected non-Indigenous heritage sites, including appropriate induction of relevant project personnel

- control strategies in the EIS will be implemented to manage known and potential cultural heritage sites and values located within the Project site
- implement procedures during site activities that aim to identify, assess and record undetected non-Indigenous heritage sites, including appropriate induction of relevant project personnel.

Mine

This will include undertaking the relevant commitments with respect to the Monklands homestead complex within the mine area and at the other potential areas identified within the proposed rail corridor. Ongoing negotiations will be undertaken with the owner of Monklands homestead and other identified Non-Indigenous cultural heritage sites to ensure appropriate cultural heritage material is recorded/salvaged prior to disturbance.

Rail

For the rail this will involve facilitating the further examination and formal reporting of the Mountain Creek changing station and the Bowen Downs road to DEHP in accordance with the *Queensland Heritage Act 1992* (QH Act) requirements.

Social

Waratah Coal has made a number of commitments to help maximise positive social impacts and help minimise negative social impacts arising from the Galilee Coal Project. Waratah Coal will:

- minimise impacts on property owners as much as possible, ensure fair compensation when impacts cannot be avoided, provide opportunities to property owners to benefit from the project when available, and encourage productive engagement with property owners
- provide the services of a farm management consultant, if requested, to assist property owners plan for changes as a result of mine and/or rail infrastructure (eg. modifications to fencing, stockyards, watering points and access roads)
- base at least 50 mine employees in Alpha and all port and rail employees in the Bowen area
- The number of employees residing in both locations along with property prices, rents and rental vacancy rates will be actively monitored and made publicly available
- Provide housing for mine employees in Alpha that fits within the character of Alpha and provides an appropriate standard befitting of senior managers and other employees who wish to reside in Alpha with their families on a long-term basis
- provide all mine employees with the opportunity to reside in the Alpha area
- provide incentives for mine employees to relocate to Alpha with their families, for example:
 - financial assistance for employees opting to reside in Alpha to purchase a house in Alpha (with similar assistance for employees to buy a house in Bowen)
 - a one-off bonus for any employee that relocates with their family to Alpha and stays for at least a year
- encourage contractors to establish facilities and base staff in Alpha and Bowen by giving preference to businesses and contractors that have locally-based staff
- participate in the Galilee Basin CSIA Roundtable and provide financial support, as recommended by the Roundtable, for public infrastructure in Alpha, including affordable housing and health and emergency services
- participate in a roundtable (or equivalent) for Abbot Point proponents, and provide financial support to improve public infrastructure in Bowen, including affordable housing and health and emergency services
- if Bowen is not included in a roundtable (or equivalent), Waratah will hold discussions with the WRC in regard to possible financial contributions towards public infrastructure and/or services in Bowen

- establish an arrangement with an established emergency service/retrieval provider for the provision of aeromedical and retrieval services for the project
- invite local emergency service providers (police, ambulance, fire & rescue and SES) to participate in the preparation and practicing of emergency procedures
- give employment preference, in order, to workers from the local area, the local region, the rest of Queensland and the rest of Australia before overseas
- promote healthy lifestyle choices among the workforce
- provide induction training to all staff, contractors and sub-contractors to ensure they are familiar with project facilities, local Indigenous cultures and values, occupational health and safety including emergency response strategies, fatigue management policies, employment conditions and entitlements, Waratah's contributions to the local community and the grievance mechanism
- implement a Code of Conduct, applicable to all employees, contractors and sub-contractors, which aims to enhance relationships between employees and contractors and the local community and minimise adverse social impacts
- participate in government-led initiatives to recruit workers from areas in Queensland that have relatively high levels of unemployment
- promote female employment
- promote Indigenous employment
- provide support for DIDO and FIFO workers, including suitable accommodation and recreation facilities, bus services between the mine site and any nearby regional centre that contains a sufficient number of employees, and promote available support networks
- provide support and encouragement for employees living in Alpha to integrate within the local community
- engage 20 new apprentices each year (and aim to recruit 50 per cent of these from Central Queensland and the Whitsunday, Isaac and Mackay Regions)
- fund an additional 5 apprentices each year (with 4 year funding commitments subject to satisfactory performance), to be engaged and managed by businesses based and operating in the project area
- provide support to local schools, including mine tours, workplace training, classroom presentations and other interactions with the aim of strengthening linkages between schools and the mining industry (and increasing female and Indigenous participation)
- aim to establish a long-term link with local training organisations (including TAFE centres) to provide guest lectures by skilled trainers (who work for the project) and accommodate workplace training for apprentices and other trainees
- implement Indigenous engagement and participation strategies, to help communicate effectively with Indigenous groups, and promote Indigenous employment and contracting opportunities
- for any overseas workers, provide culturally appropriate facilities at the mine site and provide appropriate food and food-handling procedures, show flexibility, as far as possible, in terms of meeting religious and cultural requirements (eg. for worship),

and provide cultural awareness for overseas workers during the induction training, and include awareness on their cultures in induction training provided to other workers

- give procurement preference, in order, to suppliers from the local area, the local region, the rest of Queensland and the rest of Australia before overseas
- advertise procurement and contracting opportunities locally
- package contracts to help local businesses and contractors submit competitive bids
- hold briefing sessions in the project area for local businesses and contractors
- provide support to local organisations to increase their capacity to submit a competitive bid
- ensure all contractors and sub-contractors incorporate strategies (at least the equivalent as outlined above) to give preference to local recruitment, local suppliers, promote a healthy lifestyle, promote female employment, promote Indigenous employment and provide training
- participate in discussions to help develop strategies to address the loss of agricultural workers to the mining industry
- provide information to, and communicate with, stakeholders through a variety of mechanisms, including but not limited to:
 - quarterly newsletters
 - maintenance of an information hotline and project website
 - participation in various consultative committees, including the Galilee Basin CSIA Roundtable
 - maintenance of a grievance mechanism
 - appointment of a Project Liaison Officer and Indigenous Liaison Officer
- report on social impacts and social impact management annually, and make the reports publically available
- fund an external and independent review of the project's social impacts and social impact management strategies, every two years, and make the reports publically available.

Economics

Waratah Coal commits to developing plans or other suitable mechanisms (for example, collaborative approaches) to minimise the draw-down on labour in other sectors.

Hazard and Risk

To minimise the potential risk to the health and safety of onsite and offsite personnel as a result of construction and operational activities associated with the mine site, Waratah Coal will commit to:

- construction phase defaulting under a formal SHMS in accordance with all relevant legislative requirements
- undertaking the operations of the mine site under a formal SHMS in accordance with all relevant legislative requirements
- monitoring and implementing amendments to the SHMS where necessary and frequently ensuring its applicability and currency to be maintained throughout the life of the project
- frequently liaising with internal and external stakeholders with respects to safeguarding and improving the SHMS
- Waratah Coal will consult with the QFRS and QPS during the preparation of emergency response procedures.

Hazard and Risk Management plans will be prepared that ensure that the workers accommodation has the appropriate measures in place to provide a safe and conducive environment for the workers. This will include:

- Buildings meeting the relevant building standards
- Compliance with the local disaster management plans including mitigation and management of flooding
- Establishment of links with the various Local Disaster Management Groups to allow relationships to be formed
- Providing assistance to the Local and State Emergency Service Units (as required), in accordance with the Traffic Management Plan
- A hazard assessment for dams is to be also conducted as per Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (February 2012). The assessment will be carried out based upon the structure dimensions, the usage of the land and the contaminant concentrations
- A Hazard and Risk Assessment will be undertaken identifying the final access routes for all explosives that are being brought to the mine site
- Waratah Coal is committed to undertaking hazard and risk identification workshops and assessments in cooperation with all its specialist sub-consultants and stakeholders
- Following this process, a detailed hazard and risk assessment will be prepared, and the Emergency Management Plan will be finalised and a Health and Safety Plan will be developed
- The hazard and risk assessment and an updated Traffic and Transport study will provide risk management and control measures for vehicle movements. It will also include the identification of the type and storage locations for Hazardous Chemicals/Materials this will be incorporated into the detailed design for the project. A Hazard and Risk workshop will be held, in which the issues surrounding the

storage locations and transportation (including route options) of hazardous materials and chemicals will be analysed

- All current standards for construction camp dwellings and other buildings will be adhered to
- Detailed hazard and risk assessments, and the Emergency Management Plan, Health and Safety Plan will include management of impacts from potential isolation, and contacts/consultation with location disaster management groups. Regardless of this, the relevant personnel will establish contact with the relevant local disaster management groups
- Waratah Coal will consult with the State Emergency Service (and other relevant groups) and collaborate on the provision of road crash rescue services impacted by the proposed mine (note that this is only expected to be local to the mine and the APSDA as the majority of the workforce is expected to be FIFO)
- Project managers will maintain open dialogue with the Mining Inspectors at DNRM concerning the Occupational Health and Safety and Major Hazardous Facility safety obligations
- The Emergency Management Plan and Health and Safety Plan will include the relevant legislative and regulatory responsibilities and the hazard and risk assessment process will include a wide consultation base to ensure the correct agencies and responsibilities are identified
- A site specific mosquito management plan will be developed which will be compliant with the Queensland Health “Guidelines to minimise mosquito and biting midge problems in new development areas.¹” The plan will incorporate all phases of the project, highlight any potential high risk areas and outline strategies for minimising the development of habitats for the proliferation of mosquitoes, midges and other biting insects
- An assessment of bushfire hazards will be undertaken to determine compliance with the SPP1/03 and control strategies will be developed for mitigation of bushfire risks. The revised Mine EM Plan and Rail EMP will incorporate mitigation measures to reduce the risk of bushfire hazards. The management and treatment of vegetative waste will be addressed in the non-mineral waste management plan (NMWMP). Vegetative waste will be used on site to provide fauna habitat, or chipped and mulched and used during progressive rehabilitation.
- Burning of vegetative waste will only occur as a last resort. The NMWMP will include a requirement that burning of vegetative waste does not occur unless a ‘Permit to Burn’ has been issued by the Rural Fire Brigade
- A Bushfire Management Plan (BMP) will be developed for the project as part of the overall plans and procedures for the project. The BMP will identify the areas of bushfire hazard and procedures for emergency services to access the project infrastructure/area throughout all stages of the project cycle.

Appendix 6. Social impact mitigation actions and strategies

Housing and Accommodation

Objectives	To minimise negative impacts on housing affordability and the availability of temporary accommodation in Alpha and Bowen.
Stakeholders	• Residents of Alpha and Bowen • BRC • WRC • Department of Public Works and Housing • Social housing providers in Alpha and Bowen • Real estate agents and/or property developers in Alpha and Bowen
Management and/or mitigation strategies	Waratah will provide housing for mine employees living in Alpha (acknowledging that due to the limited housing market these houses will need to be built). Under the auspices of the Galilee Basin CSIA Roundtable (and possibly an equivalent structure for Bowen), it is recommended that: • affordable housing is considered during the preparation of development plans in Alpha and Bowen • financial support is provided to help address housing affordability in Alpha and Bowen through the proposed Infrastructure and Community Development Funds (using contributions from all Galilee and Abbot Point proponents) • the need for additional temporary accommodation is assessed in both Alpha and Bowen • financial support is provided to help address temporary accommodation needs in Alpha and Bowen, if required, through the proposed Infrastructure and Community Development Funds (using contributions from all Galilee and Abbot Point proponents).

**Key
Performance
Indicators**

- Number of Waratah employees provided with suitable accommodation in Alpha.
- Median house prices and rental costs in Alpha and Bowen and comparisons with other centres in the BRC and WRC areas.
- Availability and cost of temporary accommodation in Alpha and Bowen and comparisons with other centres in the BRC and WRC areas.
- Financial contributions towards affordable housing (Waratah Coal and other proponents) in Alpha and Bowen.
- Financial contributions towards temporary accommodation (Waratah Coal and other proponents) in Alpha and Bowen.

**Baseline data
for KPIs**

Housing provided to permanent staff in Alpha by Waratah: 0

Median house prices (2011):

- Alpha: \$265,000
- Barcaldine: \$185,000
- Bowen: \$360,000
- Proserpine: \$290,000 60

Median rental costs (November 2012):

- Alpha: \$190/week
- Barcaldine: \$240/week
- Bowen: \$365/week (units \$270/week)
- Proserpine: \$320/week (units \$230/week)

The availability and cost of temporary accommodation (hotel rooms, cabins and van sites) is yet to be confirmed.

Targets

- Housing provided to 50 permanent staff in Alpha by Waratah.
- House prices in Alpha not to rise significantly more than they do in Barcaldine.
- Rental costs in Alpha not to rise significantly more than they do in Barcaldine.
- House prices in Bowen not to rise significantly more than they do in Proserpine.
- Rental costs in Bowen not to rise significantly more than they do in Proserpine.

Temporary accommodation

- Availability—hotel rooms, cabins and van sites are available on more than 90 per cent of nights surveyed (Alpha and Bowen).
- Cost—hotel rooms, cabins and van sites cost no more than 20 per cent more than comparable facilities in the region (Alpha/Barcaldine and Bowen/Proserpine).

Financial contributions

Targets for financial contributions towards housing affordability and temporary accommodation in Alpha and Bowen to be determined by the Galilee Basin CSIA Roundtable (and equivalent for Bowen), based on development plans for Alpha and Bowen.

Implementation schedule

- Waratah Coal aims to provide 50 houses to staff living in Alpha within 3 years of first production.
- Financial contributions towards housing affordability and temporary accommodation in Alpha and Bowen will be determined by the Galilee Basin CSIA Roundtable (and equivalent for Bowen), based on development plans for Alpha and Bowen.

Monitoring and review	• Waratah Coal will continuously monitor its workforce, including the number of houses provided to employees living in Alpha. • Waratah Coal will monitor house and rental costs in Alpha and Bowen. • It is recommended that the Galilee Basin CSIA Roundtable (and any similar structure for the Bowen-Abbot Point area) play a lead role in the monitoring of housing affordability and the availability and cost of temporary accommodation in Alpha and Bowen. • An independent/external review will be conducted every two years to assess the social impacts of the project and the effectiveness and adequacy of social impact management strategies. This will include impacts relating to housing affordability and the availability and cost of temporary accommodation in Alpha and Bowen.
Documentation and reporting	Documentation and reporting in regard to the development of Alpha will preferably be coordinated through the Galilee Basin CSIA Roundtable. However, Waratah Coal will also prepare: • an Annual Social Impact Report • an annual AIPP or LIPP Report. The Social Impact Report will contain a summary of grievances received during the year, and the response provided to these grievances. The reports will be made publically available. A summary of the biennial external review will also be placed on the project website.

Workforce Management

Objectives	Waratah Coal aims to have a well-trained, healthy and relatively stable workforce. Waratah also aims to: • Maximise employment, in order of priority, in (i) the project area, (ii) the region, (iii) the rest of Queensland, and (iv) elsewhere in Australia. • Ensure employees and contractors act in a manner that is conducive to a safe, peaceful and enjoyable lifestyle within the project area.
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Stakeholders	• Employees and contractors • BRC • WRC • Alpha and Bowen communities • Skills Queensland • Indigenous groups • Training providers • Local schools
Management and/or mitigation strategies	Waratah Coal will increase employment within the local area and region by: • giving preference to employees, in order of priority, from (i) the project area, (ii) the local region, (iii) the rest of Queensland, (iv) elsewhere in Australia, and (v) overseas • increasing workforce participation by increasing female and Indigenous employment • providing training, with preference to local people • strengthening links between local schools and the mining industry • strengthen links with local training providers.
Key Performance Indicators	• Number and per cent of employees (including contractors) from the project area, region, rest of Qld, elsewhere in Australia and overseas. • Employment by gender. • Indigenous employment. • Number of staff trained (local, region, Qld, Aust, overseas). • Number of apprentices, including the number of apprentices from the local region. • Number of schools assisted.
Baseline data for KPIs (and source of data)	Baseline is zero.
Targets	Targets will be finalised prior to the construction period when economic conditions, including those relating to the labour market, are more predictable.
Implementation schedule	To be prepared once strategies have been finalised.

Monitoring and review

Waratah Coal will continuously monitor its workforce including:

- the origin of employees, apprentices engaged and training provided
- the number of employees living in Alpha and Bowen
- the number of houses provided to employees living in Alpha, and the number of family members residing in Alpha.

Waratah Coal will also solicit an independent review every two years that is expected to include a survey of local residents to assess their opinion on the behaviour of Waratah's workforce and the project's effectiveness in contributing to the local community. It is recommended that community contributions are assessed in terms of:

- infrastructure and services
- community vitality and spirit
- friendliness/good neighbours
- safety.

Waratah Coal will publicise and invite input to:

- a list of social impacts and assessment of their significance
- the strategies for addressing social impacts
- results from monitoring the implementation of social impact management strategies and evaluating the outcomes.

The above information will be available on the project website at all times. The above information will be publicised (and comments invited) on a periodic basis to coincide with internal and external monitoring and evaluation activities. This may include the presentation of information in the project's quarterly newsletters, council newsletters, newspapers, etc.

An independent/external review will be conducted every two years to:

- assess the social impacts of the project
- assess the effectiveness and adequacy of social impact management strategies
- review the degree of compliance with conditions stipulated by the Coordinator-General
- review the effectiveness and adequacy of stakeholder engagement processes
- provide recommendations for continuous improvement.

Documentation and reporting	Waratah Coal will prepare: • an Annual Social Impact Report • an annual AIPP or LIPP Report. The Social Impact Report will contain a summary of grievances received during the year, and the response provided to these grievances. The reports will be made publically available. A summary of the biennial external review will also be placed on the project website.
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Health and Community Wellbeing

Objectives	• To contribute to Alpha's growth and prosperity through a well planned and effectively managed expansion in population, physical infrastructure and economic opportunities, while trying to preserve and contribute positively to the existing lifestyle and friendly, rural atmosphere. • To maximise its contribution to population growth and economic development in the Bowen area.
Stakeholders	• Residents of Alpha, Bowen and the local areas • BRC • WRC • Local business people • Galilee Basin CSIA Roundtable (anticipated to include other proponents, councils, selected government agencies and community representatives) and any similar structure for the Bowen-Abbot Point area.
Management and/or mitigation strategies	To help reduce accident-related risks Waratah Coal will: • Provide a bus service between the mine site and any major regional centre that contains sufficient mine workers. • Prepare traffic management plans in consultation with DTMR, local councils, Qld Police and the Road Accident Action Group. • Require all transport operators to observe heavy vehicle fatigue management legislation and report all accidents, incidents and near misses. • Require all employees and contractors who drive to/from work to abide by fatigue management strategies and report all accidents, incidents and near misses.

Key Performance Indicators	• Number and per cent of employees arriving by bus. • Traffic management plans (including heavy vehicle management plans). • Accident, incident and near miss data. Waratah Coal will implement Community Cohesion Strategies in both locations to build strong and productive relationships between the project, the workforce and the local community, and will help workers and their families integrate within the local community. This will entail: • Effective community engagement. • Providing support for organisations and events in Alpha and Bowen. • Providing support to local schools. • Assisting families to integrate with the local community. • Ensuring all employees and contractors abide by a Code of Conduct. • Establishing an effective grievance and dispute resolution mechanism.
Baseline data for KPIs (and source of data)	Baseline is zero.
Targets	Further targets to be quantified once strategies have been finalised and are likely to be determined by the Galilee Basin CSIA Roundtable (or equivalent structure for the Bowen-Abbot Point area).
Implementation schedule	Schedule for assistance to Alpha and Bowen to be prepared once strategies have been finalised. This is likely to be determined by the Galilee Basin CSIA Roundtable (or equivalent structure for the Bowen-Abbot Point area).

Monitoring and review	Waratah Coal will publicise and invite input to: • A list of social impacts and assessment of their significance. • The strategies for addressing social impacts. • Results from monitoring the implementation of social impact management strategies and evaluating the outcomes. The above information will be available on the project website and will be publicised (and comments invited) on a periodic basis to coincide with monitoring and evaluation activities. This may include the presentation of information in the project's quarterly newsletters, council newsletters, newspapers, etc. An independent/external review will be conducted every two years to: • Assess the social impacts of the project. • Assess the effectiveness and adequacy of social impact management strategies. • Review the degree of compliance with conditions stipulated by the Coordinator General. • Review the effectiveness and adequacy of stakeholder engagement processes. • Provide recommendations for continuous improvement.
Documentation and reporting	Documentation and reporting in regard to the development of Alpha and Bowen will preferably be coordinated through the Galilee Basin CSIA Roundtable or equivalent. However, Waratah Coal will also prepare: • An Annual Social Impact Report • An annual AIPP or LIPP Report The reports, and bi-annual external review, will be made publically available.

Community and Stakeholder Engagement

Objectives	To understand the impacts on property owners, minimise impacts as much as possible, ensure fair compensation when impacts cannot be avoided, provide opportunities to benefit from the project when available, and provide every opportunity to engage with property owners in a meaningful and effective manner.
Stakeholders	• Property owners (MLA and rail corridor) • Residents of Alpha, Bowen and the local areas • BRC • WRC

- Local business people
- Property developers
- Galilee Basin CSIA Roundtable (anticipated to include other proponents, councils, selected government agencies and community representatives) and any similar structure for the Bowen-Abbot Point area.

**Management
and/or
mitigation
strategies**

Waratah Coal will:

- Gain a full understand and appreciation of the potential impacts on property owners.
- Work with each property owner to minimise disruptions and reduce impacts as much as possible.
- Ensure fair compensation when impacts can not be avoided.
- Relocate or provide new infrastructure when required (eg. fences, stockyards, watering points, access roads).
- Ensure fair compensation for the loss of grazing land or other adverse impacts.
- Provide the assistance of a farm management consultant if requested.
- Provide opportunities for property owners to benefit from the project when available.
- Provide every opportunity to engage with property owners in a meaningful and effective way.

In addition, discussions are required with relevant stakeholders to discuss how to reduce the loss of stockmen and other agricultural workers to the mining industry. This may best be undertaken under the auspices of the Galilee Basin CSIA Roundtable.

Waratah Coal aims to be a member of the Galilee Basin CSIA Roundtable which is expected to play a leading role in:

- The preparation of a development plan for Alpha.
- Determining annual contributions by each proponent to an Infrastructure Fund (based on the needs outlined in the development plan).
- Determining annual contributions by each proponent to a Community Development Fund to improve service delivery, maintain infrastructure and support local organisations.
- Reviewing and updating the development plan each year, in response to community needs and preferences.

It is envisaged that the Infrastructure and Community Development Funds would support a wide range of needs in Alpha, including assistance for affordable housing and supporting local health & emergency service providers. Waratah will recommend that the development plan includes population

projections and facilitates economic diversification to help limit the future impacts of mine closure or a downturn in the mining industry.

Waratah Coal recommends that a roundtable (or equivalent structure) be established for the Bowen area, comprising all Abbot Point proponents, which is expected to play a leading role in:

- The preparation of a development plan for Bowen.
- Determining annual contributions by each proponent to an Infrastructure Fund (based on the needs outlined in the development plan).
- Determining annual contributions by each proponent to a Community Development Fund to improve service delivery, maintain infrastructure and support local organisations.
- Reviewing and updating the development plan each year, in response to community needs and preferences.

It is envisaged that the Infrastructure and Community Development Funds would support a wide range of needs in Bowen, including affordable housing.

**Key
Performance
Indicators**

- Number of properties with plans for relocation and/or provision of new infrastructure.
- Number of properties provided with assistance of a farm management consultant.
- Number of properties with compensation agreements.
- Number of property holders providing contract services to Waratah.
- Development of strategies to address the loss of agricultural workers to the mining industry.

KPIs should include details on the length of fencing, number of additional watering points, properties provided with electricity, etc., and the costs of each.

- Development plans for Alpha and Bowen and annual updates.
- Financial contributions to development plans by Waratah Coal and other proponents.
- Other financial contributions by Waratah Coal for services and organisations in Alpha and Bowen.
- Population of Alpha and Bowen and surrounding areas.
- Number of mine workers residing in Alpha.
- Number of Waratah employees and dependents residing in Alpha and Bowen, provided with accommodation, and average household size.

- Financial contributions towards affordable housing, health & emergency services and temporary accommodation (Waratah Coal and other proponents).
- Demand for health & emergency services
- Effectiveness of the drug and alcohol policy and code of conduct.
- Effectiveness of community engagement, the community cohesion strategy and the grievance and dispute resolution mechanism.
- Level of community support for proposed development activities.
- Comparison of personal and family income levels between Alpha and Bowen and Queensland.

Baseline data for KPIs

Waratah Coal will impact 8 properties on the MLA and up to 44 properties along the railway line. Note that other properties in the vicinity of the MLA and railway that are impacted by dust, noise, vibration or visual amenity, will be addressed in the EMP.

As Waratah Coal has not provided direct support to property owners at this stage so the baseline will be zero.

2011 census data:

- Population (Alpha urban centre): 349 (Bowen urban centre): 8,604
- Mine employees residing in Alpha (urban centre): 6
- Personal income level (Alpha urban centre) 109 per cent of median level for Queensland (Bowen urban centre) 98 per cent of median level for Queensland
- Family income level (Alpha urban centre) 96 per cent of median level for Queensland (Bowen urban centre) 86 per cent of median level for Queensland
- Personal income level (BRC) 94 per cent of median level for Queensland (WRC) 106 per cent of median level for Queensland
- Family income level (BRC) 93 per cent of median level for Queensland (WRC) 97 per cent of median level for Queensland

Other baseline data to be quantified once strategies have been finalised.

Targets

Targets will be established either negotiations with individual property owners or during the support provided by the farm management consultant. However, all properties are to have infrastructure plans and compensation agreements finalised prior to construction, and farm management advisory support to be

provided to all property holders who request assistance.

Waratah Coal will base 50 employees in Alpha, and all rail and port employees in Bowen (currently estimated at 360). These targets are expected to equate to 125 and 900 residents respectively when including family members.

Further targets to be quantified once strategies have been finalised and are likely to be determined by the Galilee Basin CSIA Roundtable (or equivalent structure for the Bowen-Abbot Point area).

Implementation schedule

Implementation shall occur following the Final Investment Decision and focus on the pre-construction period. However, environmental monitoring will occur throughout operations and property owners will be specifically targeted within the community engagement process. This will help ensure they continue to have a voice during operations and decommissioning.

Schedule for assistance to Alpha and Bowen to be prepared once strategies have been finalised. This is likely to be determined by the Galilee Basin CSIA Roundtable (or equivalent structure for the Bowen-Abbot Point area).

Monitoring and review

Waratah Coal will continuously monitor impacts and mitigation strategies involving property holders. A database will be established with information for each property holder impacted by the MLA or rail corridor.

Waratah Coal will publicise and invite input to:

- A list of social impacts and assessment of their significance.
- The strategies for addressing social impacts.
- Results from monitoring the implementation of social impact management strategies and evaluating the outcomes.

The above information will be available on the project website at all times. The above information will be publicised (and comments invited) on a periodic basis to coincide with internal and external monitoring and evaluation activities. This may include the presentation of information in the project's quarterly newsletters, council newsletters, newspapers, etc. An independent/external review will be conducted every two years to:

- Assess the social impacts of the project.
- Assess the effectiveness and adequacy of social impact management strategies.
- Review the degree of compliance with conditions stipulated by the Coordinator General.

- Review the effectiveness and adequacy of stakeholder engagement processes.
- Provide recommendations for continuous improvement.

Documentation and reporting

Waratah Coal will prepare:

- An Annual Social Impact Report.
- An annual AIPP or LIPP Report.

The Social Impact Report will contain a summary of grievances received during the year, and the response provided to these grievances. The reports will be made publically available. A summary of the biennial external review will also be placed on the project website.

Local Business and Industry Content

Objectives

Local procurement strategies can boost the economic benefits of the project in the local region. Waratah aims to maximise procurement and contracting opportunities, in order of priority, in (i) the project area, (ii) the region, (iii) the rest of Queensland, and (iv) elsewhere in Australia.

Waratah Coal believes it is also possible to help minimise the loss of staff to the mining industry by outsourcing goods and services and using established, local contractors when possible.

Stakeholders

- MCC and major contractors
- ICN
- Contractors
- Councils within the region

Management and/or mitigation strategies	Waratah Coal will increase procurement from the local area and region by: • Giving preference to local contractors and suppliers (with increased preference to contractors that have staff permanently based in Alpha and Bowen). • Advertising locally. • Packaging procurement so local businesses can tender. • Holding briefing sessions on procurement opportunities and contract requirements. • Providing support to some local organisations to assist them to meet contract requirements.
	To ensure full, fair and reasonable opportunity for Queensland and Australian companies, Waratah will prepare an AIPP or LIPP for the Galilee Coal Project. The AIPP/LIPP will focus on products and services that could be provided by either Australian or foreign entities. The ICN has placed a description of the Galilee Coal Project on its website. Further collaboration with the ICN is expected and may include: • Collaborating with ICN to develop an early Contestability Assessment. • Using the ICN Gateway website for local suppliers to register their interest in the Project. • Reporting project milestones on the ICN website. • Placing work packages of relevant size on the ICN Gateway website (with opening and closing dates). • Placing tier 1 and 2 contract awards on the ICN Gateway website. • Reporting on tenders and contracts awarded.
Key Performance Indicators	• Number and per cent of contracts and value of goods and services from the project area, region, rest of Qld, elsewhere in Australia and overseas. • Number and value of contracts awarded to Indigenous organisations.
Baseline data for KPIs	Baseline is zero.
Targets	Targets will be finalised prior to the construction period when economic conditions, including those impacting the ability of domestic companies to provide the necessary goods and services required for the project, are more predictable.

Implementation schedule	To be prepared prior to tendering (eg. three months prior to construction).
Monitoring and review	Waratah Coal will continuously monitor its procurement, including the number and value of orders from different geographic areas. Waratah Coal will publicise and invite input to: • A list of social impacts and assessment of their significance. • The strategies for addressing social impacts. • Results from monitoring the implementation of social impact management strategies and evaluating the outcomes. The above information will be available on the project website at all times. The above information will be publicised (and comments invited) on a periodic basis to coincide with internal and external monitoring and evaluation activities. This may include the presentation of information in the project's quarterly newsletters, council newsletters, newspapers, etc. An independent/external review will be conducted every two years to: • Assess the social impacts of the project. • Assess the effectiveness and adequacy of social impact management strategies. • Review the degree of compliance with conditions stipulated by the Coordinator General. • Review the effectiveness and adequacy of stakeholder engagement processes. • Provide recommendations for continuous improvement.
Documentation and reporting	Waratah Coal will prepare: • An Annual Social Impact Report. • An annual AIPP or LIPP Report. Summaries of the Annual Social Impact Report and AIPP/LIPP report will be available on the website and sent electronically to key stakeholders. A summary of the biennial external review will also be placed on the project website.

Appendix 7. Response to IESC advice

Introduction

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 Independent Expert Scientific Committee (IESC).

On 18 April 2013, I voluntarily submitted to the IESC a request for advice for the GC project. The IESC considered the matter at its meeting of 21 May 2013 and its advice was provided to me on 30 May 2013.

I have considered key aspects of the IESC advice in section 5.4 of my report. Below is my response to each of the matters raised in the IESC advice. In framing my response I have been guided by the advice of DNRM, DEHP and Waratah.

IESC advice and Coordinator-General's response

IESC comment 1 - Adequacy of groundwater conceptualisation

- a. although the Rewan Formation is generally considered to have low porosity and permeability, there is evidence to suggest that localised faulting may exist. The IESC has previously advised that it is plausible for local and regional scale faulting to present a significant potential for connectivity and vertical groundwater flow as part of their advice on the Kevin's Corner Coal Project (EPBC Act Reference no. 2009/5033). The extent of faulting in the Rewan Formation in the local setting should be determined in order to inform the connectivity assessment;
- b. while the proponent repositioned the GAB boundary for the purposes of the SEIS, the groundwater report has not been revised to include the main findings of the Great Artesian Basin Water Resource Assessment. The Assessment did not report flux volumes but showed a leaky aquitard basement unit in close proximity to an overlying partial aquifer near the proposed development. Therefore there is the potential for connectivity in the area of the proposed development. The IESC recommends that a revision of the groundwater assessment should be undertaken as a matter of priority and in particular should include the relevant GAB formations, with the nature of the connectivity with GAB formations investigated via a monitoring network developed by the proponent; and

c. the IESC also notes that the terms of reference for the 2013 Assessment, for scientific purposes, limited the study area of the GAB to the Jurassic and Cretaceous Formations. Tertiary age sediments were only examined where a significant hydraulic connection is either known or anticipated to exist. Consequently, the Triassic sediments (Moolayember Formation, Clematis Sandstone, Dunda Beds and Rewan Formation) remain part of the GAB and should be included in the groundwater analysis. The Committee considers that these formations should also be included in the proponent's groundwater conceptualisation.

Localised faulting of Rewan Formation and findings of the Great Artesian Basin Water Resource Assessment

The IESC raised similar issues of potential faulting of the Rewan Formation and the findings of the CSIRO GAB Water Resource Assessment (GABWRA) its advice to me on the Kevin's Corner Project. Those matters were addressed in my evaluation report for that project which was released on 30 May 2013 following the committee's consideration of the GC Project.

I am advised by DNRM that the Moolayember Formation, Clematis Sandstone and Dund Beds/ Rewan Formation are Triassic in age and that the CSIRO GAB Water Resource Assessment (GABWRA) was limited to the younger hydrogeological units of the Jurassic and Cretaceous periods. In the Jericho area, the Hutton sandstone is the base of the Jurassic sequence—see below figure taken from the Kevin's Corner SEIS. The CSIRO reports are split up into regions with a report presented for each region. The Central Eromanga report relates to an area immediately west of the GC Project mine site and is the most relevant report for the GC Project. There is no discussion of the Rewan Formation in this report hence there is no direct new information that can be taken from this report in relation to the Rewan Formation that can be used in the work for the GC Project.

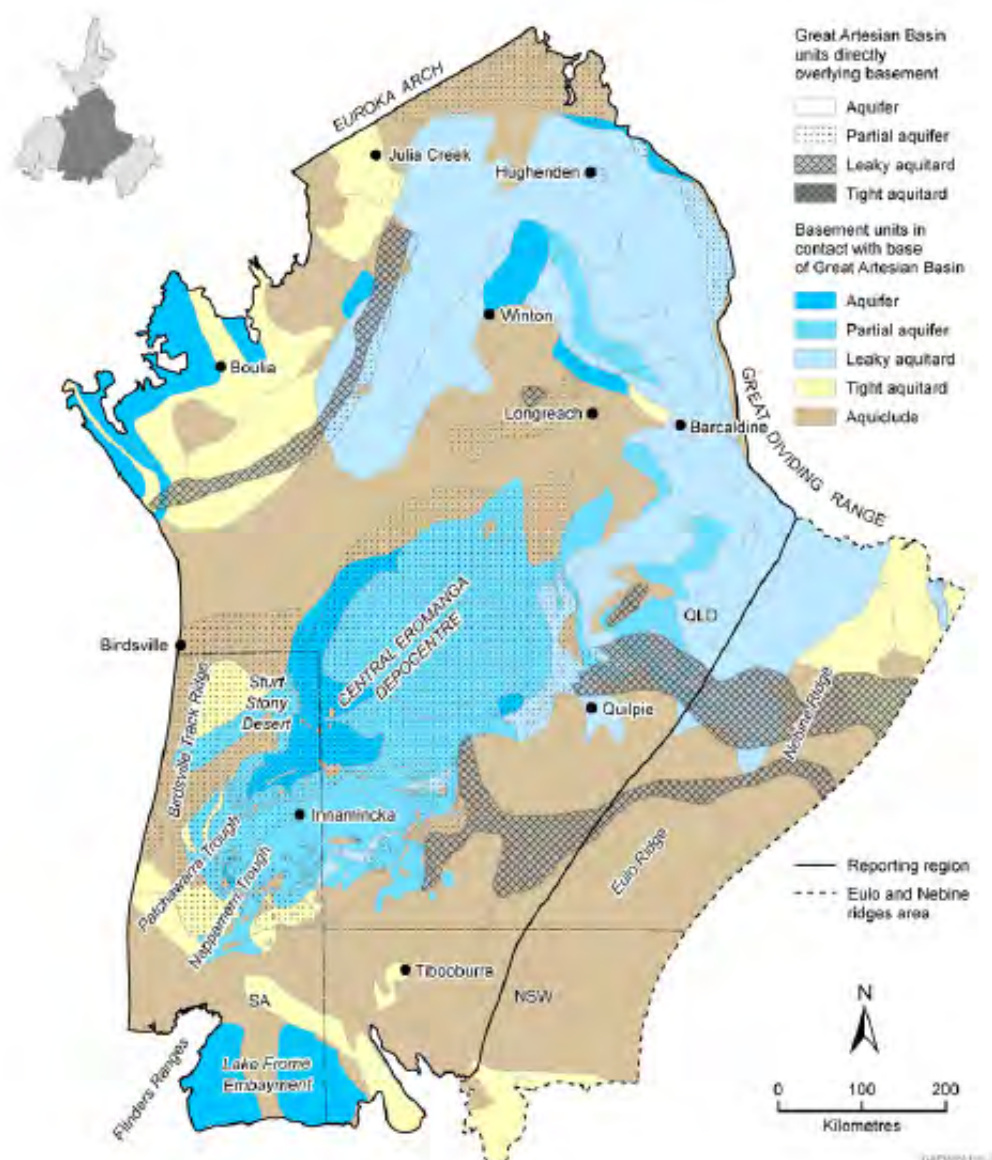


Figure 5.4 Areas of potential hydraulic interconnection between the base of the Great Artesian Basin and underlying basement units in the Central Eromanga region

The GC Project mine site is located immediately east of the Great Dividing Range at a location directly 120 km east of Barcaldine.

The figure shows that the geological unit that is the base of the Great Artesian Basin, (for the purposes of the CSIRO assessment) in the area west of the mining lease and west of the Great Dividing Range is an aquifer which DNRM take to be the Hutton Sandstone. This aquifer overlies the Moolayember basement unit which, by the light blue colouring of the above figure, indicates a leaky aquitard.

Figure 5.4 relates to geologic units much higher up in the stratigraphy than the Rewan Formation and the Clematis Sandstone. The issue of whether water from the Clematis Sandstone can rise up through the Moolayember Formation to the Hutton Sandstone or whether water from the Hutton Sandstone can drain through the Moolayember Formation to the Clematis Sandstone is of minor concern in the opinion of DNRM when examining mining impacts of the GC Project.

The potential impacts of the GC Project mine on the closest GAB aquifer (Clematis Sandstone) has been the focus of Waratah's investigations—in particular the potential for water to move from the Clematis Sandstone through the Dunda Beds/ Rewan Formation interval to the dewatered Permian aged coal measures. The CSIRO GABWRA work appears to provide no additional information in this regard.

Groundwater model conceptualisation

In regard to the groundwater model conceptualisation, the proponent has developed a model that provides a layer for the Clematis Sandstone (layer 2), a layer for the Dunda Beds/ Rewan Formation interval (layer 3) and layers 4 through 10 for underlying Permian aged coal measures. Additionally, bores have been drilled to monitor groundwater levels/ heads in these formations. DNRM consider that the model is suitable to investigate the interaction of mining activity in the Permian coal measures and the overlying GAB aquifers.

The IESC has also raised concerns that the Triassic sediments (Moolayember Formation, Clematis Sandstone, Dunda Beds and Rewan Formation) remain part of the GAB and should be included in the groundwater analysis and should also be included in the proponent's groundwater conceptualisation.

DNRM has confirmed that the Triassic sediments are part of the GAB (notwithstanding the CSIRO work directed at the hydrogeological units of the Jurassic and Cretaceous periods, and that the proponent has not suggested in the SESIS groundwater report any different position. The Clematis Sandstone, Dunda Beds and Rewan Formation have been included in the proponent's groundwater model as has the Moolayember Formation which has been combined with the Clematis for modelling purposes but DNRM consider that this does not detract from the model's ability to determine impacts of dewatering. Figure 3.6 of the SEIS depicts the model conceptualisation which DNRM believes is adequate for the purpose of predicting impacts.

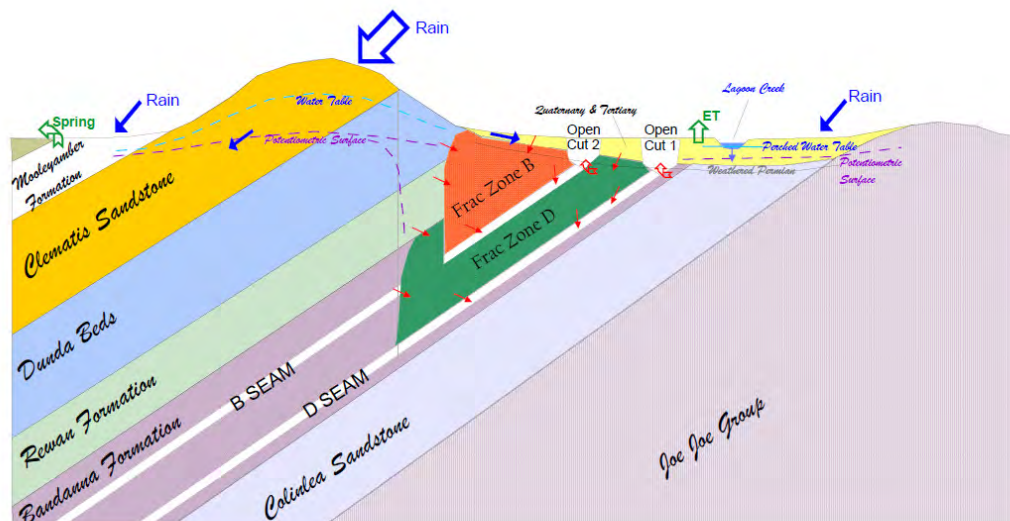


Figure 3.6 Conceptual Hydrogeological Model

Waratah, through its groundwater consultant, Dr Noel Merrick, who overviewed development of the GC project groundwater model and also was the reviewer of the CSIRO GABWRA work, has advised me that the GC project model includes all the relevant GAB formations. Further, Dr Merrick confirmed that the GABWRA work excluded the Triassic units other than noting low potential for hydraulic connection between the Jurassic and Triassic formations via a leaky aquitard. He has advised that the GC project model conceptualisation accounts for this.

IESC comment 2 - Adequacy of Numerical Model

- a. a major assumption within the predictive modelling was that the Rewan Formation represents a major barrier to interconnectivity with GAB aquifers, where core permeability values ranged from 4.5×10^{-5} to 4.3×10^{-3} m/day (horizontal) and from 7.5×10^{-6} to 7.6×10^{-4} m/day (vertical). However without including a sensitivity analysis of the role of faulting in the model, specifically within the Rewan Formation, the model is not considered fit-for-purpose, and may not accurately predict drawdown and interconnectivity. The conclusion that the model predicts the worst case scenario may not be correct. A thorough sensitivity analysis is required to improve confidence in predictions of drawdown and interconnectivity and potential impacts to water resources and receptors;
- b. the model parameterisation should be revised to incorporate the latest information on the GAB stratigraphic units' properties (as per CSIRO, 2013). This revision should incorporate drawdown resulting from development of the raw water borefield; and
- c. although it is noted that the monitoring network will be increased by five new monitoring bores, the IESC notes that the models were calibrated using a limited number of continuously monitored bores which may not have reached equilibrium. Overall, it is considered that the proponent has provided insufficient monitoring data to determine the accuracy of the model in terms of temporal variability and local heterogeneities.

Sensitivity analysis of faulting within Rewan Formation

In regard to local faulting and the need for sensitivity analysis, DNRM has advised me that because of little evidence of localised faulting it is not clear on what basis potential faulting should be incorporated into the model. The predictive modelling simulations conducted by Waratah showed negligible drawdown in the Clematis Sandstone aquifer for the worst case steady state modelling. Sensitivity testing by Waratah, in which the vertical permeability of the Rewan Formation/Dunda Beds aquitard, was increased by two orders of magnitude to 10^{-2} m/day (much higher than is likely), showed negligible impact on the GAB. In the underlying Permian coal measures, there is expected to be significant drawdown in the west of the model area caused by project mining, but it is probable that this depressurisation will not propagate to the GAB aquifer.

Review of model parameterisation and raw water borefield

The issue of parameterisation and incorporation of the results of the CSIRO GABWRA work into the Jurassic and Cretaceous aged sediments have been addressed under *IESC comment 1* above. DNRM have recommended that no additional work is required for the environmental assessment on account of the CSIRO work.

In regard to drawdown from a possible raw water supply from a nearby borefield, Waratah advises that such a supply is unlikely to be now needed following a review of the mine site water management system post the SEIS to account for the additional groundwater take from dewatering identified in the SEIS groundwater report.

Limited continuous monitoring data

I acknowledge the concerns raised by the IESC on the question of limited continuous monitoring data and consequent uncertainty in calibrating the groundwater model. Similar concerns were raised by DNRM which accepted the modelling work as sufficient to identify potential impacts and risks from the proposed mining operation, but recommended that the work be peer reviewed within two years in the light of more monitoring data availability. I have accepted this advice and recommended that this course of action be set as a condition in the water licence. I have made further recommendations in regard to expanding the monitoring bore network and for Waratah to prepare a groundwater monitoring plan for the approval of DNRM. These recommendations are included in my report at Appendix 3, Part B. The proponent has also given commitments to this end in Appendix 5.

I have further recommended to DNRM that additional monitoring of the Clematis Sandstone/Dunda Beds/Rewan Formation interface be undertaken before and during mining operations and that a management plan be prepared incorporating appropriate trigger levels for management action should there be unexplained changes to water levels and/or water quality in the Clematis Sandstone aquifer. This recommendation is also included at Appendix 3, Part B. The proponent's monitoring network presently includes two bores in the Clematis Sandstone/Rewan Formation interface and it has committed to include a further two bores in this location as well as expand the monitoring network by a further five bores.

IESC comment 3 - Drawdown

Drawdown associated with this project proposal is predicted to elongate in a general north–south direction. Drawdown of 1 m is predicted to extend approximately 20 km north, 10 km south and 15 km east of the mining area. Maximum drawdowns of 5 m and 1 m are expected to occur at the adjacent Alpha and South Galilee Coal Projects respectively. Drawdown of less than 1 m is predicted beneath the Clematis Sandstone, near the recharge springs, at Alpha township and at Jericho township. Whilst drawdown associated with this project is described in general terms, it is unclear to which model layer and timeframe this drawdown prediction applies. A table outlining the total predicted drawdown (including cumulative impacts) would help to determine potential impacts.

Clarity of drawdown figures

Figures 5.8 to 5.10 in the SEIS groundwater assessment report identify drawdowns in layer 2 (Clematis sandstone on the western side of model area), the B coal seam and the D coal seam at end of mining. Also, Attachment F to the report, shows drawdown maps in multiple layers at 10 year intervals.

IESC comment 4 - Cumulative impact assessment

a. the numerical modelling predicts cumulative drawdown to be approximately 30 km wide and greater than 100 km in length. Given the uncertainties related to the numerical modelling, however, the Committee has reservations about the accuracy of these predictions. The Committee also notes that the long term impacts of multiple developments along approximately 300 km of the GAB intake beds may have a significant impact on recharge to the GAB.

b. the IESC notes that issues associated with cumulative impacts have been included as part of the Queensland Coordinator-General's conditions for the approval of the nearby Alpha Project. It is considered that these conditions may also be relevant to this proposal. Specifically, Condition 2: Regional groundwater monitoring and reporting program, which is also of relevance to this proposal.

Need for regional cumulative groundwater assessment

A quantitative cumulative impact assessment was conducted for the SEIS in regard to the GC Project acting in concert with the South Galilee Coal Project immediately to the south and the Alpha Project to the north. The work showed that there would not be any significant impacts to the GAB or associated springs.

I acknowledge the IESC's concerns over the uncertainty of long term cumulative water impacts on the GAB and support the development of a regional groundwater and surface water monitoring and assessment program that will contribute to a regional water balance model.

DNRM has advised me that it has completed a preliminary regional scale water balance assessment of the eastern Galilee Basin to assist it in managing future applications for mine dewatering in the Galilee Basin. Both DNRM and DEHP are

supportive of further developing a regional water balance model to address both groundwater and surface water impacts in conjunction with a regional groundwater and surface water monitoring program.

I have made recommendations in my report to DNRM for the regional water balance work to be further developed and to both DNRM and DEHP for a regional groundwater and surface water quality monitoring program to be implemented to assist in future management of the State's water resources. These recommendations appear at Appendix 3, Part B, Schedule 1.

The program, to be developed and maintained by DNRM in consultation with DEHP and Galilee Basin mine proponents, will:

- establish an agreement 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
- based on data provided and impact assessment reports prepared by project proponents, adopt a risk-based assessment of regional cumulative impacts, including potential impacts on existing water users, aquatic habitat loss and impacts on ecological systems. Regional cumulative 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 flooding
 - subsidence
- report on the success of water management measures and to inform the ongoing adaptive management of water resources in the region
- periodically publish data and reports with reference to monitoring and assessment program outcomes.

I have also imposed conditions in my report to ensure that Waratah contributes to the regional groundwater and surface water monitoring and assessment program when it is established, including pro-rata funding. This condition appears at Appendix 3, Part A, Schedule 4.

The above recommendations and conditions are consistent with my approach for the Alpha and Kevin's Corner Projects.

IESC comment 5 - Recharge Springs

Recharge springs have also been mapped 30–40 km west of the GAB boundary in the Barcaldine Spring Complex. The proponent concludes (based on satellite imagery) that these springs appear to be ephemeral and are not considered to be part of the EPBC listed community of native species dependent on natural discharge of groundwater from the GAB.

However, the Committee suggests that:

- a. the proponent confirms the EPBC status of these springs and the protected species which may utilise this habitat. A thorough spring survey should be undertaken to determine its potential EPBC and/or state listed status; and
- b. the groundwater model should be revised to assess potential impacts to the springs from potential faulting and interconnectivity.

Spring status and potential impacts

In line with my previous responses on the adequacy of the groundwater modelling, it is considered that the existing predictive model has been developed by utilising all existing data and that it provides reasonable predictions of drawdowns and impacts. I am advised by DNRM, that there is little evidence of localised faulting and it is not clear on what basis potential faulting would be incorporated into the model. I hence consider that the existing model is adequate to investigate potential impacts to the recharge springs and that these impacts are expected to be negligible. Further, I see no reasonable requirement to require Waratah to determine the status of the springs and the potentially protected species that may depend on the springs.

IESC comment 6 – Surface – Groundwater Connectivity

The proposal is predicted to impact surface – groundwater connectivity, where losses are predicted in Beta Creek (approximately 1 ML/day), Tallarenha Creek (approximately 0.2 ML/day) and Saltbush Creek (approximately 0.1 ML/day). The Committee notes that the watercourses located on the project site are considered to be losing streams and that the depth to the water table at the project site is between 20 – 60 m. The regional water table has a minimum depth of 10 m along drainages, increasing to the order of 100 m beneath the Clematis Sandstone ridge. As a result the Committee considers that:

- a. subsidence may have the potential to alter surface – groundwater connectivity as cracking of between 2.5 – 20 mm adjacent to the chain pillars is predicted where the distance between the surface and the underground mining operations is less than 180 m; and
- b. it is highly probable that this fracturing will have surface expression over a significant portion of the proposed mine resulting in increased surface water loss to the groundwater as well as increased recharge. The proponent states that the surface stratigraphy is self-healing to tensile surface fracturing and will readily infill; however this has not been validated.

Localised loss of surface water flow through surface cracking

Waratah has acknowledged that tensile cracking is likely to express at the surface from subsidence where the cover to underground mine workings is 180 m or less in depth. In the SEIS at Appendix 41, Waratah has outlined mitigation measures to deal with this which may include ripping and compacting compression cracks and creating run off outlets from internally ponded areas formed through panel subsidence. The works would extend to post subsidence blanketing and compacting of some water courses,

preventing inflow of run-off into underground mining areas and maintaining environmental surface flows. Materials investigated for use in compacted blankets included silty alluvium and impervious clay. I note from the EIS (vol. 2, section 3.4.2 that the mine site area is largely covered by Tertiary and Quaternary sediments, up to 90 m thick, which have high fractions of sands, silts and clays that would act to help seal surface tension cracking.

DNRM has advised me also, that further hydraulic modelling of subsided watercourses undertaken post SEIS, showed that there are low energy zones within subsided areas. These low energy zones will most likely result in sediment deposition, which may act as a natural process to mitigate surface cracks formed within watercourses.

The proponent has committed to developing a subsidence management plan in accordance with the DNRM draft guideline "Watercourse Subsidence – Central Queensland Mining Industry". The subsidence management plan will detail mitigation strategies and include a monitoring program, so that subsidence impacts and mitigation actions can be adjusted as necessary. I have stated a condition in Appendix 1, Schedule F, requiring the preparation of a subsidence management plan prior to the commencement of activities that result in subsidence.

I have commented further on the effects of subsidence at *IESC comment 9 – subsidence*.

IESC comment 7– Void Management

The proponent proposes to undertake final void modelling to establish the required parameters for long term stability and water quality in the final voids at some stage during the life of the mine, with a Final Void Plan to be developed prior to completion of mining in the first pit. The Committee notes that:

- a. it has consistently advised that backfilling of voids is best environmental practice;
- b. in its advice on the adjacent Kevin's Corner proposal (EPBC Act Reference no. 2009/5033), the Committee noted that toxicants (associated with overburden placed into out-of-pit emplacement areas for the first two years of mining) are predicted to remain on site, migrating towards the Kevin's Corner and Alpha final voids. However, a detailed assessment is needed to determine potential impacts from the overburden that will be placed in-pit behind the active mining strip; and
- c. a detailed assessment should also be undertaken to reduce the uncertainty about the potential for lateral flow of water from the final voids and the resulting impacts on groundwater quality. Modelling of final void water quality is also required.

In-filling of final voids

In-filling of final voids is not a statutory requirement in Queensland where environmental management of the final void is effected by way of a final void management plan. On the question of best environmental practice, I am advised that there are different views on this, as final void in-filling causes groundwater to rise to a height substantially greater than open water could reach (due to the porosity of the infill), with consequently a higher risk of off-site migration of groundwater.

Tailings impact on final voids

The risk of tailings leachate contaminating groundwater is acknowledged by Waratah which has committed to dispose of tailings by a dry paste process rather than by way of a conventional wet tailings storage facility. Tailings are to be dewatered using Phoenix filter press conveyors and the tailings paste and rejects trucked to impervious clay lined containment cells in the spoil piles and compacted by bull dozers to reduce permeability and risk of oxidation. Once full, containment cells are to be capped with a clay blanket. The approach is designed to contain harmful materials and greatly reduce the risk of seepage from the containment cells into the groundwater.

I have stated a condition for the environmental authority in Appendix 1, Schedule F, requiring Waratah to prepare a mining waste management plan to prevent environmental harm arising from any contaminants being released.

Final void modelling

The Waratah SEIS reported that the two final open-cut voids could act as mild groundwater sinks with the final equilibrium groundwater levels expected to be about 10 m lower than current groundwater levels near the western edge of the Open-Cut 2 mine final voids. As the salinity in the void waters could increase with time due to evaporative concentration, there is a risk of the void lakes becoming flow-through systems and allowing conveyance of water down-gradient by means of lateral groundwater flow. Waratah has committed to undertake final void modelling and to prepare a final void management plan as part of its rehabilitation plan and to monitor surrounding groundwater. I have stated a condition for the preparation of a rehabilitation management plan in Appendix 1, Schedule F.

IESC comment 8 – Subsidence

Cracking of between 2.5 – 20 mm adjacent to the chain pillars is predicted by the proponent, where the distance between the surface and the underground mining operations is less than 180 m. This modelling was developed using values based on empirical studies in the Southern Coalfield of New South Wales. However, this region is not necessarily representative of the geological conditions in other regions. A larger database of empirical data is required to provide a greater degree of certainty in results from different coal environments.

Subsidence and associated mitigation measures are also likely to alter water quantity and quality and vegetation communities towards species which can tolerate more frequent inundation. Specifically:

- a. subsidence has the potential to alter surface-groundwater connectivity. As noted above (see 6. above), it is highly probable that fracturing will have surface expression over a significant portion of the proposed mine resulting in increased surface water loss to the groundwater;
- b. it is stated by the proponent that surface stratigraphy is self-healing to tensile surface fracturing and will readily infill; however no supporting evidence has been provided to support this claim; and

c. there is insufficient evidence to substantiate the effectiveness of proposed mitigation measures at the site.

Subsidence methodology

Waratah acknowledges that the subsidence work undertaken for the EIS is based on empirical 2D profiles derived in New South Wales. Waratah considers that the subsidence predictions are considered conservative as the estimates are based on the worst combination of above seam strata effects and maximum seam thickness rather than averages.

I am advised by Waratah that the subsidence prediction methodology used has previously been used in the Bowen Coal Basin in Queensland, specifically for the Central Colliery, Southern Colliery and Oaky North Colliery.

Given the uncertainty generally that must be attached to subsidence estimates for what are green-field proposals in the Galilee Basin, I am satisfied that the Waratah methodology is adequate to provide reasonable estimates of subsidence and to identify potential impacts.

Subsidence impacts

Waratah has acknowledged potential impacts from subsidence including changes to surface-groundwater connectivity, alteration of water quantity and quality and potential changes of vegetation communities towards species which can tolerate more frequent inundation. Waratah has outlined a range of mitigation measures to minimise these potential impacts including ripping and compacting of tensile cracks and creating run-off outlets from internally ponded areas formed through panel subsidence. These works could extend to post subsidence blanketing and compacting of some water courses, preventing inflow of run-off into underground mining areas and maintaining environmental surface flows.

Concerns raised by DNRM at the SEIS stage over the potential for significant changes to stream flow regimes in receiving waterways from ponding as a result of interception of overland flows and stream flows by subsided landforms, were adequately addressed in follow-up studies by Waratah.

As indicated in my response to *IESC comment 6*, Waratah has committed to developing a subsidence management plan to address impacts in accordance with the DNRM draft guideline "Watercourse Subsidence – Central Queensland Mining Industry". I am satisfied that with Waratah's commitments and my condition requiring the preparation of a subsidence management plan that subsidence impacts can be adequately managed.

IESC comment 9 – Groundwater Dependent Ecosystems (GDEs)

Changes to hydrology may also impact vegetation community composition at the site. For example, inundation regimes may adversely impact Matters of National Environment Significance (MNES) (e.g. Black Throated Finch) in the area. Due to the cumulative reduction in catchment area from this proposal and others (i.e. South Galilee, Alpha and Kevin's Corner proposals), the proponent's assessment concludes that areas inundated will be reduced. The Committee considers that further information is needed to determine potential impacts from the proposal, such as site species tolerances to inundation regimes and implications for MNES.

Waratah has undertaken stygofauna sampling in accordance with Western Australian protocols and found that the mine site alluvial aquifers displayed poor stygofaunal abundance and diversity. The recorded species occur locally and regionally outside the GC project mining lease and it was concluded that stygofauna will not be significantly affected.

In regard to GDEs other than stygofauna, the proponent's ecological survey work found no evidence of GDEs on the mine site. Whilst there are vegetation communities containing *Melaleuca tamarascina* which could be considered to be an indicator of GDEs, these areas are mapped as RE 10.5.1g which is not classified as a wetland. The species is known to be shallow rooted and given the depth to the regional water table of 20 m to 60 m across the site, it is unlikely the species is groundwater dependent on the project site. This has been accepted by DNRM.

The nearest identified springs to the mine site exist 30-40 km away in the GAB recharge zone and the groundwater modelling found that there was little risk of impact to the springs or any associated GDEs.

I am satisfied that the project poses little threat to GDEs.

I have addressed the issue of the BTF in my report at section 5.1 and believe it not relevant to the question of potential impacts to GDEs.

IESC comment 10 – Bimblebox Nature Reserve

The project is predicted to have an adverse impact on the approximately 8,000 ha Bimblebox nature reserve. The Bimblebox nature reserve is listed under Schedule 5 of the Nature Conservation (Protected Areas) Regulations 1994 and is part of the National Reserve System. As part of this proposal, 4,017 ha (approximately 50%) would be cleared for the open cut mines and associated infrastructure and 3,422 ha has the potential to be impacted by subsidence. The Committee's advice examines water related matters and therefore notes that *Melaleuca tamariscina* populations located within the Lambton Meadows and Glen Innes properties (making up the Bimblebox nature refuge) are considered GDEs and are likely to be adversely impacted by clearing, drawdown and subsidence. There was insufficient information to determine the significance of the population in relation to species viability.

Refer to my response to *IESC comment 9 – Groundwater Dependent Ecosystems* for my response on GDEs.

I have addressed the issue of the Bimblebox Nature Refuge in my report at section 5.2 and believe it not relevant to the committee's consideration of impacts on water resources.

IESC comment 11 – Tailing disposal and potential acid forming material

As geochemical testing of coal reject material has not been undertaken and approximately 7 % of overburden samples have the potential to be acid forming and generate significant acidity over time, the Committee considers that:

- a. completion of static geochemical testing and a detailed tailings management plan is needed;
- b. water management and monitoring strategies should be designed to take into account the results of kinetic testing of coal seam and overburden materials, noting that vegetation in the area is likely to be opportunistically reliant on perched aquifers; and
- c. modelling undertaken for adjacent proposals predicts seepage from their tailings management strategy. The tailings management strategy should consider issues associated with the final void. The Committee suggests that the proponent's environmental management plan should be updated to reflect existing geochemical knowledge and should be revised to incorporate the results of the static and kinetic tests referred to above.

Geochemical testing and tailings management

Testing of overburden and interburden for the EIS and SEIS found the vast bulk of samples to be non acid forming (NAF) with significant excess buffering capacity. The main potentially acid forming (PAF) horizon was identified as within 5 m of the C Seam roof and low capacity PAF material at the DU Seam roof and floor.

The SEIS also outlined management and monitoring strategies for acid rock drainage and for saline and sodic/dispersion materials. Waratah has committed to conduct additional geochemical investigations for an additional 4 to 6 bore holes with continuous stratigraphic testing including the overlying weathered zone and for leach column kinetic testing. The results of this testing will better inform the management plans.

To ensure mining waste materials are properly managed I have stated a condition in Appendix 1, Schedule F for the environmental authority requiring the preparation of a Mining Waste Management Plan which will address all mining waste, including tailings. I am satisfied that the proponent's commitments and my condition on waste management will ensure any mining waste impacts are managed adequately.

Final void

I have commented on final void management at *IESC comment 7 – Void management*.

IESC comment 12 – Regional Groundwater Model

The proponent's environmental management plan also proposes Environmental Authority Conditions for the development. In relation to groundwater, the Committee notes that issues associated with cumulative drawdown impacts have been included as part of the Queensland Coordinator-General's conditions for the other nearby projects, which are also of relevance to this proposal (see also 4. above). The Committee has suggested the development of a regional groundwater model for the Galilee Basin. The Committee considers that the proposal incorporates:

- a. additional groundwater quality monitoring locations which reflect the mine site infrastructure and materials handling arrangements;
- b. trigger levels for groundwater drawdown and pressure; and
- c. periodic monitoring of the full suite of potential metal contaminants.

The location of monitoring sites should not be finalised until issues relating to the GAB boundary/Rewan Formation noted above are resolved and the risks to groundwater quality associated with the exposure, handling and storage of Potential Acid Forming material are known.

I support the development of a baseline regional water balance model and regional groundwater and surface water monitoring and assessment program and have set conditions and made recommendations to both DNRM and DEHP for this to happen – refer to my response to *IESC comment 4 – Cumulative impact assessment*. The work will provide a regional focus to water management and will cover a range of matters including, appropriate locations for both groundwater and surface water monitoring, trigger levels for groundwater drawdown and pressure, management responses and monitoring for relevant metal contaminants.

IESC comment 13 – Site water balance

The site water balance predicts that, with the inclusion of an external 2500 ML/a of raw water source, the mine would be able to meet mine water demand in most years even under dry (10th per centile) conditions. It is also predicted that sediment dams not containing mine affected water would discharge approximately 20 to 25 per cent of operating years. The Committee does not consider that the water balance for the proposed project is adequate and suggests that:

- a. the model should be revised to consider: updated geochemistry results from the Waste Rock, Rejects and Tailings Report; groundwater modelling data; assurance that all mine affected water is contained on site up to the 1:1000 year average recurrence interval event; accounting for, and modelling seasonal water demand and discharge scenarios, and; clearly identifying the volume of raw water required to maintain planned operations, as well as discharge volumes;
- b. flow gauging should be undertaken on Lagoon Creek and these results should be used to verify or update the rainfall-runoff relationship in the model; and
- c. following revision of the site water balance, a sensitivity analysis should be conducted.

a. The site water balance has been revised subsequent to the SEIS to be consistent with groundwater modelling undertaken for the SEIS which indicates excess groundwater inflows beyond the mine's water demands. The project now has an overall excess of water and has moved from a 'nil discharge' strategy to a 'controlled discharge' strategy and the 2500 ML/a of external raw water is now no longer required.

Geochemical characterisation of mine waste material from the Galilee Coal Project and the adjacent Alpha Coal Project indicate spoil material will be generally benign with runoff suitable for storage in sediment dams that will overflow after large rain events. This is consistent with current practice allowing mines to discharge from sediment control structures provided they are managed in accordance with a sediment and erosion control plan and the water is not mine affected. Should future geochemical characterisation of spoil material suggest excessive saline or acidic runoff, the water management system will require revision to ensure this water is contained on site. Contaminated runoff from the ROM, product stockpiles, and industrial areas will be captured in regulated dams built and managed to comply with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DEHP, 2012). Preventing discharge from these dams will be achieved through the appropriate sizing and by maximising re-use of mine affected water.

DEHP has advised the water balance model needs revision to include: a description of environmental values of receiving waters; determination of water quality objectives; a description of wastewater quality and volumes; and a management strategy for the release of wastewaters to the receiving environment consistent with the Model Water Conditions for Coal Mines in the Fitzroy Basin. As an interim measure, water quality objectives from the adjacent Alpha Coal project can be used while reliable baseline data is captured to develop site specific objectives. I accept that this information can be provided by Waratah prior to their application for an Environmental Authority and consider the impacts and mitigation strategies have been adequately outlined in the SEIS and the work undertaken subsequent to the SEIS.

b. As no stream gauging data is available for Lagoon Creek, Waratah utilised data from an adjacent catchment for model calibration purposes. This was reported as standard practice in hydrology as it was not possible to develop a site specific model. The Native Companion Creek catchment which was used to model flow duration has approximately 40 years of available data. It would likely take several years of collecting stream gauging data to provide any certainty around rainfall runoff relationships in the Lagoon Creek catchment and as the system is highly ephemeral there is also limited opportunity to obtain the data. I consider the approach taken by Waratah is appropriate and note concerns from the IESC regarding the need to develop a site specific rainfall-runoff relationship for use in future version of the site water balance model.

c. With regards to the IESC's recommendation that a sensitivity analysis be conducted following revision of the site water balance it is not clear which parameters are referred to. The site water balance has adopted a conservative rainfall runoff relationship incorporating high runoff rates from the mine area. A conservative approach was also undertaken for water demands and groundwater inflows to account for the level of detail available prior to the detailed design phase of the project.

IESC comment 14 – Adequacy of sampling

Baseline water quality monitoring undertaken is inadequate to determine statistically significant temporal variation. Specifically:

- a. a number of sites were only sampled once, and three of the sites sampled in 2012 were sampled twice;
- b. given the ephemeral nature of receiving waterways, reporting of results according to flow conditions is needed to provide a comprehensive understanding of baseline conditions against which to set water quality objectives and discharge criteria; and
- c. the aquatic ecology monitoring strategy did not specifically target all relevant species (e.g. MNES, such as migratory birds which may utilise waterways within the region) although it is acknowledged that a wider survey was conducted as part of the fauna sampling program.

DEHP has also advised the water quality monitoring program collected insufficient data to derive local water quality objectives (WQO) consistent with the requirements of the Queensland Water Quality guidelines (2009). As an interim measure, Waratah has proposed adopting the WQOs from the adjacent Alpha Coal project until sufficient data has been collected to develop site specific objectives. The water quality data collected to date is broadly consistent with that collected as part of Alpha Coal project EIS. DEHP has indicated general agreement with this proposal if Waratah also provide the relevant meta-data used to derive the WQOs for the Alpha Coal project. This information will need to be provided prior to consideration of the application for an Environmental Authority.

Regarding the targeted survey of migratory birds utilising the regions waterways, Waratah undertook a number of terrestrial vertebrate fauna surveys, including bird surveys. These studies indicated that there are not considered to be any significant impacts on migratory bird species listed under the EPBC Act.

IESC comment 15 – Discharges

Discharges have the potential to impact hydrology and water quality within the region, as the proponent predicts that releases would occur in approximately 25 per cent of years. However, there is uncertainty about the method of disposal of excess water from site. The proponent should:

- a. provide a clear plan for discharge of water from the site, which states the method of discharge and discharge scenarios for each method; and
- b. if irrigation is proposed, the location, volume and quality of irrigation water should be identified and an assessment of the impacts on water quality, particularly salinity, should be conducted prior to approval of the project.

Changes to hydrology and water quality may result in changes to ecosystems which can tolerate periodic inundation and/or degraded water quality. The proponent acknowledges the need to develop local water quality objectives for the proposed project. In the interim, the proponent proposes to adopt the interim water quality objectives used by the adjacent Alpha Coal mine. The Committee considers that the use of these interim water quality objectives is

adequate for the most part, while site-specific objectives are being developed. In particular pH, total suspended solids (TSS) and Ammonia parameters should be revised as these do not appear to be based on 20th and 80th per centile data. The site-specific objectives should be developed with consideration of the comments made above in relation to the adequacy of the baseline sampling program.

Nominated trigger levels for investigation are not appropriate for receiving waterways. The Committee suggests that:

c. median levels for water quality parameters for stressors should not exceed the relevant 80th per centile values of reference data for the appropriate discharge. The median release water quality for toxicants should be sufficient to protect 95% of species, consistent with ANZECC 2000 guidelines;

d. if water quality parameters are unable to be met water should be retained on site, such as in proposed dams or temporarily stored in open-cut pits, and treated to levels that allow discharge with no or minimal environmental risks; and

e. baseline monitoring should also be undertaken daily after an event, for a minimum of the first seven days, to help determine water quality parameters of first flush events.

a. The water balance model was updated to accommodate the higher groundwater inflows after the submission of the SEIS. It now incorporates a 'controlled discharge' strategy and identifies two methods of discharging water from the site. The first involves the uncontrolled discharge of water from sediment control dams during prolonged wet periods. This water is expected to be of dischargeable quality as it will not come into contact with the mine area and the only contaminant will be sediment. The controlled discharge strategy is also proposed to be used to reduce mine water inventory with discharges occurring during flow events at specified rates compliant with downstream water quality objectives. Further detail on the controlled discharge strategy will be developed during the detailed design phase and prior to consideration of the application for an Environmental Authority.

b. Evaporation of excess water through irrigation systems is proposed for the project with volumes and expected water quality identified in the revised water balance report. These parameters can be conditioned within the Environmental Authority and derived from relevant guidelines until sufficient baseline monitoring data is available to determine site-specific values.

c. DEHP has advised that this statement is not strictly correct with respect to toxicants such as metals, metalloids and organic toxicants. The trigger values described in ANZECC 2000 and ARM CANZ 2000 guidelines are based on thresholds of toxicity where an exceedance of a toxic trigger is considered an environmental risk. The guidelines recommend using the 95th per centile as a trigger for further action which is a more conservative approach than comparing the median against the trigger value.

d. End-of-pipe exceedances of trigger values do not necessarily preclude a release of waste water as it dependent on conditions set out in the Environmental Authority. Discharges of mine affected water are permitted when water quality is below limits. Non-compliant releases exceeding limits conditioned within the licence would trigger an investigation to evaluate the environmental risk. The ANZECC and ARM CANZ (2000) guidelines describe the steps involved in such investigations.

e. Baseline monitoring to characterise the receiving waters will allow any impacts following a release of wastewater to be properly evaluated. Baseline, event and post event monitoring data is necessary for an effective evaluation of impacts. The extent and frequency of downstream monitoring following any release of wastewater can be conditioned in the Environmental Authority.

IESC comment 16 – Creek diversions

Three creeks are proposed to be diverted as part of the proposal. However, the proponent states that the level of detail is not considered sufficient for diversion licensing purposes, but provides a functional design to demonstrate proof of concept. Further detailed design will be undertaken through the diversion licensing process and mine design. Specifically, three options for diversions were presented and the environmental management plan appears to have finalised the preferred option. Clarification of the proposed diversion is required.

The proposal is predicted to impact water quality by changes to stream power, velocity and shear stress. These parameters exceed the former Queensland Department of Environment and Resource Management's (DERM's) hydraulic design thresholds, however, the diversion and flooding report predicts that exceedances are associated with the straight section of the diversion within the infrastructure corridor. The Committee considers that:

- a. where stream power is increasing, this has the potential to increase erosion in some areas (especially in areas affected by subsidence), which may reduce channel capacity and increase floodplain inundation and frequency; and
- b. this could also affect community composition towards species which can tolerate periodic inundation.

In addition, monitoring is proposed to be undertaken throughout the life of the project. Specifically baseline monitoring will be conducted for a minimum of 12 months prior to construction to assess the performance requirements for operations and relinquishment monitoring. Baseline monitoring will include the establishment of control reaches for the diversions to determine if changes in the diversion are a result of isolated processes or an event affecting the whole stream system. The proposed monitoring approach should ensure that there is sufficient monitoring data to determine spatial and temporal variability, for example a minimum of 24 months (minimum monthly data) of monitoring as discussed above.

a. The three creeks proposed to be diverted are Lagoon Creek, Malcolm Creek and Saltbush Creek. Works within Saltbush Creek are proposed to increase its capacity and cater for flows from the Lagoon Creek diversion rather diverting the existing watercourse. DNRM have advised that these works will also require authorisation as part of the Lagoon Creek diversion. DNRM raised concerns regarding the long term stability of the original diversion proposed for Malcolm Creek which included a linear section approximately 7 km long and resulted in a reduction in stream length of approximately 4 km. Subsequent to the SEIS, Waratah has undertaken a revision of the stream diversion design to increase stream length to only 800m less than the existing watercourse. This was achieved by providing for meandering of a low flow channel within the high flow channel for the full length of the diversion, increased sinuosity of the high flow channel within the infrastructure corridor and through increased sinuosity of the diversion within the Lagoon Creek floodplain. Concerns

related to the proximity of the diversion to the open cut pits have been addressed by moving the high flow channel to the centre of the infrastructure corridor in order to minimise the risk of lateral movement of the diversion toward the final voids.

The refinement of the Malcolm Creek diversion has been assessed against hydraulic performance criteria in the *Watercourse Diversions – Central Queensland Mining Industry* version 5, 2011 guideline and found compliant. Waratah will be required to prepare a monitoring and evaluation program during the development of the detailed design of the diversion, which will be submitted to the administering authority prior to the watercourse diversion being authorised. DNRM have determined that the level of information provided within the SEIS and subsequent discussion papers as a result of post-SEIS meetings is sufficient to assess the feasibility of surface water proposals and that any associated impacts are able to be mitigated. I note that DNRM will require further information on the detailed design of the impacts of the proposed diversion as part of the watercourse diversion authorisation process.

b. Waratah has proposed to revegetate creek diversions with species tolerant of periodic inundation. I note concerns from both the IESC and EHP regarding the importance of good baseline data in enabling proper evaluation of impacts to the physical condition and biological health of affected streams. Guidance on the quantity of data and survey timing required for baseline studies is provided in the ANZECC (2000) and ARMCANZ (2000) guidelines as well as the *Queensland Water Quality Guidelines* (DERM 2009). Waratah has made commitments to this effect and have which are outlined in the *Mine Site Creek Diversion and Flooding Report* (Engeny, 2012c).

IESC comment 17 – Flooding

Subsidence and creek diversions have the potential to impact hydrological regimes. Changes to hydrology may impact vegetation community composition at the site, specifically from altered inundation regimes. However, an assessment of potential impacts to vegetation communities does not appear to be provided. The flooding assessment from the adjacent Kevin's Corner proposal concludes that areas inundated for more than 96 hours will be reduced due to the Alpha and Kevin's Corner proposals, as the catchment area is reduced. The Committee considers that further information is required to determine potential impacts from the proposal, such as site species tolerances to inundation regimes.

An assessment of the impacts of subsidence on stream flows was prepared for the SEIS and identified potential significant changes to flow regimes in receiving waterways resulting from interception of overland flow by subsided landforms. Without mitigation works, over 90 per cent of stream flows in the Spring Creek catchment will be captured by subsidence ponding and flows to beyond the mine boundary will occur in only very wet years. Stream flows in Lagoon Creek will be reduced by 33 per cent in 50 per cent of years by runoff being captured in open cut pits, dams and subsided areas. Jordan Creek will also be affected with an 8 per cent decrease in stream flows predicted for the majority of years.

To mitigate these impacts, Waratah has identified excavation through the pillar zones to maintain connectivity of water and sediment movement along the waterways as a key measure. The effect of these excavated drains was incorporated in the water balance model to identify performance and final ponding areas within each catchment. The results of the modelling, showing cumulative subsidence ponding volumes with and without mitigation earthworks, are shown in the following table. The water balance model indicated mitigation measures would see stream flows in the Spring Creek catchment would be reduced by only 40 per cent at the northern mine boundary, Lagoon Creek stream flow would be reduced by only 21 per cent in 50 per cent of years and flows into Jordan Creek would be reduced by only 3 per cent in 50 per cent of years. The residual ponding is significantly reduced and contained in minor depressions that would require significant disturbance to vegetation to construct large open drains.

Cumulative subsidence ponding volumes

Catchment	Cumulative Subsidence Ponding Volume (ML)—No Mitigation	Cumulative Subsidence Ponding Volume (ML)—With Mitigation	% Reduction in Subsidence Ponding Due to Mitigation Earthworks
Spring Creek	2089	23	-99
Lagoon Creek	3146	343	-89
Tributary of Jordan Creek	229	12	-95

IESC comment 18 – Bioregional Assessments

The Committee notes that the Galilee Basin has been identified as a priority sub-region for completion of the Lake Eyre Bioregional Assessment. Given that the proposal is located within this region, the Committee considers that data and relevant information from this project should be made accessible for these Bioregional Assessments.

I acknowledge the Australian Government's proposed bioregional assessment for the Lake Eyre Basin, of which the Galilee Basin has been identified as a priority sub-region. My assessment report for the GC project and all EIS and SEIS material on the public record is available for use in the Bioregional assessments. Other relevant material may be held by the proponent and State agencies and enquiries should be made directly to those bodies.

Acronyms and abbreviations

Acronym	Definition
µS/cm	Measure of conductivity in microsiemens per centimetre
ABSDA	Abbot Point State Development Area
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
AS/NZS	Australian standard/New Zealand standard
BTF	black-throated finch
CDMP	coal dust management plan
CEMP	Construction Environment Management Plan
CHMP	Cultural Heritage Management Plan
dB(A)	decibels measured at the 'A' frequency weighting network
DERM	Department of Environment and Resource Management (formerly the Environmental Protection Agency) (Qld)
DIDO	drive-in drive-out (workforce)
DTMR	Department of Transport and Main Roads (Qld)
EA	environmental authority
EC	electrical conductivity
EIS	environmental impact statement
EMP	environmental management plan
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPC	exploration permit for coal
EPP	Environmental Protection Policy (water, air, waste, noise)
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
ESA	environmentally sensitive area
FIFO	fly-in fly-out
GAB	Great Artesian Basin
GC project	Galilee Coal project
GHG	greenhouse gas
GQAL	good quality agricultural land
IAS	initial advice statement
IDAS	Integrated Development Assessment System
IESC	Independent Expert Scientific Committee
L _{A1}	those noise levels that are exceeded for one per cent of each one-hour sample period
L _{Aeq}	the average A-weighted sound pressure level of a continuous steady

Acronym	Definition
	sound that has the same mean square sound pressure as a sound level that varies with time
L_{Amax}	the maximum average A-weighted sound pressure measured over a specified period of time
MCF	multi-cargo facility
mg/L	milligrams per litre of liquid/gaseous liquid
ML	megalitres
MNES	matters of national environmental significance
MRA	<i>Mineral Resources Act 1989</i> (Qld)
Mtpa	million tonnes per annum
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NQBP	North Queensland Bulk Ports Corporation
pH	Measure of acidity/alkalinity
PM_{10}	particulate matter with equivalent aerodynamic diameter less than 10 μ m
$PM_{2.5}$	particulate matter with equivalent aerodynamic diameter less than 2.5 μ m
PPV	peak particle velocity, which is a measure of ground vibration magnitude and is the maximum instantaneous particle velocity at a point during a given time interval in mm s^{-1}
QGEOP	Queensland Government Environmental Offsets Policy
RE	regional ecosystem
RIA	road impact assessment
RMP	road-use management plan
ROM	run-of-mine
SCL	strategic cropping land
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i> (Qld)
SEIS	supplementary environmental impact statement
SES	State Emergency Service
SEWPaC	Australian Government Department of Sustainability, Environment, Water, Population and Communities
SIA	social impact assessment
SPA	<i>Sustainable Planning Act 2009</i> (Qld)
TOR	terms of reference
TSP	total suspended particles
Waratah	The proponent, Waratah Coal Pty Ltd
WMP	Waste Management Plan

Glossary

Term	Definition
assessment manager	For an application for a development approval, means the assessment manager under the <i>Sustainable Planning Act 2009</i> (Qld).
bilateral agreement	The agreement between the Australian and Queensland governments that accredits the State of Queensland's EIS process. It allows the Commonwealth Environment Minister to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
construction areas	The construction worksites, construction car parks, and any areas licensed for construction or on which construction works are carried out.
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 <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
controlling provision	The matters of national environmental significance, under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth), that the proposed action may have a significant impact on.
Coordinator-General	The corporation sole constituted under section 8 of the <i>State Development and Public Works Organisation Act 1971</i> .
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 <i>Environmental Protection Act 1994</i> (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 significant 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 <i>Environment Protection and Biodiversity Conservation Act 1999</i>. The nine matters are: a) world heritage properties b) national heritage places c) wetlands of international importance (listed under the Ramsar Convention) d) listed threatened species and ecological communities e) migratory species protected under international agreements f) Commonwealth marine areas g) the Great Barrier Reef Marine Park h) nuclear actions (including uranium mines) i) protection of water resources from coal seam gas and large coal mining development.
nominated entity (for an imposed condition for undertaking a project)	An entity nominated for the condition, under section 54B(3) of the SDPWO Act.
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: j) is made to the Coordinator-General in writing k) is received on or before the last day of the submission period l) is signed by each person who made the submission m) states the name and address of each person who made the submission n) 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 significant 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.
coordinated project	A project declared as a 'coordinated project' under section 26 of the SDPWO Act.

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 approval under the <i>Sustainable Planning Act 2009</i> • proposed mining lease under the <i>Mineral Resources Act 1989</i> • draft environmental authority (mining lease) under Chapter 5 of the <i>Environmental Protection Act 1994</i> (EP Act) • proposed petroleum lease, pipeline licence or petroleum facility licence under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> • non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EP Act.
works	Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that: o) 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 p) 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 q) 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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