Submitter No.	419	Issue Reference:	4050 / 19012
Submitter Type	Government	TOR Category	EMP (Land)
Name	DERM	Relevant EIS Section	Chapter 7 – Environmental Management Plan: Mine, Section 7.8.18 Element 18 – Land Rehabilitation

DETAILS OF THE ISSUE

The rehabilitation performance criteria within the EM plan does not include clearly measurable rehabilitation indicators or act as completion criteria or rehabilitation success criteria. Rehabilitation indicators need to be clearly measurable.

Section 203(3)(b) of the *Environmental Protection Act 1994* requires that the indicators will be measured to establish when rehabilitation is, by reference to specific completion criteria, complete. This should be included within the EM plan.

The rehabilitation indicators should be associated with the post mining land use identified in Table 25 – Post Mining Land Use.

The EIS should provide the rehabilitation success criteria and indicators for the Galilee Coal Project. These should be developed in line with the departmental guideline 'Rehabilitation requirements for mining projects' and the legislative requirements of Section 203 of the *Environmental Protection Act 1994*.

PROPONENT RESPONSE

Specific measures for decommissioning and rehabilitation will be identified in the Environmental Authority, the EM Plan and the Rehabilitation and Decommissioning Plan.

A Rehabilitation and Decommissioning section is contained within the revised *Draft Mine EM Plan* and has been prepared to provide information on the proposed rehabilitation and decommissioning activities (see *Appendices – Volume 2* of this SEIS).

The following resources will be used to assist in the development of the final Rehabilitation and Decommissioning Plan:

- DERM Guideline: Rehabilitation requirement for mining projects[1] and
- Leading practice sustainable development program for the mining industry: mine rehabilitation[2].

These documents have been prepared based on a number of case studies and experience across Australia and in Queensland specifically and represent best practice mine rehabilitation activities. Specifically, with respect to rehabilitation of Queensland open pit operations, the leading practice document uses Gregory Crinum coal mine as a case study of best practice rehabilitation. Other relevant case studies used in this document include Kidston Gold Mine in Queensland and Mt Owen open pit coal mine in New South Wales.

The use of these documents, as well as others such as the leading practice sustainable development program for the mining industry: mine closure and completion[3] and the experience of site personnel, their colleagues, DERM and specialist consultants commissioned with providing rehabilitation and closure related advice will ensure that the proposed rehabilitation will result in a stable and non-polluting site.

1 DERM (2011) *Guideline: Rehabilitation requirements for mining projects*. Department of Environment and Resource Management. 2011.

2 *Leading Practice Sustainable Development Program for the Mining Industry: Mine Rehabilitation.* Department of Industry, Tourism and Resources, October 2006.

3 *Leading Practice Sustainable Development Program for the Mining Industry: Mine Closure and Completion.* Department of Industry, Tourism and Resources, October 2006

Additional to the Rehabilitation and Decommissioning Plan for the site, which will be based on best practice, experience and case studies, the completion criteria developed for each aspect of the mine closure and rehabilitation will be used to define successful rehabilitation. The rehabilitation indicators and completion criteria will be determined based on critical assessment of the likely final land uses for each closure domain across the site and targeted to achievement of the outcomes identified throughout Section 1.3 (of the existing Galilee Coal Project EIS). These criteria will be measured against and where the monitoring results are not trending towards successful closure, contingency measures will be identified and adaptive management applied.

Waratah Coal commits to returning the land to a post-mine land use that will be stable, self-sustaining and require minimal maintenance. It also identifies the requirement for stakeholder consultation and agreement to appropriately define a biodiversity offset strategy and rehabilitation and closure plan. The site will not be relinquished back to the government until such time as agreed completion criteria are met and prove that the land is available for the agreed final land use.

Mine site landform impacts rehabilitation and management are also discussed in Sections 5.1 and 5.2 of the *Soils and Land Suitability SEIS Report* (contained in *Appendices – Volume 2* of this SEIS), with commitments for further work discussed in Section 6.

Submitter No.	**419**	Issue Reference:	**4051 / 19013**
Submitter Type	Government	TOR Category	**EMP (Land)**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.18 Element 18 – Land Rehabilitation

DETAILS OF THE ISSUE

The EM plan does not sufficiently detail the management of top soils for the project to ensure rehabilitation requirements are met.

The EIS and EM plan should detail the management of top soil to ensure rehabilitation requirements are met.

PROPONENT RESPONSE

Section 3.4 (of the existing Galilee Coal Project EIS) identifies the characteristics of the existing soil profiles across the proposed disturbance area. Section 3.6 (of the existing Galilee Coal Project EIS) then identifies the management of topsoil to minimise impact to the soil, ensure that it is stockpiled appropriately and available for reuse on rehabilitation. This EIS section also identifies that an Erosion and Sediment Control Plan will be prepared prior to the commencement of construction which will further detail topsoil management measures.

The rehabilitation requirements associated with topsoil will depend on the final land use, the landform the topsoil is to be used on and the characteristics of the topsoil to be used in each area. The process to be implemented during rehabilitation and closure planning to ensure that these aspects are appropriately considered and that completion criteria will be met for each closure domain will be identified in the Rehabilitation and Decommissioning Plan. The Rehabilitation and Decommissioning Plan will be completed prior to the commencement of construction, following completion of the required land and soil assessment works (to inform the plan).

Topsoil management measures have been discussed in Sections 4 of the *Soils and Land Suitability SEIS Report*, with commitments for further work discussed in Section 6 (see *Appendices – Volume 2* of this SEIS). Also refer to sections 9.6.1.1, 9.6.2.2 and 9.6.2.3 of the *Rehabilitation and Decommissioning* section of the *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4052 / 19011
Submitter Type	Government	TOR Category	EMP (Land)
Name	DERM	Relevant EIS Section	Chapter 7 – Environmental Management Plan: Mine, Section 7.8.18 Element 18 – Land Rehabilitation

DETAILS OF THE ISSUE

The EM plan does not sufficiently detail the management of overburden for the project to ensure rehabilitation requirements are met.

The EIS and EM plan should detail the management of overburden to ensure rehabilitation requirements are met.

The EIS and EM plan should describe and show the location, design and methods for constructing dumps of waste rock and subsoil. The location of the dumps should be shown on map relative to topography and other natural features of the area. The following should be detailed and discussed:

- Management of the 4122 dumps to ensure material is not deposited or otherwise moves off the lease boundary
- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually
- Measure to ensure stability of the waste rock dumps, particularly the management of drainage
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance, and
- The proposed distance from the waste rock dumps to the mining lease boundary.

PROPONENT RESPONSE

Figures 17 to 20 (Volume 3, Chapter 1 of the existing Galilee Coal Project EIS) identify the sequence of overburden, reject and tailings landform development while Section 1.2.2.4 (Volume 3, Chapter 1 of the existing Galilee Coal Project EIS) clearly identifies the scheduled waste, categorised into the different overburden categories of prime waste, tertiary waste, Permian prime waste, dragline Permian prime waste and truck/shovel overburden and inter-burden waste to be produced on an annual basis. Figure 15 Initial Mine Concept Plan for the Open-cut Activities (Volume 3, Chapter 1 of the existing Galilee Coal Project EIS) and the corresponding text identifies the process of stripping, stockpiling and rehabilitating overburden.

Section 3.6 identifies the management and mitigation measure outcomes that will be applied for the management of overburden, including the requirement for concave slope profiles and average slope gradients of four degrees to be maintained on final landforms, irregular dump shapes to be created and minimisation of slope gradients adjacent to waterways to minimise erosion potential and associated sedimentation.

Additional detail relating to how these outcomes will be achieved will be provided in the Erosion and Sediment Control Plan to be prepared prior to the commencement of construction. The Rehabilitation and Decommissioning Plan will also provide more information as to the final landforms, including overburden dumps, to be remaining on site come closure.

The figure contained at Issue Reference 6017 (in Part C – 18 – Environmental Management Plan) shows the mine infrastructure area, including overburden encapsulation areas.

Additional work is being undertaken on the geochemical characteristics of overburden / interburden material, which will be used to further define ongoing management and mine closure/rehabilitation goals. Refer to Issue Reference 4098 (in Part C – 02 – Land) for more information. Refer also to Figure 3 and section 7 of the *Rehabilitation and Decommissioning* section of the *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4053 / 19009 / 10000
Submitter Type	Government	TOR Category	EMP (Land)
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.18 Element 18 – Land Rehabilitation

DETAILS OF THE ISSUE

- The EM plan provides general post mining land uses – including the statement of 'beef cattle grazing at low stock rates or native bushland' as a post mine land use for the tailings dams.
- The departmental guideline 'Rehabilitation requirements for mining projects' states that indicating that the land will achieve a specific land capability class (DME 1995) is not a sufficient description of the proposed land use. The EM plan does not provide an indication of what 'grazing at low stock rates' is or justification that a tailings dam can be rehabilitated to this use.
- The EM plan lists 'native bushland' as the post mining land use for several mining activities.
- The EM plan does not list any post mining land uses associated with areas of subsidence.
- The EIS should provide an EM plan developed considering the departmental guideline 'Rehabilitation requirements for mining projects'.
- The EM plan should cover all domains on the mine site.
- The proposed post mining land use must be clearly specified using terms such as grazing (up to a particular intensity), cropping (including type of crop), forestry plantation (for a specified type of wood), habitat (for a nominated species), or return to native vegetation.

PROPONENT RESPONSE

A preliminary discussion of post-mining land use and suitability is provided in Section 3.3 of the *Soils and Land Suitability SEIS Report* (contained in *Appendices – Volume 2* of this SEIS), with commitments for further work discussed in Section 6. Appendix B of the *Soils and Land Suitability SEIS Report* (provides a list of preliminary intended land uses and their suitability ranking. This information is mapped in Figures 2.7 and 2.8, Plans 1-8 of the *Soils and Land Suitability SEIS Report*.

Also refer to Issue Reference 4040 (in Part C – 19 – Decommissioning and Rehabilitation) which discusses mine closure and rehabilitation.

A subsidence management program will be developed as a result of a cooperative and outcomes-orientated approach by the landowner, the Queensland Government and China First, to control the surface effects of mine subsidence. Active subsidence areas will be temporarily quarantined allowing remedial works to complete a completed rehabilitation landform. This may take a few months. Land usage pre-subsidence will be returned to similar land usage post subsidence at completion of remedial works. See *Longwall Mining Subsidence Report* in *Appendices – Volume 2* of this SEIS.

Section 9 of the *Draft Mine EM Plan* also provides details (and is contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4054 / 19010 / 10001
Submitter Type	Government	TOR Category	EMP (Land)
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.18 Element 18 – Land Rehabilitation

DETAILS OF THE ISSUE

The EM plan does not sufficiently detail the management and rehabilitation of subsidence.

PROPONENT RESPONSE

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.

A *Rehabilitation and Decommissioning* section has been prepared as part of the *Draft Mine EM Plan* to provide information on the proposed rehabilitation and decommissioning activities (see *Appendices – Volume 2* of this SEIS).

Waratah Coal aims to minimise the potential impact of subsidence that may result from longwall mining undertaken by its operation and proactively manage subsidence impacts that may result from its underground operations. This includes the prevention and management of impacts as well as monitoring to provide early identification of impacts.

More specifically, the objectives of the Subsidence Management Strategy are to:

- Outline the monitoring and measurement protocols
- Establish responsibilities for the management of subsidence related issues during and immediately following under-mining
- Satisfy the applicable regulatory requirements for subsidence management across the Waratah Coal 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. This includes presenting contingency plans / procedures, and
- Detail the review and reporting protocols.

Subsidence Management Process, Structure and Organisation

Waratah Coal's overall approach to subsidence management includes the following:

- Design to reduce surface impacts – Mine design is such to reduce the potential impact to public safety, the natural environment and built features
- Identify and manage environmental risks – specialist studies (including subsidence) are prepared to identify potential impacts to public safety, the natural environment and built features
- Measure baseline information – Background data is established for the surface above the proposed mining area, this will include the establishment of subsidence monitoring points
- Monitor the effects of mining – Continued monitoring of data for the surface above the proposed mining area, including subsidence monitoring points
- Regularly assess and interpret monitoring – Monitoring data is analysed to identify any variances

- Re-assess impacts – Where variances are identified that are greater than predictions, additional assessment of impacts is undertaken
- Identify and implement remedial actions – If additional assessment indicates greater impacts, then remedial action may be required. Stakeholder consultation will be undertaken in determining and implementing remedial actions, as required
- Implement remedial actions – In the event that any surface impacts due to subsidence are noted, appropriate remediation and/or mitigation measures will be implemented in consultation with appropriate stakeholders, and
- Provide regular progress reports – Progress reports will be provided to relevant parties in accordance with reporting conditions outlined in approval documentation.

Surface changes due to longwall mining are dependent on the amount of surface subsidence, determined by factors such as overlying strata geology, the longwall block width, the seam height extracted, and the depth of cover. Subsidence impacts on the surface include the formation of tension cracks and in flat areas internal drain way subsidence troughs can form.

Types of remedial works for these impacts may include ripping, re-compacting and seeding of all tension cracks and reshaping any internally draining areas to be externally draining by the construction of contour drains and topsoiling and seeding any disturbed areas. These works will extend to blanketing and compacting of some water courses post-subsidence, preventing inflow of runoff into underground mining areas and maintain environmental surface flows. Materials which have been investigated for use in compacted blankets include silty alluvium and clay. Some re-alignment of water courses and minor earthworks will be necessary, but the work done so far allows these activities to be well planned prior to subsidence in any particular area. The natural fall of the mining area drains freely to the north and is sufficient to minimise the events of subsidence troughs. In the flatter areas, reshaping of any internally draining areas to be externally draining will be done by the construction of contour drains and appropriate rehabilitation measures.

On the cessation of subsidence in any one area and completion of remedial works, it is planned that the land will be returned to grazing and original land activities. Yield trials will verify the maintenance of original land productions.

The project area surface stratigraphy contains cohesive Quaternary alluvial and Tertiary sands, clays and laterites which are self-healing to tensile surface fracturing. Surface tension cracks which form in cohesionless creek bed alluvium and Recent Colluvium are self-healing and readily infill. Open tension cracks in surface clays need to be ripped and compacted.

Surface subsidence caused by longwall mining will be managed through Subsidence and Rehabilitation Management Plans.

For further information regarding subsidence and impacts refer to *Longwall Mining Subsidence Report* and section 9 of the *Rehabilitation and Decommissioning* section of the *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4055 / 19018
Submitter Type	Government	TOR Category	EMP (Waste)
Name	DERM	Relevant EIS Section	Volume 2, Chapter 1, Project Description and Chapter 12, Waste

DETAILS OF THE ISSUE

Section 3.8 – Waste of the TOR requires that the EIS and EM plan provide detailed information on excavated waste and tailings. Much of the necessary information is deferred by the EIS to a future time when the waste management strategy will be developed. The relevant environmental impacts of the project can not be assessed without that information.

The EIS and EM plan do not adequately address the requirements of Section 3.8 – Waste of the TOR, in detailed information on excavated waste and tailings. The EIS and EM plan should address those matters, including details on excavated waste and tailings management as required in section 3.4, Waste of the TOR.

PROPONENT RESPONSE

Work on the feasibility design for the tailing facilities and management for the Galilee Coal Project is planned to commence once other works such as land suitability, waste characterisation and other environmental considerations are progressed to provide realistic inputs. It is anticipated that the feasibility design will be carried out for co-disposal cells (structures) within the open-cut spoil areas. The feasibility design report will include the design approach and assumption, tailings characterisation, dam design including hydraulic and long term stability assessment, construction sequences and material volumes and tailings management. A hazard assessment is to be also conducted as per *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (February 2012)[4]. The assessment will be carried out based upon the structure dimensions, the usage of the land and the contaminant concentrations.

Additional work is being undertaken on the geochemical characteristics of overburden / interburden material, which will be used to further define ongoing management and mine closure/rehabilitation goals. Refer to Issue Reference 4098 (in Part C – 02 – Land) for more information.

Section 7 of the *Draft Mine EM Plan* deals with waste (see *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4056 / 19019
Submitter Type	Government	TOR Category	EMP (Waste)
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.13 Element 13 – Waste

DETAILS OF THE ISSUE

The EIS and EM plan should detail the finalised management of tailings at the Galilee Coal Project, including (if required):

- Undertaking the chemical analysis of tailings material
- The availability or leachability of metals from the tailings, and
- The management of tailings.

4 DERM 2012. *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (EM 635, Version 1). Queensland Government.

The EIS and this section of the EM plan should include information regarding the design and operation of any tailings storage facility. It should also be noted how the tailings storage facility is managed in conjunction with the sites water management systems. The following information is required to be submitted for tailings storage facilities:

- Adequate design plans or conceptual design plans for the tailings storage facility, together with certification (for final design plans) or endorsement (for conceptual design plans) of a suitably qualified and experienced person that the submitted final or conceptual design plan of the regulated tailings storage facility will provide the performance stated in that submitted design plan, and
- A risk assessment based on the design plans or conceptual design plans.
- The design of the regulated dam should take into account:
  - That the dam is designed and located to have the smallest practical catchment
  - That the dam is designed to accept waste inputs for the operation year and inputs from the critical wet season
  - The spillway is designed and maintained to withstand the peak flow from the critical design storm (the critical design storm has a duration that produces the peak discharge for the catchment), and
  - That the gradients of earth embankment batters should be stable.
- An operational plan setting out procedures and criteria to be used for operating the tailings storage facility.

For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore inspire sufficient confidence to allow the administering authority to endorse the conceptual design plan for the regulated dam within the EM plan.

PROPONENT RESPONSE

Refer to the Tailings Storage Facility Update; the Waste Rock, Rejects and Tailings Report and section 7 of the *Draft Mine EM Plan*. All are contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	**419**	Issue Reference:	**4057 / 19020**
Submitter Type	Government	TOR Category	**EMP (Waste)**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.13 Element 13 – Waste

DETAILS OF THE ISSUE

The EM plan does not contain sufficient detail regarding general waste management at the proposed Galilee Coal Project.

The EM plan should include waste management control strategies that consider:

- The types of wastes
- The segregation of wastes
- The storage of wastes
- The transport of wastes

- Monitoring and reporting matters concerning the waste
- Emergency response planning
- Disposal, reuse and recycling options
- Processes to be implemented to allow for continuous improvement of the waste management systems, and
- Staff awareness and training.

PROPONENT RESPONSE

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:

- Characterise wastes generated from the project and volume trends
- Segregate waste streams so that the waste management hierarchy can be addressed when selecting waste management strategies; in descending order of preference, the hierarchy is:
  - Avoid waste generation by optimising methods used within the construction, operation and decommissioning phases
  - Reuse waste products by identifying secondary sources that can utilise the waste material
  - Recycle waste by identifying facilities that can recycle the particular waste streams
  - Recover energy from the waste, and
  - Dispose of the waste at an appropriate facility.
- Undertake cleaner production where possible, by identifying and implementing ways of improving production processes so that the processes do one or more of the following:
  - Use less energy, water or another input
  - Generate less waste, and
  - Generate waste that is less environmentally harmful.
- Outline procedures for the identification of regulated wastes and an approved tracking system for regulated waste movement
- Describe waste removal and transport from site by licensed contractor(s) with disposal only to licensed reprocessors, recyclers, or waste disposal facilities
- Assess the marketability of waste for recycling and reuse
- Describe procedures for dealing with accidents, spills and other incidents that may impact on the waste management
- Outline waste commitments with auditable targets to reduce, reuse and recycle
- Describe measures to ensure wastes do not attract or propagate pests, disease vectors or vermin, and do not impact on public health
- Outline monitoring of waste streams and auditing against the NMWMP with measures for continuous improvement, and
- Describe training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation, collection and disposal.

Refer to Issue Reference 4098 (in Part C – 02 – Land) for a discussion of mineral (i.e. rock) waste management.

Section 7 of the revised *Draft Mine EM Plan* provides details (see *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	4059 / 19036
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – Environmental Management Plan: Mine, Table 9. Water quality element plan

DETAILS OF THE ISSUE

The EM plan is required to detail the finalised plans for the tailings waste.

The EM plan should include measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values to match these environmental protection objectives. The environmental protection objectives should be directly linked to the environmental protection commitments.

PROPONENT RESPONSE

A new *Draft EM Plan* (see *Appendices – Volume 2* of this SEIS) has been developed for the mine, based on information available to date. It has been prepared in accordance with the content requirements of an EM Plan for a mining lease as set out in Section 203 of the *Environmental Protection Act 1994 (Qld)*, and with reference to the publications *Guideline: Mining – Level 1 mining and exploration projects*[5] and *Mining – Environmental management plan (mining lease) (EM Plan (ML))*[6] (EPA 2003). It includes construction, operation, closure/rehabilitation, and post-closure stages.

The structure of the EM Plan follows this stepped process for each component (i.e. air, land, noise, etc.):

- Identification of environmental values through detailed site investigations (provided by specialist studies)
- Identification of potential impacts on environmental values identified
- Development of environmental protection objectives to minimise potential impacts
- Development of environmental commitments including control measures to achieve the stated objectives, and
- Development of proposed environmental authority conditions to be included in the environmental authority.

Submitter No.	779	Issue Reference:	4067
Submitter Type	Individuals	TOR Category	EMP
Name	Names withheld	Relevant EIS Section	

DETAILS OF THE ISSUE

Lack of Rehabilitation Management Plan. Proponent should be required to provide detailed rehabilitation plan.

PROPONENT RESPONSE

Refer to Issue Reference 4040 in Part C – 19 – Decommissioning and Rehabilitation. Section 9.6.3 of the *Decommissioning and Rehabilitation* section of the *Draft Mine EM Plan* provides details (see *Appendices – Volume 2* of this SEIS).

5 *Guideline: Mining, Level 1 mining and exploration projects*. Department of Environment and Heritage Protection, EM581, Version , 4 July 2012.

6 *Information sheet: Mining – Environmental management plan (mining lease) (EM Plan (ML))*. Department of Environment and Resource Management, 17 September 2010.

Submitter No.	419	Issue Reference:	19005
Submitter Type	Government	TOR Category	EMP
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine – General

DETAILS OF THE ISSUE

The EM plan is incorrectly titled Emergency Management Plan: Mine at the top of each page. This should read Environmental Management Plan.

PROPONENT RESPONSE

The *Draft Mine EM Plan* page headers contain the correct title. See *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	19006 / 19109
Submitter Type	Government	TOR Category	EMP
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.4.1, Key Project Activities (p113)

DETAILS OF THE ISSUE

The EM plan is required to identify all mining activities, including all Environmentally Relevant Activities under schedule 2 and 6 of the *Environmental Protection Regulation 2008* and all notifiable activities under schedule 2 of the *Environmental Protection Act 1994*.

The EM plan should identify and describe all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the proposed project and define the critical environmental values. For each of the environmental values to be protected, commitments must be proposed and identify the environmental protection objective(s), standard(s), measurable indicator(s) and control strategy(ies) to demonstrate how the objective(s) will be achieved.

The EM plan should be amended to include all relevant mining activities proposed to be undertaken as part of the Galilee Coal Project.

The EM plan should also identify each of the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Galilee Coal Project.

PROPONENT RESPONSE

A new *Draft EM Plan* has been developed for the mine, based on information available to date. It has been prepared in accordance with the content requirements of an EM Plan for a mining lease as set out in Section 203 of the *Environmental Protection Act 1994*, and with reference to the Department of Environment and Resource Management (DERM) publications *Guideline: Mining – Level 1 mining and exploration projects*[7] and *Mining – Environmental management plan (mining lease)* (EM Plan (ML))[8] . It includes construction, operation, closure/rehabilitation, and post-closure stages.

7 *Guideline: Mining, Level 1 mining and exploration projects.* Department of Environment and Heritage Protection, EM581, Version , 4 July 2012.

8 *Information sheet: Mining – Environmental management plan (mining lease) (EM Plan (ML)).* Department of Environment and Resource Management, 17 September 2010.

The structure of the EM Plan follows the below stepped process for each component (i.e. air, land, noise, etc.):

- Identification of environmental values through detailed site investigations (provided by specialist studies)
- Identification of potential impacts on environmental values identified
- Development of environmental protection objectives to minimise potential impacts
- Development of environmental commitments including control measures to achieve the stated objectives, and
- Development of proposed environmental authority conditions to be included in the environmental authority.

These will be informed by the specialist studies currently underway, and as such, the EM Plan will be finalised following the completion of these specialist studies (and prior to issue of the Environmental Authority).

The revised EM Plan includes a review of all relevant mining activities including a list of anticipated 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 as part of proposed mining activities. Presently, it is expected that the following ERAs will be relevant to the mine and rail:

- ERA 8 – Chemical Storage
- ERA 14 – Electricity Generation
- ERA 15 – Fuel Burning
- ERA 16 – Extractive and Screening Activities
- ERA 17 – Abrasive Blasting
- ERA 18 – Boiler Making or Engineering
- ERA 21 – Motor Vehicle Workshop Operation
- ERA 31 – Mineral Processing
- ERA 33 – Crushing, Milling, Grinding or Screening
- ERA 38 – Surface Coating
- ERA 43 – Concrete Batching
- ERA 50 – Bulk Material Handling
- ERA 56 – Regulated Waste Storage
- ERA 57 – Regulated Waste Transport
- ERA 60 – Waste Disposal
- ERA 63 – Sewage Treatment, and
- ERA 64 – Water Treatment.

See also the list of *Potential Environmentally Relevant Activities* and their triggers contained in *Appendices – Volume 2* of this SEIS.

The new *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	19007
Submitter Type	Government	TOR Category	EMP
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.7.11, Maintenance of the EMP (p120)

DETAILS OF THE ISSUE

The EM Plan states that the 'EMP will be updated periodically from the commencement of construction'.

The EM Plan is a legislative requirement under the *Environmental Protection Act 1994* (EP Act). Changes to an approved EM Plan require an amendment to the approval through an application under the EP Act.

PROPONENT RESPONSE

Refer to Issue Reference 19006, and note that once approved, no changes will be made to the EM Plan without an approval through an application under the EP Act. The new *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	19017 / 19021
Submitter Type	Government	TOR Category	EMP (Waste)
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 19. Waste stream management

DETAILS OF THE ISSUE

Table 19 of the EM plan identifies that a sewage treatment plant is to be constructed as part of the mining activities. The EM plan does not provide any information regarding the undertaking of ERA 63 Sewage Treatment as part of the Galilee Coal Project.

Section 55 of the *Environmental Protection Regulation 2008* 'Release of water or waste to land' states:

1. This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the relevant land).
2. The administering authority must consider the following matters—
   a. the topography, including the flooding potential of the relevant land
   b. the climatic conditions affecting the relevant land
   c. the available land on which the water or waste can be released, and
   d. the storage of the water or waste in wet weather.

   Example—

   Storage of water or waste in ponds or tanks
   a. the way in which the water or waste will be released to the relevant land
   b. the need to protect soil and plants on the relevant land from damage
   c. the potential for infiltration of the water or waste to groundwater
   d. the potential for generation of aerosols or odours from the water or waste
   e. the impact of any transfer or run-off of contaminants from the relevant land to surface waters, and
   f. the on-going availability of the land for the release of the water or waste.

The EM plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of waste or water to land and as such does not provide sufficient information for the administering authority to make a decision under Section 203 of the *Environmental Protection Act 1994* with regards to the undertaking of ERA 63 as part of the Galilee Coal Project.

The EIS and EM plan should detail the operation of the sewage treatment facility considering departmental and recycled water guidelines. The EM plan should include details of the process of disposal of sewage sludge and waste waters.

PROPONENT RESPONSE

Accommodation camp and mine site sewerage systems will be require on-site treatment and disposal. On-site systems will be sized, designed and managed to current standards for the mining industry. Generally, this would entail a secondary treatment system capable of producing recycled water suitable for irrigation via surface and/or sub-surface absorption beds and/or irrigation fields (at least Class C recycled wastewater quality).

A detailed site assessment, including of site opportunities and constraints, soils and local climatic conditions will be coupled with MEDLI mass balance modeling to determine sustainable irrigation loads for the site, coupled with suitably sized wet weather storage and buffer storage systems to manage variable loads and low irrigation demands during wet periods. During heavy rainfall events, recycled water will be temporarily stored in the wet weather storage, to be discharged at a later date. Signage will be established to restrict access to these areas, and sludge from the plant will be transported off-site by a regulated waste contractor to a regulated waste facility.

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. The SBMP will contain:

- A summary of the system
- Organisational structure and responsibility
- Objectives and Targets
- A Risk assessment and identification of environmental issues and potential impacts
- An Environmental Management Plan
- An environmental monitoring and inspection plan (including frequent and repeated monitoring of pathogen indicators, such as E.coli)
- Procedures for communication, tracking, incident management, reporting, and training, and
- Procedures for periodic review and continual improvement.

Treated wastewater may be used in progressive revegetation works during the life of the project, and following the cessation of mining. Treated sludge will not be used on mine rehabilitation works.

Design and operational details of the STP including disposal methods have been incorporated in the revised EM Plan.

The revised *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS – refer to section 7.

Submitter No.	419	Issue Reference:	19022 / 8013
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Volume 1, Project Overview – Chapter 7, Environmental Management Plan: Mine Section 7.8.4 Element 4, Groundwater (p133)

DETAILS OF THE ISSUE

Volume 5, Appendix 14 - Groundwater, Table 7-1 states mitigation measures in relation to the effects on groundwater. In particular it discusses impacts on farm bores. The same information is also provided in Volume 2 - Mine - Chapter 8, Groundwater Resources as part of section 8.5, Management Measures. However there is no reference or discussion in Volume 1 - Project Overview – Chapter 7, Environmental Management Plan: Mine of these mitigation or management measures.

The groundwater impacts on farm bores should be included in this section as a detailed policy objective.

PROPONENT RESPONSE

The analysis of impacts has been conducted as a matter of course with the new groundwater model that has been developed. This includes drawdown impacts on farm bores and changes in creek-aquifer water exchanges that might impact on creek flow or groundwater dependent ecosystems. Management measures have been devised based on the outcome of this modelling and assessment.

The revised *Draft Mine EM Plan* incorporates management measures for mitigation of impacts on groundwater resources – refer to section 10. The *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	19023
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Volume 1, Project Overview – Chapter 7 EMP: Mine, Section 7.8.4 Element 4, Groundwater (p133)

DETAILS OF THE ISSUE

There is no discussion in this section or the EIS document of the requirement to gain an entitlement to authorise the take of groundwater at the mine for dewatering purposes.

The EIS should be reworded to include the following comment:

> 'Where groundwater is to be taken within the boundaries of the Highlands sub artesian area it will first be necessary to obtain a licence to dewater from DERM.'

PROPONENT RESPONSE

The *Draft Mine EM Plan* has been amended accordingly to address water resources (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.6.2.

Submitter No.	419	Issue Reference:	19024
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Volume 1, Project Overview – Chapter 7 EMP: Mine Section 7.8.4, Element 4, Groundwater (p133)

DETAILS OF THE ISSUE

There is no reference to or discussion in this section of the Environmental Management Plan of the groundwater level monitoring program detailed in Volume 5, Appendix 14 Groundwater, Table 7-2.

The revised monitoring program that is to be included in Volume 5, Appendix 14 Groundwater, Table 7-2 should be included in this section as a detailed policy objective.

PROPONENT RESPONSE

The monitoring network has been expanded from that which existed at the time of the EIS (see the *Groundwater Assessment* report in *Appendices – Volume 2* of this SEIS). An appropriate map will be included in the groundwater technical report.

Seven new sites have been added to the monitoring network for the SEIS. All sites are equipped with continuously datalogged vibrating wire piezometers. In all, there are 25 piezometers at the 7 sites, designed to monitor the full stratigraphic section down to the deepest coal seam to be mined. Four of the new sites are situated close to the mining footprint, with two upgradient of the open cut pits in the vicinity of Lagoon Creek, and two downgradient of the open cut pits overlying and adjacent to the underground mines. There are three far-field monitoring sites. The first is a single-piezometer at Alpha airport to monitor groundwater responses close to the Alpha township. The second is a 5-piezometer hole close to Jericho township. The third has two piezometers in the Clematis Sandstone and Rewan Formation strata of the Great Artesian Basin, as a check on whether mining effects reach the GAB.

The revised *Draft Mine EM Plan* incorporates monitoring requirements specified in the revised monitoring program. See *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	419	Issue Reference:	19025
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 10. Groundwater element plan

DETAILS OF THE ISSUE

The EM plan states the operational policy objective for water quality is to ensure preservation of groundwater quality and quantity during construction.

Environmental Protection Commitments are required to be outlined for the entire project – not only for the construction phase.

PROPONENT RESPONSE

A revised *Draft Mine EM Plan* has been prepared in accordance with the content requirements specified in the EP Act. Section 10 of the revised *Draft Mine EM Plan* describes environmental protection commitments for all project phases including construction, operational and decommissioning/rehabilitation phases. See *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	19028 / 4064 / 6026 / 2009
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

This section of the EM plan is required to outline the management of any proposed releases of mine affected water to the environment.

The EM plan 'proposes' conditions for an Environmental Authority, including release limits. The proposed release conditions and the proposed release limits are not linked to identified environmental values or environmental protection commitments.

Section 51 of the *Environmental Protection Regulation 2008* 'Matters to be considered for environmental management decisions' in part states that:

1. The administering authority must, for making an environmental management decision relating to an activity, consider the following matters —
   a. the characteristics of the contaminants or materials released from carrying out the activity, and
   b. the impact of the release of contaminants or materials from carrying out the activity on the receiving environment, including the cumulative impact of the release with other known releases of contaminants, materials or wastes.

The EM plan does not provide the necessary information the administering authority is required to consider when making a decision regarding the release of contaminants and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the EP Act.

Section 52 of the *Environmental Protection Regulation 2008* 'Conditions to be considered for environmental management decisions' states that the administering authority must consider whether to impose conditions about:

- Ensuring an adequate distance between any sensitive receptors and the relevant site for the activity to which the decision relates
- Limiting or reducing the size of the initial mixing zone or attenuation zone, if any, that may be affected by the release of contaminants
- Treating contaminants before they are released
- Restricting the type, quality, quantity, concentration or characteristics of contaminants that can be released
- The way in which contaminants may be released and
- Ensuring a minimum degree of dispersion happens when a contaminant is released.

The EM plan should be redrafted to include the management of discharges, including a reasoned discussion supporting the need for the release of specific contaminants to the environment and the management of the release to the environment.

PROPONENT RESPONSE

The water management system has been designed such that there will be no controlled (or uncontrolled) releases of contaminated water to the environment. Water balance modelling utilising 122 years of meteorological data to demonstrate the demand for water onsite and adequately sized dams will prevent discharge of contaminated water (refer to Issue Reference 6020 in Part C – 18 – Environmental Management Plan). It should be noted however, that

there will be some uncontrolled discharge associated with sediment control structures during prolonged wet periods. The quality of this uncontrolled discharge is expected to be within nominated discharge limits enforceable under the Environmental Authority (EA).

If releases are required from time to time in order for safe mine operation (i.e. under Transitional Environmental Program (TEP) conditions), an appropriate framework for monitoring and reporting water quality downstream of the release point will be developed. As discussed in the response to Issue Reference 2004 in Part C – 07 – Noise & Vibration, further monitoring and assessment of the environmental values (EV's) in receiving waters is required to develop appropriate trigger values for incorporation into the EA that can be used as a benchmark for compliance auditing. The steps involved and estimated timelines for this will be outlined in the EM Plan.

Most modern coal mines in Queensland are designed such that the requirement for releases is minimal. Releases are generally only required when retention ponds fill to unsafe operating levels following periods of extended heavy rainfall, such as during the last two wet seasons. As for other mines in Queensland, this scenario will apply to the Galilee Coal Project. EA's for other coal mines generally state that releases can only be made when flows in the receiving waters (generally based on the first major river system downstream of the release point) are greater or equal to the 80th percentile flow volume for that system. Further, releases at these times may only be made if the 'end of pipe' levels of contaminants within the effluent fall within a specified range. This approach aids in ensuring effective dispersal of contaminants and minimising the potential impacts on the environment. It is envisaged that this sort of release scenario would apply to any TEP releases associated with the Galilee Coal Project, though this would need to be negotiated with DEHP.

With respect to potential sensitive receptors in the receiving waters in proximity to the Galilee Coal Project, based on current information there are no high conservation aquatic flora or fauna present, but there are significant wetlands located downstream of the mine site. Their location relative to the release point will be considered when setting any trigger levels for the EA. Based on information presented in the EIS report, as well as the wetland near the junction of Beta Creek and Tallarehna Creek, there is at least one referrable Wetland within 5km, downstream of the mine site on Lagoon Creek that will need to be considered as part of this process. The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000)[9] will also be considered as part of this process.

The revised *Draft Mine EM Plan* includes the nominated discharge management and release criteria for the site – refer to section 10. The *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	**419**	Issue Reference:	**19029 / 4062 / 6029 / 2007**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan should provide sufficient information regarding the operation of the activities with regards to how the release of mine effected water will be undertaken to allow the administering authority to set appropriate conditions within the environmental authority.

The Standard Criteria, defined in Schedule 4 of the *Environmental Protection Act 1994*, must be considered and includes:

- Any applicable Commonwealth, State or local government plans, standards, agreements or requirements, and
- The character, resilience and values of the receiving environment.

9 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Council of Australia and New Zealand (ARMCANZ), 2000.

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Section 3.2.4.2 provides some direction to make judgements about an acceptable level of change for the protection of various ecosystems. In the absence of clear information from which to set decision criteria, the guidelines recommend for sites of high conservation value, a default target for the size of the effect to be 10% of, or one standard deviation from a baseline mean, whichever is smaller.

To negotiate a value for 'end-of-pipe' (electrical conductivity) EC limits, it will be necessary to have sufficient background water quality data from historical flow events, ideally above each discharge point. This data should be used to demonstrate that there is sufficient 'assimilative capacity' in receiving waters to receive mine discharges.

The EM plan should be redrafted to include the management of discharges, including a reasoned discussion supporting the need for the release of specific contaminants to the environment and the management of the release to the environment.

PROPONENT RESPONSE

Refer to Issue Reference 19028 for more information. The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**19030 / 4063 / 6028 / 2008**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

Further, Section 56 of the *Environmental Protection Regulation 2008* 'Release of water, other than storm water, to surface water' states:

1. This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water, other than storm water, to surface water.
2. The administering authority must consider each of the following matters —
    a. any available toxicity data relevant to the release and the receiving environment;
    b. if there is an initial mixing zone —
        i. whether there is any practicable alternative that would reduce or eliminate the initial mixing zone
        ii. whether the size of the initial mixing zone is likely to adversely affect an environmental value or the ecological condition of the receiving environment, including, for example, a watercourse or wetland, and
        iii. whether concentrations of contaminants in the initial mixing zone are acutely toxic to the biota.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of water, other than storm water, to surface water and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the *Environmental Protection Act 1994*.

The EM plan should be redrafted to include the management of discharges, including a reasoned discussion supporting the need for the release of specific contaminants to the environment and the management of the release to the environment.

PROPONENT RESPONSE

Refer to Issue Reference 19028 for more information. The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**19031**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 8. Hydrology element plan

DETAILS OF THE ISSUE

The EM plan states the operational policy objective for hydrology is to maintain environmental flows in the watercourses throughout construction.

Environmental Protection Commitments should be outlined for the entire project – not just during the construction phase.

PROPONENT RESPONSE

The revised *Draft Mine EM Plan* has been prepared in accordance with the content requirements specified in the EP Act. Section 10 of the revised *Draft Mine EM Plan* describes environmental protection commitments for all project phases including construction, operational and decommissioning/rehabilitation phases. See *Appendices – Volume 2* of this SEIS.

Submitter No.	**364**	Issue Reference:	**19045**
Submitter Type	Government	TOR Category	**EMP (Nature Conservation [Aquatic Ecology])**
Name	**DEEDI (Fisheries Qld)**	Relevant EIS Section	Volume 1 – Chapter 7 – 7.8.3.2 Table 8

DETAILS OF THE ISSUE

The EMP Mine includes a reporting protocol on waterways. The proponent should include Fisheries Queensland in the reporting protocol.

PROPONENT RESPONSE

The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 1.5.

Submitter No.	**364**	Issue Reference:	**19046**
Submitter Type	Government	TOR Category	**EMP (Nature Conservation [Aquatic Ecology])**
Name	**DEEDI (Agriculture & Food)**	Relevant EIS Section	Volume 1 – Chapter 8 – 8.8.3.2 Table 8

DETAILS OF THE ISSUE

The EMP for Rail construction and reporting protocol. Proponent should include Fisheries Queensland in the reporting protocol.

PROPONENT RESPONSE

The *Draft Rail EMP* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 4.2.3.7.

Submitter No.	**364**	Issue Reference:	**19047**
Submitter Type	Government	TOR Category	**EMP (Nature Conservation [Aquatic Ecology])**
Name	**DEEDI (Agriculture & Food)**	Relevant EIS Section	Volume 1 – Chapter 7 – 7.8.7.1

DETAILS OF THE ISSUE

The proponents undertake to investigate requirements for fishway design on the proposed dam on Tallarenha Creek, and other barriers to fish passage. The proponent should consult with Fisheries Queensland to ensure fish passage design is efficient and effective.

PROPONENT RESPONSE

There is no longer a dam proposed on Tallarenha Creek. Fishway Design and other mitigation measures for fish passage are presented in section 10 of the *Draft Mine EM Plan* and section 4.2. of the *Draft Rail EMP* (both contained in *Appendices – Volume 2* of this SEIS).

Submitter No.	**364**	Issue Reference:	**19048**
Submitter Type	Government	TOR Category	**EMP (Nature Conservation [Aquatic Ecology])**
Name	**DEEDI (Agriculture & Food)**	Relevant EIS Section	Volume 1 – Chapter 8 – 8.8.7.1

DETAILS OF THE ISSUE

This section sets out the EMP Rail operational objectives in relation to Aquatic Flora and Fauna.

The proponent should consult with Fisheries Queensland to ensure that design of waterway crossings and barriers allow for adequate fish movement and minimise impact on fisheries resources.

It is likely that the proponent will require development approval for operational works that is the building or raising of waterway barrier works under the *Fisheries Act 1994* including any and all: waterway diversions; levee designs; culvert or bed level crossings; rock armouring; or all and any other works within a waterway as defined under the Act for both permanent and temporary works which occur outside the Mining Lease.

PROPONENT RESPONSE

The *Draft Rail EMP* has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS – refer to section 4.2.3.

Submitter No.	419	Issue Reference:	19049 / 2012
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 9. Water quality element plan

DETAILS OF THE ISSUE

The EM plan states the implementation strategies for water affected by activities are:

- Stormwater collected within the construction areas, and where applicable, diverted into holding/settlement ponds for treatment and reuse.

The EM plan does not include measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values to match these environmental protection objectives. The environmental protection objectives are not directly linked to the environmental protection commitments.

PROPONENT RESPONSE

Refer to Issue Reference 19006 for more information. The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 7 and section 10.

Submitter No.	419	Issue Reference:	8012
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Vol 1, Project Overview, Chapter 7, EMP: Mine, section 7.8.4 Element 4, Groundwater (p133)

DETAILS OF THE ISSUE

Volume 2, Mine Chapter 8, Section 8.7 Commitments

In this section Waratah Coal commits to:

- 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 monitoring to assess any potential impacts of the mine on groundwater ecosystems, and
- Refinement of the groundwater model based upon above data to assess transient scenarios.

However, there is no mention in Volume 1 Project Overview – Chapter 7 Environmental Management Plan: Mine, Section 7.8.4 Element 4, Groundwater in relation to a commitment to on-going updating and recalibrating of the model.

PROPONENT RESPONSE

Waratah Coal has instigated development of a new and more extensive groundwater model. This model development is proceeding in two stages. The model development proceeded in two stages. Stage 1 (completed in December 2012) simulated steady-state conditions for worst-case prediction of long-term impacts at the end of mining. Stage 2 involved transient calibration and simulated the transient progression of mining in order to quantify possible short-term impacts.

Some dataloggers were installed in the EIS monitoring bores in May 2012, and the VWP monitoring commenced at various sites from September to November 2012. Stage 2 of the modelling made use of the transient monitoring record, but Stage 1 was limited to steady-state calibration. However, it has been conducted on a much broader off-site set of groundwater levels than was used in the EIS model.

The uncertainty in formation permeabilities has been addressed by core laboratory measurements, packer testing, and acquisition of vertical head profiles (for model calibration of vertical connectivity) in VWP holes. Additional information (since the EIS) is now available from the neighbouring Alpha Coal Project. See the *Groundwater Assessment* report in *Appendices – Volume 2* of this SEIS for more information.

The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**8038**
Submitter Type	Government	TOR Category	Water Resources (Groundwater) / **EMP (Water Resources [Groundwater])**
Name	**DERM**	Relevant EIS Section	Vol 1, Project Overview, Chapter 7, EMP: Mine, Section 7.8.4 Element 4, Groundwater (p133)

DETAILS OF THE ISSUE

Volume 5, Appendix 14, Section 2.4 states:

> 'The Model was calibrated in a steady state simulation and not calibrated in transient mode due to a lack of transient data. This led to greater uncertainty in predictive runs of mine development under transient conditions.'

It was indicated that there was uncertainty surrounding hydraulic parameters and longer tests are required. It was also indicated in Appendix 14 that recalibration of the model with additional data could assist with refining predictions.

PROPONENT RESPONSE

Waratah Coal has instigated development of a new and more extensive groundwater model. This model development is proceeding in two stages. The model development proceeded in two stages. Stage 1 (completed in December 2012) simulated steady-state conditions for worst-case prediction of long-term impacts at the end of mining. Stage 2 involved transient calibration and simulated the transient progression of mining in order to quantify possible short-term impacts.

Some dataloggers were installed in the EIS monitoring bores in May 2012, and the VWP monitoring commenced at various sites from September to November 2012. Stage 2 of the modelling made use of the transient monitoring record, but Stage 1 was limited to steady-state calibration. However, it has been conducted on a much broader off-site set of groundwater levels than was used in the EIS model.

The uncertainty in formation permeabilities has been addressed by core laboratory measurements, packer testing, and acquisition of vertical head profiles (for model calibration of vertical connectivity) in VWP holes. Additional information (since the EIS) is now available from the neighbouring Alpha Coal Project. See the *Groundwater Assessment* report in *Appendices – Volume 2* of this SEIS for more information.

The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	419	Issue Reference:	6017 / 4049 / 4113 / 6051 / 6052 / 17016 / 19008
Submitter Type	Government	TOR Category	**EMP** / Project Description
Name	**DERM**	Relevant EIS Section	All sections

DETAILS OF THE ISSUE

The EIS does not provide the necessary details on the proposed containment system proposals for the mine site. The EIS and EM plan should describe and identify on maps at suitable scale the location and form of all necessary mining infrastructure on the mine site.

The EIS and EM plan should detail, as a minimum:

1. The location and size open-cut pits, including proposed size and shape of final voids
2. The location and footprint of essential plant, including the coal preparation plant, stockpiles and loading facilities
3. The location and size of overburden dumps
4. A containment system for the management and permanent storage of tailings
5. A containment system for the management of runoff and seepage from overburden rock dumps
6. A site water management system for the management of runoff from around the site and the surrounding catchments that would normally pass through the site, and
7. Any associated diversion channels, levees and dams required to control and store contaminants generated by the mining activities or to protect the mine workings from flooding.

The EIS and EM plan should as a minimum:

1. Undertake a preliminary design for the purpose of sizing and locating infrastructure, overburden dumps, tailings dams and associated diversions and flood levees
2. Include a site water management system for the management of runoff from around the site and the surrounding catchments, and
3. Identify and assess the potential environmental impacts of proposed developments.

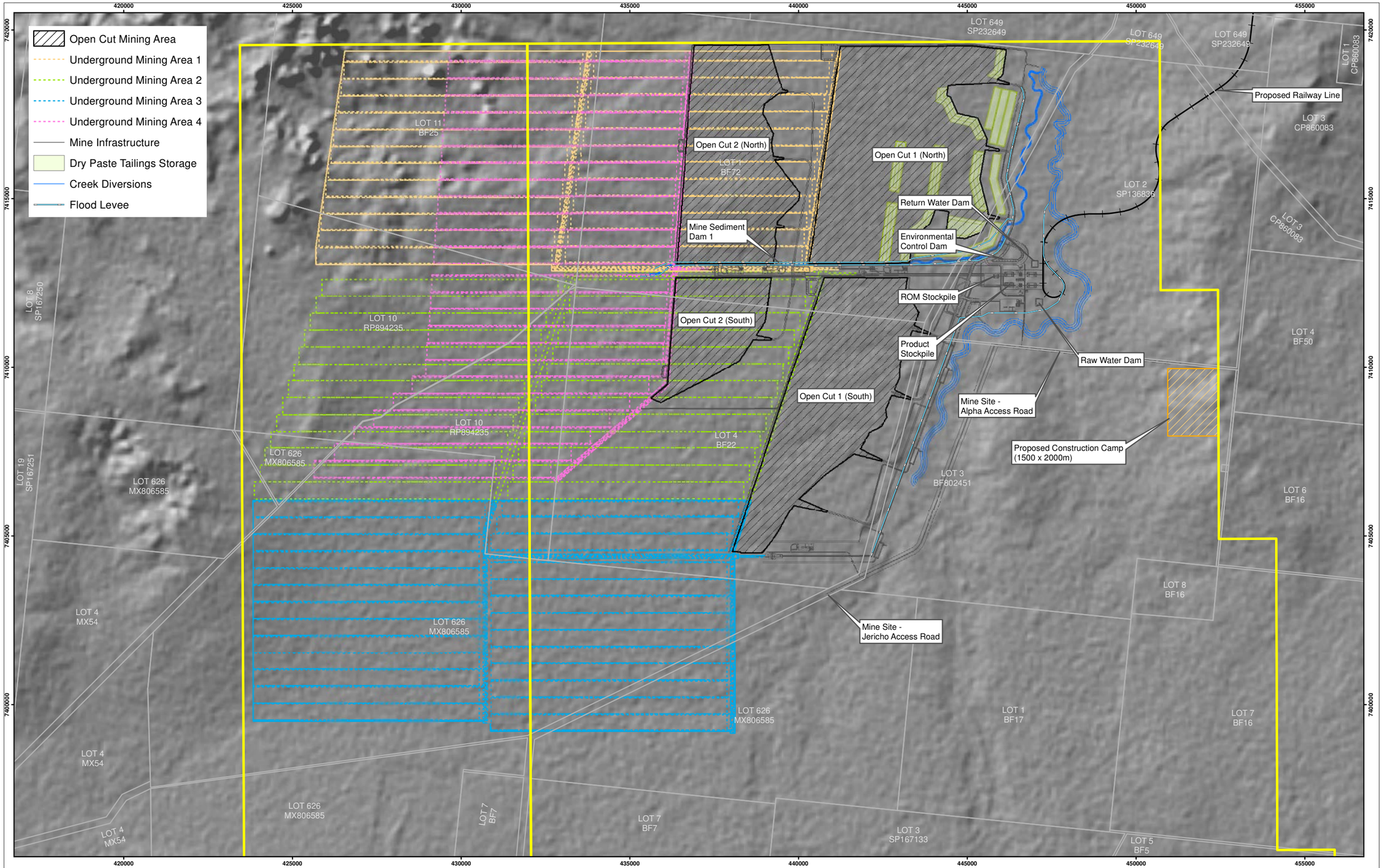
PROPONENT RESPONSE

A revised mine site infrastructure layout has been prepared to detail these features (see Figure 1).

1. Figure 1 shows the location, relative size and shape of the final voids. The total area of footprint for the open-cut mines is 7437 ha. The individual size for each open-cut mine is:
   - Open-cut No. 1 North: 2803.03ha
   - Open-cut No. 1 South: 2077.41ha
   - Open-cut No. 2 North: 1776.20ha, and
   - Open-cut No. 2 South: 780.22ha;

   The proposed size and shape of the final voids will be detailed in the Environmental Authority, the EM Plan and the Rehabilitation and Decommissioning Plan – refer to Issue Reference 4040 (in Part C – 19 – Decommissioning and Rehabilitation) for more detail.
2. The location and footprint of essential plant is shown on Figure 1. The footprint area for the CHPP, stockpiles and loading facilities is 120ha.

Figure 1. Mine Infrastructure Plan



GALILEE COAL PROJECT (Northern Export Facility)

Waratah Coal
THE NEW ENERGY IN COAL

Mineralogy House, Level 7, 380 Queen Street, Brisbane Qld 4000, Australia

Source:	Cadastral Boundaries: DERM 2012 EPC Boundary: Department of Natural Resources and Mines (DNRM) 2012 Mine Detail: Waratah Coal Pty. Ltd. 2012 Background Image: Shaded relief: ESRI Data & amp; Maps 2006
Disclaimer:	This plan is based on or contains data provided by others. Waratah Coal Pty. Ltd. gives no warranty in relation to the data (including accuracy, reliability, completness, currency or suiability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to and use of the data. Data must not be used for direct marketing or be used in breach of privacy laws.
File:	File: WAR20-26-SEIS004a-FIG-1-MINE-INFRASTRUCTURE-ARRANGEMENT- Date: 14/11/2012

0 1,000 2,000 3,000 4,000 5,000
Metres

A3 Scale 1:100,000

Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator

EPC1040 & Part of EPC1079

Cadastral Boundary

MINE INFRASTRUCTURE ARRANGEMENT

3. The location and size of the overburden encapsulation areas is shown on Figure 1. The collective size of these areas is 1816ha.
4. Proposed containment systems for the management and permanent storage of tailings and rejects are detailed in the *Tailings Storage Facility Update* report in the *Appendices – Volume 2* of this SEIS. The tailings will be dewatered using filter press conveyors and the tailings paste and rejects will be trucked to disposal cells constructed initially within the box-cut spoil piles and later within the in-pit spoil piles.

A mine water management system has been designed to facilitate the containment and re-use of runoff and other water produced or impacted by mining activities during the life of the mine . The performance of the water management system has been assessed using water balance modelling. The site water management system is described in the *Mine Site Water Management System* report contained in *Appendices – Volume 2* of this SEIS..

Diversion channels and levees designed to prevent the mine workings from flooding are described in the *Mine Site Creek Diversion and Flooding* report also contained in *Appendices – Volume 2* of this SEIS.

The *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS) contains more information – refer to sections 1, 2, 7 and 10.

Submitter No.	**419**	Issue Reference:	**6018 / 19043 / 2045 / 6078 / 19115**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Volume 2, Chapter 9, Surface Water Resources

DETAILS OF THE ISSUE

Section 3.4.1.1 of the ToR requires studies to be carried out to define the site in terms of its existing and future flood characteristics, water resource values and geomorphic condition of watercourses. This necessary detailed information has not been provided in the EIS and EM plan.

PROPONENT RESPONSE

Flood Characteristics

The existing flood characteristics of the mine site were provided as part of the EIS with additional flood modelling for the post mine scenario completed as part of the SEIS investigations and described in the *Mine Site Creek Diversion and Flooding* report (contained in *Appendices – Volume 2* of this SEIS). The results of this flood modelling indicate changes to the flood characteristics as a result of the proposed creek diversions and flood protection levees. Inundation depth, velocity and flood extent will be altered, although the modelling demonstrates the impacts will be limited to within the mine lease area.

Water Resource Values

A desk-top assessment of environmental values (EVs) for the waterways downstream of the mine has been undertaken and is described in the *Environmental Values Identification for Galilee Coal Mine* report contained in *Appendices – Volume 2* of this SEIS.

The Department of Environment and Heritage Protection is currently performing an Environmental Values identification study for the Burdekin River basin which is due for completion in December 2013. Draft Environmental Values for the Burdekin River basin were established by NQ Dry Tropics in 2009 as part of the Burdekin Water Quality Improvement Plan. A desktop review of water uses within the receiving waterways of the Galilee Coal Mine has confirmed the

suitability of the draft Environmental Values identified in the Burdekin Water Quality Improvement Plan. The draft Environmental Values identified for the Galilee Coal Mine are:

- Lagoon Creek, Sandy Creek, tributary of Jordan Creek and Jordan Creek: aquatic ecosystems (slightly to moderately disturbed), stock watering, and cultural and spiritual values.
- Belyando River: aquatic ecosystems (slightly to moderately disturbed), stock watering, irrigation, drinking water, and cultural and spiritual values.

Geomorphic Condition

A desktop geomorphic review of the creek reaches to be diverted has been undertaken and is described in the *Mine Site Creek Diversion and Flooding* report contained in *Appendices – Volume 2* of this SEIS. This assessment indicates that the reaches are significantly modified as a result of farming activities. This has led to increased sediment mobilisation and loss of riparian vegetation which is evident through the bank erosion and increased sediment bed load within the reaches

The potential impacts of the mine on downstream EV's will be assessed and presented as part of the aquatic ecology and water quality technical reports.

The *Draft Mine EM Plan* has been revised (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**6019 / 19039 / 2010 / 10002**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine – Section 7.8.3, Hydrology and Water Quality (p30)

DETAILS OF THE ISSUE

The EM plan for the mine does not detail the potential impacts, implementation strategies, monitoring, reporting or corrective actions for:

- the subsidence of watercourses, or
- ponding of water within subsided panels.

The EM plan also focuses on the construction phase of the operation and provides no detail on the operational phase.

That the EIS and EM plan should address all potential impacts on watercourses as a result of subsidence, including detailing appropriate management measures to mitigate identified impacts for the operational phase of the project.

PROPONENT RESPONSE

Subsidence

Upon completion of subsidence impact assessment revised flood modelling will be undertaken using a post-mine ground surface. This modelling will be used to identify locations of major changes to the surface flow regime and assess possible mitigation measures where necessary in accordance with Watercourse Subsidence – Central Queensland Mining Industry Guideline[10].

Waratah Coal aims to minimise the potential impact of subsidence that may result from longwall mining undertaken by its operation and proactively manage subsidence impacts that may result from its underground operations. This includes the prevention and management of impacts as well as monitoring to provide early identification of impacts.

[10] DERM (2011) *Watercourse Diversions – Central Queensland Mining Industry*. Department of Environment and Resource Management.

More specifically, the objectives of the Subsidence Management Strategy are to:

- Outline the monitoring and measurement protocols
- Establish responsibilities for the management of subsidence related issues during and immediately following under-mining
- Satisfy the applicable regulatory requirements for subsidence management across the Waratah Coal 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. This includes presenting contingency plans / procedures, and
- Detail the review and reporting protocols.

Subsidence Management Process, Structure and Organisation

Waratah Coal's overall approach to subsidence management includes the following:

- Design to reduce surface impacts – Mine design is such to reduce the potential impact to public safety, the natural environment and built features
- Identify and manage environmental risks – specialist studies (including subsidence) are prepared to identify potential impacts to public safety, the natural environment and built features
- Measure baseline information – Background data is established for the surface above the proposed mining area, this will include the establishment of subsidence monitoring points
- Monitor the effects of mining – Continued monitoring of data for the surface above the proposed mining area, including subsidence monitoring points
- Regularly assess and interpret monitoring – Monitoring data is analysed to identify any variances
- Re-assess impacts – Where variances are identified that are greater than predictions, additional assessment of impacts is undertaken
- Identify and implement remedial actions – If additional assessment indicates greater impacts, then remedial action may be required. Stakeholder consultation will be undertaken in determining and implementing remedial actions, as required
- Implement remedial actions – In the event that any surface impacts due to subsidence are noted, appropriate remediation and/or mitigation measures will be implemented in consultation with appropriate stakeholders, and
- Provide regular progress reports – Progress reports will be provided to relevant parties in accordance with reporting conditions outlined in approval documentation.

Surface changes due to longwall mining are dependent on the amount of surface subsidence, determined by factors such as overlying strata geology, the longwall block width, the seam height extracted, and the depth of cover. Subsidence impacts on the surface include the formation of tension cracks and in flat areas internal drain way subsidence troughs can form.

Types of remedial works for these impacts may include ripping, re-compacting and seeding of all tension cracks and reshaping any internally draining areas to be externally draining by the construction of contour drains and topsoiling and seeding any disturbed areas. These works will extend to blanketing and compacting of some water courses post-subsidence, preventing inflow of runoff into underground mining areas and maintain environmental surface flows. Materials which have been investigated for use in compacted blankets include silty alluvium and clay. Some re-alignment of water courses and minor earthworks will be necessary, but the work done so far allows these activities to be well planned prior to subsidence in any particular area. The natural fall of the mining area drains freely to the north and is sufficient to minimise the events of subsidence troughs. In the flatter areas, reshaping of any

internally draining areas to be externally draining will be done by the construction of contour drains and appropriate rehabilitation measures.

On the cessation of subsidence in any one area and completion of remedial works, it is planned that the land will be returned to grazing and original land activities. Yield trials will verify the maintenance of original land productions.

The project area surface stratigraphy contains cohesive Quaternary alluvial and Tertiary sands, clays and laterites which are self-healing to tensile surface fracturing. Surface tension cracks which form in cohesionless creek bed alluvium and Recent Colluvium are self-healing and readily infill. Open tension cracks in surface clays need to be ripped and compacted.

Surface subsidence caused by longwall mining will be managed through Subsidence and Rehabilitation Management Plans. For further information regarding subsidence and impacts refer to *Longwall Mining Subsidence Report* in *Appendices – Volume 2* of this SEIS.

The potential maximum impacts of underground longwall mining associated with the proposed Galilee Coal Project on flood and stream flow characteristics within the mine lease area have been identified and are described in the *Surface Water Impact Assessment of Longwall Mining Subsidence* report contained in *Appendices – Volume 2* of this SEIS.

Flood modelling has been undertaken to identify subsidence ponding areas and changes to flood inundation depths, extents and velocities as a result of mine subsidence. Water balance modelling has been performed to assess the potential reduction in stream flow volumes as a result of underground mine subsidence and capture of runoff in open cut pits and dams.

Management strategies to reduce the impacts of subsidence on waterways are identified in the *Surface Water Impact Assessment of Longwall Mining Subsidence* report contained in *Appendices – Volume 2* of this SEIS.

A new *Draft Mine EM Plan* has been developed for the mine, based on information available to date. It has been prepared in accordance with the content requirements of an EM Plan for a mining lease as set out in Section 203 of the *Environmental Protection Act 1994*, and with reference to the Department of Environment and Resource Management (DERM) publications *Guideline: Mining – Level 1 mining and exploration projects*[11] and *Mining – Environmental management plan (mining lease)* (EM Plan (ML))[12]. It includes construction, operation, closure/ rehabilitation, and post-closure stages.

The revised *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS) incorporates subsidence management requirements for protection of watercourses – refer to sections 9 and 10.

[11] *Guideline: Mining, Level 1 mining and exploration projects*. Department of Environment and Heritage Protection, EM581, Version , 4 July 2012.

[12] *Information sheet: Mining – Environmental management plan (mining lease)*. Department of Environment and Resource Management, 17 September 2010.

Submitter No.	419	Issue Reference:	6020, 6021 / 19041, 19042
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan does not adequately describe the water management practices or water management system to be utilised for the Galilee Coal Project.

This section of the EM plan is required to outline the water management practices of the site – i.e. the water management plan. This section of the EM plan should detail, examine and address all issues relevant to the importation, generation, use, and management of water on a mining project in order to minimise the quantity of water that is contaminated and released by and from the project.

A mining project water management plan systematically identifies the actual and potential risks of harm to natural water flows posed by mining activities; the actual and potential risk of environmental harm posed by water contaminated by the mining activities; and defines management actions that will effectively minimise these risks.

A mining project water management plan should be based on a comprehensive process that assesses the likelihood and consequence of risks to water quality values within and around the mining project. Effective management actions (controls) should then be identified to reduce these risks to acceptable levels.

This section of the EM plan should detail the sites water management system following the departmental guideline 'Preparation of water management plans for mining activities'. The guideline identifies that a water management plan should form an integral part of the EM plan.

The EM plan should:

- Determine the adequacy of the system to prevent unauthorised discharges during Average Recurrence Interval (ARI) 1 in 25, 1 in 50, 1 in 100 and 1 in 1000 year rainfall events considering both an operational water balance and the ability to deal with rainfall events that may occur on site at any time.
- Provide an overview of the application of 'time of concentration' design rainfall events for catchments contributing to individual relevant dams or storages or to groups of dams or storages, under conditions arising from water balance modelling or more conservative alternatives; so as to determine the failure outcomes for worst case contaminant release including overtopping and likely collapse of structures and the Annual Exceedence Probability (AEP) levels at which such outcomes occur.
- Develop control measures for routine operations to minimise the likelihood of environmental harm.
- Develop control measures to manage seepage and drainage for all regulated structures.
- Develop contingency plans and emergency procedures for non-routine situations.
- Develop a system for emergency spills or discharges.

PROPONENT RESPONSE

A mine water management system has been designed to facilitate the containment and re-use of runoff and other water impacted by mining activities during the life of the mine. The performance of the water management system has been assessed using water balance modelling. The site water management system is described in the *Mine Site Water Management System* report contained in *Appendices – Volume 2* of this SEIS.

This information will be included in the EM Plan along with control measures for:

- routine operations
- management of seepage and drainage
- contingency plans and emergency procedures, and
- a system for emergency spills or discharges.

The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**6022 / 19032 / 4060**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan does not outline any flood protection levee structures to be utilised for the Galilee Coal Project.

This section of the EM plan should include a determination of whether any flood protection levee's proposed for the site are to be authorised as a regulated structure under the environmental authority.

Adequate design plans or conceptual design plans for the flood protection levees should be included within the EM plan. Either a final design plan or a conceptual design plan, together with the certification (for a final design plan) or the endorsement (conceptual design plan) of a suitably qualified and experienced person, stating that the submitted final or conceptual design plan for the flood protection levees will deliver the performance stated in that submitted design plan.

The design plan should adequately described the physical dimensions of the flood protection levee, the materials and standards to be used for construction of the flood protection levee and the criteria to be used for operating the flood protection levee.

For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore inspire sufficient confidence to allow the administering authority to endorse the conceptual design plan for the flood protection levee within the EM plan.

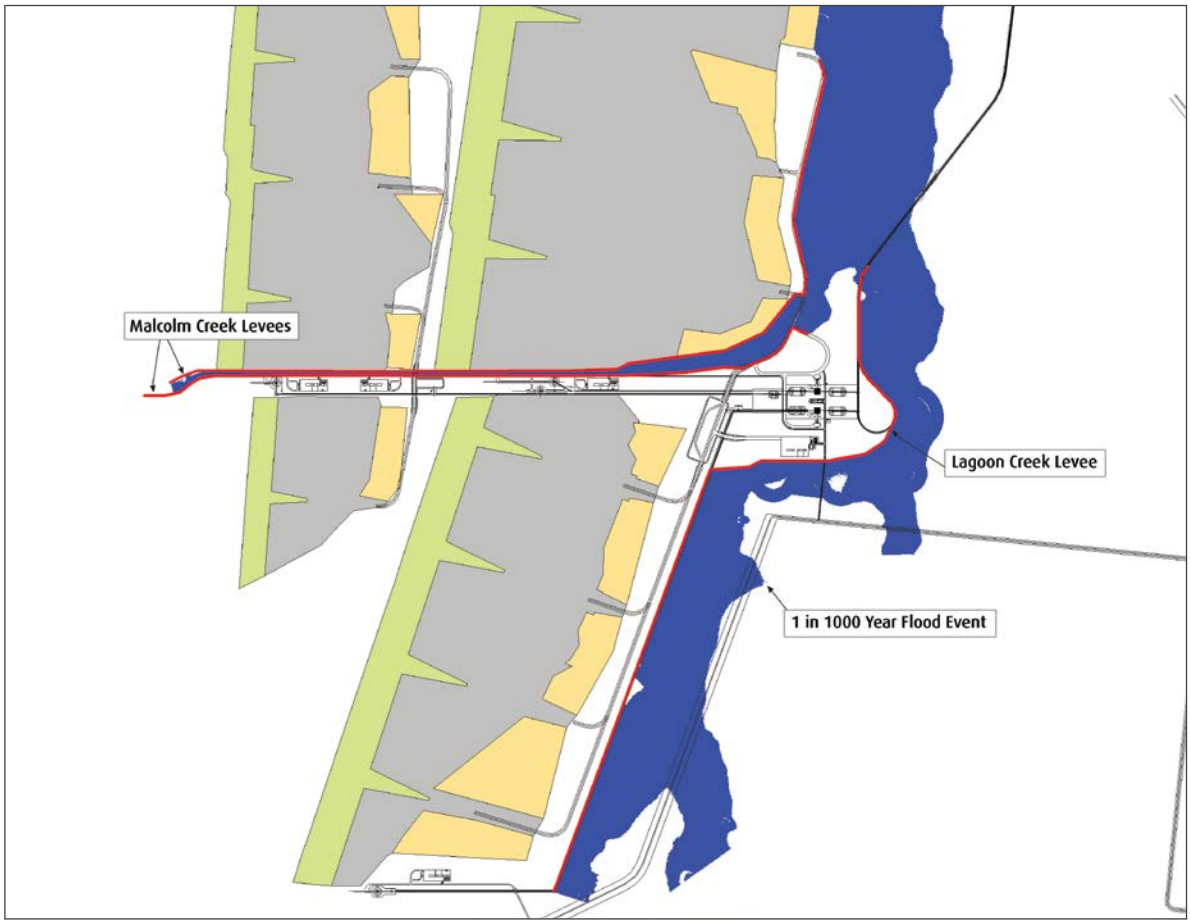
PROPONENT RESPONSE

Flood protection levees will be required to protect open-cut pits and key mine infrastructure, and as a consequence will be classified as regulated structures in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*[13]. Flood protection levees will be required along Malcolm Creek to protect open-cut pits and working areas while a single levee along Lagoon Creek will be required to protect infrastructure and haul roads where people will be routinely present.

13 *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. Department of Environment and Resource Management. EM635, Version 1, Feburary 2012.

Concept design plans for the proposed flood protection levees are provided in the *Mine Site Creek Diversion and Flooding* report (contained in *Appendices – Volume 2* of this SEIS).

Figure 2. Proposed levees



The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	**419**	Issue Reference:	**6023 / 19037**
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 8. Hydrology element plan

DETAILS OF THE ISSUE

The EM plan states the implementation strategies are:

- All construction water will be contained in ponds and treated before release;
- All construction activities will be scheduled in such a way that the impacts of flooding on the construction of the rail will be minimised;
- Prepare flood management plans for both construction and operation; and
- All drainage structures associated with the project including those necessary for supporting facilities such as access roads will be designed to the appropriate standards. All designs will incorporate an appropriate level of flood immunity, minimisation of impacts to upstream landholders and mitigation of the impacts of velocity and scour.

The EM plan does not include measurable indicators, standards and control strategies to protect or enhance each of the environmental values to match these environmental protection objectives. The environmental protection objectives are not directly linked to the environmental protection commitments.

PROPONENT RESPONSE

A *Draft EM Plan* has been developed for the mine, based on information available to date. It has been prepared in accordance with the content requirements of an EM Plan for a mining lease as set out in Section 203 of the *Environmental Protection Act 1994,* and with reference to the Department of Environment and Resource Management (DERM) publications *Guideline: Mining – Level 1 mining and exploration projects*[14] and *Mining – Environmental management plan (mining lease)* (EM Plan (ML))[15]. It includes construction, operation, closure/rehabilitation, and post-closure stages.

The structure of the EM Plan follows the following stepped process for each component (i.e. air, land, noise, etc.):

- Identification of environmental values through detailed site investigations (provided by specialist studies)
- Identification of potential impacts on environmental values identified
- Development of environmental protection objectives to minimise potential impacts
- Development of environmental commitments including control measures to achieve the stated objectives, and
- Development of proposed environmental authority conditions to be included in the environmental authority.

These are informed by the specialist studies that have been undertaken, and as such the EM Plan will be finalised prior to issue of the Environmental Authority. The EM Plan will also include a commitment to no uncontrolled releases to local waterways (or the surrounding environment) of mine affected water.

The *Draft EM Plan* describes environmental protection objectives, performance criteria and control strategies for protection of surface water environmental values.

Note that a seperate *Draft Rail EMP* has been developed, similar to the mine EM Plan described above, to outline the environmental values, potential impacts, mitigation measures and commitments for the management of rail construction and operational activities.

Refer to section 10 of the *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS).

14 *Guideline: Mining, Level 1 mining and exploration projects*. Department of Environment and Heritage Protection, EM581, Version , 4 July 2012.

15 *Information sheet: Mining – Environmental management plan (mining lease) (EM Plan (ML)*. Department of Environment and Resource Management, 17 September 2010.

Submitter No.	419	Issue Reference:	6024 / 19033 / 4061
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan does not provide adequate information regarding the management of storm water on the proposed Galilee Coal Mine.

Section 57 of the Environmental Protection Regulation 2008 'Release of storm water' states:

1. This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of storm water to the receiving environment.
2. The administering authority must consider the following matters—
   a. the topography of, and climatic conditions affecting, the receiving environment;
   b. if the activity involves exposing or disturbing soil— the soil type, its characteristics and the way it is managed;
   c. if the activity involves the storage of materials or wastes that are exposed to rainfall or storm water run-off— the characteristics and containment of the material or waste.

The EM plan should provide descriptions of the proposed storm water drainage system and the proposed disposal arrangements, including any off-site services. Maps (A3) should be provided in latitudes and longitudes in the GDA94, and include contours at a scale suitable to allow contributing catchments for rainfall runoff to be determined. Maps should include a contour plan with superimposed site layout showing all relevant facilities and infrastructure. Watercourses, drainage lines and contributing catchments must be identified and marked on the map.

PROPONENT RESPONSE

A mine water management system has been designed to facilitate the containment and re-use of runoff and other water produced or impacted by mining activities during the life of the mine. The performance of the water management system has been assessed using water balance modelling. The site water management system is described in the *Mine Site Water Management System* report (contained in *Appendices – Volume 2* of this SEIS).

The *Draft Mine EM Plan* has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS – refer to sections 7 and 10.

Submitter No.	419	Issue Reference:	6027 / 19038 / 4058
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan does not outline the water containment structures to be utilised for the Galilee Coal Project.

Suggested Solution

This section of the EM plan should include a determination of whether any water storages onsite would be classified as a regulated dam, following a hazard analysis. For any identified regulated dams, the following information is required to be submitted:

- Adequate design plans or conceptual design plans for the dams, together with certification (for final design plans) or endorsement (for conceptual design plans) of a suitably qualified and experienced person that the submitted final or conceptual design plan of the regulated dam will provide the performance stated in that submitted design plan.
- The design of the regulated dam should take into account:
  - That the dam is designed and located to have the smallest practical catchment
  - That the dam is designed to accept waste inputs for the operation year and inputs from the critical wet season
  - The spillway is designed and maintained to withstand the peak flow from the critical design storm (the critical design storm has a duration that produces the peak discharge for the catchment)
  - That the gradients of earth embankment batters should be stable
  - That the dam should prevent any erosion of the downstream face of the dam and spillway to avoid surface scour which may lead to failure of the wall, and
  - The former Department of Mines and Energy, *Technical Guidelines of Environmental Management of Exploration and Mining in Queensland*, January 1995.

For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore inspire sufficient confidence to allow the administering authority to endorse the conceptual design plan for the regulated dam within the EM plan.

PROPONENT RESPONSE

A mine water management system has been designed to facilitate the containment and re-use of runoff and other water produced or impacted by mining activities during the life of the mine. The performance of the water management system has been assessed using water balance modelling. The site water management system is described in the *Mine Site Water Management System* report contained in *Appendices – Volume 2* of this SEIS.

The assessment of the mine water management system included a preliminary hazard assessment of proposed water storages which identified that the following dams will be classified as regulated structures in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*:

- Two environmental dams (ED1 and ED2)
- Four open cut mine pit dewatering dams (PD1 to PD4)
- Two underground mine dewatering dams (UGD1 and UGD2)
- CHPP return water dam (RWD1).

The *Mine Site Water Management System* report (see *Appendices – Volume 2* of this SEIS) identifies the volumes and indicative locations of these dams. Concept and detailed design of these dams will be undertaken as part of the engineering design of the mine.

It is also likely that operational tailings and rejects disposal cells will be classified as regulated structures. Waratah Coal's *Tailings Storage Facility Update* report (in *Appendices – Volume 2* of this SEIS) provides the locations and conceptual design details for the proposed tailings and rejects disposal cells. The design of these cells will be further progressed as part of the engineering design of the mine.

Section 10 of the *Draft Mine EM Plan* contains details (see *Appendices – Volume 2* of this SEIS).

Submitter No.	251	Issue Reference:	6030, 6031, 6032, 6033, 6034, 6035, 6036 / 19044, 19051, 19052, 19053, 19054, 19064, 19065, 19066, 19067, 19068, 19096 / 4065, 4066, 4082
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])** / Hazard & Risk
Name	**Dept of Community Safety**	Relevant EIS Section	

DETAILS OF THE ISSUE

State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide

FLOOD HAZARD

Volume 1 – Project Overview, Chapter 4 – Risk Assessment, Section 4.3 – Legislative Framework states:

- In addition the Queensland State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide also has relevance to the project. SPP 1/03 requirements for proposed developments are to mitigate and minimise potential adverse impacts of flood, bushfire and landslide on people, property, economic activity and the environment. SPP 1/03 has an effect where development applications are assessed, planning schemes are made or amended accordingly and / or land is designated for community infrastructure (p48).

Volume 1 – Project Overview, Chapter 7, Environmental Management Plan: Mine. Section 7.8.1.2 Element Plan states:

- Operation Policy Objective – Geology and Soils, Minimise Environmental Impact by Preventing Soil Loss and Erosion
  - If practicable undertake construction activities during periods of low average monthly rainfall to minimise the impact of potential flooding and high intensity rainfall (p125).

Volume 1 – Project Overview, Chapter 7, Environmental Management Plan: Mine. Section 7.8.3.2 Element Plan states:

- All construction activities will be scheduled in such a way that the impacts of flooding on the construction of the rail will be minimised (p130)
- Prepare flood management plans for both construction and operation (p130)
- All drainage structures associated with the project including those necessary for supporting (facilities such as access roads will be designed to the appropriate standards. All designs will incorporate an appropriate level of flood immunity, minimisation of impacts to upstream landholders and mitigation of the impacts of velocity and scour. (p130).

Volume 1 – Project Overview, Chapter 7, Environmental Management Plan: Mine. Section 7.8.14.2 Element Plan states:

- Operational Policy Objective – Hazard and Risk – Safely Manage the Risks to the Existing Environmental Values, Including Surrounding Land Uses Associated With the Project
- Develop an Emergency Response Action Plan to account for natural disasters such as storms, floods and fires will be developed for the construction, operation and maintenance phases (p167), and
- Construction activities will be phased to minimise potential flood impacts (p169).

Volume 1 – Project Overview, Chapter 8 – Environmental Management Plan: Rail. Section 8.4.1 Rail Easement states:

- Collinsville to Bowen Development Rd (103km – 166km) – In this section the alignment crosses the North Queensland Gas Pipeline (near the Bowen River), as well as a 4.5km stretch of the Bowen River Floodplain (p185)

- Belyando River to China First Tenement (393km – 468km): the route continues south-west where it crosses the confluence of the Belyando River and its downstream tributaries. At this point the crossing of the extensive Belyando Floodplain is less than 5km (p186).

Volume 1 – Project Overview, Chapter 8 – Environmental Management Plan: Rail. Table 5. Geology and soils element plan states:

- Implementation Strategies: if practicable undertake construction activities during periods of low average monthly rainfall to minimise the impact of potential flooding and high intensity rainfall (p199).

Volume 1 – Project Overview, Chapter 8 – Environmental Management Plan: Rail. Table 8. Hydrology element plan states:

- Implementation Strategies: all construction activities will be scheduled in such a way that the impacts of flooding on the construction of the rail will be minimised (p204)
- Prepare flood management plans for both construction and operation, and
- All drainage structures associated with the project, including those necessary for supporting facilities such as access roads, will be designed to the appropriate standards. All designs will incorporate an appropriate level of flood immunity, minimisation of impacts to upstream landholders and mitigation of the impacts of velocity and scour (p204).

Volume 1 – Project Overview, Chapter 8 – Environmental Management Plan: Rail. Table 21. Hazard and risk element plan states:

- Implementation Strategies – Emergency response: develop an Emergency Response Action Plan to account for natural disasters such as storms, floods and fires will be developed for the construction, operation and maintenance phases (p233), and
- Flooding: construction activities will be phased to minimise potential flood impacts (p 235).

Volume 1 – Project Overview, Chapter 8 – Environmental Management Plan: Rail. Table 26. Acid Sulphate Soil Element Plan states:

- Implementation Strategies – a description of the management strategies to minimise impacts from the site works including:
  - Strategies for preventing the oxidation of iron sulphides (including avoiding the disturbance of ASS by redesigning layout of the excavations and/or re-flooding of potential ASS to limit oxidation) (p243).

Volume 2 – Mine, Chapter 18 – Hazard Risk and Emergency Management Section 18.5.2.11 – Flooding states:

- Waratah is proposing to divert Tallarenha Creek in two areas on the mine site to allow for the construction of infrastructure and to separate creek water and the upstream catchments from local drainages on the proposed mining areas. In addition to the diversion Waratah will construct a levee bank along the eastern side of the site as a further flood mitigation measure. The location and design of the proposed diversions and levees have been established using the results of the detailed flood assessment undertaken for the project
- The risks associated with flooding to mine site personnel have also been undertaken as part of the flood impact assessment (see Volume 5, Appendix 17) (p 454).

Volume 3 – Rail, Chapter 18 – Hazard Risk and Emergency Management, Section 18.5.2.10 Flooding states:

- To minimise the risk of flood hazards to structures and personnel, rail infrastructure will be designed with flood immunity to the 100 ARI peak design flood event. This will allow the on-going operation of the railway and rolling stock provisioning yard during the 1 in 100 year flood event. Suitably sized drainage conduits and storage systems will be selected based on required capacities determined from future flood modelling. This may also include measures for flood proofing infrastructure to prevent the ingress of floodwaters (levees, drainage structures)

- Standard flood hazardous management procedures will be implemented based on dangerous flood depths and velocities. These will include procedures for dealing with flood warnings, flood awareness, flood readiness and suitable evacuation measures. Ongoing flood management during operation of the railway will include regular inspections and maintenance works of flood control infrastructure in line with industry standards, guidelines and principles, and
- Appendix F – Flooding Procedure (p550).

DCS Comments

The areas required for the Project that are susceptible to flooding have been identified in the flood study reports contained in Volume 5 – Appendices of the EIS, as required by SPP1/03 Outcome 4.

The EIS has committed to the preparation of flood management plans and an Emergency Response Action Plan for the construction and operational phases of the Project; however detail on the flood immunity of specific mine infrastructure is not extensive.

It is recommended that the following be addressed in the EIS to ensure compliance with SPP 1/03[16]:

- The EIS states in Volume 3 – Rail, Chapter 18 – Hazard Risk and Emergency Management, Section 18.5.2.10 that rail infrastructure will be designed with 100 ARI flood immunity, however the other components of the Project (rail and port) do not confirm the level of flood immunity. DCS recommends that this be confirmed in Volume 2 – Mine and Volume 4 – Port of the EIS.
- The proponent should confirm that the proposed flood mitigation strategies detailed in the EMP for the rail and mine works will maintain the safety of site occupants, that is, the on-site workforce, from all floods up to and including a defined flood event (1 in 100 year ARI), in accordance with SPP 1/03 Guideline/Appendix 5A/Flood.

PROPONENT RESPONSE

All mine infrastructure including open-cut pits and working areas have been designed to be protected from the 1 in 1000 year ARI flood event through the use of flood protection levees (refer *Mine Site Creek Diversion and Flooding* report contained in *Appendices – Volume 2* of this SEIS). The rail has been designed to have 1 in 100 year immunity with addition provision for a minimum 500mm of freeboard (refer *Rail Corridor Cross Drainage* report also contained in *Appendices – Volume 2* of this SEIS.).

The final Mine EM Plan and Rail EMP, plus the Emergency Management Plan will incorporate flood management measures to ensure safety of site occupants.

It is proposed that desktop studies be undertaken involving geological and soils mapping and acid sulfate soils (ASS) risk mapping. Where there is a possibility that ASS may be disturbed by the proposed works, or there is a requirement under State Planning Policy 2/02 (SPP2/02)[17], then a detailed field investigation and laboratory testing regime will be undertaken in accordance with a detailed monitoring program devised in consultation with the relevant authorities (DEHP, and others where appropriate).

If investigations indicate the presence of ASS and if the proposed works may disturb the ASS, then management strategies will be developed based on the hierarchy of preferred strategies as set out in the Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines Version 3.8[18] issued by the Queensland Government. The hierarchy includes ASS avoidance and minimisation as well as treatment and handling strategies. The management strategies will be designed to mitigate any likely ASS impacts and will be set out in an ASS management plan to be approved by the Queensland Government.

16 State Planning Policy 1/03 *Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, Qld Government, Dept. of Local Government and Planning. Department of Emergency Services. June 2003.

17 State Planning Policy 2/02 *Guideline: Planning and Managing Development involving Acid Sulphate Soils. 2.0.* Queensland Government.

18 Dear, S.E., Dobos, S.K., Watling, K.M., Ahern, C.R. (2002). *Soil Management Guidelines, Queensland Acid Sulfate Soil Technical Manual.* Version 3.8, November 2002.

The *Draft Mine EM Plan* has been amended to address flood mitigation – refer to section 10. The *Draft Rail EMP* has also been amended to include mitigation measures – refer to section 4.2.3. Both reports are contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	**419**	Issue Reference:	**2001 / 19014 / 19103**
Submitter Type	Government	TOR Category	**EMP (Nature Conservation [Aquatic Ecology])**
Name	**DERM**	Relevant EIS Section	Mine site EMP, Section 7.8.7, Element 7, Aquatic Flora and Fauna (p144-146)

DETAILS OF THE ISSUE

The environmental management plan for aquatic flora and fauna does not clearly outline performance criteria, implementation strategies, reporting, etc for the operational and rehabilitation phases of the project (rather for the construction phase only). It is important that considerations of the operational phase include performance criteria of 'no uncontrolled release events to local waterways of mine-affected water' (as the verbal commitment at the recent information session suggested).

The EIS EM plan should include operational and rehabilitation phase performance criteria, implementation strategies, monitoring/auditing, reporting, a commitment for no uncontrolled discharges of mine affected water, the protection of water quality and potentially impacted aquatic ecosystems. This should include as a minimum a performance criteria stating 'no uncontrolled release events to local waterways (or surrounding environment) of mine-affected water' (as per the proponents verbal commitment at the recent information session).

PROPONENT RESPONSE

A new *Draft Mine EM Plan* has been developed for the mine, based on information available to date. It has been prepared in accordance with the content requirements of an EM Plan for a mining lease as set out in Section 203 of the *Environmental Protection Act 1994*, and with reference to the Department of Environment and Resource Management (DERM) publications Guideline: Mining – Level 1 mining and exploration projects[19] and *Mining – Environmental management plan (mining lease)* (EM Plan (ML))[20]. It includes construction, operation, closure/ rehabilitation, and post-closure stages.

The structure of the EM Plan follows the following stepped process for each component (i.e. air, land, noise, etc.):

- Identification of environmental values through detailed site investigations (provided by specialist studies)
- Identification of potential impacts on environmental values identified
- Development of environmental protection objectives to minimise potential impacts
- Development of environmental commitments including control measures to achieve the stated objectives, and
- Development of proposed environmental authority conditions to be included in the environmental authority.

These are informed by the specialist studies currently underway, and as such the EM Plan will be finalised following the completion of these specialist studies (and prior to issue of the Environmental Authority). The EM Plan will also include a commitment to no uncontrolled releases to local waterways (or the surrounding environment) of mine affected water.

Refer to sections 9 and 10 of the *Draft Mine EM Plan* (contained in *Appendices – Volume 2* of this SEIS.

19 *Guideline: Mining, Level 1 mining and exploration projects*. Department of Environment and Heritage Protection, EM581, Version , 4 July 2012.

20 *Information sheet: Mining – Environmental management plan (mining lease)* (EM Plan (ML)). Department of Environment and Resource Management, 17 September 2010.

Submitter No.	419	Issue Reference:	16000 / 19015
Submitter Type	Government	TOR Category	EMP (Noise & Vibration)
Name	DERM	Relevant EIS Section	Chapter 7, EMP: Mine, Table 18. Noise and vibration element plan

DETAILS OF THE ISSUE

Environmental Protection Commitments are required to be outlined for the entire project – not just construction.

PROPONENT RESPONSE

Environmental Protection Objectives specific to Noise and Vibration are detailed in Section 2 of the *Supplementary Noise Assessment Report* contained in *Appendices – Volume 2* of this SEIS.

The *Draft Mine EM Plan* has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS – refer to section 5.

Submitter No.	419	Issue Reference:	2002 / 19026
Submitter Type	Government	TOR Category	EMP (Water Resources [Groundwater])
Name	DERM	Relevant EIS Section	Volume 2 Mine, Chapter 8 – section 8.3 – Description of Environmental Values (p232)

DETAILS OF THE ISSUE

The section provides information on the suitability of water analysed for various purposes, stock, irrigation and drinking water for humans.

In relation to tertiary groundwater there is inconsistency in what is reported in section 8.3.1.3 where it is said the water is suitable for drinking and that which is reported in Appendix 14 where it is said it is not suitable.

Furthermore, Chapter 8 indicates that several of the wells in the tertiary had TDS values in excess of recommended guidelines for stockwater. However an examination of the raw data in Appendix 14 shows TDS values in four of the five bores at less than 2300mg/l. This would generally be regarded as suitable for stockwater (based on this indicator) for the stock likely to be watered in this area.

The information in section 3.3 of Appendix 14 and Volume 2, Chapter 8, section 8.3 should be revised to ensure consistency and accuracy.

PROPONENT RESPONSE

Refer to section 10 of the *Draft Mine EM Plan* which has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	2003 / 2011 / 19027 / 19050
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Mine site EMP), Section 7.8.3, Element 3, Hydrology and Water Quality (p130 onwards)

DETAILS OF THE ISSUE

The environmental management plan for the hydrological and water quality considerations is generally insufficient. The main focus appears to be regarding the construction phase while no clear performance criteria, implementation strategies are provided for the operational and rehabilitation phases of the project (in regards to hydrological and water quality aspects).

PROPONENT RESPONSE

Refer to section 10 of the *Draft Mine EM Plan* which has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	419	Issue Reference:	2004 / 19040
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan does not provide statements clearly identifying each environmental value with the potential to be affected by the project. The EM plan does not provide sufficient detail regarding ecosystem values and lacks background receiving water and sediment monitoring data as appropriate, to enable the administering authority to establish acceptable wastewater release limits.

Suggested Solution

The EM plan should include a description of all environmental values, including ecosystem values. These values should be clearly linked to water quality data.

Descriptions should include background receiving water and sediment monitoring data as appropriate to enable the administering authority to establish release limits.

PROPONENT RESPONSE

A desk-top assessment of environmental values (EVs) for the waterways downstream of the mine has been undertaken and is described in the *Environmental Values Identification for Galilee Coal Mine* report contained in *Appendices – Volume 2* of this SEIS.

The Department of Environment and Heritage Protection is currently performing an Environmental Values identification study for the Burdekin River basin which is due for completion in December 2013. Draft Environmental Values for the Burdekin River basin were established by NQ Dry Tropics in 2009 as part of the Burdekin Water Quality Improvement Plan. A desktop review of water uses within the receiving waterways of the Galilee Coal Mine has confirmed the

suitability of the draft Environmental Values identified in the Burdekin Water Quality Improvement Plan. The draft Environmental Values identified for the Galilee Coal Mine are:

- Lagoon Creek, Sandy Creek, tributary of Jordan Creek and Jordan Creek: aquatic ecosystems (slightly to moderately disturbed), stock watering, and cultural and spiritual values.
- Belyando River: aquatic ecosystems (slightly to moderately disturbed), stock watering, irrigation, drinking water, and cultural and spiritual values.

Given that many of the waterways within and adjacent to both the mine and the rail have some level of exposure to riparian vegetation clearing, cattle access to creeks and agricultural runoff, the ecosystem protection level assigned to those waterways should be slightly to moderately disturbed (upland) freshwater streams (i.e. 95% ecosystem protection level). Exception to this might include any of the Directory of Important Wetlands of Australia (DIWA) listed wetlands adjacent to the mine site, for which 99% ecosystem protection level trigger values could apply.

However, it is considered that 1) the characterisation of water quality in waterways within and adjacent to the mine and rail, and 2) the collection of water quality data to inform the development of trigger values for the project are two separate issues and should be carried out as separate exercises. The objectives of each are as follows:

1. The characterisation of water quality in waterways is to highlight:
   - the current condition (based on reference to relevant guidelines);
   - existing pressures on water quality from disturbances in the catchment; and
   - any key issues of relevance to the impact assessment (e.g. if there are already elevated turbidity issues due to erosion or dispersive soils in the catchment and the activities associated with the GCP are likely to exacerbate this, this could be outlined in the study).

   The available data, particularly with the availability of data from the South Galilee Coal Project, Hancock Coal and Adani Project EIS reports, are sufficient to meet that objective.
2. The collection of water quality data to inform the development of trigger values is to enable the setting of trigger values for release waters that will protect all EV's downstream of the project.

The Environmental Authority (EA) and the associated monitoring program underpinning it are normally developed in consultation with DEHP once initial approval for the project has been gained through the EIS process.

A water and sediment quality monitoring program will be prepared (refer to the *Aquatic Environment Position Paper* contained in *Appendices – Volume 2* of this SEIS) to provide sufficient data to help inform the development of the EA for the project. The monitoring program will be developed in accordance with procedures outlined in the ANZECC (2000) guidelines[21], so there is an expectation that, as a first step, EV's for the waterways in question will be determined through processes outlined in those guidelines. Once these are established, a 12 to 24 month water and sediment quality monitoring program will be initiated in consultation with DEHP. That monitoring program will clearly outline:

- Monitoring locations
- Monitoring frequency and schedule
- Routine and event-based monitoring
- Water and Sediment Quality Parameters (those water quality parameters already sampled should be used as a starting point – see Tables 2-3 in the *Aquatic Environment Position Paper* contained in Volume 2 - Appendices)
- QA/QC objectives

21 ANZECC & ARMCANZ (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

- Sampling and analysis methodologies (the DERM (2009)[22] sampling protocols should be used as the guiding document)
- Protocols for other data collection techniques (e.g. any data loggers that might be installed)
- Documentation and records
- Data quality assessment, and
- Analysis.

It should be noted that the ephemeral nature of the waterways in question will restrict water quality and sediment quality sampling opportunities for a large proportion of any given year. This needs to be considered so that the number of sampling points and the timing and frequency of sampling are sufficient to generate the required number of data points within the nominated timeframe such that the EA is not delayed. During the wet season, the remoteness of the study area and the nature of the roads will place further restrictions on water quality data collection. Various methods for enhancing site access will be utilised – for example helicopter or All Terrain Vehicle (ATV).

While the preference is to collect the required number of data points to set trigger values for the EA (i.e. DEHP recommend a minimum of 18 samples per site, or site group where there is clear evidence of similar water quality characteristics between a group of sites), it is a real possibility that less than the recommended number of samples are collected due to the ephemeral nature of the waterways. As such, several options will be discussed with DEHP, including, but not limited to:

- Committing to meeting all relevant guideline values (these would be the local water quality objectives developed for various reaches of the Belyando sub-catchment and the ANZECC (2000) guidelines with respect to toxicants). If these are not able to be achieved for some parameters, conditions in the EA could be set such that downstream monitoring site values (medians) for those parameters not exceed those associated with upstream reference monitoring sites by more than 10%
- Making an interim commitment to adopt EA terms already set out for neighbouring coal mines (if they are in place at that stage) until such time as there are sufficient data to allow the EA to be updated based on more locally relevant data, and / or
- Carrying out whole of effluent direct toxicity tests on effluent stored in treatment ponds on site (or from ponds at another mine site of a similar nature in the same region as an analogue) and using this information to determine what, if any, elements of the effluent is toxic and, for those elements found to be toxic, determining trigger values based on 95% or 99% ecosystem level protection based on existing ecotoxicological information.

The latter approach could be used at any point to fine tune the trigger values for the EA if required. It might also be used to assess whether or not effluent is of a suitable enough quality to be released outside times of high flow in the receiving waters.

While not currently required for coal mines in the Burdekin Catchment, Waratah Coal will also commit to developing a Receiving Water Monitoring Program (REMP) to complement the monitoring requirements set out under the EA.

Since submission of the EIS an *Environmental Values Identification for Galilee Coal Mine* report has been commissioned (see *Appendices – Volume 2* of this SEIS). This information has been utilised in formulating the *Mine Water Quality Monitoring Program*, also contained in *Appendices – Volume 2* of this SEIS.

The *Draft Mine EM Plan* has been amended accordingly to include the Environmental Values and is contained in *Appendices – Volume 2* of this SEIS.

22 DERM (2009) *Monitoring and sampling manual 2009.* Department of Environment and Resource Management, Version 2, September 2010.

Submitter No.	419	Issue Reference:	2005 / 19034 / 6025
Submitter Type	Government	TOR Category	EMP (Water Resources [Surface Water])
Name	DERM	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.8.3, Element 3 Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

This section does not provide sufficient information regarding the potential impacts of the activities on the environment, in particular, impacts on ecosystems.

PROPONENT RESPONSE

Additional aquatic ecosystem assessments have been undertaken and will be completed in the next several months, including an assessment of the potential impacts of the mining activities on aquatic ecosystems. Potential impacts on water quality and aquatic ecosystems relating to activities associated with the project will be defined and discussed in the technical reports that will follow completion of the field assessments.

However, works to date indicate the potential impacts on ecosystem quality are expected to include:

- The clearing of vegetation and topsoils from working areas and stockpiling on site resulting in sediment mobilisation
- Impacts on vegetation and banks during bridge and culvert construction resulting in possible sediment mobilisation
- The storage of chemicals (e.g. hydrocarbons, surfactants etc.) during construction and operation and the movement of these to watercourses
- The storage seepage and overtopping of potentially contaminated water from tailings dams, pits or other environmental control dams
- The construction and operation of underground mines which may result in subsidence impacting drainage in the immediate area
- The construction of creek diversions resulting in increased sediment mobilisation or storage
- Changes to contributing catchment area and runoff characteristics to Lagoon Creek resulting in reduced flow rates and annual flow volumes, and
- Erosion in creek diversion due to increased velocity resulting in increased sediment load

The potential effects as a result of these impacts if uncontrolled may include:

- Increased total suspended solids and turbidity within receiving waterways
- Increased sediment mobilisation and sediment load within receiving waterways with subsequent impacts on aquatic ecosystems
- Increased salinity of receiving waterways with impact to non-salt tolerant species and possible impacts to livestock downstream
- Increased nutrient levels resulting in increased eutrophication of downstream waterbodies
- Reduced streamflow volumes resulting in impacts aquatics biota and riparian vegetation, and
- Increased concentrations of dissolved heavy metals and other contaminants resulting in toxicity and accumulation in receiving waters with possible impacts on drinking water supplies.

The *Draft Mine EM Plan* has been amended accordingly and section 10 documents the potential impacts and control measures for mitigation of potential impacts on aquatic ecosystems (see *Appendices – Volume 2* of this SEIS).

Submitter No.	419	Issue Reference:	2006 / 19035
Submitter Type	Government	TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Table 9. Water quality element plan

DETAILS OF THE ISSUE

The EM plan states the operational policy objective for water quality is to maintain water quality values in the watercourses throughout construction.

Environmental Protection Commitments are required to be outlined for the entire project – not just construction.

PROPONENT RESPONSE

The *Draft Mine EM Plan* has been amended accordingly (and is contained in *Appendices – Volume 2* of this SEIS) – refer to section 10.

Submitter No.	419	Issue Reference:	17017 / 19016
Submitter Type	Government	TOR Category	**EMP (Project Description)** / Project Description
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine, Section 7.4, Project Characteristics (p113)

DETAILS OF THE ISSUE

The EM plan does not include the proposed mining sequence for both proposed pits/longwalls and seams.

The EM plan should be revised to include the following:

- The proposed sequencing and timing of mining of each seam within the mining lease
- The use of different mining techniques in areas of different topographic or geo-technical character, and
- The estimated area to be disturbed at each major stage of the project.

PROPONENT RESPONSE

The requested information for proposed sequencing and timing of mining of each seam and the different used of mining techniques is contained and clearly detailed in the original EIS submission as follows:

- Open-cut: Please refer to EIS Vol 2, Section 1.2.2.1 Open-cut Mining Method, pages 22-24; Section 1.2.2.2 Open-cut Mining Development Sequence pages 25-26; and Section 1.2.2.3 Open-cut Mine Development Schedule pages 27-32, which includes the proposed 25 years sequencing summarised in Figure 16 on page 28.
- Underground: Please refer to EIS Vol 2, Section 1.2.2.7 Underground Mining Method on pages 36-37 and Section 1.2.2.8 Underground Mining Development Sequence on pages 38-41, which includes the proposed sequencing summarised in Figures 33 and 34 on pages 40 and 41.

The estimated gross area disturbed for each mine at the major stages of the project is summarised in the following table. Please note that the areas given are the total areas estimated to be disturbed. The amount of disturbed land at any given time will be significantly less than the amounts below as rehabilitation is planned to be completed within two years of mining. All detail will be contained in the Mine Rehabilitation Plan.

Table 1. Estimated gross area of disturbed land

Year	Open-Cut Mines				Underground Mines	
	OC 1 Nth	OC 1 Sth	OC 2 Nth	OC 2 Sth	B Seam	D Seam
1-5	1125.5	650.8	418.0	111.6	1033.8	2295.8
6-10	799.4	424.9	419.9	114.8	1596.6	4144.2
11-20	1148.8	1299.5	644.4	245.2	3235.4	8692.6
21-25	171.2	88.9	624.7	395.0	1690.3	6365.2
26-30	–	–	–	–	1227.3	5929.5
Total Area	2803.0*	2077.4*	1776.2*	780.2*	8783.4	27427.3

* Please note total area is less than the sum of the individual areas as some areas will overlap in footprint.

The *Draft Mine EM Plan* has been amended accordingly – refer to section 2 for Project Description; section 7 for Mineral Waste; and section 9 for Rehabilitation. The *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	**419**	Issue Reference:	**10002**
Submitter Type		TOR Category	**EMP (Water Resources [Surface Water])**
Name	**DERM**	Relevant EIS Section	Chapter 7 – EMP: Mine – Section 7.8.3, Hydrology and Water Quality (p130)

DETAILS OF THE ISSUE

The EM plan for the mine does not detail the potential impacts, implementation strategies, monitoring, reporting or corrective actions for:

- the subsidence of watercourses, or
- ponding of water within subsided panels.

The EM plan also focuses on the construction phase of the operation and provides no detail on the operational phase.

The EIS and EM plan should address all potential impacts on watercourses as a result of subsidence, including detailing appropriate management measures to mitigate identified impacts for the operational phase of the project.

PROPONENT RESPONSE

Waratah Coal aims to minimise the potential impact of subsidence that may result from longwall mining undertaken by its operation and proactively manage subsidence impacts that may result from its underground operations. This includes the prevention and management of impacts as well as monitoring to provide early identification of impacts.

More specifically, the objectives of this Management Strategy are to:

- Outline the monitoring and measurement protocols
- Establish responsibilities for the management of subsidence related issues during and immediately following under-mining
- Satisfy the applicable regulatory requirements for subsidence management across the Waratah Coal 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. This includes presenting contingency plans / procedures, and
- Detail the review and reporting protocols.

Subsidence Management Process, Structure and Organisation

Waratah Coal's overall approach to subsidence management includes the following:

- Design to reduce surface impacts – Mine design is such to reduce the potential impact to public safety, the natural environment and built features
- Identify and manage environmental risks – specialist studies (including subsidence) are prepared to identify potential impacts to public safety, the natural environment and built features
- Measure baseline information – Background data is established for the surface above the proposed mining area, this will include the establishment of subsidence monitoring points
- Monitor the effects of mining – Continued monitoring of data for the surface above the proposed mining area, including subsidence monitoring points
- Regularly assess and interpret monitoring – Monitoring data is analysed to identify any variances
- Re-assess impacts – Where variances are identified that are greater than predictions, additional assessment of impacts is undertaken
- Identify and implement remedial actions – If additional assessment indicates greater impacts, then remedial action may be required. Stakeholder consultation will be undertaken in determining and implementing remedial actions, as required
- Implement remedial actions – In the event that any surface impacts due to subsidence are noted, appropriate remediation and/or mitigation measures will be implemented in consultation with appropriate stakeholders, and
- Provide regular progress reports – Progress reports will be provided to relevant parties in accordance with reporting conditions outlined in approval documentation.

Types of remedial works may include ripping, re-compacting and seeding of all tension cracks and reshaping any internally draining areas to be externally draining by the construction of contour drains and top soiling and seeding any disturbed areas. These works will extend to blanketing and compacting of some water courses post-subsidence, preventing inflow of runoff into underground mining areas and maintain environmental surface flows. Materials which have been investigated for use in compacted blankets include silty alluvium and clay. Some minor earthworks will be necessary, but the work done so far allows these activities to be well planned prior to subsidence in any particular area. The natural fall of the mining area drains freely to the north and is sufficient to minimise the events of subsidence troughs. In the flatter areas, reshaping of any internally draining areas to be externally draining will be done by the construction of contour drains and appropriate rehabilitation measures.

On the cessation of subsidence in any one area and completion of remedial works, it is planned that the land will be returned to grazing and original land activities. Yield trials will verify the maintenance of original land productions.

For further information regarding subsidence rehabilitation refer to Section 11 of the *Longwall Mining Subsidence Report* in *Appendices – Volume 2* of this SEIS.

The *Draft Mine EM Plan* has been amended accordingly and is contained in *Appendices – Volume 2* of this SEIS – refer to sections 9 and 10.

Submitter No.	1841	Issue Reference:	21002
Submitter Type	Government	TOR Category	EMP
Name	Commonwealth DSEWPaC	Relevant EIS Section	Executive Summary

DETAILS OF THE ISSUE

Commitments are in general vague and non-committal, and certain elements, such as subsidence, while an unknown, requires commitments in the event that it does occur and clear management measures tied to specific thresholds. Many of the Environmental Management Plans (EMPs) lack clear thresholds linked to intervention measures. Also most of the plans refer to the construction phase only, and should include operation and decommissioning as part of the plan. Not only does the land rehabilitation EMP require timeframes and management thresholds, but more detail regarding the location and types of land rehabilitation. It is clear that the original landscape is a mixture of pasture and native vegetation. The proposed rehabilitation of native vegetation needs to be clearly defined in terms of the species to be used, the efficacy of rehabilitating certain vegetation types, timeframes for achieving proposed outcomes, and thresholds for management measures. If rehabilitation is to occur in proximity of rehabilitation for pasture, then suitable pasture species need to be selected that will not undermine the native vegetation rehabilitation. The department does not consider it appropriate to use Buffel Grass near native vegetation.

PROPONENT RESPONSE

The *Draft Mine EM Plan* has been amended accordingly regarding the implementation of actions during construction, operation and decommissioning. Section 9.6 has been updated regarding rehabilitation and decommissioning. The *Draft Mine EM Plan* is contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	1841	Issue Reference:	21012
Submitter Type	Government	TOR Category	EMP
Name	Commonwealth DSEWPaC	Relevant EIS Section	Volume 5B – Appendix 10, Section 8 – Mitigation and Management

DETAILS OF THE ISSUE

Mitigation measures are also too general. Operation monitoring does not appear to be coupled with management anywhere.

PROPONENT RESPONSE

The *Draft Mine EM Plan* and the *Draft Rail EMP* have been updated. Both are contained in *Appendices – Volume 2* of this SEIS.

Submitter No.	**1841**	Issue Reference:	21014
Submitter Type	Government	TOR Category	Nature Conservation / **EMP**
Name	**Commonwealth DSEWPaC**	Relevant EIS Section	Volume 5B – Appendix 10, Section 8.3 – Environmetal Offsets

DETAILS OF THE ISSUE

Section 9.2 – Some of the proposed management actions do not appear to be environmental strategies, but rather normal mining operation managements. The purpose of some of the strategies requires clarification.

PROPONENT RESPONSE

The *Draft Mine EM Plan* and the *Draft Rail EMP* have been updated. Both are contained in *Appendices – Volume 2* of this SEIS

Submitter No.	**419**	Issue Reference:	12026 / 19004
Submitter Type	Government	TOR Category	**EMP (Air Quality)**
Name	**DERM**	Relevant EIS Section	Volume 1, Environmental Management Plan: Mine

DETAILS OF THE ISSUE

An ambient air monitoring program is not included in the EM plan. It is specified in the EIS that PM_{10} ground level concentrations at the sensitive receptors may exceed the EPP (Air) objectives. Therefore, PM_{10} and dust deposition monitoring must be conducted at the site. It is also important that the proponent develops an ambient air monitoring program prior to the commencement of mining activities. Monitoring data could then be integrated with the dust mitigation strategies to ensure protection of environmental values.

The proponent should provide a commitment to conduct ambient air monitoring at the mining site, and that the Environmental Management Program includes details of ambient air monitoring to be employed for the mitigation of adverse air impacts. The air quality monitoring program should address at least the following:

a. Sampling practices, procedures and parameters for contaminant testing

b. Selection of sampling locations to demonstrate that samples collected will be representative of the air quality of the area

c. Frequency of sampling to be undertaken at each location including the number of samples to be taken, sampling period/duration; continuous or semi–continuous sampling, and

d. Meteorological data collection including at least the wind speed and wind direction during the air quality monitoring program at the monitoring locations.

PROPONENT RESPONSE

Sampling practices, procedures and parameters for contaminant testing

The following pollutants will be monitored in the air surrounding the Waratah Coal project:

- Dust deposition, and
- PM_{10} and $PM_{2.5}$ ambient concentrations.

The location of dust deposition gauges is shown in Figure 3. The dust deposition gauge network will be maintained in accordance with relevant Australian Standards and sampled monthly to determine insoluble matter (g/m^2/month) and ash content (percent).

Dust deposition rates are to be maintained within guidance criteria to avoid nuisance impacts at sensitive receptors within the mine lease area (i.e. > 4 g/m^2/month). All dust depositional gauges will be sampled monthly for insoluble matter and ash in accordance with *Australian Standard 3580.10.1 2003 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method*.

The monitoring of ambient concentrations needs to be conducted using a regulatory method (in order to assess regulatory compliance) and continuously so that a reactive air quality management plan can be informed by the air quality monitoring network.

The most common regulatory methods for monitoring ambient concentrations surrounding major extractive industries are by using high volume air samplers (HVAS) or tapered element oscillating microbalance analyser (TEOM). TEOMs produce continuous measurements that can be used to assess regulatory compliance and feed into a reactive air quality management plan, whereas the use of HVAS would require the use of co–located continuous measurement techniques such as an E-sampler or beta attenuation monitor (BAM), as the measurement method is not continuous.

Ambient air concentration rates are to be maintained within the Queensland EPP Air criteria at sensitive receptors.

Sampling using a HVAS will be undertaken in accordance with:

- *AS/NZS 3580.9.6:2003 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet – Gravimetric method*

Sampling using a TEOM will be undertaken in accordance with:

- *AS 3580.9.8 Methods for sampling and analysis of ambient air – Method 9.8: Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.*

It is also recommended that PM_{10} and $PM_{2.5}$ ambient air concentrations to be also monitored continuously using an E-Sampler, E-BAM or DustTrack (or equivalent method) at the same locations as any HVAS. If using TEOMs to monitor ambient air quality, a co-located E-Sampler, E-BAM or DustTrack (or equivalent method) is recommended to monitor $PM_{2.5}$ concentrations. Neither the TEOM, E-Sampler, E-BAM nor DustTrack is a recognised regulatory method for measuring $PM_{2.5}$, but will be useful to provide air quality data to Waratah Coal and to the surrounding community on a continuous basis.

The continuous measurements will provide continuous feedback information on air quality and be incorporated into a dust management plan once the mine is operational.

Any non-conformances in recorded by regulatory methods – HVAS, TEOM or dust deposition gauges will be investigated to determine the source or event(s) that led to the non-conformance and if possible, measures taken to minimise the possibility of re-occurrence.

In the event of any exceedance, the mining practices will be reviewed, modified and documented, where appropriate, and corrective actions will be undertaken.

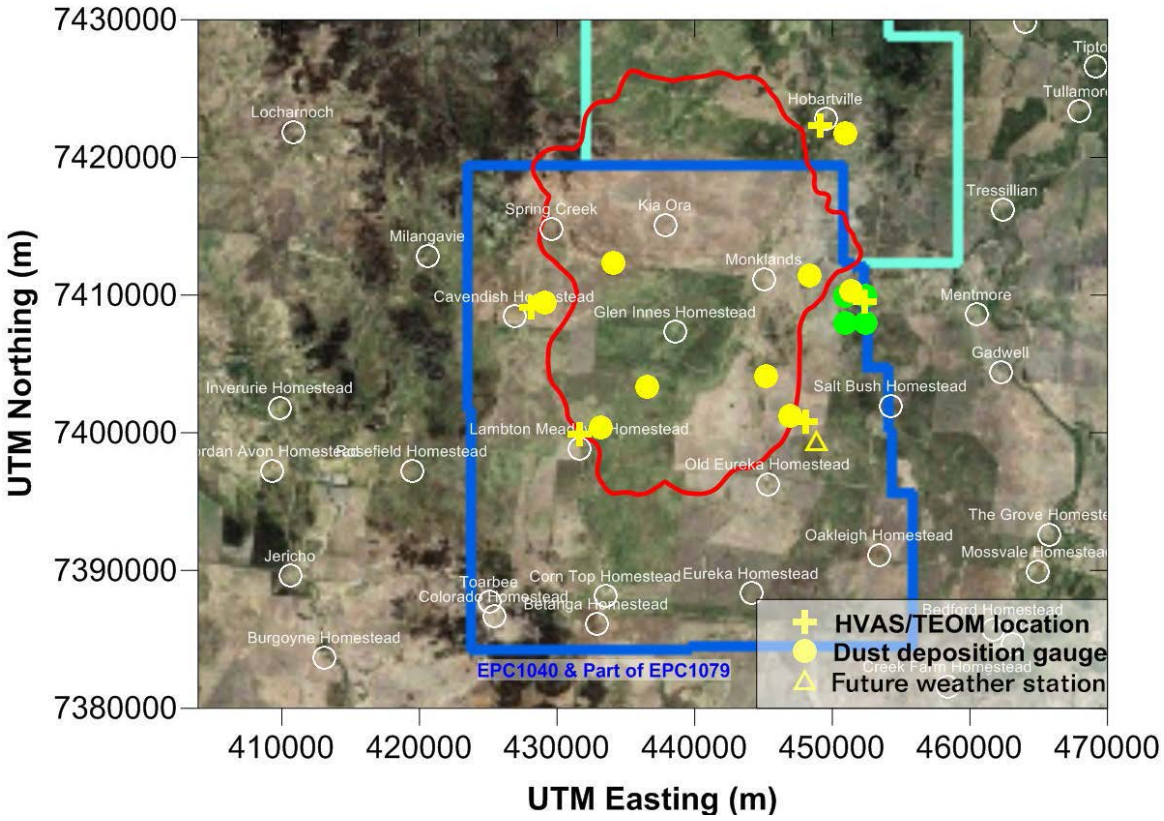
Selection of sampling locations to demonstrate that samples collected will be representative of the air quality of the area

The recommended locations of five HVAS or TEOMs (and associated co-located continuous air quality monitors), nine dust deposition gauges and a weather station in relation to the Waratah Coal mine are shown in Figure 3. Final locations of the air quality monitoring stations will need to take into account the availability of power. HVAS or TEOMs require a 240V power supply.

The locations of the ambient air quality samplers have been selected based on proximity to major emission sources at the Galilee Coal Project mine and the location of surrounding sensitive receptors.

It is noted that the receptors "Kia Ora", "Spring Creek", "Monklands" and "Glen Innes Homestead (Bimblebox Nature Reserve)" are to be acquired or relocated by Waratah Coal.

Figure 3: Location of air quality monitoring stations – preliminary air quality monitoring plan



Frequency of sampling to be undertaken at each location including the number of samples to be taken, sampling period/duration; continuous or semi–continuous sampling

The sampling frequency for each lcoation and parameter is sumamrised in Table 2.

Table 2: Sampling parameters for each location

Monitored Parameter	Frequency	Number of samples	Continuous or Batch Sampling
Dust deposition	Once every 30 days (=/– two days) as per *Australian Standard 3580.10.1 2003*	One sample per site	Batch sampling
PM_{10} – HVAS	Monitor over 24-hours every 6 days	One sample per 6 days	Semi-continuous
PM_{10} – TEOM	Monitor continuously	One reading every 10 minutes	Continuous
PM_{10} – E-sampler	Continuous	One reading every 10 minutes	Continuous
$PM_{2.5}$ – E-sampler/BAM/ DustTRack	Continuous	One reading every 10 minutes	Continuous

Meteorological data collection, including at least the wind speed and wind direction during the air quality monitoring program at the monitoring locations

A weather station has been installed and commenced collecting data on 27 April 2012. The following data is collected by the weather station:

- daily rainfall
- continuous wind speed, wind gust and direction
- continuous temperature
- continuous relative humidity
- continuous solar radiation, and
- continuous barometric pressure.

Evaporation rates are also monitored, parametrically using an Environdata FAO56 Evaporation Calculation (EV30). Using this monitor, evaporation rates are calculated using monitored relative humidity, air temperature, wind speed and solar radiation. Evaporation rates will be used to inform the daily road watering requirements to control emissions from haul roads.

The weather station is currently located next to the sensitive receptor named "Kia Ora".

The proposed location for the weather station once the mine becomes operational is provided in Figure 3. It is considered that the location proposed in Figure 3 will be representative for the surrounding area. Wind speed is measured at 10m above the ground level.