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1. INTRODUCTION

The Galilee Coal Project (Northern Export Facility) (also known as the China First Project), (hereafter referred to as the project) comprises a new coal mine located in the Galilee Basin, Queensland, approximately 30 km to the north of Alpha; a new rail line connecting the mine to coal terminal facilities; and use of coal terminal facilities in the Abbot Point State Development Area (APSDA) and port loading facilities at the Port of Abbot Point.

Figure 1 shows the overall project concept.

Waratah Coal proposes to mine 1.4 billion tonnes of raw coal from its existing tenements, Exploration Permit for Coal (EPC) 1040 and EPC 1079. The mine development involves the construction of four nine Million Tonnes Per Annum (Mtpa) underground long-wall coal mines, two 10 Mtpa open cut pits, two coal preparation plants with raw washing capacity of 28 Mtpa.

The annual Run-of-Mine (ROM) coal production will be 56 Mtpa to produce 40 Mtpa of saleable export highly volatile, low sulphur, steaming coal to international markets. At this scale of operation, the capital expense of constructing the required rail and port infrastructure is economically viable over the life of the project. The assessment of the mining construction and operation is detailed throughout **Volume 2** of this EIS.

Processed coal will be transported by a new railway system approximately 468 km in length that runs from the Galilee Basin to the existing Port of Abbot Point. The railway component includes a state of the art, heavy haul, standard gauge railway to support 25,000 tonne (t) train units. The final railway easement is expected to be approximately 60-80 m wide and will include both the rail and a service road. The assessment of the rail construction and operation is detailed throughout **Volume 3** of this EIS.

It should be noted that the description of the stockpiling and export elements of the project provided in the Initial Advice Statement of October 2008, proposed either use of the Multi-Cargo Facility (MCF) or a jetty berth design similar to that currently in use at Abbot Point. Since then, as a result of the outcomes of detailed engineering studies by Waratah Coal and the opportunity for Waratah Coal to minimise environmental impacts and exploit economic opportunities by sharing facilities in multi-user infrastructure arrangements, the jetty berth design has been removed as an option for the project, and use of facilities within the proposed Terminal 4-7 (T4-7), Multi-User Corridor (MUC) and MCF remains the sole option for the stockpiling and port export elements of the project. However, it should be noted that should any component of the T4-7, MUC or MCF not progress, Waratah Coal would need to seek alternatives for coal stockpiling and ship loading. This could include investigation of a stand-alone jetty and stockpiling facilities. Should this be required, this would be the subject of a separate future EIS process and referral to the Commonwealth Government.

The project will utilise future coal stockpiling and port loading facilities to be developed by North Queensland Bulk Ports Corporation (NQBP) within planned infrastructure at the APSDA and the Port of Abbot Point. Waratah Coal intends to utilise facilities for coal stockpiling at the proposed T4-7 within the APSDA. This project is currently undergoing initial design and is the subject of an Expression of Interest (EOI) (closing on 1 August 2011) from entities wishing to participate in the development of the T4-7. Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location; to develop conveyers within the MUC between the T4-7 and the MCF; and use of two berths at the MCF. The T4-T7 project is yet to undergo a formal environmental assessment process; which will be overseen by NQBP. This process will be commenced when preferred respondents and design parameters are finalised – expected to commence in early 2012. It is anticipated that once NQBP has completed their assessments, Waratah Coal may need to undertake additional approvals processes and/or accept resultant conditions of operations from NQPBs via lease requirements and a framework agreement.

The proposed MCF will be a new multi trade port facility adjacent to the existing Abbot Point Coal Terminal berths. Awarding of a stockpiling tranche in the T4-T7 would allow Waratah Coal use of two berths within the MCF. The MCF Environmental Impact Statement process is well underway, and Federal Government approval is expected in 2011. However, the MCF EIS does not include undertaking the following activities and development of the following structures:

- Wharf structures;
- Ship loading and unloading infrastructure and associated facilities of private port users as well as operation of these facilities; and
- Conveyors, pipelines etc. servicing the MCF.

It is anticipated that once NQBP has received their approval, Waratah Coal will need to undertake additional approvals processes to facilitate the above activities and development.

Given that the coal terminal and port infrastructure are largely the subject of current and future assessments by NQBP, this EIS does not consider the potential impacts of these projects. However, an overview of existing environment within the APSDA and the Port of Abbot Port, as well as the probable coal terminal design and infrastructure requirements is provided in Volume 4 of this EIS.

Various supporting infrastructure will also be constructed as part of the project including the connection to new power and water supply infrastructure being proposed by Government.

The project will be developed over three years. The mine will have a life of approximately 30 years, whereas the rail and coal terminal facilities at the APSDA and Port of Abbot Point will continue to operate to support other projects.

1.1 PROJECT COMPONENTS

1.1.1 MINE

The mine will be a combination of two surface mines and four underground mines with an ultimate export capacity of 40 Mtpa. The surface and underground mines will be supported by a purpose built Mine Infrastructure Area (MIA).

The raw coal will be washed for the export market with an overall product yield of 72%. The annual raw coal production will be 56 Mtpa to produce 40 Mtpa of saleable export product coal.

The overall mine arrangement will incorporate the following operations producing raw coal (refer Figure 2: Mine Infrastructure Arrangement)

- two surface mining pits in the B seam resource producing 10 Mtpa total;
- two surface mining pits in the C and D seam resources producing 10 Mtpa total;
- one long wall mine in the B seam producing 9 Mtpa;
- three long wall mines in the C and D seam resources producing 27 Mtpa total;
- raw coal stockpiles at the underground mines;
- haulage roads to deliver raw coal from the surface mines to crushing and stockpile facilities;
- three overland conveyor systems to transport raw coal to the coal processing plants;
- three raw coal stockpiles to feed the coal preparation plants while providing blending capability;
- two coal preparation plants consisting of four 1,000 tonnes per hour (tph) modules each;
- two product coal stockpiles handling product coal to rail load out facilities;
- two railway turning loops each with a single coal load out facility;
- topsoil stockpiles and out of pit overburden spoil sites to create initial surface mining pit space;
- water management structures including dams, levee banks and sediment traps;
- tailings dams and coarse spoil disposal areas integrated into the mine spoil pile areas;
- refuelling and maintenance facilities;
- access roads, power lines and other services located in a central services corridor transgressing the entire resource area; and
- a mine office, communications, and associated amenities.

The surface mining method will be a combination of walking draglines for overburden removal in conjunction with truck and shovel fleets for partings removal and coal recovery.

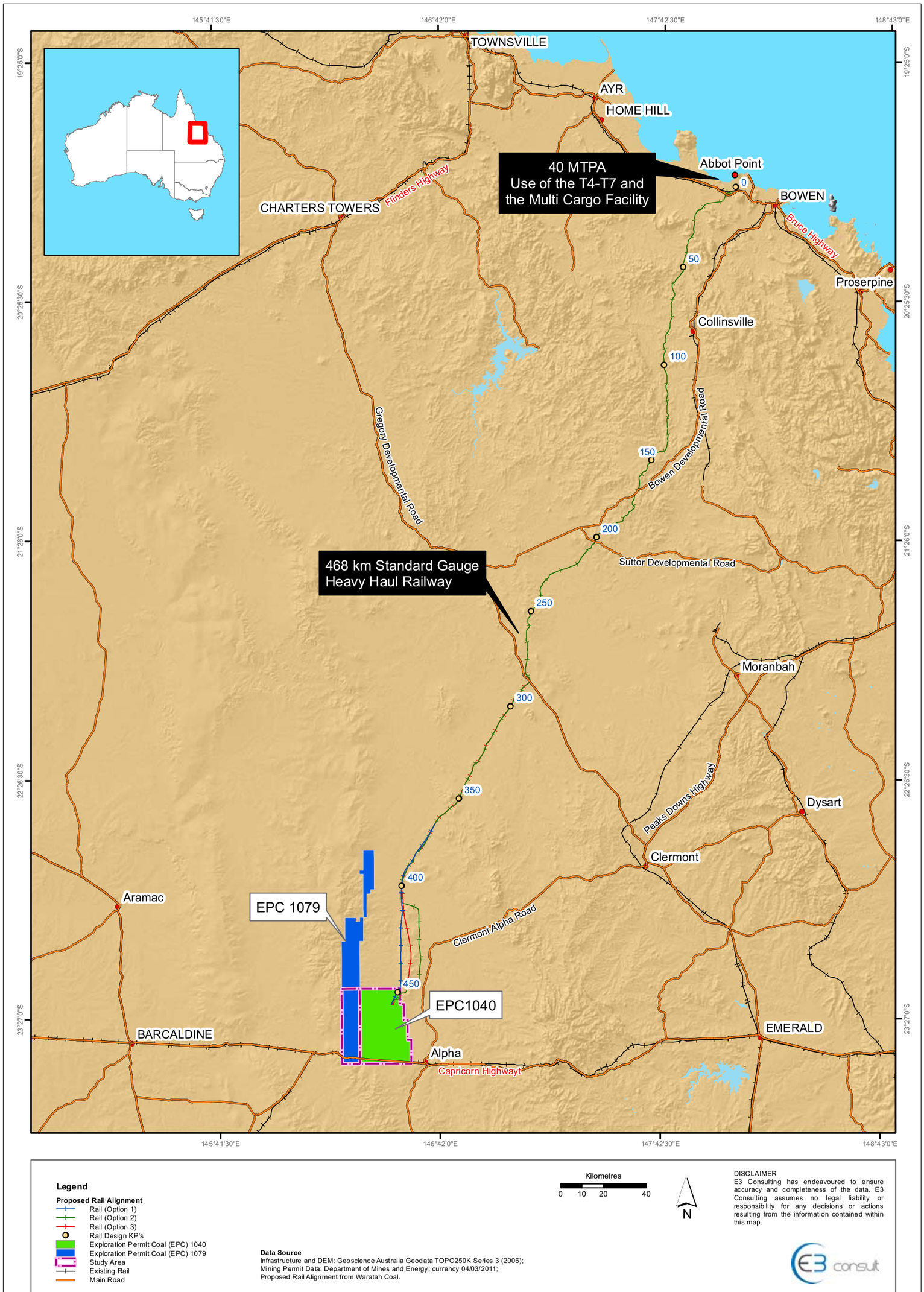
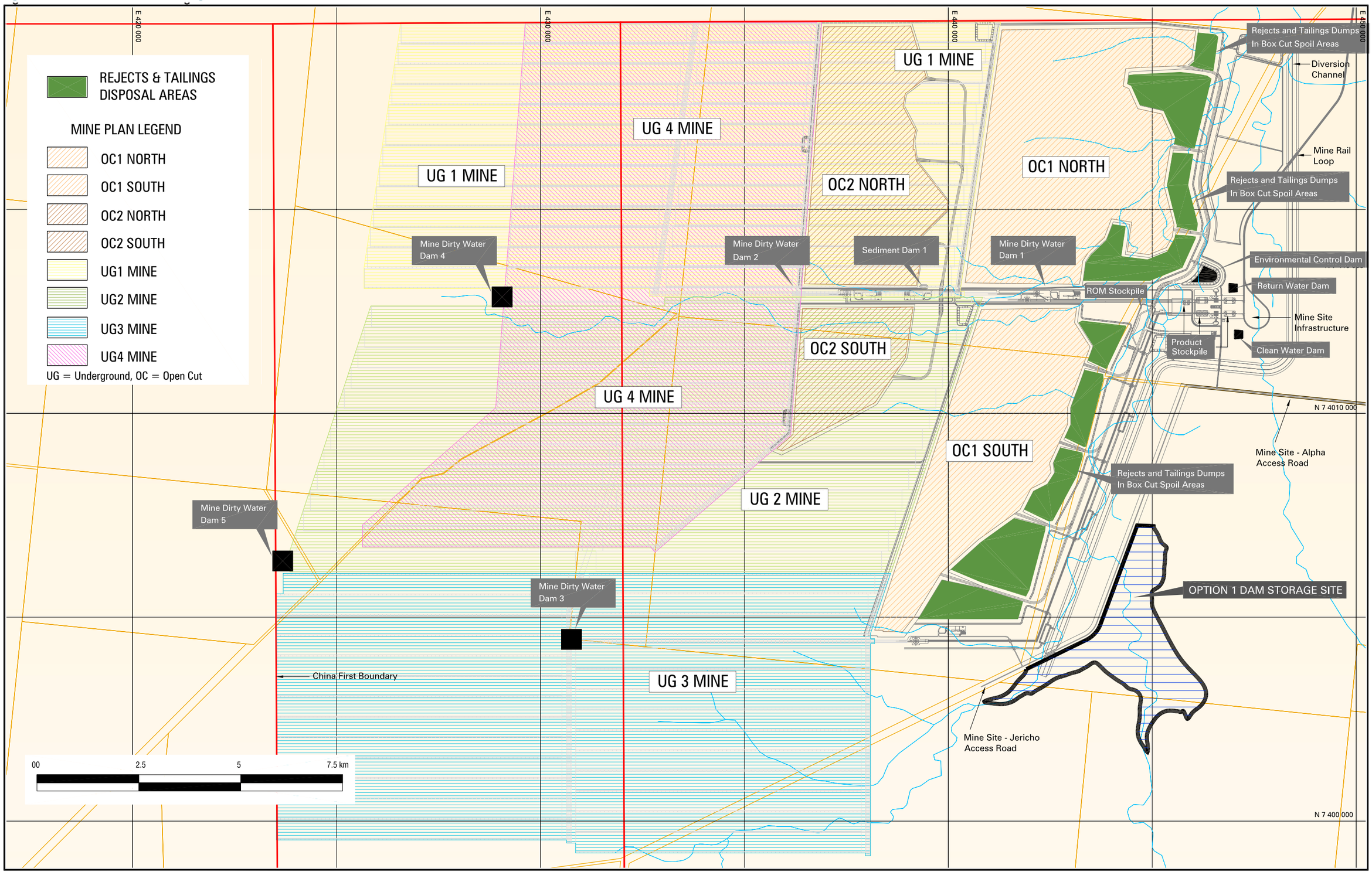


Figure 1. Project Regional Concept

Figure 2. Mine Infrastructure Arrangement



An additional overburden removal system utilising large electric rope shovels loading onto overburden conveyors will also be used in conjunction with the draglines. This configuration offers the flexibility to create additional pit space by moving overburden over longer distances rather than through the use of walking draglines without the expense of truck and shovel fleets to achieve this.

The underground mining system is based on large scale long wall mining with each mine accessing the underground resource at 120 m depth through two cross measure drifts and a ventilation shaft.

The benign structural geology of the Galilee Basin offers an opportunity to mine 7 km long blocks with a 450 m wide long wall face. Extraction height of the long wall faces will vary from 1.8 m to 2.5 m depending on the constraints of seam geology.

1.1.2 RAIL

Studies have been undertaken of the rail network options to the preferred export port location of Abbot Point. These studies have identified that the best option to achieve the minimum possible logistical cost is a new heavy haul, standard gauge rail link operating with 20,000 tonne unit size diesel electric trains.

Initially the transport of 40 Mtpa of export quality washed coal to the coal terminal will require the use of six (6) train sets each comprising four (4) locomotives and 250 wagons, operating on a 24 hour cycle over a six day week. The ultimate scenario, the transport of 400 Mtpa of export quality washed coal to the coal terminal from a number of coal mines in the Galilee Basin will require the use of sixty seven (67) train sets each comprising four (4) locomotives and 250 wagons, operating on a 24 hour cycle over a six day week, generating 134 train movements per day or 1 train every 22 minutes (based on 300 operational days per calendar year). The rail line is approximately 468 km and will operate as a private line **(see Figure 3 to Figure 6)**.

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

Maintenance roads will be constructed within the railway easement along the length of the railway.

The train locomotives will be diesel-electric. The key design characteristics for the proposed railway are outlined in **Table 1** (Railway Design Parameters).

The need for electricity will be limited to providing power for construction camps, signals and telemetry. Fibre optics will be used to support the rail communications system.

Table 1. Railway design parameters

DESCRIPTION	PARAMETER
Corridor width (nominal)	60 - 80 m wide easement which may be larger through significant cuttings
Design speed	80 km/hr loaded, 100 km/hr unloaded
Track	Standard Gauge single track with passing loops at 75 km average spacing
Nett tonnage per train	21,240 t (Standard Gauge)
Train length	3,200 m
Passing loop length	3,500 m
Flood immunity	1 in 100 years (Q100)
Maximum grades	1 in 100 against loaded train, 1 in 80 against unloaded train
Rail bridge design loading	M400
Signalling	Trains to be equipped with state of the art signalling technology with supervision of the drivers actions by the safety system

1.1.3 ABBOT POINT

Waratah Coal requires a suite of infrastructure at the Abbot Point State Development Area (APSDA) to enable the efficient delivery of coal from the Galilee Coal Project (Northern Export Facility) mine via a standard gauge railway, stockpiling, and ultimately export via shipping. The description of the project provided in the Initial Advice Statement (IAS) has been amended to reflect the outcomes of detailed engineering studies by Waratah Coal and the opportunity for Waratah Coal to minimise environmental impacts and exploit economic opportunities by co-locating facilities in locations developed by other proponents.

Notably, Waratah Coal is seeking a tranche location within the newly proposed Terminal 4-7 Project **(refer Figure 7)**. This project is undergoing initial design and is the subject of an expression of Interest (EOI) seeking a response from entities wishing to participate in the development of the T4-7. Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location. This project is yet to undergo a formal environmental assessment process. The EOI released by North Queensland Bulk Ports (NQBP) suggests that NQBP will be responsible for overseeing the assessment process. Consequently this process is external to Waratah Coal and therefore outside the scope of the current EIS. It is anticipated that once NQBP has completed their EIS, resultant conditions of operations from this approval process will be enforced on preferred respondents (i.e., Waratah Coal) via lease requirements and a framework agreement.

As a result of seeking co-location within the APSDA, Waratah Coal has made a number of changes to the coal terminal originally proposed. These changes are addressed in **Volume 4, Chapter 1** of the EIS.

1.1.4 OTHER PROJECT COMPONENTS

The project will include a range of infrastructure to support the operations of the mine. This will include but is not limited to:

- connections to power and water supply services;
- temporary and permanent workers accommodation;
- fencing, roads and tracks;
- potential airstrip capable of landing 20 seater aircraft;
- stormwater and sewerage services;
- telecommunications;
- borrow pits and quarries;
- storage areas and depots; and
- waste facilities.

147°42'30"E

AYR
BOWEN
ABBOT POINT
Collinsville
Dysart
Jericho
Alpha
EMERALD

Abbot Point
Guthalungra
Bruce Highway
BOWEN
Bowen Developmental Road
Collinsville
Scottville

0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90

Sandy Creek
Bogie River
Doni River
Bowen River
Pelican Creek
Emu Creek

20°25'30"S

147°42'30"E

Legend

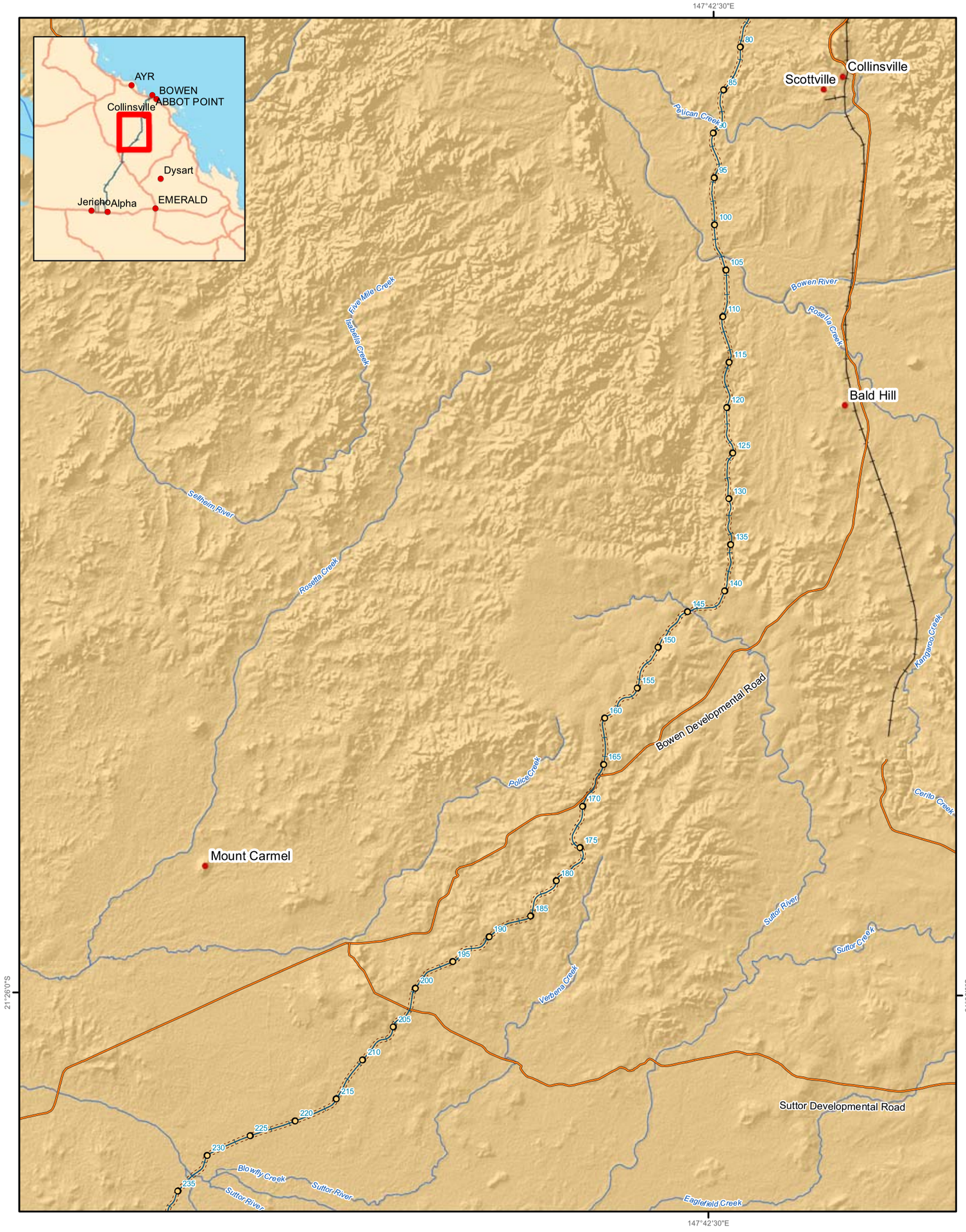
- Proposed Rail Design KP's
- Proposed Rail Alignment
- 500m Rail Corridor
- Abott Point State Development Area
- Existing Rail
- Main Road
- Watercourse

Kilometres
0 2 4 8

N

DISCLAIMER
E3 Consulting has endeavoured to ensure accuracy and completeness of the data. E3 Consulting assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.

Data Source
Infrastructure, watercourse and DEM: Geoscience Australia Geodata TOPO250K Series 3 (2006);
Proposed Rail Alignment from Waratah Coal.



Legend

- Proposed Rail Design KP's
- Proposed Rail Alignment
- 500m Rail Corridor
- Existing Rail
- Main Road
- Watercourse

Kilometres
0 2.5 5 10

N

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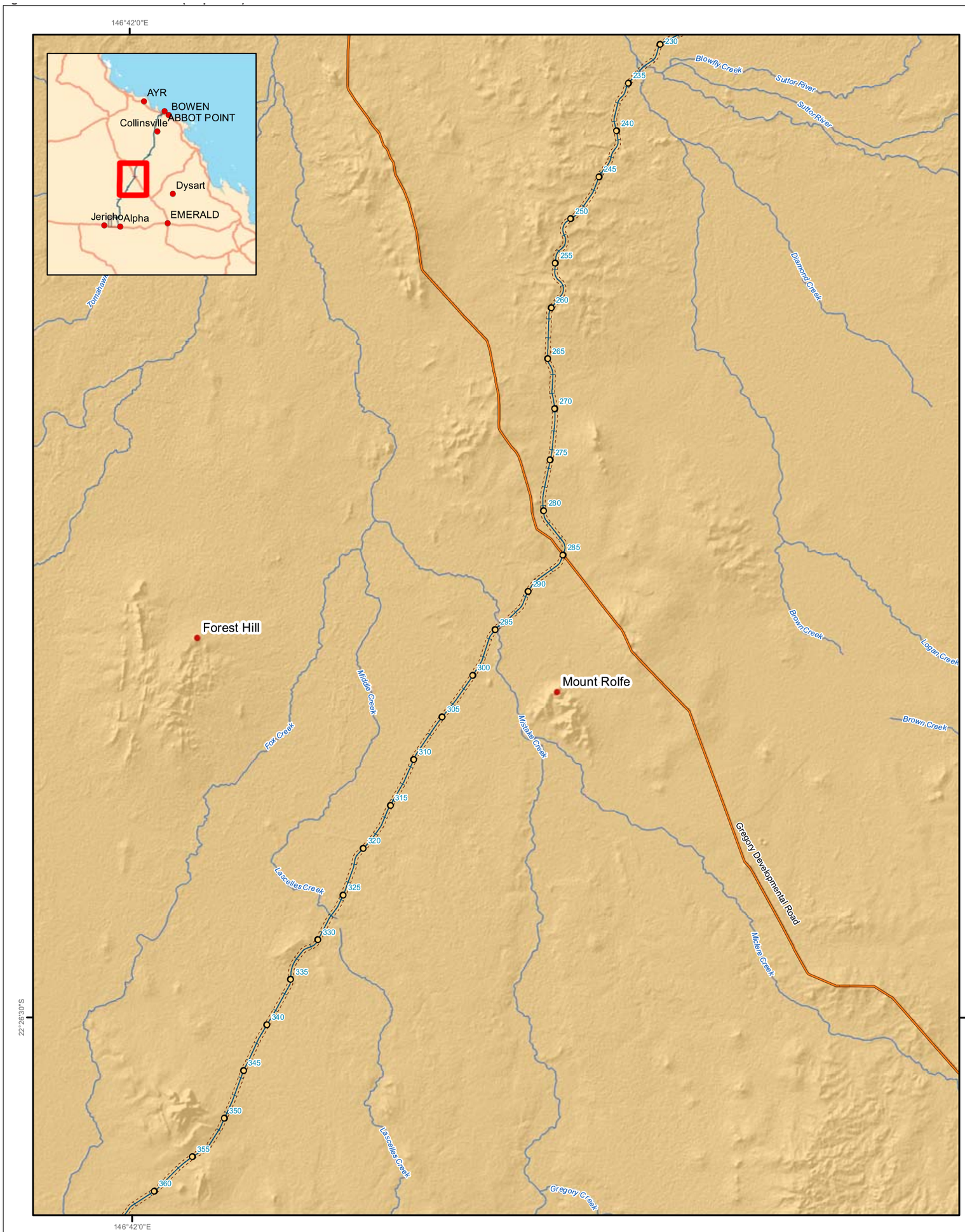
Data Source
Infrastructure, watercourse and DEM: Geoscience Australia Geodata TOPO250K Series 3 (2006);
Proposed Rail Alignment from Waratah Coal.

E3 consult

Figure 4. Rail Corridor – Infrastructure (Map 2 of 4)

Figure 5. Rail Corridor – Infrastructure (Map 3 of 4)



Legend

- Proposed Rail Design KP's
- Proposed Rail Alignment
- 500m Rail Corridor
- Main Road
- Watercourse

Kilometres
0 2 4 8

N

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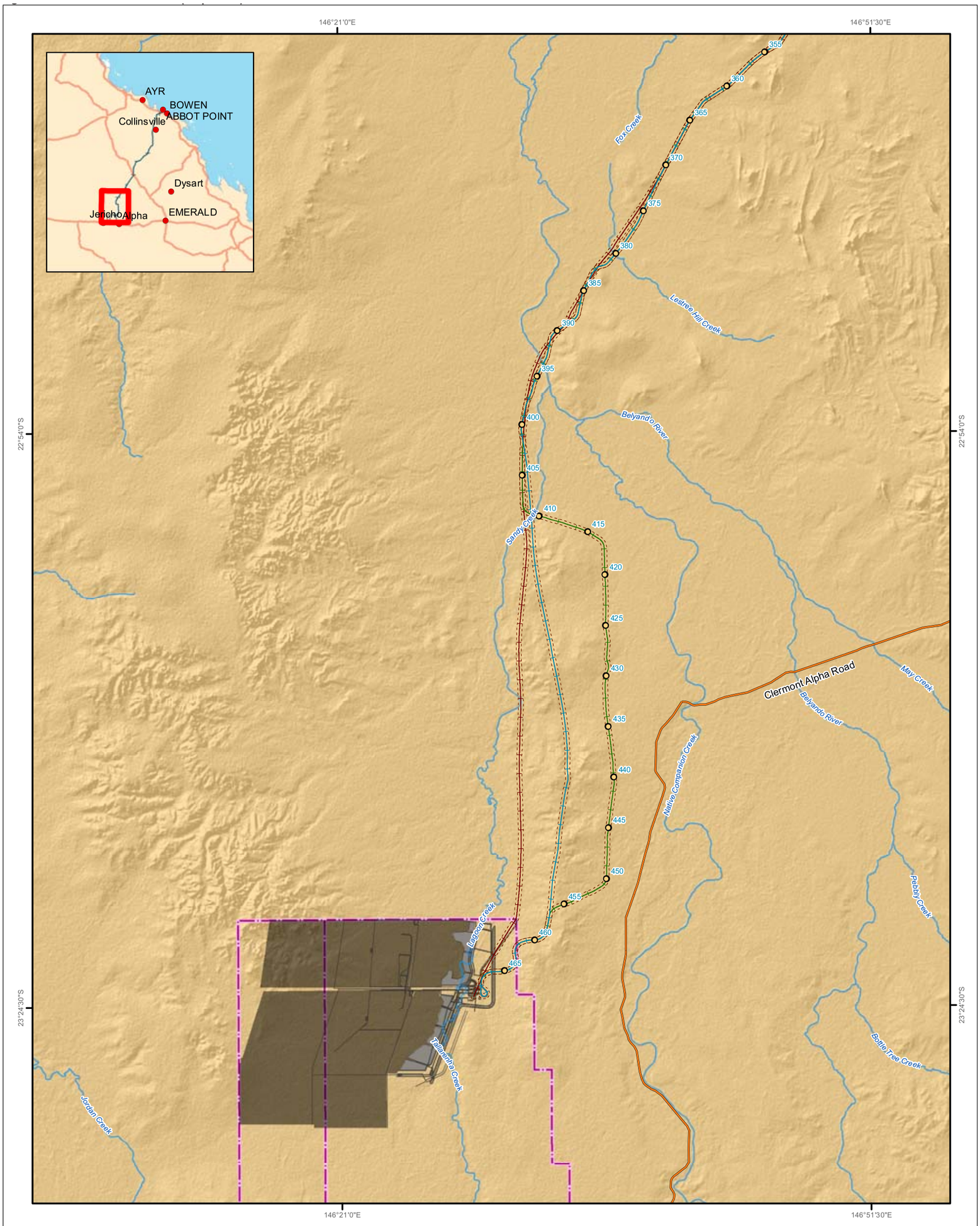
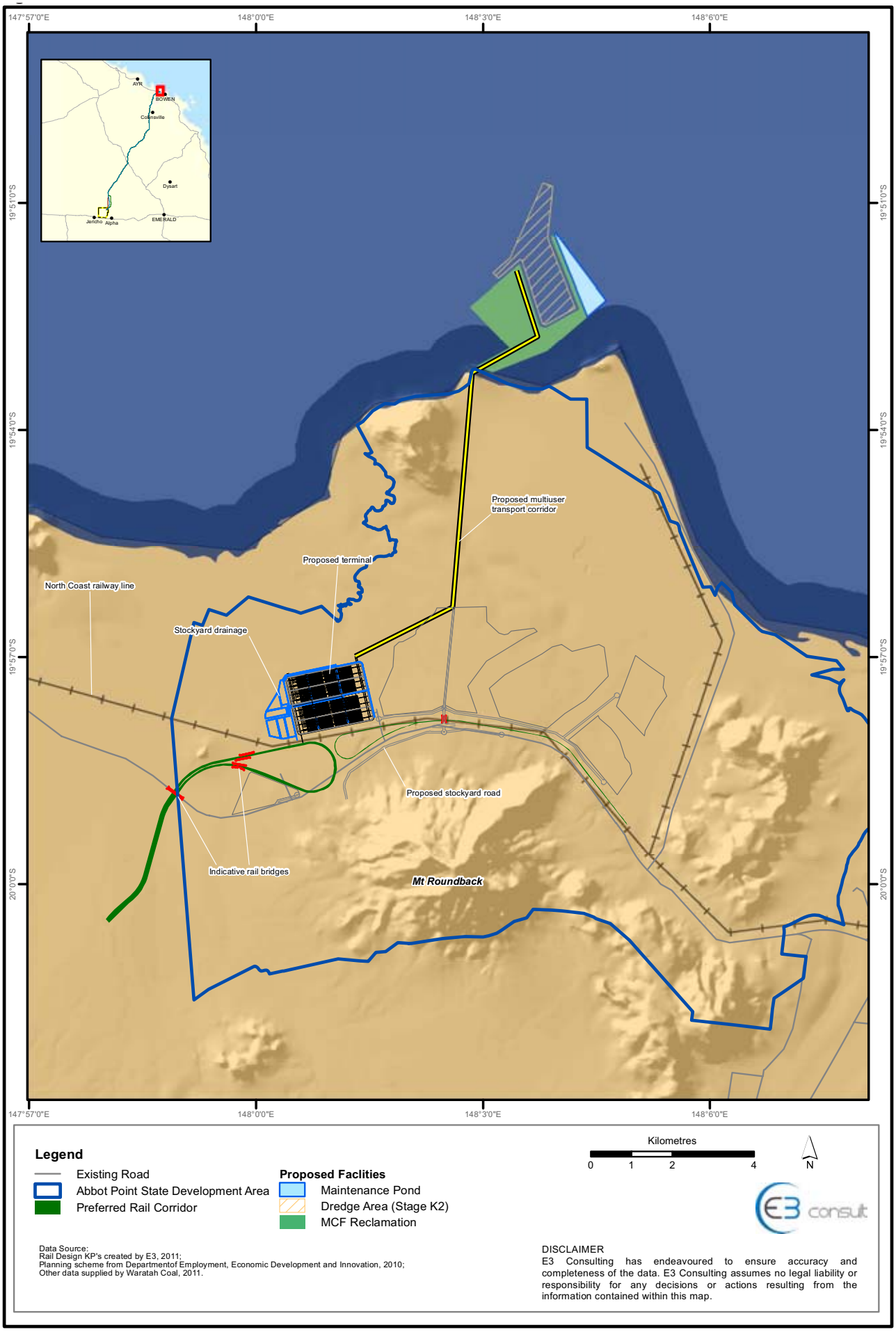


Figure 6. Rail Corridor – Infrastructure (Map 4 of 4)

Figure 7. APSDA Infrastructure



1.2 PROJECT PROPONENT

The project proponent is Waratah Coal, a fully owned subsidiary of Mineralogy Pty Limited. The project will be developed by China First Pty Ltd, a fully owned subsidiary of Resourcehouse and proponent of this EIS.

Waratah Coal presently holds 37 Exploration Permits for Coal (EPC), seven Exploration Permits for Minerals (EPM) and has five EPC applications pending. The total area of all granted tenements is 23,441 km^2 of which 21,561 km^2 represent the area available for coal exploration. The EPM's cover areas already held as EPC's. Additionally, 3,673 km^2 of land are under application by Waratah Coal for new EPC's. All tenements and applications are within Australia, mostly within the state of Queensland.

The contact details for Waratah Coal are as follows:

Manager Environment and Approvals
Waratah Coal
GPO Box 1538
Brisbane Qld 4001.

Waratah Coal's approach to managing environmental aspects for which it is responsible is embodied in the development and implementation of its Environmental Management System (EMS). Waratah Coal's EMS has been developed to be consistent with the internationally recognised EMS standard ISO 14001. In delivering its environmental stewardship responsibilities, Waratah Coal has developed and adopted a systematic approach to managing environmental issues across all activities.

1.3 PROJECT DESCRIPTION

Waratah Coal intends to establish a new coal mine, railway and coal stockyards and supporting infrastructure to export highly volatile, low sulphur, steaming coal to international markets. The project is shown in Figure 1 and will incorporate:

- a new coal mine and associated infrastructure located near Alpha in the Galilee Basin, Central Queensland;
- a rail network between the mine and the Abbot Point State Development Area (APSDA); and
- utilising future coal stockpiling at (T4-7) within the APSDA and port loading facilities within the Multi Cargo Facility (MCF) at the Port of Abbot Point.

Waratah Coal proposes to mine 1.4 billion tonnes of raw coal from its existing tenements, Exploration Permit for Coal (EPC) 1040 and EPC 1079. The mine development involves the construction of four 9 Million Tonnes Per Annum (Mtpa) underground long-wall coal mines, two 10 Mtpa open cut pits, two coal preparation plants with raw washing capacity of 28 Mtpa.

The annual Run-of-Mine (ROM) coal production will be 56 Mtpa to produce 40 Mtpa of saleable export product coal. At this scale of operation, the capital expense of constructing the required rail and port infrastructure is economically viable over the life of the Project.

Processed coal will be transported by a new railway system approximately 468 km in length that runs from the mine in the Galilee Basin to the coal terminal at the existing Port of Abbot Point. The railway component includes a state of the art, heavy haul, standard gauge railway to support 25,000 tonne train units. The final railway easement is expected to be approximately 60-80 m wide and will include both the rail and a service road.

The project will utilise future coal stockpiling and port loading facilities to be developed by North Queensland Bulk Ports Corporation (NQBP) within planned infrastructure at the APSDA and the Port of Abbot Point. Waratah Coal intends to utilise facilities for coal stockpiling at the proposed T4-7 within the APSDA. This project is currently undergoing initial design and is the subject of an Expression of Interest (EOI) (closing on 1 August 2011) from entities wishing to participate in the development of the T4-7. Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location; to develop conveyers within the MUC between the T4-7 and the MCF; and use of two berths at the MCF.

Various supporting infrastructure will also be constructed as part of the project including the connection to new power and water supply infrastructure being proposed by Government.

The project will be developed over three years. The mine will have a life of approximately 30 years, whereas the rail and coal terminal facilities at the APSDA and Port of Abbot Point will continue to operate to support other projects.

The coal mine infrastructure area is situated approximately 30 km north of Alpha. To date, Waratah Coal has identified approximately 1.4 billion tonnes of coal within EPC 1040 and EPC 1079. Coal quality tests confirm that these coal reserves average less than 0.5%

sulphur and possess an average calorific value of 26 MJ/kg, making it a highly volatile and low sulphur product.

The project is intended to have an initial export capacity of 40 Mtpa, with the capability to expand substantially to 100 Mtpa. The project will proceed through a staged development process with first coal loads expected in the 4th quarter of 2014. As the coal will require washing for the export market, an initial 56 Mtpa of ROM coal will be required to provide 40 Mtpa of export coal.

The transport of the coal from the mine to international markets requires the resolution of four key logistical issues, these being:

- higher transport costs than competitors due to distances between the mine and existing Queensland coal ports infrastructure;
- congestion on the existing Queensland Rail (QR) operated narrow gauge rail infrastructure;
- congestion at the existing coal ports; and
- uncertainty over the ultimate ownership of important infrastructure as a result of the proposed privatisation of major infrastructure assets by the Queensland Governments.

In recognition of these issues and to enable coal to be exported at the minimum logistical cost, Waratah Coal proposes to construct the new rail line and coal terminal infrastructure with an initial capacity of 50 Mtpa.

1.3.1 CHANGES IN RAIL ALIGNMENT SINCE FIELD ASSESSMENTS

The field assessments for the rail alignment were undertaken in July 2010. A corridor of 1.6 km (i.e. 800 m either side of the proposed rail alignment) was defined as the study area for the rail assessment. However, since July 2010 the proposed rail alignment has shifted (as depicted in Figures 2 to 5 in Volume 3, Chapter 1) to accommodate design elements and community concerns. The majority of the changes are within the 1.6 km corridor. As a consequence of the changes in rail alignment, the specific amount of REs and other ecological values to be impacted will have changed, and hence for ecological values the results presented herein are indicative, not definitive, at this stage. However, given the relatively minor nature of the changes in alignment, the changes are not considered likely to be significant, and it is likely that the type and magnitude of impacts will be very similar to those presented herein. Waratah Coal are committed to undertaking detailed surveys of all remnant vegetation to be cleared prior to finalisation of the alignment.

1.3.2 CHANGES IN RAIL ALIGNMENT AT THE MINE

The rail alignment at the mine (between KP410-460) has been re-designed to provide an additional two options to limit the impact on Hancock Coal Pty Ltd (EPC1210) at approximately KP450 to KP463. Hancock Coal Pty Ltd has applied for a Mining Lease (ML) over these areas; however, these MLs are yet to be granted. The rail alignment is designed to avoid Hancock Coal's proposed infrastructure within MLA 70426. As a result an additional desktop assessment was undertaken of Options 2 and 3 of the rail alignment using the original field assessments undertaken for Option 1.

This report confirmed constraints associated the land, land use, terrestrial and aquatic ecology, groundwater and surface water resources, waste, traffic and transport, indigenous and non-indigenous cultural heritage were essentially the same or very similar for all three proposed alignments due to the close proximity between each of the alignments.

Assuming Option 2 or 3 become the preferred rail alignment further assessments will be undertaken as part of the Supplementary EIS.

1.3.3 CHANGES IN RAIL ALIGNMENT AT THE PORT

The project will now utilise future coal stockpiling and port loading facilities to be developed by North Queensland Bulk Ports Corporation (NQBP) within planned infrastructure at the APSDA and the Port of Abbot Point. Waratah Coal intends to utilise facilities for coal stockpiling at the proposed T4-7 within the APSDA (refer Figure 7). This project is currently undergoing initial design and is the subject of an Expression of Interest (EOI) (closing on 1 August 2011) from entities wishing to participate in the development of the T4-7. Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location; to develop conveyers within the MUC between the T4-7 and the MCF; and use of two berths at the MCF. The T4-T7 project is yet to undergo a formal environmental assessment process; which will be overseen by NQBP. NQBP has confirmed that rail infrastructure requirements from the mine to the coal terminal (in loader) will be the responsibility of the terminal owners to arrange separately, including seeking approval from the Coordinator General. Any rail

infrastructure proposed will be required to demonstrate consistency with the Development Scheme for the APSDA, with regards to its objectives and purpose of the land use precincts.

It is anticipated that once NQBP has completed their assessments, Waratah Coal will need to undertake additional field assessments of the rail alignment particularly between KP5-KP16 as the final rail alignment corridor is confirmed.

1.3.4 INCREASE IN CAPACITY OF THE RAIL ALIGNMENT

Since the field assessments were undertaken for the rail alignment in July 2010, Waratah Coal has undertaken further assessment to investigate the feasibility of increasing the capacity (tonnage) of the rail alignment from 60 Mtpa-400 Mtpa (ultimate design capacity).

This investigation of increased capacity of the rail alignment has been instigated by concerns from both the community and Government regarding the environmental and social impact of multiple rail alignments from the Galilee Basin. Investigations undertaken by Waratah include; Air Quality and Greenhouse Gas, Noise and Visual Impact, these reports recommend the following additional mitigation measures:

- Air Quality and Greenhouse Gas

  The following dust control methods are proposed with the aim to reduce dust emissions by 80%:

  - Implementing partial covers for the coal wagons; and/or
  - Wetting down the coal in each wagon before leaving the coal mine.

The revised Air Quality and Greenhouse Gas Assessment is provided in **Volume 3, Chapter 10** and **Volume 5 Appendices 18 & 19**.

- Noise and Vibration

  It is concluded that to achieve the 24 hour noise criterion for the rail corridor for the 400 Mtpa scenario, the residences at Hobartville, Riverview, Lenore Station, Salisbury Plains and Colinta Holdings would require either:

  - relocation of the residence or some other form of change of use for the residences so they would no longer be noise-sensitive locations; or
  - attenuation of the rail noise through the use of noise barriers adjacent to the rail line. Heights and their locations would be determined during the detailed design of the rail line.

The revised Noise and Vibration Assessment is provided in **Volume 3, Chapter 11** and **Volume 5 Appendix 20**.

- Visual Impact

  There are now 7 homesteads in the high impact zone compared to only 4 previously, the following mitigation measures are recommended for the ultimate scenario (400mtpa):

  - The most highly impacted of the homesteads will be buffered by extensive planting/mounding or both with consultation with their owners;
  - Grade separated crossings will include planting on batters to create vegetated regions at these crossings. The Clermont Alpha Road will gain a 1km vegetation buffer between road and rail to maintain the visual landscape character of the area;
  - The rail alignment will be designed to cross level crossings of minor roads at right angles and not be aligned parallel to roads on approach;
  - Duplication of the rail alignment will require installation of signalised crossings for other minor roads intersected by the rail alignment; and
  - Where all other mitigation measures fail to alleviate the visual impact, a separation of 1.5km between the rail and homesteads will be created by the relocation of the homesteads to areas of low to incidental impact.

The revised Landscape & Visual Amenity Assessment is provided in **Volume 3, Chapter 5** and **Volume 5 Appendix 8**.

Waratah Coal has not undertaken any additional ecological assessments because, the increase of capacity of the rail alignment can be accommodated within the proposed corridor and, the original calculations of the amounts of ecological values to be impacted were based upon an ultimate corridor width of 100 m. In addition, because the ultimate corridor width will be 60-80 m and as little as 40 m wide (if required) in sensitive locations **(refer Figure 6** in **Volume 3, Chapter 1)** the specific amount of REs and other ecological values to be impacted will not have changed.

Waratah Coal also understand from the Rail Selection Assessment (refer section 1.1.3 of Volume 3, Chapter 1) that it is feasible for the proposed railway to be developed to carry up to 400mtpa of coal from the Galilee Basin over a number of stages as follows:

- Single line with up to 6 passing loops = 40 Mtpa;
- Single line with up to 9 passing loops = 60 Mtpa;
- Single line with up to 12 passing loops = 80-120 Mtpa; and
- Dual line with up to 16 passing loops = 120-400 Mtpa.

The frequency of train movements along the rail alignment at 400 Mtpa capacity will be:

- Up to 67 trains each way, assuming 300 days operation per calendar year;
- Up to 16 passing loops;
- Passing bays of at least 3.5 km long;
- Trains will be approximately 3.2 km in length;
- Trains will travel at a maximum of 80 km/h fully loaded
- Trains will travel at a maximum of 100 km/h empty; and

Total number of trains will be 134 per day, one train every 22 minutes.

1.4 PROJECT RATIONALE

The coal mine infrastructure area is situated approximately 30 km north of Alpha. To date, Waratah Coal has identified approximately 1.4 billion tonnes of coal within EPC 1040 and EPC 1079. Coal quality tests confirm that these coal reserves average less than 0.5% sulphur and possess an average calorific value of 26 MJ/kg.

The project is intended to have an initial export capacity of 40 Mtpa, with the capability to expand substantially to 100 Mtpa. The project will proceed through a staged development process with first coal loads in 2014. As the coal will require washing for the export market, an initial 56 Mtpa of ROM coal will be required to provide 40 Mtpa of export coal.

The transport of the coal from the mine to international markets requires the resolution of four key logistical issues, these being:

- higher transport costs than competitors due to distances between the mine and existing Queensland coal ports infrastructure;
- congestion on the existing Queensland Rail (QR) operated narrow gauge rail infrastructure;
- congestion at the existing coal ports; and
- uncertainty over the ultimate ownership of important infrastructure as a result of the proposed privatisation of major infrastructure assets by the Queensland Governments.

In recognition of these issues and to enable coal to be exported at the minimum logistical cost, Waratah proposes to construct the new rail line and coal terminal infrastructure with an initial capacity of 56 Mtpa.

1.4.1 PROJECT DEMAND

Over the last 15 years the rapid growth in the world's economy has resulted in a swift increase in global fuel consumption, principally in oil, coal, natural gas and other fossils fuels. In particular, the demand for coal has increased considerably due to its low price and reliable supply, compared to other fossil fuels. Australia being the world's leading exporter of coking and thermal coal, holds a strong position with future international coal trade as it continues to improve its inland transportation and port infrastructure to expedite coal shipments to international markets.

The Australian Bureau of Agricultural and Resource Economics (ABARE) predict that global thermal coal imports will increase by 19% over the next 5 years. The growth over this outlook is likely to be driven predominately by developing Asia (in particular China, India and Korea), which reflects their increasing economic reliance on coal-fired electricity generation which cannot be met by their domestic supplies.

In 2007, 58% of the world's exported thermal coal was imported by Asian countries, which is expected to steadily rise to 65% by 2030. Australia has large proven reserves of thermal coal, including an estimated 14 billion tonnes of inferred coal resource lying untapped within the Galilee Basin. Being well situated geographically to Asian markets, Australia is in a strong position to be a major supplier to these coal dependant countries.

In 2009, China became a net importer of thermal coal, with it importing an estimated 84 million tonnes of steaming coal, up by 137% from the previous year. The ABARE forecasts that this will further increase to 100 million tonnes by 2015.

The ABARE forecasts a steady growth in thermal coal exported from Australia to be between 6 to 9 % per annum, up to 200 Mtpa, by 2014-15. For Queensland this represents an excellent opportunity to expand its global market for thermal coal through the rapid development of the Galilee Basin and associated infrastructure.

1.4.2 PROJECT COSTS, BENEFITS AND TIMEFRAMES

It is estimated that the construction of the project will require an investment of US$8.1 billion consisting of:

- port and onshore infrastructure – A$2 billion;
- railway – A$2.1 billion; and
- mine – A$4 billion.

The project will realise significant economic and social benefits on a regional, state and national scale. The rail corridor will open a new multi-billion tonne coal province with opportunities for thermal coal export to world markets for both Waratah Coal, as well as other Galilee Basin proponents through welcomed third party access arrangements. It will also provide much needed new rail infrastructure in Central Queensland to ease existing congestion on the current coal haulage systems.

The project will generate considerable export income for the Australian economy with revenue of $4.6 billion per annum, or $85 billion over the life of the project. Commonwealth and State Government revenue will also be increased through taxes and royalties of up $360 mpa (State) and $700 mpa (Commonwealth) respectively from the project alone.

The project will assist in driving the growth of Central and North West Queensland, creating approximately 3,500 direct jobs during construction and 2,360 permanent employees for the long term operation of the mine, rail and port facilities. A flow through benefit of an additional 70,000 indirect jobs is anticipated, with the majority of these expected to occur in Queensland.

The project will generate additional expenditure to the regional economy as local suppliers, service providers and contractors participate in the project. The project will assist progression across general regional development of both the Northern Economic Triangle and Central Queensland. There exists an opportunity for a fibre optic cable used for the railway communications systems to provide a platform to enhance broadband capacity of the region, as well as provisions for new water and power infrastructure servicing this remote area.

The project is committed to commence early engineering works in late 2010 with final construction due for completion in 2014. This schedule is based on a high level assessment of the time required for the design, supply and construction of the various project elements following a conventional contracting strategy.

1.4.3 FINANCING AND DEVELOPMENT

Waratah Coal has appointed MCC Overseas Ltd (MCC), one of the world's largest engineering and construction companies, as principle engineering, procurement and construction management contractor (EPCM) for the $8.1 Billion AUD project. MCC will manage a syndicated group consisting of China Overseas Engineering Group (COVEC), China Communications Construction First Harbor Consultants (CCCC) and Sinocoal International Design and Research Institute (SCIEG), to design and construct one of Australia's largest coal mines along with the required export infrastructure. Waratah Coal has made a financial decision to proceed with the China First Coal Project following the completion of their Bankable Feasibility Study (BFS) by MCC, in conjunction with specialist consultants SCIEG, COVEC and CCCC. The BFS has been completed showing strong profitability, with the debt funding and equity raising well advanced. The project will see 85% of the debt funding provided from lending institutions in China, estimated to be $5.6 Billion AUD. The remaining 15% equity ($2.4 Billion AUD) is expected to be funded by cash proceeds from an IPO of Resourcehouse on the Hong Kong Stock Exchange set for completion mid-2011.

Further to this, Resourcehouse has signed coal purchase and supply agreement with China Power International Holding Ltd, conditionally agreeing to take 50% of the future mine production, generating an estimated revenue of $80 Billion USD. This speaks volumes for the strength and interest from China and other energy hungry markets in developing a new world class coal region such as the Galilee Basin.

1.4.4 CONSEQUENCES OF NOT PROCEEDING

If the project does not proceed, the cost to the Commonwealth and State would include:

- approximately 3,500 construction jobs, comprising 2,500 at the mine and 1,000 for the rail alignment;
- permanent employment of approximately 2,360 jobs, comprising 1,900 at the mine in Alpha and 460 at Bowen to service the Rail (275) and Port (185);
- loss of export income and revenue injection into the regional economy;
- loss of taxes and royalties to the Commonwealth and State;
- lost opportunity of infrastructure and services development within Alpha, Bowen and the greater region; and
- the economic opportunity of developing this viable coal reserve will not be realised.

1.5 RELATIONSHIP TO OTHER PROJECTS

A number of projects are proposed in proximity to the project. These projects are in various stages of approval and / or development. Where information is available and the projects could potentially contribute to cumulative impacts they have been detailed in the EIS. These projects have also been considered in the cumulative impacts assessment section of the EIS (see Volume 1, Chapter 5).

As a requirement of the project's Terms of Reference (ToR), Waratah Coal has completed a high level assessment of potential cumulative environmental, social and economic impacts associated with the development of its own project components as well as external existing or proposed projects.

External projects considered for inclusion in this Cumulative Impact Assessment (CIA) were identified by their geographic overlap with Waratah Coal's project components. Once identified, a high level assessment was undertaken to determine the availability of information accessible to Waratah Coal to undertake a reasonable assessment of cumulative impacts. Where a project could not reasonably and practically be assessed for impacts due to a lack of available literature the project was not considered any further. This refinement process resulted in eight projects being identified as likely to be suitable for inclusion in the Cumulative Impact Assessment. These are identified in Table 2. Prior to further assessment, these projects were discussed and agreed as meeting ToR requirements with both Department of Environment and Resource Management (DERM) and Department of Employment, Economic Development and Innovation (DEEDI (formerly DIP)).

Table 2. Projects included in Waratah Coal's cumulative impact assessment

PROPONENT	PROJECT	DESCRIPTION	LOCATION	STATUS	RELATIONSHIP / IMPACT ON WARATAH COAL
IsaLink Pty Ltd	IsaLink High Voltage Direct Current Transmission	Construction of 1100 km of transmission line, a converter station at the connection to National Grid, a converter station (at or near the mine) and an upgrade of the existing AC line between Ernest Henry and Mount Isa.	Rockhampton to Cloncurry	EIS is on hold.	Directly affected. Transmission line crosses mining tenements of Waratah Coal.
Hancock Prospecting Pty Ltd	Alpha Coal Mine	Construction and operation of a mine, rail line and coal terminal facilities.	Alpha and Abbot Point or Dudgeon Point	EIS submitted.	Directly affected. Overlap of proposed rail line.
Galilee Power Pty Ltd, a fully owned subsidiary of Waratah Coal Pty Ltd	Galilee Basin Power Station	Coal-fired power station that incorporates clean-coal low emission power generation technology and carbon capture and storage (CCS) to comply with the Queensland Government's ClimateQ: toward a greener Queensland strategy.	Alpha	IAS submitted further documentation on hold.	Owned by Waratah Coal.
Hancock Galilee Pty Ltd, wholly owned by Hancock Prospecting Pty Ltd	Kevin's Corner	Open cut and underground coal mine.	Alpha	IAS submitted, ToR finalised and EIS in progress.	Direct impact on Waratah Coal.
NQBPC	Abbot Point Multi Cargo Facility	Multi-cargo coal terminal facility at Coal terminal of Abbot Point to provide for coal terminal/coal terminal of, predominantly, bulk commodities.	Abbot Point	EIS submitted.	Will be used as offshore component of this project.
AMCI (Alpha) Pty Ltd	South Galilee Coal Project (SGCP)	SGCP proposes to develop a Greenfield coal mine.	Immediately SW of the township of Alpha – 160 km W of Emerald and 450 km W of Rockhampton	IAS submitted, ToR finalised and EIS in progress.	SGCP plans to utilize common-user rail and coal terminal facilities proposed to be developed by either Hancock Prospecting Pty Ltd or Waratah Coal Pty Ltd.
NQBPC	Terminals 2 & 3	Expansion of the T2 (previously X80) and T3 (previously X110) projects	Abbot Point	Draft Voluntary EIS (VIES) submitted.	Close proximity to the proposed terminals T4-7 for Abbot Point.
Drake Coal Pty Ltd	Drake Coal Project	New Coal mine and CHPP.	17km south of Collinsville	VEIS approved.	Proposed rail line will pass near this project.

Specific cumulative impacts on environmental, social and economic values were then assessed at an individual project level across the eight identified projects which encompass the Barcaldine, Issac and Whitsundays Regions.

In assessing cumulative impacts, Waratah Coal adopted a conservative approach. For example, the Cumulative Impact Assessment has assumed that the timing of the construction of the assessed projects will be concurrent with the project. Whilst this is not necessarily the case in reality, the assumption of concurrence has allowed the proponent to apply a conservative approach to impact assessment.

The cumulative impact assessment was undertaken in two parts. First, the impacts associated with project components (coal mine, rail alignment and coal terminal) were assessed to determine the overall impact of the project.

Second, cumulative impacts associated with Waratah Coal's project components and eight external regionally occurring projects were assessed.

Overall, the results of this assessment have identified that the most significant cumulative impacts associated with the development of the project and other external projects within Waratah Coal's area of interest relate to the following aspects:

- surface water and aquatic ecology:
  - changes to natural water flow paths and regimes associated with the construction of culverts, bridges and similar infrastructure; and
  - disturbance to the nationally important Caley Valley wetlands.
- nature conservation:
  - adverse effects to sensitive areas and protected native flora; and
  - adverse effects on native and or migratory fauna.
- social impact:
  - impacts associated with dilution of the community values of towns like Alpha caused by a transient population.
- economic impact:
  - crowding out of business due to competition for resources and in particular, labour; and
  - reduction in the availability of affordable housing in the region.

To combat these potential impacts, Waratah Coal has developed and is committed to implement multiple mitigation strategies. These include:

- developing and implementing appropriate methods for minimising impacts to regional water quality. The methods include the development of Erosion and Sediment Control Plans (ESCP), Acid Sulfate Soil Management Plans for surface waters, and a Water Quality Monitoring Program during construction and operational phases;
- offsetting impacts to the natural environment. Waratah Coal has committed to implementing offsets for flora and fauna and vegetation impacts, developing Species Management Plans, Weed Management Plans and undertaking targeted species monitoring programs. Collectively, these approaches will aid Waratah Coal in minimising it's impacts to natural values;
- minimising Impact to social values. Waratah Coal has committed to implementing a suite of measures aimed at aiding the development of Alpha, developing opportunities for labour through preferential employment opportunities for local communities and engaging in a coordinated approach to infrastructure development in the local area; and
- maximising the economic benefits to local communities. Waratah Coal has committed to implement measures which will address labour skills shortages and, develop the local supply chain to ensure prosperity remains in the local regions and local businesses remain viable.

Waratah Coal is committed to minimising potential negative impacts and maximising social benefits and economic opportunities across all project phases. As an active participant in the region, Waratah Coal will undertake this project in a manner which seeks to minimise cumulative impacts to the environmental, social or economic values of the region.

1.6 ALTERNATIVES TO THE PROJECT

In development of the project a series of alternatives have been examined as follows:

1.6.1 MINE

Waratah Coal proposes to mine 1.4 billion tonnes of raw coal from its existing tenements, EPC 1040 and part of EPC 1079 as an open cut and underground operation. Waratah Coal also holds Exploration Permits for Coal on EPC 1039, 1053 and the balance of EPC 1079 that will be developed (in the future) as an underground operation.

The balance of Waratah Coals tenements within the Galilee Basin are 'coal to liquid' potential resources used for power generation and chemical plants, and are more expensive to access than traditional coal mining operations.

The Galilee Basin covers up to 250,00 km^2 of central Queensland, the actual coal-bearing section of the mining area is about 879.85 km^2 and the resources in it are estimated to be 8.679 billion tonnes.

The coal reserves for this project vary in thickness across the deposit ranging from less than 20 metres in the north, then increasing in thickness to greater than 100 metres to the south. This coal reserve encroaches on the Bimblebox Nature Reserve (BNR) which is some 8000 ha and is located in the central western side of EPC 1040. This BNR is listed as a Category C environmentally sensitive area. The coal within the BNR is the highest quality and most shallow coal and contributes over 30% of the coal to be mined. As such, the project will not be viable without coal reserves under the BNR.

Due to the nature of this coal deposit, the remote location of the Galilee Basin and the considerable amount of infrastructure required to be developed it is not economically feasible to relocate the mine area.

1.6.2 RAIL

Waratah Coal engaged specialist consultants and contractors Worley Parsons, China Overseas Engineering Group Corporation (COVEC), and Trimble Planning Solutions to conduct studies into the feasibility of the railway corridor and associated infrastructure to ensure its financial viability and design capacity will meet future demands.

During the concept study and feasibility study, various rail alignments were investigated. The following elements were considered in determining the alignment:

- Sustainability;
- Capital Cost;
- Environment;
- Social Impacts; and
- Engineering Capabilities.

The objective of the railway development process was to identify the most technically feasible corridor between the mine site and port, that achieved the minimum rail engineering and safety requirements for a state of the art heavy haul railway, protected the environment where possible, supported local land use plans and policies, and was compatible with the small number of surrounding communities. Consideration was given to accommodating potential third party users, as was the possible integration of the new route into existing rail infrastructure systems such as the Queensland Rail (QR) operated Goonyella and Blackwater railway systems.

A research area banding a 50 km to 100 km wide corridor from mine to coal terminal was investigated. Initial infrastructure options for the railway were developed by Worley Parsons, which were further refined using Trimble's Quantm Alignment Planning System to manage the complex range of constraints influencing the corridor selection process.

The Quantm system is a computer-based optimisation tool that simultaneously optimises the horizontal and vertical alignment to deliver a range of alternatives that provide improved environmental outcomes, while simultaneously meeting engineering, community and heritage constraints and reducing project construction costs. Based on the user defined criteria, the system investigates millions of alignment options per scenario. This enables the planner who has local knowledge and experience to determine the most optimal outcome based on a wide range of criteria.

In refining the final corridor the project's impact to the natural environment was reduced by avoiding all National Parks, state forest, nature refuges and major wetlands. Footprint encroachment through protected vegetation was minimised through the inclusion of Regional Ecosystem mapping (Endangered and Of-concern) in the assessment. The route was further refined to ensure perpendicular crossings of major

rivers and short passages across their large floodplains wherever practical. Areas of the route that traversed challenging topography, particularly the steep slopes of the Leichhardt and Clarke Ranges, were refined to more closely conform to natural contours and provide better compliance to crossings of existing constraints.

The selected route ensures minimal impacts to current land-use infrastructure including townships, roads, railways and other utilities. The route avoids all major water pipelines; however, it passes under three major transmissions lines and over the North Queensland Gas Pipeline near the Bowen River. Where the route crosses existing linear infrastructure, suitable clearances have been allowed for to minimise impact to these.

A detailed description of the rail corridor location and selected route is presented in Volume 3, Chapter 1 of the EIS.

1.6.3 PORT

The project will utilise future coal stockpiling and port loading facilities to be developed by North Queensland Bulk Ports Corporation (NQBP) within planned infrastructure at the APSDA and the Port of Abbot Point. Waratah Coal intends to utilise facilities for coal stockpiling at the proposed T4-7 within the APSDA. This project is currently undergoing initial design and is the subject of an Expression of Interest (EOI) (closing on 1 August 2011) from entities wishing to participate in the development of the T4-7. Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location; to develop conveyers within the MUC between the T4-7 and the MCF; and use of two berths at the MCF. The T4-T7 project is yet to undergo a formal environmental assessment process; which will be overseen by NQBP. NQBP has confirmed that rail infrastructure requirements from the mine to the coal terminal (in loader) will be the responsibility of the terminal owners to arrange separately, including seeking approval from the Coordinator General. Any rail infrastructure proposed will be required to demonstrate consistency with the Development Scheme for the APSDA, with regards to its objectives and purpose of the land use precincts.

It is anticipated that once NQBP has completed their assessments, Waratah Coal will need to undertake additional field assessments of the rail alignment particularly between KP5-KP16 as the final rail alignment corridor is confirmed.

1.7 CO-LOCATION OPPORTUNITIES

In development of the project a series of co-location opportunities have been examined with other proponents as follows:

1.7.1 MINE

Power requirements for the mine are likely to be supplied by means of a dedicated 275 kV overhead line from the distributor at Lillyvale, feeding into a HV substation on the mine lease. A Power Allocation (Power Enquiry) has been made to Powerlink by both Waratah Coal and AMCI seeking confirmation of a regulated or unregulated supply to both mines. This power supply will be subject to a separate EIS process.

Waratah Coal's preferred option for water supply is a proposed dam on the Tallarenha Creek. Alternatively, should the dam prove un-feasible Waratah Coal propose to access the Sunwater proposed pipeline from the Connors River Dam on a user pays basis.

Waratah Coal intend to utilise an upgraded Alpha Airport for the fly-in / fly-out activities. It is expected that the Barcaldine Regional Council (BRC) will seek the approvals necessary for the upgrade of Alpha Airport. It is noted that AMCI also intend to use Alpha Airport for the fly-in / fly-out activities. Waratah Coal will work with both Council AMCI and the community regarding the proposed upgrade to the Airport and other associated infrastructure within Alpha as part of the Supplementary EIS phase.

1.7.2 RAIL

Currently there are three other projects that are proposing to construct rail infrastructure from the Galilee Basin for the transportation of coal. These projects are the Alpha Coal Project (Hancock Prospecting Pty Ltd), the Carmichael Coal Project, (Adani Mining Pty Ltd) and the South Galilee Coal Project [AMCI (Alpha) Pty Ltd & Alpha Coal Pty Ltd (Bandanna Energy)]. Given the significant engineering differences between the Alpha Coal rail proposal and the Waratah Coal rail proposal, it is unlikely that significant co-location will be achievable due primarily to topographic constraints. However; Waratah Coal has 'in principle' agreement with AMCI (proponents of the South Galilee Coal Project), Adani Mining Pty Ltd (proponent of the Carmichael Coal Project) and the Meijin Group (trading as Macmines Austasia Pty Ltd) regarding third party usage of the proposed rail infrastructure.

1.7.3 PORT

As indicated in section 1.7.3 the project will now utilise future coal stockpiling and port loading facilities to be developed by North Queensland Bulk Ports Corporation (NQBP) within planned infrastructure at the APSDA and the Port of Abbot Point. Waratah Coal intends to utilise facilities for coal stockpiling at the proposed T4-7 within the APSDA. This project is currently undergoing initial design and is the subject of an Expression of Interest (EOI) (closing on 1 August 2011) from entities wishing to participate in the development of the T4-7.

Waratah Coal is seeking preferred respondent status in this project which would award the right to develop a site at the T4-7 location; to develop conveyers within the MUC between the T4-7 and the MCF; and use of two berths at the MCF.

1.8 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

1.8.1 METHODOLOGY OF THE EIS

The purpose of the EIS is to provide information on the nature and extent of potential direct and indirect environmental, social and economic impacts (both positive and negative) associated with the construction and operation of the project. Specifically, the EIS provides:

- an understanding of the project, the existing environment affected by the project, the potential impacts of the project and measures to be undertaken to mitigate adverse impacts;
- an outline of the impacts on the surrounding area in terms of community interests, infrastructure and land use;
- a framework for decision-makers to consider the environmental aspects of the project in view of legislative and policy provisions to determine whether the project can proceed and the relevant conditions for approval to ensure environmental compliance and recommended environmental management and monitoring programs based on legislative requirements;
- a source of information from which interested parties may gain an understanding of the project, the need and benefits, alternatives, the affected environment, potential impacts and measures to minimise these impacts; and
- a document for public consultation and informed consent on the project.

Through this EIS, Waratah Coal is seeking assessment and approval from the State and Commonwealth for the following components of the project:

- a new operational coal mine producing 56 Mtpa;
- a new standard gauge heavy haul rail line linking the mine to new coal stockyards at a terminal in the APSDA;
- new coal stockyards in the APSDA; and
- a new overland conveyor system within the APSDA infrastructure corridor linking the stockyards in the APSDA to the proposed MCF or a new coal terminal at the Port of Abbot Point.

Waratah Coal referred the project to the Commonwealth Minister for the Environment, Heritage and the Arts on 11 February 2009 for a decision as to whether the project constituted a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Referral No. 2009/4737.

On 20 March 2009 the Minister determined that the project constituted a 'controlled action' as it has the potential to have a significant impact on Matters of National Environmental Significance (MNES). The controlling provisions were determined as:

- sections 12 and 15A (world heritage properties);
- sections 15B and 15C (national heritage places);
- sections 18 and 18A (listed threatened species and communities);
- sections 20 and 20A (listed migratory species); and
- sections 23 and 24A (Commonwealth marine areas).

The Minister further determined that environmental assessment of MNES is to be undertaken in accordance with Part 8 of the EPBC Act to be administered by Department of Sustainability, Environment, Water, Population and Communities (DSEWPC).

1.9 PUBLIC AND STAKEHOLDER CONSULTATION

Waratah Coal is committed to effective community engagement throughout the project's development and operational phases. This is an important and necessary process to build and maintain relationships with impacted communities and other stakeholders; to contribute as appropriate to the sustainable development of local communities; and to therefore earn and maintain a social license to operate.

The initial public consultation program – prepared specifically for the implementation of the EIS – aimed to:

- identify project stakeholders (i.e. those individuals and organisations with an interest in the project);
- ensure stakeholders are aware of the project, what it entails, and the potential impacts;
- ensure stakeholders are aware of the project approval process;
- understand community attitudes towards the project (and attitudes towards the cumulative impact of multiple resource projects), including both concerns and opportunities for mutual benefit;
- ensure information on community attitudes (including concerns, and opportunities for mutual benefit) is made available to the relevant technical studies included in the EIS;
- facilitate public input to the EIS process; and
- build and strengthen relationships with stakeholders to facilitate effective community engagement in the longer term.

A significant number of stakeholders were engaged during the EIS, including elected representatives, federal and state government agencies, local councils, Indigenous representatives, the private sector, other public and private organisations, and local residents. Approximately 240 people attended 15 public meetings held in June or September 2010. In addition, during the EIS period:

- Waratah Coal has received more than 500 emails about the project;
- Waratah Coal has received, on average, 20 phone calls per day (generally seeking information on the project or registering interest as a supplier or prospective employee);
- approximately 600 suppliers expressed interest in the provision of goods or services;
- more than 1,000 job seekers expressed interest in employment; and
- over the past year, a newspaper article has been published in either a major or regional newspaper, or a radio program has been aired on Waratah Coal and / or the project within Queensland every second day on average.

The public consultation process has not only supported a range of technical studies included in the EIS, but has directly contributed to the development of the project. The clearest example of this has been the suggestions by the Barcaldine Regional Council (BRC) for shared infrastructure, which is being considered by Waratah Coal in the project design.

1.10 RELEVANT LEGISLATION AND POLICY REQUIREMENTS

The Coordinator-General has declared the project to be a 'significant project' under the SDPWO Act for which an EIS is required and the Commonwealth Government has declared the project to be a controlled action requiring an EIS. The approval of the EIS for the project is required from the Coordinator-General and Minister for the Environment.

In addition to this EIS process, further compliance by the project with relevant legislation, policies and approvals is required. Table 3 below details key legislative and policy requirements, approvals, and timing applicable to the project.

Table 3. Key approvals required for the project

LEGISLATION	RELEVANT AUTHORITY	ACTION/APPROVAL	TIMING
Environment Protection and Biodiversity Conservation Act 1999	Department of Sustainability, Environment, Water, Population and Communities (DSEWPC)	Assessment of impact on environmental issues of Commonwealth significance and approval of controlled action. The controlling provisions were determined as: • Sections 12 and 15A (world heritage properties); • Sections 15B and 15C (national heritage places); • Sections 18 and 18A (listed threatened species and communities); • Sections 20 and 20A (listed migratory species); and • Sections 23 and 24A (Commonwealth marine areas).	
State Development and Public Works Organisation Act 1971	Department of Employment, Economic Development and Innovation / Coordinator-General	Approval of the EIS The QCC report on the EIS is required to facilitate the EPBC Approval, Environmental Authority, Mining Leases and subsequent SPA development approvals. Approval for a material change of use (APSDA)	No set statutory timeframe, though approximate timeframe expected to be in the order of 8 months to the issue of Coordinator-General's Report – Part 4.
Environmental Protection Act 1994	Department of Environment and Resource Management	Level 1 Environmental Authority (mining activities) Approval (via Environmental Authority) for the following Environmentally Relevant Activities (ERAs): • ERA 6 – Manufacturing asphalt • ERA 8 – Chemical • Storage • ERA 14 – Electricity generation • ERA 15 – Fuel burning • ERA 16 – Extractive and screening activities • ERA 17 – Abrasive blasting • 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 63 – Sewage Treatment • ERA 64 – Water treatment • ERA 65 – Water treatment	Application assessment time: approximately 1 – 3 months after lodgement of the development application).

Mineral Resources Act 1989	Department of Employment, Economic Development and Innovation (DEEDI)	Mining lease	No set statutory timeframe.
Sustainable Planning Act 2009	Assessment Managers	For off-mining lease infrastructure, Development Permits may be required for: • Material Change of Use; • Operational Works; • Building Works; • Plumbing and Drainage Works; and • Reconfiguring a lot. • Tidal Works Permit • Development Permit to clear native vegetation. • Alteration or improvement to local government roads	Approximately 1 – 3 months after lodgement of the development application
Vegetation Management Act 1999	DERM	Development Permit to clear native vegetation.	Application assessment time: approximately 1 – 3 months after lodgement of the development application
Nature Conservation Act 1992	DERM	Interference with species listed under the *Nature Conservation (Wildlife) Regulation 2006*	2012 Pre-construction
Water Act 2000	DERM	Development Permit (Water Licence) to take or interfere with water, including from a watercourse or overland flow or groundwater. Riverine Protection Permit. Development Permit for a Referable Dam.	Application assessment time: approximately 1 – 3 months after lodgement of the development application. Approval timing is approximately 2 months from lodgement. Approximately 1 – 3 months after lodgement of the development application.
Aboriginal Cultural Heritage Act 2003	DERM	Approval of Cultural Heritage Management Plan	No set statutory timeframe.

Other project considerations may include a range of state and regional policies, frameworks, designations and plans such as:

- State Planning Policy 1/92 (Development and the Conservation of Agricultural Land)
- State Planning Policy 2/02 (Planning and Managing Development Involving Acid Sulfate Soils)
- State Planning Policy 1/03 (Mitigating the Adverse Impacts of Flood, Bushfire and Landslide)
- State Planning Policy 1/07 (Housing and Residential Development)
- SPP 1/10 – Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments (temporary SPP)
- Environmental Protection Policy (Air) 2008
- Environmental Protection Policy (Noise) 2008
- Environmental Protection Policy (Water) 2009
- Environmental Protection Policy (Waste Management) 2000
- Local authority planning schemes incorporated under Barcaldine Regional Council, Central Highlands Regional Council, Isaac Regional Council and Whitsundays Regional Council
- Port of Abbot Point Land Use Plan

1.11 CONTROLLED ACTIONS UNDER COMMONWEALTH LEGISLATION

The *Environment Protection and Biodiversity Conservation Act 1999* prescribes the Commonwealth Government's role in assessment and management of protected areas. Where an action is likely to have a significant impact on matters of national significance, the project is required to be referred to the Commonwealth.

Waratah Coal referred the project to the Commonwealth Minister for the Environment, Heritage and the Arts on 11 February 2009 for a decision as to whether the project constituted a 'controlled action' under the EPBC Act.

On 20 March 2009 the Minister determined that the project constituted a 'controlled action' as it has the potential to have a significant impact on Matters of National Environmental Significance (MNES). The controlling provisions were determined as:

- sections 12 and 15A (world heritage properties);
- sections 15B and 15C (national heritage places);
- sections 18 and 18A (listed threatened species and communities);
- sections 20 and 20A (listed migratory species); and
- sections 23 and 24A (Commonwealth marine areas).

The Minister further determined that environmental assessment of MNES is to be undertaken in accordance with Part 8 of the EPBC Act to be administered by DSEWPC.

1.11.1 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

As required by Section 1.9.3 of the ToR, Matters of National Environmental Significance (MNES) are addressed in a separate stand-alone report provided in Volume 5, Appendix 27.

The impact assessment consisted of both desktop and fieldwork studies and included application of the DSEWPC Protected Matters Search Tool and review of available Recovery Plans and DSEWPC Conservation and Listing Advice documents/webpages.

The impact assessments against the MNES EPBC Act Guideline demonstrated that the project as a whole is not likely to have a significant impact on the following MNES:

- World Heritage Properties
- National Heritage Places
- Listed Migratory Species; and
- Commonwealth Marine Areas.
- For Threatened Species and Communities the following was determined:
- There is unlikely to be a significant impact upon any threatened species, TEC or migratory species for the mine component of the proposed action.
- The rail component of proposed action has the potential to impact upon the two TECs, Brigalow (*Acacia harpophylla* dominant and co-dominant) and Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin to the extent that 0.03 % of the occurrence of each within

the bioregion would be removed. Minimisation and mitigation measures (such as rehabilitation) are proposed as well as an offset strategy to compensate for the unavoidable impacts.

- There is likely to be minor removal of habitat for 11 threatened species and 20 migratory species potentially occurring within, or adjacent to the rail alignment, but this is not likely to be a significant impact at the population level for any species provided the mitigation measures outlined in Section 4.4.2 of Volume 5, Appendix 27 are adhered to.

2. DESCRIPTION OF THE PROJECT

2.1 ASSOCIATED INFRASTRUCTURE

2.1.1 WORKFORCE AND ACCOMMODATION

2.1.1.1 Mine

A construction workforce of approximately 2,500 contractors will be required at peak construction period. The workforce will be predominantly fly-in / fly-out (FIFO); however, expectation is there will be a portion of local workers in this project. Accommodation will be provided at a purpose built 2,000 person workers village adjacent to the site. The mine development is expected to operate on a two shift, seven day rotating roster.

A proposed workforce of 2,360 permanent employees / contractors will be required during the mine operations. This will comprise 1,900 workers at the mine site of which 1872 will be FIFO, and 28 will be housed in Alpha. The remaining 460 workers will be required for the rail (275) and the port operations (185).

The majority of the workforce for the construction and operational phases will be FIFO. To cater for the estimated workforce levels during both phases, a temporary 2,500 person workers village will be established at the mine site. The workers village at the mine site is considered able to accommodate the rail line construction workers also; however, this will depend on the level of available accommodation.

2.1.1.2 Rail

The construction of the railway will extend for a three year period and require 1,000 workers. The construction workforce is expected to be based in camps at the mine site and at Merinda (near Bowen) and three temporary camps along the railway alignment (e.g. one near Collinsville, one near Mt Coolon and one mid-way between Mt Coolon and the mine site). The temporary construction camps are each expected to accommodate around 150 workers, who are likely to work 12 hour shifts on a FIFO basis (e.g. 21 days on 7 days off).

Around 60 employees are expected to run and maintain the railway network during operations. It is expected that these staff will generally reside in the Bowen area.

The construction contractor will select the location of the temporary workers villages, works depots and laydown areas prior to the commencement of construction works. It is expected that four temporary workers villages (accommodating up to 500 workers each) and up to ten works depots will be required along the rail easement to be located ideally within one hour's drive from the construction site. It is expected that the workers villages will be located approximately 100 km apart; however, this may vary to suit construction and logistical requirements. The workers village at the mine site will also be used to accommodate rail line construction workers and there may be a requirement for temporary accommodation at Bowen and the surroundings towns to cater for the construction of the rail at the APSDA.

2.1.2 TRANSPORT

A new access road between the mine site and the Capricorn Highway is proposed. This would provide a more direct access route from Alpha than via the Clermont-Alpha Road, which follows the Alpha Creek alignment. It is expected that once constructed, all vehicular traffic from the south would use this route to access the mine.

The current airfield will require significant expansion to accommodate the increased services for the mine. Such works will be coordinated with BRC and other relevant authorities and will require increased runway length and width and improved terminal facilities. Traffic access would also need to be improved with vehicle parking and set-down areas to be provided for both cars and buses. The airport access road would also need upgrading to a suitable sealed standard, while the highway intersection would require short auxiliary left and right turn treatments with improved lighting and signage.

2.1.3 WATER SUPPLY AND STORAGE

2.1.3.1 Mine

At the mine, water will be provided from one or more of the following options:

1. a dam at the mine holding groundwater pumped from the underground and open cut dewatering operations;
2. a dam on Tallarenha Creek; or
3. a connection into the new 225 km pipeline SunWater's proposed 49,500 ML/a water supply pipeline from the Connors River Dam to Moranbah (133 km in length).

2.1.3.2 Rail

Construction water for the railway will predominately be required for:

- compaction / conditioning of earthworks;
- dust suppression;
- weed wash down bays;
- concrete works;
- workforce and,
- rehabilitation works.

Preliminary estimates of the total water requirements for the three year construction of the rail indicate that approximately 10,000 Mega Litres (ML) will be required. The primary requirement for water will be for bulk earthworks with a higher demand in flood plains and towards the coast where there are extensive bulk earthworks requirements. The final requirement for construction water is subject to further studies into the refinement of the rail design and future hydro-geological assessments.

Along the railway corridor, water will be sourced from existing domestic supplies where practical, including those from established townships such as Collinsville and Mount Coolon. Due to the rural and isolated nature of the railway corridor, water will also be sourced from existing surface storages such as farmer's dams and harvesting of existing turkey nest dams. Further to this, any shortfall to water requirements will be made up by tapping into potential groundwater from alluvial basins.

2.1.4 STORMWATER DRAINAGE

The management of stormwater will be considered as part of the design of the accommodation villages and depots. The design and intent of the storm water management system will be to avoid ponding and flooding from overland flows. Where storm water capture is included in the design, storm water discharge points will be engineered to avoid impacting the natural flow system.

2.1.5 SEWERAGE

2.1.5.1 Mine

Package sewage treatment plants (STP) suitable for 2,500 equivalent persons will be used at the workers village. Effluent from the STP will be fed to the dedicated STP waste disposal area. The dedicated waste disposal area will be determined in greater detail during the detailed design phase, but will consist of irrigated pastures (or similar vegetation) and will be located at sufficient distance from the camp to provide buffer from odour, and waterways to ensure adequate buffering of in-stream values. The irrigation areas will be of sufficient size that the treated effluent can be applied a suitable rate to prevent runoff into local waterways. No storage is of treated effluent is proposed other than the storage tank associated with the sewage treatment plant.

Packaged sewerage treatment plants will be incorporated into the design of the accommodation facilities and work depots and will be managed by the accommodation contractor. A registered waste disposal company will be engaged to maintain the systems and to remove the waste to an appropriate treatment facility.

2.1.6 ENERGY

2.1.6.1 Mine

During the initial phase of construction, portable diesel generators and existing single wire earth return (SWER) lines will be used to supply energy. When available, energy will be supplied to the mine site via a new 275 kV line being developed by Powerlink. Powerlink is proposing to acquire a suitable site for a substation north of the proposed mine (to be known as Surbiton Hill Substation). An easement is also required for a proposed 275kV transmission line that will run between the Surbiton Hill Substation and Powerlink's existing Lilyvale Substation near Emerald. The transmission line will be approximately 200 km in length. The new line development will incorporate a 275 kilovolt feed into a sub-station to the north of the mine, whereby the power supply will be reduced and reticulated throughout the mine site at various voltages including 66 kV, 22 kV and 11 kV. Further negotiations are to be undertaken with Powerlink regarding the supply of energy to the mine.

A Power Allocation (Power Enquiry) has been made to Powerlink by both Waratah Coal and AMCI seeking confirmation of a regulated or unregulated supply to both mines. This power supply will be subject to a separate EIS, initial supply will be provided by generator sets but the preferred supply will be the feed of power from the substation.

2.1.6.2 Rail

Power demands for the railway (non-electric traction) will be required to support the communication, signaling and lighting equipment at passing sidings and over infrastructure crossings. Loading and unloading facilities at the mine and coal terminal will also require power, as will the refueling and maintenance workshops and construction camps.

Power requirements for rail facilities at the mine is likely to be supplied by means of a dedicated 275 kV overhead line from the distributor at Lillyvale, feeding into a HV substation on the mine lease.

2.1.7 TELECOMMUNICATIONS

Waratah Coal proposes to establish a fibre optic cable linking the mine, rail and the facilities at Abbot Point. Communications at the mine will be a combination of fibre optic and connection into the local telecommunication network.

3. ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

3.1 MINE

3.1.1 CLIMATE

The climate assessment of the mine site describes existing physical climatic descriptions of the proposed mine site. Meteorological data has been taken from multiple BOM weather stations to provide an indication of regional climate trends.Where possible, data has been taken from the Barcaldine, Emerald, Claremont and Blackall stations, as these are the closest to the location of the mine site.

The study area has a sub-tropical continental climate and, in general, winter days are warm and sunny and nights are cold (Bureau of Meteorology (BOM), 2010a). The following describes a number of climatic patterns identified:

- The long term monthly average temperatures within the study area display typical ranges for subtropical regions. Longreach, being further inland, is generally hotter than the other monitoring stations in the region, although it can be cooler during mid-winter. Mean monthly minimum temperatures can be as high as 19°C to 22°C in the summer and drop as low as 7°C in the winter. The mean maximum temperatures can range between 33°C to 36°C in the hottest months and drop to between 22°C and 25°C during the coldest part of the year.
- There is a consistent pattern for average monthly rainfall across the study region of 80-120 mm of rain per month during the summer months, dropping to average lows of 15-20 mm during winter.

- Long term wind data from two representative locations in the study area (one from the east and one from the west of the study area) show very different wind strengths although similar wind directions across the study area. Emerald, is located east of the study area and has winds that are frequently from the east with more moderate winds. Barcaldine, to the west of the study area, also shows more winds from the east but has a higher frequency of low wind speeds.
- Relative humidity in the study area is typically higher during the summer and autumn months and lower during the spring months.

3.1.2 CLIMATE CHANGE ADAPTATION

A climate change risk assessment was undertaken for the project. The approach adopted for the risk assessment was consistent with AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines.

The risk assessment identified that the projected increases in average wind speed associated with climate change may pose a potential high risk to environment and sustainability. This in turn could potentially result in minor breaches in compliance. The assessment further considered that the projected increase in the number of extreme fire risk days posed a potential high risk to the environment and sustainability. The remainder and by far the majority of the risks to the project and workforce associated with climate change were assessed as being medium to low.

The risks ranked as high during the assessment are considered as the most severe risks that can be accepted as part of routine operations without executive sanction. To ensure that appropriate action is taken to address these risks they will be managed by the senior management team and monitoring and reporting will be undertaken at the executive level. The risks ranked as medium to low will be managed as part of routine operations and they will be maintained under review and reported upon at senior management level.

The project is located predominantly in a hot, arid environment that is subjected to high volume flooding and intense storms and as such the design tolerances will already largely be addressed at the initial design stage, therefore, designing the project infrastructure ensuring operating tolerances include climate change projections or are able to be adapted to meet changing conditions is a key mitigating factor. It is expected that any areas requiring adaption to take into consideration changes associated with climate change will be identified as part of routine operational monitoring and performance reporting.

Implementing appropriate workplace health and safety procedures is the other key mitigating factor to address potential impacts associated with climate change. The procedures established to address the existing conditions are expected to adequately mitigate the projected changes to the climate. Similarly it is expected that any areas requiring adaption to take into consideration changes associated with climate change will be picked up as part of routine operational monitoring and performance reporting.

To summarise potential impacts to the project and Waratah Coal's workforce associated with climate change will be adequately managed through appropriate design of infrastructure and the implementation of a sound workplace health and safety system. It is expected that these two factors, combined with the standard monitor, review and adapt continuous improvement management system will adequately mitigate climate change risk.

3.1.3 GEOLOGY AND SOILS

The EIS describes the geology, soils and landform for the mine study area of the project, detailing the existing physical environment and any possible impacts resulting from the project. An assessment is also provided which describes the approach to be taken by Waratah Coal to minimise these potential impacts. Volume 2, Chapter 3 of the EIS further details the baseline environment within the project area.

3.1.3.1 Description of environmental values

A complex of soil units were identified across the project area, including areas of Kandosols and Rudosols. Some are prone to erosion and dispersion. The majority of the soils are also unsuitable as topsoils. The proposed mine site is currently used for low (Class C/D) intensity cattle grazing. As a result of this historical and current land use of low intensity cattle grazing, there has been extensive tree clearing throughout the area, which is consistent with that of the adjoining land.

The Galilee Basin covers nearly 250,000 km^2 of central Queensland. The Galilee is connected to the Bowen Basin over the Springsure Shelf (south east of Alpha). In the project area, the target geology is held within the Bandanna Formation and Colinlea Sandstone, correlatives of the Bowen Basin's Group IV Permian Rangal Coal Measures.

The surface geology of the mine is dominated by unconsolidated sediments of the Cainozoic (recent geological period) origin. These sediments include unconsolidated sands, silts and clay, lateritised in part and form an extensive blanket over the mine area. Depths of these sediments vary across the site and range up to 90 m in the eastern and central sections of the EPC.

3.1.3.2 Potential impacts and mitigation measures

The main potential impacts of the project included changes to agricultural land capability and increased risk of erosion in areas of construction and / or operation. In addition, some soils encountered will be sodic and / or dispersive and this may affect excavation conditions at the mine.

Management strategies and commitments to mitigate these impacts have been identified as a component of technical studies. These include:

- Identified areas of dispersive soils prior to disturbance and closely monitored works to ensure the efficacy of the erosion control measures ;
- Where land is disturbed, progressive land rehabilitation will occur as use of those areas ceases;
- Post-disturbance re-grading will be undertaken to produce slopes that are suitable for the proposed land use;
- A drainage design that addresses runoff volumes and erosion minimisation will be put in place;
- Erosion from surface water runoff will be minimised by using contour banks at intervals down the constructed slopes;
- Where appropriate, lighter vehicles or larger wheel/ track size will be used to reduce soil compaction;
- Sediment runoff will be collected and treated as needed in sediment dams; and
- An ESCP will be prepared to address the potential issues arising from field investigations.

Further detailed investigations will be undertaken prior to construction in order to fully manage identified potential impacts.

3.1.4 LAND USE AND TENURE

3.1.4.1 Description of environmental values

This EIS describes the land use, tenure and infrastructure within the footprint of the mine development. The EIS further includes an assessment of potential impacts of the mine to existing land use and tenure and identifies mitigation measures to address potential impacts.

The mine footprint comprises mainly agricultural land used for cattle grazing on natural pastures and areas of native vegetation (refer Figure 8). Cropping and / or horticulture are not undertaken within EPC 1040 and 1079. The vegetation within the mine open cut footprint is generally characterised as being in a degraded condition having been cleared and blade ploughed for grazing land.

Of the native vegetation occurring within the overall EPC, less than 5% is classified as Forest Reserve. This Reserve is not within the current mine footprint or the proposed Mining Lease footprint. Approximately 25% of the proposed mine footprint is classified as Nature Refuge and Conservation Area. The Bimblebox Nature Refuge directly overlies the areas identified as Underground Mine 2 (UG2), Underground Mine 4 (UG4) and Open Cut 2 (OC2) South (refer Figure 2 Volume 2 Chapter 4).

3.1.4.2 Potential impacts and mitigation measures

The proposed mine will have an impact to land tenure and land use. The main impact will be the potential for disruption to existing land use regimes through the loss of land required for the mine development. A further impact will be the requirement to remove or relocate existing property infrastructure such as fences, gates, dams and irrigation systems.

Management strategies and commitments to mitigate these impacts have been identified as a component of technical studies. These include:

- Implementing a Community Consultation Program to communicate both the potential impacts as well as benefits of the project to the broader community. This will include use of local media, community meetings/ displays, dedicated 24-hour project telephone hotline to provide an avenue for stakeholder interaction, and a project dedicated website to provide stakeholders with project-specific information;
- Undertaking direct consultation with relevant landholders in the area of the proposed development;

- Avoiding small parcels of land where possible by realigning the rail alignment where practicable; and
- Avoiding impacts where possible on Good Quality Agricultural Land, and if there is deemed to be any impact, rehabilitate the site as soon as possible to its original condition where practicable.

Waratah Coal will liaise with all tenure holders through the final design phases to ensure that design takes into consideration to the extent practicable the requirements of all tenure holders, including significant potential impacts associated with disruptions to land use and changed grazing regimes.

3.1.5 TOPOGRAPHY AND LANDSCAPE CHARACTER

3.1.5.1 Description of environmental values

Mine site topography is characterised as gently undulating plains occurring across the majority of the mine area with strongly undulating to hilly land in the north-east corner of EPC 1040. Ground level rises gently to the west up to 400 m Australian Height Datum (AHD) culminating in outcrops of the Great Artesian Basin.

3.1.5.2 Potential impacts and mitigation measures

The mine site comprises level to gently undulating topography falling from low hills to small creeks. The mining activities will result in topographical changes to the mine area during mine operation and post-mining through the removal of existing topography during stripping of overburden and mining and the creation of new topographic highs through the placement of spoil and construction of dams. Changes to the location of Tallarenha Creek and the width of its floodplain will occur as a result of mining and creek diversions.

3.1.6 LAND CONTAMINATION

In Queensland, activities that have been identified as likely to cause land contamination are listed on the Environmental Management Register (EMR). This register is managed by the Department of Environment and Resource Management (DERM). Where it has been demonstrated through investigations that contaminants are present in soils above defined safe exposure limits, this land is recorded by DERM on the Contaminated Land Register (CLR).

3.1.6.1 Description of environmental values

The EIS identifies the potential for land contamination along the rail alignment of the project, assesses potential impacts resulting from the project and suggests management measures to mitigate potential impacts.

A Preliminary Site Investigation (PSI) within the rail alignment area was undertaken as part of the EIS. The PSI comprised searches of the Queensland Department of Resource and Environmental Management (DERM) Environmental Management Register (EMR) and Contaminated Land Register (CLR), and a site inspection.

A total of 36 lots cover the proposed mine footprint. Of these, desktop searches revealed that six were considered to pose a potential High risk for contamination. One of these lots was listed on the Environmental Management Register (EMR) for a possible high level of Arsenic. The remaining 30 lots were classed for rural land use and ranked as a medium risk. No low risk lots were recorded at the mine footprint.

3.1.6.2 Potential impacts and mitigation measures

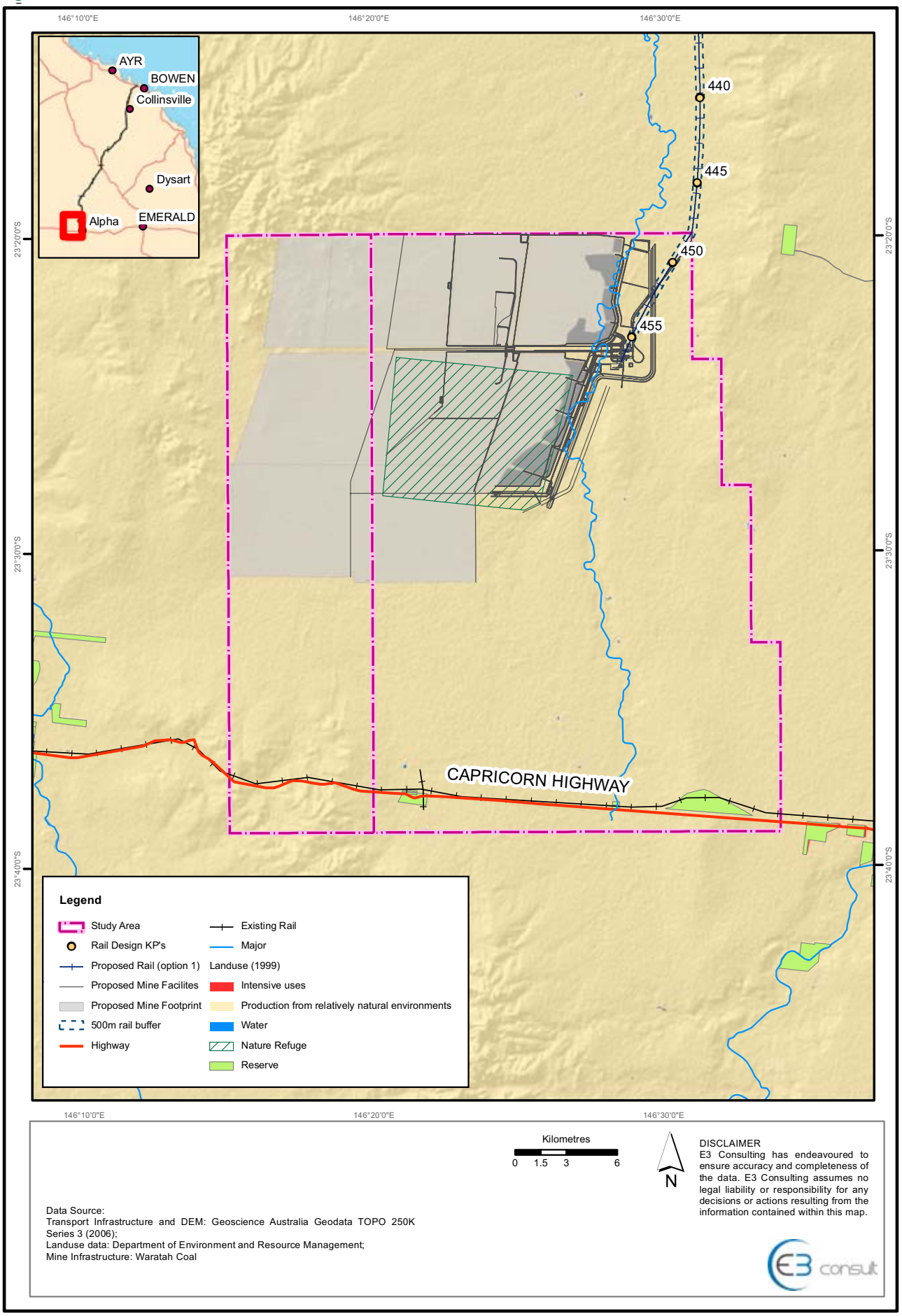
The principal risks for land contamination from the construction and operation of the project result from:

- Hydrocarbon storage and use;
- Chemical storage and use;
- leaching of contaminants to groundwater or via overland flow to surface waters;
- Waste and reject handling and storage; and
- Mobilisation of contaminants if not properly managed.

Management strategies and commitments to mitigate these impacts have been identified as a component of technical studies.

To avoid contamination resulting from the construction and operation of the mine, Waratah Coal will implement comprehensive EMPs as outlined in Volume 1, Chapter 7. This will include implementing and managing any potentially contaminating activities in accordance with relevant guidelines and legislation once construction commences and also during the operational phase.

Figure 8. Mine Site – Land Use Conservation



3.1.7 NATURE CONSERVATION

3.1.7.1 Description of environmental values

The EIS describes the existing environment in relation to terrestrial ecological values within the footprint of the mine development. Desktop and field studies were used to identify, describe and assess key flora and fauna values of the study area and potential impacts associated with both the construction and operation of the mine. The assessment also describes the approach to be taken by Waratah Coal to minimise potential impacts.

The proposed action involves the clearing of 4,594.68 ha of vegetation (based on calculations of regional ecosystems to be cleared) to facilitate two open cut mines, and the mining of four underground mines, each 480 m wide by 7000 m long and an extracted thickness range of between 1.8 to 4.2 m.

The vegetation of the bioregion consists predominantly of eucalypt and acacia woodlands (often with an open spinifex understorey). The bioregion includes 29 vulnerable and 14 endangered REs that support habitat for 21 threatened species. There are five nationally important wetlands and another 45 wetlands of regional significance present in the bioregion. The Galilee and Buchannan Lakes, in addition to numerous other smaller lakes are the dominant landscape features within the bioregion.

Most of the bioregion is under leasehold tenure and is used for cattle grazing and some sheep grazing in the west. The dominant land use across the proposed mine site is cattle grazing. A significant portion of the mine site is cleared of standing timber for cattle pastures. These areas are dominated by buffel grass (*Pennisetum ciliare*), an introduced invasive pasture species which is well established on rough, blade ploughed terrain on low, undulating hills.

Part of the mine surface clearance footprint occurs in the north and eastern parts of the Bimblebox Nature Refuge (BNR), an area gazetted under the Nature Conservation (Protected Areas) Regulation 1994. The vegetation within this area consists predominantly of poplar box (*Eucalyptus populnea*) and silver-leaved ironbark (*Eucalyptus melanophloia*) open woodland (REs 10.5.12, 10.5.5). The BNR is mapped as being of Local Significance within the Desert Uplands Biodiversity Planning Assessment (EPA, 2005) and is identified as containing 'Special biodiversity values' and is of value as a 'Wildlife refugia'.

Immediately to the south-west of the BNR the study area encompasses a woodland area with similar vegetation to that of the BNR. Dominant tree species include silverleaved ironbark, poplar box and lancewood (*Acacia shirleyi*). This area is identified as containing Of Concern RE (Biodiversity status), 'Wildlife refugia', 'Disjunct populations', 'Taxa at limit of geographic range', 'Areas of high species richness' and 'Hollow-bearing trees' and is mapped as being of State Significance (EPA, 2005). Partially cleared sandstone escarpments with some areas supporting Lancewood dominated woodlands are present to the north-west within the study area. To the east the mine surface clearance footprint transects a riverine habitat comprising several ephemeral watercourses including Lagoon Creek. The vegetation within this area is dominated by poplar box open woodland and also contains patches of river red gum (*Eucalyptus camaldulensis*) and brigalow (*Acacia harpophylla*). This area is mapped as being of Regional Significance (EPA, 2005). Figure 3 of Volume 2, Chapter 6 shows the broad habitat types and linkages of the mine study area.

3.1.8 ENVIRONMENTALLY SENSITIVE AREAS (ESA)

3.1.8.1 Description of environmental values

The mine site is remote from and unlikely to have any detrimental impact upon any Category A ESA. Category A ESAs include national parks, the great Barrier Reef Marine area and other areas of high significance.

No VM Act Endangered REs are required to be cleared or will be impacted by the mine.

Two REs classified as Endangered under the DERM Biodiversity Status classification occur within the mine clearance footprint. The estimated clearing extent is 13.4 ha of RE 10.4.3 and 0.08 ha of RE 10.3.25. The proportion of these REs that this clearing would represent is 0.19% (RE 10.4.3) and <0.01% (RE 10.3.25) of that which occurs in the Bioregion. The need to clear these patches is still to be finalised; however, it is likely that at least some portions will be unavoidable. The consequence is Minor and the impact has been determined to be Medium for these REs in a regional context.

The mine surface clearance footprint overlaps with the Bimblebox Nature Reserve (BNR), which is classified as a Category C ESA.

3.1.8.2 Potential impacts and mitigation measures

The potential impacts on the BNR associated with the construction of the mine include:

- direct spatial reduction in extent. It is estimated that approximately 3,926 ha of remnant vegetation will be cleared within the BNR as a result of the project construction. This figure equates to approximately 52 % of the Refuge's existing remnant vegetation extent (7,526 ha) and would represent an approximate 0.4 % of amount of the affected REs which occur within the bioregion;
- increased edge effects within the BNR (through reducing the edge to area ratio and moving the edge) including the potential to increase the abundance of buffel grass (and other weeds) and the associated potential for increased fire intensity;
- the underground mining area takes up the remaining 48 % and has the potential to cause subsidence and other impacts on the soil profile, hydrology etc. which may then negatively impact on the vegetation;
- potential for dust to reduce the health of retained vegetation in the vicinity of the clearance footprint; and
- potential for temporary facilities, materials and equipment to damage areas outside the construction footprint.

Assuming widely accepted standards of environmental practice, these indirect impacts are unlikely to occur. Their consequences could potentially be moderate so the impacts associated with these indirect impacts have been determined to be Medium.

However, due to constraints associated with the location of the coal resource and extraction requirements, impacts to the BNR cannot be avoided. As such, it is proposed that offsets be established to compensate for unavoidable impacts to particular significant biodiversity values as required under existing offset policies at the State and Commonwealth level.

Waratah Coal have formulated a Galilee Coal Biodiversity Strategy to establish offsets to compensate for unavoidable impacts to particular significant biodiversity values as required under existing offset policies at the State and Commonwealth level. Waratah Coal also commit to compensating for impacts to the Bimblebox Nature Refuge (both to the open cut and underground mining areas) in addition to the normal offset requirements, with the aim of achieving a net conservation gain and expanding Queensland's protected area estate.

The focus for the BNR is to identify another parcel of land within the same bioregion (Desert Uplands) that is of 'ecological equivalence' to the BNR. Offset criteria will include an area that contains a mix of the same REs and the same or higher biodiversity values. To assist in determining 'ecological equivalence' DERM's biocondition methodology and BPA mapping will be used. It is currently estimated the BNR offset may be twice the total area (approx. 16,000 ha), and the intent is it will become a future protected area. Further detail on the offset requirements, spatial analysis, offset availability and future steps is provided within the Galilee Coal Biodiversity Strategy at Appendix 27.

3.1.9 ECOLOGICAL COMMUNITIES / REGIONAL ECOSYSTEMS

3.1.9.1 Description of environmental values

Twenty-one REs occur within the study area, two of which are listed as Of Concern under the *Vegetation Management Act 1999* (VM Act) (RE 10.3.4 and RE 10.10.7). Two others, listed as Least Concern under the VM Act, are classified as Endangered under the DERM biodiversity status (RE 10.3.25 and RE 10.4.3). REs can be listed as endangered, regardless of their RE status, using a combination of area and the level of degradation or loss of biodiversity values. The two REs listed as Endangered (DERM biodiversity status) in the study area do not affect any exemptions or consent requirements under the VM Act for the project. The field survey found the DERM RE mapping to be generally accurate.

A total of 10 Least Concern REs, equating to approximately 4,594.68 ha, is required to be cleared or will be impacted by the mine surface clearance footprint. This represents 6.89 % of the RE extent within a 10 km buffer and 0.30 % of the RE extent within the bioregion. The underground mine component of the project extends beneath roughly equal areas of buffel grass pasture habitat and open woodland, including most of the balance of the BNR and a large portion of the Cavendish area.

While no REs mapped by DERM were analagous with any Threatened Ecological Communities (TECs) listed under the EPBC Act, the EPBC Act Protected Matters Search Tool identified three TECs potentially occurring within the broader study area. These are:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin; and
- Weeping Myall Woodlands.

3.1.9.2 Potential impacts and mitigation measures

The field survey confirmed that no EPBC Act listed TECs occur within the study area. Minor occurrences of Brigalow dominant and co-dominant REs were found to be present (i.e. RE 10.3.3 and RE 10.4.3) but these REs are not included within the EPBC Act definition of the TEC Brigalow (Acacia harpophylla dominant and co-dominant).

Furthermore, no VM Act Endangered REs occur in the project footprint. The majority of RE on the study site is Least Concern, with some small areas of Of Concern Subdominant RE occurring close to the edge of the underground mine area. The mine surface clearance footprint does not contain any areas mapped as high-value regrowth under the VM Act.

However, the mine footprint does require unavoidable clearing of areas of Least Concern remnant vegetation and will potentially have a high impact upon:

- RE 10.3.27, listed as 'Of Concern' under the DERM Biodiversity Status; and
- RE 10.3.12, listed as 'Least Concern' under the VM Act.

As such, Waratah Coal will:

- develop a Biodiversity Offset Strategy that compensates for unavoidable clearing and impacts to the BNR in consultation with DERM and DSEWPC;
- develop a Subsidence Management Plan in consultation with DERM;
- develop a Fire Management Plan, working with BRC and the Rural Fire Service;
- develop Weed and Pest Management Plan in consultation with BRC and Biosecurity Queensland;
- develop an Erosion and Sediment Management Plan incorporating existing State Planning Policy and local management plans;
- develop and implement a Mine recovery, Remediation Rehabilitation and Monitoring plan; and
- develop a Vegetation Management Plan for the remaining vegetation overlying the underground mine area.

A full description of the proposed minimisation, mitigation and offset measures is detailed in Volume 2, Chapter 6.

3.1.10 TERRESTRIAL FLORA

3.1.10.1 Description of environmental values

Database searches identified three flora species listed under the *Nature Conservation Act 1992* (NC Act) that are known to have ranges that overlap the wider study area. Five populations of the Near Threatened large-podded tick-trefoil (*Desmodium macrocarpum*) have been recorded in previous surveys and the present field survey was unable to confirm the potential extent of this species beyond these locations due to unfavourable seasonal conditions.

A total of 85 'Least Concern' native flora species were recorded during the field surveys. Additionally eight non-native flora species were identified within the study area including three declared Class 2 weed species (rubber vine (*Cryptostegia grandiflora*); velvet tree pear (*Opuntia tomentosa*) and arsenic weed (*Senna obtusifolia*).

3.1.10.2 Potential impacts and mitigation measures

Potential direct and indirect impacts associated with construction of the mine on this Near Threatened flora species (large-podded tick-trefoil) include:

- direct loss of individuals through clearing activities. Approximately 21-33 individuals will be removed. This represents over half of the known plants (33 to 53 individuals) in the vicinity;
- reduction in the long term viability of the local population by removing approximately over half of the known individual plants. Although there is no known study on the long term viability of the large-podded tick-trefoil, population reduction and increased spatial isolation of plant populations generally result in decreasing genetic variation;

- direct loss of mapped Essential Habitat. While a comparatively small area of essential habitat has been mapped, approximately 3,926 ha of potential habitat is proposed to be removed. This figure equates to approximately 52 % of the BNRs existing remnant vegetation extent (7,526 ha) and approximately 0.4 % of amount of the affected REs which occur in the bioregion; and,
- potential to affect health and viability of plants outside the clearance footprint through:
  - increased edge effects and associated potential to increasing the abundance of buffel grass and fire intensity;
  - potential for dust to reduce the health of plants and associated vegetation retained outside the construction footprint;
  - potential for temporary facilities, materials and equipment to damage plants and associated vegetation outside the construction footprint; and
  - potential for accidental and inappropriate release of pollutants which could contaminate soil and water, reducing the health of riparian and water dependant vegetation.

These indirect impacts are unlikely, assuming widely accepted standards of environmental practise. Their consequences could potentially be major so the impacts associated with these indirect impacts have been determined to be Medium. Mitigation measures to help minimise these impacts are provided Volume 2, Chapter 6.

The unavoidable direct impacts of removing over half of the known individual plants in the local population are of moderate consequence and unmitigated, the indirect impacts could potentially be major (threatening the locally known occurrence of the species). As such, the potential impact on large-podded tick-trefoil is High. Mitigation measures to help minimise the impacts upon large-podded tick-trefoil are provided in Section 6.3.6. Waratah Coal will develop a Significant Species Management Plan specifically for large-podded tick-trefoil. Offsets are also proposed to compensate for the surface mine impacts on the mapped Essential Habitat for the species – these are detailed in the Galilee Coal Biodiversity Strategy at Appendix 27.

No other Threatened or Near Threatened flora species were located during the assessment. It is possible but unlikely that any other Threatened or Near Threatened flora species occur within or adjoining the footprint in significant numbers. Therefore no significant impacts are anticipated for any Threatened or Near Threatened flora species with the exception of large-podded tick-trefoil.

3.1.11 TERRESTRIAL FAUNA

3.1.11.1 Description of environmental values

3.1.11.1.1 Threatened or Near Threatened species

No Threatened or Near Threatened species under the NC Act were observed during the field survey, but a total of 10 Threatened and Near Threatened fauna species (listed under the NC Act or the EPBC Act) were deemed to potentially occur across the study area. The species have been recorded from, or may potentially utilise habitat, within the broader area. They comprise three reptiles, six birds and one mammal. The species, their preferred habitat and the likelihood of occurrence are detailed in Table 3 below.

Additional information in the form of calculations of areas to be impacted and potential habitat maps for brigalow scaly-foot, yakka skink, Australian painted snipe and black-throated finch at the mine site can be found at Figure 5 to Figure 8 (respectively) of the MNES standalone report in Chapter 26 of Volume 5.

3.1.11.1.2 Regionally Significant fauna species

Eleven Regionally Significant fauna species were observed within the study area during the field surveys.

3.1.11.1.3 Marine and / or Migratory species

Fifteen species, that are not listed as Threatened or Near Threatened but which are listed under the EPBC Act as Marine and / or Migratory fauna species, were also identified as potentially occurring across the study area. The species, their preferred habitat and the likelihood of occurrence are detailed in Table 4.

Table 4. Threatened, Near Threatened and Migratory fauna species potentially present within the study area

COMMON NAME	SCIENTIFIC NAME	STATUS		PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE WITHIN STUDY CORRIDOR	BASIS FOR MAPPED LIKELIHOOD OF OCCURRENCE
		NC ACT	EPBC ACT			
Reptiles						
Common Death Adder	*Acanthophis antarcticus*	NT	–	Wet and dry eucalypt forests, woodlands and coastal heaths.	Likely	All remnant vegetation except Landzones 1, 2.
Yakka Skink	*Egernia rugosa*	V	V	Poplar box, ironbark, brigalow, white cypress pine, mulga, bendee and lancewood woodlands, open forests. Substrates include rock, sand, clay and loamy red earth.	Likely	All remnant vegetation in project area except Landzones 1 & 2.
Brigalow Scaly-foot	*Paradelma orientalis*	V	V	Sandstone ridges in woodlands and vine thickets, and in open forests and woodlands, especially ironbark, cypress pine, Brigalow, bull oak, spotted gum and vine scrubs.	Possible	Remnant vegetation in Landzones 3,4,5,7,8,9 &10 South of latitude -21.70.
Birds						
Fork-tailed Swift	*Apus pacificus*	–	Mi	Aerial forager of insects. Often seen flying before storm fronts. Not known to land on the Australian continent.	Likely	Throughout study area
Great Egret	*Ardea alba*	–	Mi	Widespread species – common.	Likely	Throughout Study area, Landzones 1,3,4,5,9
Cattle Egret	*Ardea ibis*	–	Mi	Widespread species – common.	Likely	Throughout Study area, Landzones 1,3,4,5,9
Sharp-tailed Sandpiper	*Calidris acuminata*		Mi	Fresh or saltwater wetlands, edges of lagoons, swamps, lakes and similar habitats.	Likely	Landzone 1,3
Black-necked Stork	*Ephippiorhynchus asiaticus*	NT	–	Permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands.	Likely	Landzone 1,3
Horsfield's Bronze-cuckoo	*Chalcites basalis*		Mi	Found in many wooded habitats (such as open and dry woodland and forest) with a range of understoreys from grasses to shrubs or heath.	Likely	Throughout the study area in remnant vegetation areas

COMMON NAME	SCIENTIFIC NAME	STATUS		PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE WITHIN STUDY CORRIDOR	BASIS FOR MAPPED LIKELIHOOD OF OCCURRENCE
		NC ACT	EPBC ACT			
Latham's Snipe	*Gallinago hardwickii*	–	Mi	Marshes and swamps in tall grass.	Likely	Throughout Study area in Landzones 1,3
Squatter Pigeon (southern)	*Geophaps scripta scripta*	V	V	Patchy distribution in dry eucalypt forest, often near water. Recorded from Abbot Point area. Locally extinct in former southerly parts of its range.	Likely	Throughout study area
Sarus Crane	*Grus antigone*	–	Mi	Swamps, grasslands and coastal mudflats.	Likely	Throughout Study area in Landzones 1,3
White-throated Needletail	*Hirundapus caudacutus*	–	Mi	Migrant, occasionally found in airspace over project area only.	Likely	Throughout the study area
Square-tailed Kite	*Lophoictinia isura*	NT	–	Variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Likely	Remnant vegetation throughout study area in Landzones 3, 8-12
Black-chinned Honeyeater	*Melithreptus gularis*	NT	–	Upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (Eucalyptus sideroxylon), White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*) and Forest Red Gum (*Eucalyptus tereticornis*).	Likely	All remnant vegetation south of Latitude-20.02 and north of Latitude -22.21
Rainbow Bee-eater	*Merops ornatus*	–	Mi	Variety of habitats. May breed in sand banks of creeks and rivers. Seasonal visitor.	Likely	Throughout study area
Southern Boobook	*Ninox novaeseelandiae*		Mi	Southern Boobooks are seen in a variety of habitats from dense forest to open desert.	Likely	Throughout study area
Little Curlew	*Numenius minutus*	–	Mi	Coastal and inland grasslands and black soil plains in northern Australia, near swamps and flooded areas.	Likely	Throughout Study area in Landzones 1,3, 4,5,8

COMMON NAME	SCIENTIFIC NAME	STATUS		PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE WITHIN STUDY CORRIDOR	BASIS FOR MAPPED LIKELIHOOD OF OCCURRENCE
		NC ACT	EPBC ACT			
Black-throated Finch (southern)	*Poephila cincta cincta*	E	E	Eucalypt woodland and riverside vegetation, including paperbark and Acacia shrublands and dense riverine grass and reed areas with scattered trees.	Likely	17 REs in which this subspecies was recorded between 1994 and 2007 (Black-throated Finch Recovery Team *et al.* 2007)
Sacred Kingfisher	*Todiramphus sanctus*		Mi	Shallow inland wetlands, either freshwater or brackish, and seasonally or ephemerally inundated pastures and grasslands.	Likely	Throughout Study area in Landzones 1,3,4,5,8
Australian Painted Snipe	*Rostratula australis*	V	V/Mi	The Sacred Kingfisher inhabits woodlands, mangroves and paperbark forests, tall open eucalypt forest and melaleuca forest.	Likely	Throughout the study area
Common Greenshank	*Tringa nebularia*	–	Mi	On the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Likely	Throughout Study area in Landzones 1,3,4,5,8
Marsh Sandpiper	*Tringa stagnatilis*	–	Mi	Fresh or brackish (slightly salty) wetlands such as rivers, water meadows, sewage farms, drains, lagoons and swamps.	Likely	Throughout Study area in Landzones 1,3,4,5,8
Channel-billed Cuckoo	*Scythrops novaehollandiae*		Mi	Summer breeding migrant to the tall open forests in northern and eastern Australia. Widespread in suitable habitat where it parasitises currawongs, crows and magpies.	Likely	Remnant vegetation throughout the study area
Mammals						
Eastern Long-eared Bat	*Nyctophilus timoriensis*	V	V	Mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities. Roosts in tree hollows, crevices, and under loose bark.	Unlikely	All remnant veg south of Latitude -21.69

3.1.11.2 Potential impacts and mitigation measures

3.1.11.2.1 Threatened or Near Threatened species

All 10 species potentially occurring within the vicinity of the mine surface clearance were considered in terms of the loss of potential habitat.

The direct impacts will be the clearing of 4,594.68 ha of vegetation (based on calculations of regional ecosystems to be cleared) to facilitate two open cut mines. In addition, subsidence as a result of the mining of four underground mines, each 480 m wide by 7000 m long and an extracted thickness range of between 1.8 to 4.2 m could cause changes in habitat values.

Potential indirect impacts on fauna are likely to include the following:

- potential reduction in habitat values and general health and viability through edge effects such as potential increase in dust, noise and light pollution and changed moisture availability;
- mortality through potential collisions with vehicles; and
- barrier effects (associated with the open cut mine).

These impacts are possible and could potentially be of moderate consequence for some species. As such, they have been determined to be Medium. Mitigation measures are proposed in Section 6.3.6 and are aimed at reducing these impacts.

3.1.11.2.2 Regionally Significant fauna species

Regionally significant fauna, including the 11 species recorded on the site, will be affected by the direct loss of habitat and other potential indirect impacts. The direct habitat loss and some edge effect impacts are unavoidable. The consequences of these impacts will be minor for most of these species which are generally either mobile (bush stone-curlew (*Burhinus grallarius*), grey-crowned babbler, brown treecreeper (*Climacteris picumnus*)), able to utilise adjoining habitats (e.g. great brown broodfrog (*Pseudophryne major*), Australian bustard, rufus bettong (*Aepyprymnus rufescens*), hooded robin (*Melanodryas cucullata*)) and / or relatively tolerant of disturbance (common brushtail possum, swamp wallaby (*Wallabia bicolor*) and spectacled hare-wallaby (*Pseudomys desertor*)). As such the impacts on these species have been determined to be Medium. However, for the desert mouse (*Pseudomys desertor*), the consequence is potentially moderate as this species is known to be dependent on perennial native groundcovers which are well represented in the footprint area and generally less abundant in surrounding areas. Desert mouse is known to be sensitive to grazing and fire. As such the impact on this species is classified as being potentially High. A Significant Species Management Plan for desert mouse, including monitoring and evaluation, will be implemented.

3.1.11.2.3 Marine and / or Migratory species

Migratory species are all highly mobile species which may visit the study area periodically. The mine footprint and adjoining areas do not include significant or locally uncommon habitat values and the site would not constitute a critical resource to any migratory species given the availability of similar habitat within the local area. As such, the impacts from the construction of the mine on all of these species have negligible consequence and have been determined to be Low. Nonetheless, mitigation measures to help minimise these impacts are provided in Volume 2, Chapter 6.

3.1.12 FRESHWATER AQUATIC FLORA AND FAUNA

The mine site is located within the Belyando Catchment, a sub-catchment of the Burdekin River. The Belyando Catchment encompasses an area of approximately 73,000 km^2 and is the largest sub-catchment of the Burdekin River Basin, comprising almost 60% of the total area. Some of the major tributaries of the Belyando River include Mistake, Sandy and Native Companion Creeks.

At the time of sampling, none of the streams surveyed within the mine site were flowing. Vegetation assessment were carried out at each site and it is anticipated that at a time when inundated, these streams would support similar communities to that observed at other sites surveyed in this EIS within the Belyando Catchment.

Field surveys documented that streams within the catchment are generally small with widths of less than 5 m except at major river systems and flood plain channels. These larger streams also have larger riparian areas which are up to 20 m wide and sparsely populated with mature eucalypts. The riparian areas at all sites sampled were in good condition with few obvious signs of anthropogenic impact outside of clearing for agriculture.

In lieu of water flow, habitat assessment identified that seasonal aquatic habitats including shallow riffles, runs and pools, sand beds, undercut banks, root masses, leaf litter piles, clay banks and large woody debris. The substrate was dominated by coarse sand, though the channel margins were clayey. The hydrological regime of the site is highly seasonal. For example, only 40 days prior to the sampling, the stream had good flow. It is anticipated that at the time when inundated, these habitats would support similar communities as that observed at other sites within the Belyando Catchment.

Management measures will be implemented which will minimise impacts to aquatic ecology. These will include variations to the design of infrastructure such as bridge structures and the development of an ESCP to reduce potential impacts resulting from the works. Prior to construction, an assessment will be completed to determine important perennial waterholes that may act as refugia during dry seasons. Then, the project will implement ongoing monitoring of these areas to assess impacts from drawdown. If properly managed the impacts to freshwater ecosystems resulting from the works are expected to be minimal.

3.1.13 WATER RESOURCES

3.1.13.1 Surface water

3.1.13.1.1 Description of environmental values

The Belyando catchment is predominately low relief floodplain with wide braided channels and alluvial plains. The section of the catchment covering the mine is predominantly gently undulating plains with strongly undulating to hilly land in the north-east corner of the Exploration Permit Coal 1040 (EPC). The Belyando catchment is predominantly agricultural land with cattle grazing on natural vegetation. Cropping and / or horticulture are not undertaken within the EPC. The vegetation within the mine open cut footprint is generally characterised as being in a degraded condition having been cleared and blade ploughed for grazing land.

Riparian areas in the catchment generally consisted of layer of mature eucalypts including ironbark and other eucalypts species, one or two trees thick directly on the banks of the streams. These are surrounded by a layer of saplings and shrubs before the landscape opens up into grazing paddocks. Soils were mostly clays and fine sediment. The riparian areas at all sites sampled were in good condition with few obvious signs of anthropogenic (human-induced) impact outside of clearing for agriculture.

Baseline results from field studies undertaken in the Belyando catchment show that the streams sampled are generally of reasonable quality with readings outside of expected ranges explainable by the surrounding land uses and the survey sites natural ephemeral nature. The physico-chemical properties are comparable to the guidelines for slightly to moderately disturbed upland streams in the central coast region.

3.1.13.1.2 Potential impacts and mitigation measures

The construction and operation of the mine has the potential to have a significant impact on waterways in the region. The activities with the highest risk of causing impacts include:

- the clearing of vegetation and topsoils from work sites and stockpiling of overburden on site resulting in sediment movement though overland flow;
- the storage of chemicals on site (e.g. hydrocarbons, detergents and degreasers) during construction and operations and the movement of these to streams;
- the storage, seepage and overtopping of potentially contaminated water such as tailings water or pit process water in dams and basins at the mine;
- the construction and operation of underground mines which may result in subsidence impacting drainage in the immediate area;
- construction and operational phase water demands;
- the construction of two diversions to Tallarenha Creek from the open cut mine areas; and
- potential effects on flooding levels in the region resulting from the creek diversions and operation of the mine.

In order to minimise impacts associated with construction and operations of the mine, Waratah Coal has committed to developing Environmental Management Plans (EMPs) for both the construction and operational phases of the Project. These plans will include a Sub Plan for surface water issues outlining project specific mitigation measures for each of the potential impacts.

3.1.13.2 Groundwater

3.1.13.2.1 Description of environmental values

The mine lies east of the boundary of the Great Artesian Basin (GAB) and includes groundwater in the Galilee Basin. The coal reserves of the mine are outside the GAB, a significant source of freshwater for much of inland Australia. The presence of shale aquitards between the coal seams and the GAB aquifers and the predominantly easterly groundwater flow (that is, flowing away from the GAB) suggests a low potential for negative impacts on the GAB groundwater resources resulting from open cut, longwall and underground coal mining.

Field sampling undertaken for this EIS identified that groundwater is generally brackish to saline and useable for livestock drinking water.

3.1.13.2.2 Potential impacts and mitigation measures

Studies undertaken for this EIS identified that groundwater contamination from mining activities was a primary concern. Groundwater contamination may occur as a result of impacts from coal rejects disposal, mining, leaking tailings dams, spills and leaks from chemical, fuel and oil storage and handling at workshops and mine operations infrastructure. Further, modelling suggests the mine will have significant impacts to groundwater users within 12-30 km of the mine from drawdown around the mine voids.

As a component of Waratah Coal's commitment to protecting natural values, Waratah Coal will implement a monitoring program with trigger levels to assess the actual impacts from the mine during its development and Waratah Coal will enter into agreements with local land users for monitoring and "make good" arrangements where unacceptable impacts are reported. Further longer term hydraulic testing is required to fully predict the extent of potential impacts.

Mitigation measures to manage impacts to natural values have been developed as part of the EIS study and include site specific studies of vulnerable groundwater areas, management and containment measures for potential contaminants and a commitment to enter into agreements with landholders regarding groundwater usage (if required) and "make good" requirements if groundwater is impacted by project activities.

3.1.14 AIR QUALITY

3.1.14.1 Description of environmental values

Studies undertaken for this EIS have assessed the impacts to air quality from the activities at the Project's Mine against Queensland's *Environment Protection Policy (Air) 2008* (EPP (Air)) ground-level dust concentration guidelines for total suspended particles (TSP), particulate matter with an aerodynamic diameter less than 10 microns (particulate matter$_{10}$ (PM_{10})) and particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$). Dust deposition rates have also been assessed against relevant guidelines.

Air dispersion modelling has been used to predict ground-level concentrations of pollutants and rates of dust deposition, based on 2008 meteorological data for the mine region and estimated emission rates for the mine's activities. The Unites Stated Environmental Protection Authority (USEPA) regulatory dispersion models CALMET / CALPUFF were selected, driven by The Air Pollution Model (TAPM)-generated meteorological data.

Emission rates were estimated using methodologies sourced from the National Pollution Index (NPI) and USEPA. To assess the worst case conditions, emissions were estimated for year 19 of the mine's life, as this represents peak emissions. The major sources of emissions were waste handling by the draglines, the transport of waste to the out of pit waste dumps, hauling of coal and wind erosion of exposed areas.

Results from the air dispersion modelling show that emission from only the mining activities exceed the relevant guidelines for TSP, PM_{10}, $PM_{2.5}$ and dust deposition; however, only for PM_{10} does the area of exceedance extend beyond the boundary of the mine. When background concentrations (based on 70th percentile recorded PM_{10} concentrations at West Mackay) are included, the area of exceedance for all substances increases.

For TSP and dust deposition, it is not predicted that guidelines will be exceeded beyond the boundary of the mine. Annual and 24-hour $PM_{2.5}$ concentrations from only the mining activities are not predicted to exceed guidelines beyond the boundary of the mine; however, when background concentrations are included it is predicted that guideline levels will be exceeded just beyond the northern mine boundary; however, this does not affect any sensitive receptors.

PM_{10} concentrations are expected to exceed the 24-hour guidelines beyond the mine boundary for both the mine only and the mine plus background. PM10 concentrations are also expected to exceed guidelines at five sensitive receptors identified in the region of the mine. Two of these (Receptors 2 and 4) are within the mine boundary, while one (Receptor 1) is likely located within the boundary of another proposed coal mine. However, while these receptors are inhabited, it can be expected that any exceedance of the EPP (Air) guidelines will impact human health and wellbeing. No exceedance of guidelines is predicted for the nearby townships of Jericho and Alpha.

3.1.14.2 Potential impacts and mitigation measures

Waratah Coal will be able to sustain mining activities in accordance with its commitment principles through the introduction and continuous review of dust management and mitigation systems during the construction and operational phases of the mine. Examples of onsite mitigation measures which will be employed to meet the air quality objectives during construction and operation of the mine site include:

- A dust monitoring program will be carefully designed to quantify actual dust impacts and will be used as a dust management tool throughout the operational phase of the Project;
- Implementing dust suppression measures such as watering roads and water sprays on stockpiles;
- Implementing a progressive rehabilitation program to minimise the amount of disturbed areas and exposed mine and stockpile surfaces;
- Ongoing vegetation of stripped areas in the open cut mine pits;
- Utilising fully enclosed conveyor systems and underground loading during coal preparation on site; and
- Implementing a wet process for coal handling to minimise dust emissions.

The proposed mitigation measures will ensure air pollutants across both construction and operational phases of the project will not diminish or degrade the ambient air quality to the extent that it will adversely impact human health and ecological health of terrestrial flora and fauna.

3.1.14.3 Greenhouse gas emissions and abatement

Desktop studies have been used to identify the likely greenhouse gas emission sources from the Project. Emission estimates have been based on the mine operating at full capacity, where 56 Mtpa ROM and 40 Mtpa saleable coal is produced from the mine per annum.

Studies projected that the mine will produce 2.3 Mt Carbon Dioxide equivalents (CO_2-e) per annum, with scope 1 and 2 emissions contributing approximately 48% and 52% of total emissions, respectively. The bulk of the annual scope 1 greenhouse gas emissions are associated with fugitive methane emissions released during open cut mining (31%) and during underground mines (26%). The remainder is predominately associated with diesel consumption for mining equipment (26%). The majority of total scope 1 emissions are CO_2 emissions and CH_4 emissions, with negligible amount of N_2O emissions.

The emissions intensity of the mine is 0.06 t CO_2-e/t saleable coal, which is approximately equivalent to the average emissions intensity of existing Australian coal mines that have both open cut and underground operations, and is less than the average emissions intensity of all coal mines (0.079 t CO_2-e/t saleable coals).

Greenhouse gas emissions generated by the project will have to be annually reported under the requirements of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), and Waratah Coal will be a direct participant in the emissions scheme included in the Carbon Pollution Reduction Scheme (CPRS) as it is currently proposed. It is further expected that Waratah Coal will assess the energy efficiency of the project and identify measures to improve energy efficiency, under the Energy Efficiency Opportunities (EEO) Program.

Technical assessments undertaken during the EIS process suggest that the project can most effectively reduce its annual emissions through improvements in energy efficiency. Waratah Coal is committed to undertaking ongoing internal measurement and monitoring of emissions, in addition to mandatory reporting under NGER Act and the EEO Program. The focus of the monitoring program will be to identify sources with the greatest potential for emissions reductions. Greenhouse gas emissions may also be offset through investment in third party projects that reduce emissions below a

demonstrated baseline, for example, through forestry agreements, renewable energy and partnerships such as with Australia Carbon Trust.

3.1.15 NOISE AND VIBRATION

3.1.15.1 Description of environmental values

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

Baseline ambient noise levels were sampled at four locations representing noise sensitive locations around the proposed mine site. The Rating Background noise Level (RBL) is predominately composed of a variety of noise sources such as insects, birds and frogs, ongoing low intensity farming, vehicle noise and weather.

From these measurements, design planning levels were determined for noise emissions from the project. Noise and vibration modelling was subsequently carried out for the mine area and associated ancillary infrastructure.

The following conclusions can be drawn from the outcomes of the assessment:

- mine operations – with the recommendations in place, the noise emissions from mine site will comply with the derived noise criteria;
- blasting – with the recommended modifications to the blast design, the predicted noise and vibration from blasting will comply with the relevant criteria;
- aircraft noise – the potential noise impact on the existing residences associated with a relatively small number of flights per day was determined to be negligible. With the recommended noise amelioration measures in place, the noise impact on the proposed accommodation camp will also not be significant;
- construction noise – there is only limited potential for significant construction noise emissions at the nearest receptors due to the nature of the construction activities required for this project, the allowable time for construction per day and the large intervening distance between the sources and the receptors. Using the measures outlined in the Environmental Management Plan (EMP), potential noise impacts during construction (including commissioning) will be minimised at noise sensitive locations; and
- haul roads and mine access road – to operate the internal mine haul routes within the mine site 24 hours per day requires the implementation of the recommended amelioration measures. the use of the mine access road will have minimal impact on the surrounding residences.

3.1.15.2 Potential impacts and mitigation measures

To manage potential impacts of noise and vibration during construction, Waratah Coal will develop and implement Construction Noise and Vibration Management Plans that address potential impacts. Ongoing monitoring of noise and vibration will occur during the construction of the operation of the mine and associated facilitates to ensure compliance with the EMP. This may include limiting construction hours to reduce noise impacts, limiting the size and use of explosives to daylight hours to reduce potential noise and vibration impacts.

3.1.16 WASTE

3.1.16.1 Waste generation

The technical study undertaken for this EIS has documented that the construction, operation and decommissioning of the project will increase the volume and diversity of the waste from the project area as compared with waste generation from the existing land use. While waste produced during the construction phase will be of a relatively short duration waste will continue to be produced during the operation and decommissioning phases of the mine site.

Waste streams generated during the construction and operational phases of the project will come from a suite of sources including:

- site preparation works including the establishment of overburden and topsoil stockpiles;
- CHPP including coal stockpile areas;
- railway turning loops and coal load out facility;
- water management structures including dams, levee banks and sediment traps;
- haulage and access roads; and
- ancillary infrastructure including mine office, communications, services, and associated amenities.

3.1.16.2 Waste management

In order to properly manage the waste generated through the construction and operations of the mine, Waratah Coal will develop a waste management strategy which incorporates waste management into daily operations and implements efficient practices throughout the lifecycle of the project. These principles will ensure early identification of anticipated waste streams and quantities, and allow effective implementation of appropriate management and mitigation measures to reduce the potential for impacts to occur. Waratah Coal will also ensure that as part of this process, licensed contractors will be engaged to remove and track and record any regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) generated onsite.

Despite an overall increase in waste compared to baseline conditions, the impacts of waste generation from construction and operations of the mine are considered to be minor due to Waratah Coal's commitment to the implementation of best practice protocols and a responsible waste management approach. This will include the implementation of the five key principles of the waste management hierarchy. These are:

- Waste avoidance
- Waste re-use
- Waste recycling
- Energy recovery from waste; and
- Waste disposal

This commitment will reduce potential harm to the environment and human health, and where possible, avoided completely.

3.1.17 TRANSPORT

3.1.17.1 Transport methods and routes

The technical review undertaken for the EIS considered the impact of the project on transport resulting from construction and operational stages of the project. The analysis considered the impacts to all transport types (i.e road, rail, air) and on potential impacts to the community with respect to road condition and safety matters.

The mine site has been designed to be largely self-contained with a view to reducing unnecessary off-site traffic volumes. For example, staff accommodation was been sited within the Mine boundary such that external traffic is not needed to transport staff from accommodation to work areas on a daily basis. However, regardless of the project phase, the development of the mine site will have some impact on local road conditions.

It is expected that the townships of Jericho and Alpha will expand to provide services associated with the mine and any increase in the local population which will service the mine site. This will intensify the demands on the local transport network. This increased demand will primarily be focused on a proposed new road to access the mine site from the Capricorn Highway, west of Alpha. This new road will replace the existing access route which is indirect, partially unsealed and inaccessible during periods in the wet season. This new road will include a new access intersection with the Capricorn Highway. The proposed development will also impact a number of roads which will generally be relocated around the mining activity boundary to maintain their connection and operation.

3.1.17.2 Potential impacts and mitigation measures

Technical review of transport requirements suggests that the mine will not compromise capacity on these roads due to the existing low volumes and the significant self containment of the mine site and further investigation is proposed during the final design phase of the project into the structural life of pavements, particularly on the highway. Further assessment into the acoustic impact of increased traffic within the townships of Alpha and Jericho is also proposed.

Generally, the mine is identified as an appropriate use in the context of the region, with respect to traffic impact. There is suitable spare capacity on the existing road network to accommodate higher traffic volumes, while the mine is expected to provide benefits to local users by improving the road network north of the highway in the vicinity of the mine.

3.1.18 INDIGENOUS CULTURAL HERITAGE

The EIS provides an assessment of Indigenous cultural heritage issues and proposes a management approach to minimise potential development impacts on indigenous cultural heritage in the mine area.

3.1.18.1 Potential impacts and mitigation measures

The assessment undertaken for the EIS included collating site data throughout the mine area from a range of sources including the Aboriginal Heritage Register and Database, and other published and unpublished sources. Waratah Coal has developed a Cultural Heritage Management Plans (CHMP) with the Wangan and Jagalingou people over an area which covers the majority of the mine area. Waratah Coal has undertaken public notifications pursuant to Part 7 of the *Aboriginal Cultural Heritage Act 2003* (ACH Act) to develop statutory CHMPs for the western portion of the proposed mine and is continuing to talk with the relevant Aboriginal parties to finalise the terms and conditions of the CHMP.

Identification of unrecorded Indigenous heritage resources within the project areas will be undertaken during dedicated field surveys. Where practicable, infrastructure will generally be sited to avoid locations of Aboriginal cultural heritage. In instances where this cannot be avoided, measures to mitigate impacts will be undertaken with Aboriginal parties, in accordance with agreed CHMPs.

Through these CHMPs, procedures will be developed covering the management of cultural heritage sites and values. Waratah Coal aims to promote an understanding of Aboriginal cultural and heritage in the workplace through employee induction programs and other specific training activities. Waratah Coal is committed to working with the relevant Aboriginal parties to develop and implement CHMPs and to provide management strategies that are agreed on and that are appropriate for the protection of identified Indigenous cultural heritage.

3.1.19 NON-INDIGENOUS CULTURAL HERITAGE

The assessment of non-indigenous heritage in the mine area involved a comprehensive review of publically available information together with significant stakeholder consultation and field assessment.

3.1.19.1 Potential impacts and mitigation measures

The proposed mine will have a minimal impact on places of cultural heritage significance. Development of the mine will require the removal of the Monklands homestead which includes a shearing shed of potential local significance.

The development of the mine will result in direct impacts on Kiaora and Monklands homesteads and surrounding landscapes. The only area currently identified that may contain heritage significance is Monklands homestead which contains local significance as a former sheep property with evidence of use in the shearing shed and wire netting fence.

An archival recording will be undertaken to include photographs and plans as specified by DERM for heritage places. The recording will be undertaken for Kiaora and Monklands homesteads and surrounding landscape. Copies of the photographic record will be deposited with the State Library of Queensland and the local Alpha library.

The history and significance of the properties will be incorporated in interpretative facilities associated with the China First mine or in the local area. This will be undertaken prior to the commencement of mine construction works. Waratah Coal will also develop a project specific EMP for the mine.

3.2 RAIL

3.2.1 CLIMATE CHANGE AND CLIMATE CHANGE ADAPTATION

3.2.1.1 Climate

The proposed corridor has a tropical climate, with hot and wet summers, and cool dry winters. Summer has a monsoonal weather, frequently influenced by tropical cyclones and low pressure systems, which cause significant rainfall in the coastal areas. The wind direction is predominant from the east, south east and north east, influenced by the trade wind.

Climate conditions for the rail alignment have been assessed for three project locations:

- the coal termnal – the start of the railway;
- central region of the railway; and
- the mine site.

3.2.2 LAND

3.2.2.1 Geology and Soils

The EIS describes the geology, soils and landform for the rail alignment study area of the Project, detailing the existing physical environment and any possible impacts resulting from the Project. An assessment is

also provided which describes the approach to be taken by Waratah Coal to minimise these potential impacts. Volume 3, Chapter 3 of the EIS further details the baseline environment within the project area.

3.2.2.2 Description of environmental values

Rail alignment topography varies along the length of the corridor from low coastal plains in its most easterly portion to gently undulating plains at its western extent. Between these, the alignment transects through granitic hills associated with the Clarke Ranges where the highest elevation reaches some 200 m.

A complex of soil units were identified across the project area, including areas of sodosols and vertosols in the east and predominantly sosdosols at the western extent of the alignment. Broadly, many of the soil units have been identified as prone to erosion and dispersion and also exhibit low fertility.

The proposed rail alignment traverses all classes of Good Quality Agricultural Land (GQAL) which will result in permanent sterilisation of discrete areas of Class A and Class B GQAL suitable for cropping.

3.2.2.3 Potential impacts and mitigation measures

The main potential impacts identified during the technical review included changes to agricultural land capability and increased risk of erosion in areas of construction and / or operation. In addition, some soils encountered will be sodic or dispersive which may affect excavation conditions and therefore construction and operational methodologies at the mine.

A number of mitigation measures have been identified for the rail alignment:

- In order to minimise erosion and slope failure, the final route for the rail line can follow ridges and spur lines or traverse the less steep mid to lower parts of hill slopes;
- Where there is the potential for fossils to be uncovered during earthmoving activities, the significance of the fossils will be assessed through the project EMP;
- Topsoil should be stripped from all disturbed areas and retained for use in rehabilitation areas. Records should be maintained to ensure useable soils are retained and logs of stockpiles kept to reconcile predicted and actual soil volumes;
- Strongly sodic or dispersive materials will not be used for rehabilitation purposes;
- Development of an Acid Sulfate Soils Management Plan for specific construction works below an elevation of 5 m above mean sea level (5 m AHD).

Further detailed investigations are required prior to construction to fully manage identified potential impacts. This further work will aim to delineate areas of potential impacts and assess the appropriate scale of mitigation or management.

3.2.3 LAND USE AND TENURE

3.2.3.1 Description of environmental values

The predominant land use within the footprint of the rail alignment is classified as 'for production from relatively natural environments' based on Queensland Land Use Datasets. Discrete parcels of land are found along the alignment and are classified as, 'Water or Production from Agriculture' (Dry Land and Irrigated) land use purposes which potentially encroach or abuts the corridor in various locations. Some areas along the rail alignment have been identified as set aside for conservation purposes. The rail alignment has been designed to avoid these areas.

The majority of land tenure within the rail alignment is zoned as rural and administered by the relevant Planning Schemes for the Barcaldine, Isaac and Whitsunday Regional Councils. A total of 72 separate allotments intersect the rail corridor. Of these, the predominant land tenure type is leasehold which comprises approximately 50% of existing tenure types. Freehold land comprises approximately 30% of tenure type with the remaining 20% held as easements. Land identified as freehold title only exists between at the eastern extent of the rail alignment between KP5 to KP95.

3.2.3.2 Potential impacts and mitigation measures

The proposed rail line easement will have a moderate impact to land tenure and land use. The main Impact will be the potential for disruption to existing land use regimes through the fragmentation of land required for the rail line easement. A further potential impact will be the requirement to remove or relocate existing property infrastructure such as fences, gates, dams and irrigation systems.

Impacts associated with fragmentation of grazing land will be addressed through consultation with all tenure holders to ensure to the extent practicable that the easement is located near fence lines and property boundaries. Impacts associated with changed grazing regimes will be addressed through the relocation and / or restoration of existing infrastructure or the construction of new infrastructure to reduce the impacts to a close as is practicable to existing conditions.

With the implementation of the mitigation measures it is expected that potential impacts associated with disruptions to land use and changed grazing regimes will be minimal. Waratah Coal will liaise with all tenure holders throughout all project phases to take into consideration the requirements of all tenure holders to the extent that is practicable.

3.2.4 TOPOGRAPHY AND LANDSCAPE CHARACTER

3.2.4.1 Description of environmental values

Rail alignment topography varies along the length of the corridor from low coastal plains in its most easterly portion to gently undulating plains at its western extent. Between these, the alignment transects through granitic hills associated with the Clarke ranges where the highest elevation reaches some 200 m.

3.2.4.2 Potential impacts and mitigation measures

Through the Clarke and Leichhardt Ranges, the topographical features such as rocky outcrops and steeply sloping ground can present an increased potential for landslip. Further, major rivers and tributaries may affect the extent of clearing required during construction, the type of equipment required to undertake construction and the amount of time that disturbed construction areas are in use. In these areas, there is greater potential for landslips to occur in the areas of steeper topography between if construction works are not managed properly.

3.2.5 LAND CONTAMINATION

The EIS identifies the potential for land contamination along the rail alignment of the Project, assesses potential impacts resulting from the project and suggests management measures to mitigate potential impacts.

3.2.5.1 Description of environmental values

A Preliminary Site Investigation (PSI) within the rail alignment area was undertaken as part of the EIS.

The PSI comprised searches of the Queensland Department of Resource and Environmental Management (DERM) Environmental Management Register (EMR) and Contaminated Land Register (CLR), and a site inspection.

A total of fifty seven lots intersected the rail alignment buffer area. Of these, four lots were identified as having a High Risk level of contamination. Environmental Management Register (EMR) searches conducted on these lots identified one listed on the EMR for a Hazardous Contaminant (Arsenic).

A total of 52 lots were classed as rural land use and were ranked as Medium Risk of contamination. Searches of these lots on the EMR reported one as having the Notifiable Activities of a Livestock Dip or Spray (22) and Race and Petroleum Product or Oil Storage (29). One lot was classed parkland and was assessed to be a low risk.

During the site inspection of the rail alignment, additional cattle dips were observed. PSI data for these lots was undertaken to assess the risk posed to the rail alignment; however, no sampling was undertaken. The lots listed for extractive industry were not listed on the EMR and desktop PSIs without soil sampling were undertaken.

A review of the Australian Government's Department of Defence Unexploded Ordnance (UXO) Database did not identify any property lots located on or near the mine site which could potentially contain UXOs. The probability of locating unexploded ordnance is therefore deemed low.

3.2.5.2 Potential impacts and mitigation measures

Potential impacts include:

- leaching of contaminants to groundwater or via overland flow to surface waters;
- mobilisation of contaminants if not appropriately managed;
- where the project construction intersects the existing rail lines, there is potential to encounter arsenic impacted soils. There is potential for mobilisation of this contaminant if not appropriately managed;

- where the project construction intersects areas of extractive resources, there is potential for mobilisation of contaminants from the elevated levels of minerals, elements or compounds in the resource material;
- demolition of buildings in the rail alignment has the potential to impact soils with hazardous materials if not appropriately assessed and managed; and
- spills and leaks from various contaminating sources such as, petrol and other chemicals stored on site during construction and operations should be managed properly.

To avoid contamination resulting from the operation of the rail, Waratah Coal will implement comprehensive EMPs as outlined in Volume 1, Chapter 8. This will include implementing and managing any potentially contaminating activities in accordance with relevant guidelines and legislation once construction commences and also during the operational phase.

3.2.6 NATURE CONSERVATION

3.2.6.1 Description of environmental values

The EIS describes the existing environment in relation to terrestrial ecological values within the footprint of the project's rail alignment. Further, the assessment describes the approach to be taken by Waratah Coal to minimise potential impacts.

Desktop and field studies were used to identify, describe and assess key terrestrial flora and fauna values of the study area and potential impacts associated with the construction and operation of the rail corridor. The terrestrial flora and fauna assessment of the proposed rail corridor was conducted by helicopter, over ten days in July 2010. A total of 57 flora and fauna habitat sites were ground-truthed.

The proposed rail corridor is located within the Brigalow Belt North bioregion (from KP 5 to KP 376) and Desert Uplands bioregion (from KP 376 to KP 468).

3.2.7 ENVIRONMENTALLY SENSITIVE AREAS (ESAS)

There are no Category A and / or Category C ESAs occurring within or adjacent to the proposed rail corridor. The only ESAs occurring within the proposed rail corridor are Category B ESAs, being Regional Ecosystems listed as Endangered under DERM Biodiversity Status. The presence of Category B environmentally sensitive areas within the project area triggers the need for an environmental authority under the *Environmental Protection Act 1994* within the Category B areas. The balance of the site is exempt from this particular requirement.

The Category B ESAs recorded within the study area are predominantly Brigalow (*Acacia harpophylla*) dominant and co-dominant communities, but also include:

Black gidgee (*Acacia argyrodendron*) woodlands (KP 205 – 207);

Gidgee (*Acacia cambagei*) woodlands (KP 260 – 360); and

False sandalwood (*Eremophila mitchellii*) open woodland on alluvial plains (KP 10 – 25).

The black gidgee woodland survey site (Site 29) was found to be degraded by grazing activities. Harissa cactus (*Harrissia martini*) was identified as being present.

The Gidgee woodland survey sites (Sites 37, 39 and 51) were found to be in generally good condition; however, some areas have been degraded due to grazing and fire. The declared weeds (declared under the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act)) parthenium weed (*Parthenium hysterophorus*), velvet tree pear (*Opuntia tomentosa*) and harissa cactus were found to be present amongst these sites as well as buffel grass (which is not a declared weed but is significant ecologically as it has the potential to out-compete native groundcover species and increase biomass).

3.2.8 ECOLOGICAL COMMUNITIES / REGIONAL ECOSYSTEMS

3.2.8.1 Description of environmental values

TECs

The EPBC Act Protected Matters Search Tool identified five Threatened Ecological Communities (TECs) potentially occurring within the broader study area. These are:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin;
- Weeping Myall Woodlands;

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT); and
- the Community of native species dependent on natural discharge of groundwater from the Great Artesian Basin.

The field survey identified that one of these, Brigalow (*Acacia harpophylla* dominant and co-dominant), occurs as small intermittent patches throughout the length of the proposed rail corridor. Brigalow communities were generally observed to be in good condition.

Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin are mapped as occurring:

- as a pure stand at KP 273 (Site 38), however, the field survey found that this community had been removed by cultivation and no native grasslands occurred in the vicinity of this location;
- as 20 % of a mosaic RE at KP 192 (Site 27), however, the field survey found the Native Grassland does not occur along the proposed rail corridor at this location; and
- with patchy distribution around Collinsville (between KP 60 – 110) and the field survey confirmed that some Native Grasslands areas do occur within this portion of the proposed rail corridor.

The desktop study indicated that Weeping Myall Woodlands could potentially occur in the southern portions of the proposed rail corridor although there is very limited suitable habitat (i.e. RE 11.3.2). No evidence of Weeping Myall Woodland was found during the field survey.

The desktop study indicated that the proposed rail corridor avoids any areas mapped as SEVT remnant vegetation; however the field survey observed a limited number of small areas of greatly degraded SEVT in sheltered pockets between KP 5 – KP 140.

The desktop study and field survey also concluded that the proposed rail corridor avoids any areas mapped as 'Communities of native species dependent on natural discharge of groundwater from the Great Artesian Basin'.

REs

Current RE mapping identifies 61 REs as occurring within the study footprint, including 45 Least Concern, 15 Of Concern and 3 Endangered.

The field survey found the DERM RE mapping to be generally accurate and 27 REs were observed during the ground-truthing surveys including:

- 17 Least Concern REs;
- 7 Of Concern REs; and
- 2 Endangered Res.

The communities were generally found to be in good to excellent condition within the large contiguous stands of vegetation between KP10 - 202, KP 225 – KP 255 and KP323 – KP 343. In other areas the communities tended to be impacted to a greater degree by grazing and / or altered fire regimes associated with buffel grass.

High Value Regrowth

The proposed rail corridor transects numerous small patches of High Value Regrowth (HVR) as mapped by DERM. The transected HVR predominantly consists of Least Concern REs but also include regrowth of three TECs / Endangered REs and eight Of Concern REs.

3.2.8.2 Potential impacts and mitigation measures

TECs

The construction of the rail will require the following amounts of clearing of two EPBC listed Threatened Ecological Communities (TECs):

- Brigalow (*Acacia harpophylla* dominant and co-dominant) – 81 ha; and
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin – 48 ha.

This equates to 0.03 % of the occurrence of each within the bioregion. This clearing is unavoidable and is considered to have a minor consequence for these TECs within their local and bioregional contexts.

Mitigation measures to ameliorate these impacts include (but are not limited to):

- detailed flora surveys will be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- clearing along the proposed rail corridor should be limited to the amount necessary to undertake earthworks and will aim to minimise the construction corridor width where possible - calculations of areas to be cleared are based on 100 m widths, in sensitive areas this could be reduced to as little as 40 m;

- clearly mark designated revegetation / rehabilitation zones and other no go areas (including large sign cant trees) prior to any vegetation clearing. High visibility tape, barricade webbing or similar will be used to avoid inadvertent clearing of native vegetation;

Significant Community Management Plans will be developed for Brigalow and Natural Grassland Communities, which may potentially be impacted by the proposed rail. These plans will include:

- proposed management measures including those identified for construction and operation of the rail infrastructure;
- a monitoring and evaluation program for the community / species; and
- offset commitments relating to the community / species.

Where impacts are unavoidable to significant biodiversity values these will be compensated for through delivery of offsets (refer to Volume 5, Appendix 27).

REs

Three Endangered REs, equating to approximately 60.57 ha of remnant vegetation (and 5.4 ha of HVR), are required to be cleared or will be impacted by the proposed clearance footprint (i.e. REs 11.3.1, 11.4.8 and 11.4.9). These are all Brigalow REs (and are the same as the Brigalow TEC REs). This represents 0.23 % of the RE extent within a 10 km buffer and 0.03 % of the RE extent within the bioregion. For each individual Endangered RE the impact is less than 0.6 % of the RE extent within a 10 km buffer and less than 0.07 % of the RE extent within the bioregion.

Thirteen Of Concern REs, equating to approximately 97.71 ha, are required to be cleared or will be impacted by the rail corridor clearance footprint. This represents 0.22 % of Of Concern REs within a 10 km buffer and 0.01 % of that which occurs within the bioregion. For each Individual Of Concern RE the impact is less than 1 % of the RE extent within a 10 km buffer and less than 0.06 % of the RE extent within the bioregion.

A total of 48 Least Concern REs, equating to approximately 2,691 ha, are required to be cleared or will be impacted by the rail corridor clearance footprint. This represents 0.48 % of their extent within a 10 km buffer and 0.04 % of their extent within both bioregions. Note that for each of these Least Concern RE the impact is less than 3.3 % of the RE extent within a 10 km buffer and less than 0.4 % of the RE extent within the bioregion. One exception is RE 11.11.15d for which the impact is approximately 2.35 % of the RE extent within the bioregion (11 ha out of 470 ha).

Minimisation and mitigation measures for REs are as outlined above for TECs. A full description of these is provided at Volume 3, Chapter 6.

High Value Regrowth

The proposed rail corridor transects approximately 50 ha of High Value Regrowth (HVR) as mapped by DERM.

3.2.9 TERRESTRIAL FLORA

3.2.9.1 Description of environmental values

The review of Queensland Herbarium HERBRECS, Wildnet and EPBC Act Protected Matters databases identified 34 Threatened or Near Threatened plant species that are known to occur or have ranges that overlap with the proposed rail corridor. These include:

- Thirty one species listed under the *Nature Conservation Act 1992* (NC Act), including three Endangered, ten Vulnerable and eighteen Near Threatened species; and
- nine species listed under the EPBC Act including one Endangered and eight Vulnerable.

However, only black ironbox (*Eucalyptus raveretiana*) was observed and recorded during the field survey. Black ironbox was observed at seven locations during the assessment. In all instances the plants were observed within the beds or banks of watercourses. Several age classes are represented at these locations and specimens generally range from 0.5 – 8 m in height in the channel and up to 25 m along the banks.

A total of 200 Least Concern native flora species were recorded during the surveys. Additionally 16 non native flora species were identified. Of these, eight are declared weeds under the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act).

3.2.9.2 Potential impacts and mitigation measures

In all, approximately 2,691 ha of remnant vegetation is proposed to be cleared. This represents less than 1 % (approximately 0.51 %) of the entire vegetation extent within a 10 km buffer and less than 1 % (approximately 0.3 %) of that which occurs at the bioregional level.

Potential direct and indirect impacts to flora associated with the proposed clearing include:

- direct spatial reduction in remnant vegetation due to clearing (detailed below);
- increased edge effects (through transecting large vegetation areas as well as reducing edge to area ratios) including the potential to increase the abundance of buffel grass and other weeds, feral animals and fire;
- potential for dust to reduce the health of vegetation in the vicinity of the clearance footprint;
- potential for temporary facilities, materials and equipment to damage areas outside the construction footprint;
- potential to alter the hydrological characteristics for areas upstream and downstream of the rail corridor; and
- potential for accidental and inappropriate release of pollutants which could contaminate soil and water, reducing the health of riparian and water dependent vegetation.

Potential direct and indirect impacts associated with construction of the rail corridor on Threatened and Near Threatened flora species include:

- direct loss of individuals through clearing activities;
- reduction in the long term viability of the local populations by removing individual plants, population reduction and increased spatial isolation of plant populations;
- direct loss of potential habitat; and
- potential effects on health and viability of plants outside the clearance footprint through
  - increased edge effects and associated potential to increasing the abundance of weed species and fire intensity;
  - potential for dust to reduce the health of plants and associated vegetation retained outside the construction footprint; and
  - potential for temporary facilities, materials and equipment to damage plants and associated vegetation outside the construction footprint.

Detailed survey is required to confirm the presence or absence and potential presence of each of the threatened flora species along the proposed rail corridor prior to alignment finalisation. It is anticipated that Threatened and Near Threatened flora species recorded during detailed corridor survey will generally be able to be avoided by alignment refinement. There may however, be some individual and populations which are unavoidable. Generally this would relate to species with restricted habitat niches from which the rail corridor may not be able to deviate. For example, the Vulnerable black ironbox occurs as a dominant and co-dominant canopy species along a number of watercourses between KP 5 – KP 100. These watercourses will need to be crossed by the rail corridor and it is likely that some individual trees and seedlings will need to be displaced to facilitate construction.

A number of mitigation measures are proposed and outlined in **Volume 3, Chapter 6**, including (but not limited to):

- detailed flora surveys will be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- minimise the clearance of remnant vegetation to that necessary for construction;
- clearing along the proposed rail corridor should be limited to the amount necessary to undertake earthworks and will aim to minimise the construction corridor width where possible;
- a detailed Rehabilitation Plan will be developed that includes a detailed rehabilitation monitoring and evaluation plan including monitoring schedule (e.g. quarterly monitoring of areas under rehabilitation). Suitable completion criteria and indicators to measure the progress of rehabilitation may include 70 % of cover of native and introduced species within each stratum as occurring on adjoining reference sites of the same land type. At least two reference sites within the same sub-catchment should be established within each RE being rehabilitated to provide benchmarking of rehabilitation progress and completion;

A Species Management Plan will be developed for black ironbox and any other significant flora species which may potentially be impacted by the proposed rail. These plans will include:

- proposed management measures including those identified for construction and operation of the rail infrastructure;

- a monitoring and evaluation program for the community / species; and
  - offset commitments relating to the community / species.

Where impacts are unavoidable to significant biodiversity values these will be compensated for through delivery of offsets (refer to Volume 5, Appendix 27).

3.2.10 TERRESTRIAL FAUNA

3.2.10.1 Description of environmental values

Database searches identified 35 terrestrial Threatened and Near Threatened fauna species listed either under the EPBC or NC Act as potentially occurring in the area. These include:

- 5 Endangered, 13 Vulnerable under the EPBC Act; and
- 5 Endangered, 13 Vulnerable and 12 Near Threatened under the NC Act.

Additionally, the searches identified 26 other Migratory species under the EPBC Act.

In addition to the species listed under the EPBC and NC Act, the rail traverses two significant bioregions. Each of these regions have a suite of taxa which are listed as 'priority taxa'. Where the rail traverses the Brigalow Belt North bioregion, a further 30 fauna species are listed. Of these 30 species, 15 may occur in the vicinity of the proposed rail corridor. Where the rail traverses the Desert Uplands bioregion, 46 fauna species are listed. Of these 46 species, 33 may occur in the vicinity of the proposed rail corridor.

A total of 133 vertebrate species were recorded during field surveys, including 11 Regionally Significant fauna species and 4 non native species. Two of the non native species are declared Class 2 Pests under the LP Act, feral cat (*Felis catus*) and feral pig (*Sus scrofa*).

The assessment found that the proposed rail corridor is generally well located in relation to minimising impacts on terrestrial flora and fauna values. It is likely that additional avoidance and minimisation will be achievable based on detailed on-ground surveys in specifically targeted areas.

Additional information in the form of calculations of areas to be impacted and potential habitat maps for brigalow scaly-foot, yakka skink, Australian painted snipe and black-throated finch at the mine site can be found at Figures 12 – 57 of the MNES standalone report in Chapter 26 of Volume 5.

3.2.10.2 Potential impacts and mitigation measures

Potential direct and indirect impacts on fauna are likely to include the following:

- loss of habitat such as mature vegetation, hollow-bearing trees and fallen logs, and therefore loss of nesting, refuge and foraging resources;
- mortality;
- habitat fragmentation and loss of connectivity (disturbance to fauna movement corridors);
- barrier effects; and
- edge effects.

The significance of these impacts on Threatened, Near Threatened, Migratory and Regionally Significant fauna species is considered below. The potential impacts on Least Concern fauna species as a group are largely unavoidable and will be of minor significance to these species.

For threatened species, with the exception of one species, the striped-tailed delma, the loss of potential habitat is generally less than 1 % of the available habitat within a 10 km buffer of the rail corridor. For most potentially occurring species it is less than 0.5 % of the possible habitat within a 10 km buffer. Clearing of potential habitat for the striped –tailed delma for the rail corridor equates to approximately 12 % of the potential habitat within the 10 km buffer. The impacts on the habitat of potentially occurring Threatened, Near Threatened and listed migratory species, including the striped-tailed delma, are to be addressed through mitigation and habitat offsets.

Regionally Significant fauna, including the 48 species which have been identified as potentially occurring within the proposed rail corridor, have the potential to be affected by the direct loss of habitat and other potential indirect impacts. The direct habitat loss and some edge effect impacts are unavoidable. The consequences of these impacts will be minor for most of these species which are generally either mobile (e.g. bush stone-curlew, grey-crowned babbler, brown treecreeper), able to utilise adjoining habitats (e.g. great brown broodfrog, Australian bustard, rufus bettong, hooded robin) and / or relatively tolerant of disturbance (common brushtail possum, swamp wallaby and spectacled hare-wallaby).

A number of mitigation measures are proposed and outlined in Volume 3, Chapter 6, including (but not limited to):

- detailed fauna habitat surveys will be conducted of all remnant vegetation areas within the corridor prior to finalisation of the alignment;
- removal of vegetation in a staggered sequence to allow fauna species to relocate off site;
- minimised clearing of large trees in riparian areas to protect potential nesting trees of raptors;
- recognised fauna spotter / catcher (DERM certified) to inspect the corridor immediately prior to clearing vegetation and be present for clearing activities;
- development and implementation of protocols for any displaced fauna to be relocated to more suitable similar habitat within the surrounding area;
- where possible rehabilitation of disturbed areas associated with construction works with suitable endemic vegetation to enhance their potential for fauna movement;
- appropriate strategies will be developed and implemented to minimise the risk of road kill including (reduced speed zones, minimise vehicle movement during times of high fauna activity, for example dawn, dusk and at night);
- Significant Species Management Plans will be developed for any significant fauna species which may potentially be impacted by the proposed rail. These plans will include:
  - proposed management measures including those identified for construction and operation of the rail infrastructure;
  - a monitoring and evaluation program for the community / species; and
  - offset commitments relating to the community / species.

Where impacts are unavoidable to Threatened fauna species habitat under the EPBC Act and they are likely to have a significant impact on the species this loss will be compensated for through delivery of offsets (refer to Volume 5, Appendix 27).

3.2.11 FRESHWATER AQUATIC FLORA AND FAUNA

3.2.11.1 Description of environmental values

Baseline aquatic ecology investigations were undertaken along the rail alignment. Several wetlands listed as Great Barrier Reef Wetland Protection or management areas were located within or adjacent to the rail alignment and were targeted during field surveys.

A total of 33 macro invertebrate groups, seven macro crustacea and 24 fish species were observed across the entire rail alignment. Species richness was highest within the Bowen River Catchment. A number of turtles and other aquatic related vertebrate species were also observed during field work that should be considered when constructing the project. Stream Invertebrate Grade Number – Average Level (SIGNAL) scores calculated using macro invertebrate identified at each of the sites indicated that most of the waterways crossed by the rail alignment are considered to have some level of pollution, which is most likely a result of surrounding agricultural land uses.

3.2.11.2 Potential impacts and mitigation measures

The potential impacts on aquatic ecosystems include:

- Impacts on vegetation and banks during bridge construction through their removal, causing sediment movement;
- Disturbance and stockpiling of soils causing increased turbidity or suspended solids within the water column;
- Piling and culvert works for stream crossings;
- Use of potentially contaminated / low quality water for dust suppression and other site activities; and
- Storage of oil, fuel and chemicals on site.

During construction and operation of the rail alignment, there are a number of mechanisms that have the potential to impact on aquatic ecosystems including:

- impacts on vegetation and banks during bridge construction through their removal, causing sediment movement;
- disturbance and stockpiling of soils causing increased turbidity or suspended solids within the water column;
- piling and culvert works for stream crossings;

- use of potentially contaminated / low quality water for dust suppression and other site activities; and
- storage of oil, fuel and chemicals on site.

EMPs will be developed for the construction and operational phases of the rail alignment. Management measures addressing freshwater ecology issues will include (but are not limited to):

- avoid disturbing broad diverse riparian vegetation assemblages, high value habitat nodes and corridors in highly fragmented landscapes to remove linkages across semi contiguous and contiguous corridors through placement of site infrastructure;
- design alignment crossings to be elevated to minimise dissection of contiguous ecotonal vegetation corridors and high value habitat nodes and corridors in highly fragmented landscapes;
- revegetate understorey and mid storey vegetation in clearing corridors across drainage lines following construction;
- Erosion and Sediment Control Plans for the rail alignment detailing control measures to be implemented, construction details, dimensions, materials used, expected outcomes and staging of erosion and sediment control once construction is complete;
- limit vehicle access during construction to access tracks and designated construction areas; and
- where works are to be carried out within the streams themselves (i.e. piling for bridge crossings) sediment sampling will be carried out to identify potential contaminants.

An aquatic ecosystem monitoring program will be put in place for construction works through the Construction EMP. The monitoring program will incorporate the following:

- Impact monitoring criteria will be included in the EMP. Criteria will be developed for each of the catchments addressed in this report (Don, Lower Catchment, Bowen, Suttor and Belyando);
- Monitoring will include visual inspections of construction areas and surrounding waters for evidence of spills; and
- Physical and chemical water quality monitoring will be carried out up and down stream of work sites within the study area.

3.2.12 WATER RESOURCES

3.2.12.1 Surface water

3.2.12.1.1 Description of environmental values

Baseline monitoring was carried out at 19 sites within the Suttor (10 sites) and Bowen / Bogie Catchments (9 sites), with field studies being undertaken over two temporal events encompassing dry and wet seasons to account for seasonal variation in water quality. Wet season sampling was carried out within a week of significant rainfalls in the region resulting from cyclone Ului.

Results from the field sampling identified that streams in the study area were generally in good health. Nutrient and metal levels were elevated at some sites during both dry and wet season sampling. This effect was more pronounced in the upland catchments (Suttor) then the lowland catchments (Bowen / Bogie). The lower levels of nutrients and metals identified in the lowland catchments compared to the upland catchments are likely due to the more stable nature of the streams and sandy sediments.

3.2.12.1.2 Potential impacts and mitigation measures

Construction works that have the most potential to impact on surface waters include:

- clearing of vegetation and topsoils from work sites and stockpiling of overburden on site;
- impacts on vegetation and banks during bridge construction through their removal, causing sediment movement;
- storage of chemicals on site (e.g. hydrocarbons, detergents, degreasers, etc) during construction and operations; and
- piling works associated with construction of bridges and culverts at waterway crossings for the railway.

Management measures have been identified to reduce potential impacts resulting from the works. A few of these measures include the development of an ASS management plan, Stormwater Management Plan and the development of an Erosion and Sediment Control Plan (ESCP).

3.2.12.2 Groundwater

Previous studies of groundwater in the area of the rail alignment include DERM historical groundwater records, the desktop review undertaken for the study area by SKM (2009) and investigations for the Abbot Point Multi Cargo Facility EIS (GHD, 2010).

These studies have identified that the main potential impacts with respect to groundwater are related to shallow near surface groundwater that could be impacted by the project's railway construction activities.

Storage and handling of fuels / chemicals / raw materials has the potential to impact groundwater where leaks or spills from storage and handling areas occur. Where the groundwater that is impacted by contaminants is up gradient of an environmental receptor (i.e. a water body), a groundwater bore, or within the radius of influence of an active groundwater bore there is potential for impacts to a receptor.

Impacts to local groundwater regimes may also occur where groundwater is within the construction zone in the upper 1 m of the surface or where bridge construction entails deeper construction in areas of shallow groundwater that requires dewatering of construction areas.

Management measures which will be implemented to mitigate these impacts include:

- Ensuring safe and effective fuel, oil and chemical storage and handling on site.
- Providing appropriate spill control materials including booms and absorbent materials on site and at refueling facilities at all times;
- In the event of groundwater contamination occurring, the impact will be assessed and remediated in accordance with the requirements of the EP Act;
- Surface flows should be channelled with appropriate erosion and sediment controls to minimise the potential of increased sediment loading leading to changes in the recharge of shallow aquifers;
- Characterisation of groundwater levels and corrosivity should assess the potential for changes in groundwater levels and impacts to infrastructure;
- In the identified areas of shallow unconfined groundwater, it is recommended that a site specific assessment of the depth and vulnerability of groundwater is undertaken prior to site works; and
- Where blasting is undertaken, conduct a census of bores within a 500m area and monitor bores to assess potential impacts and requirement for mitigation measures.

If managed properly it is unlikely works will have any significant impact on groundwater resources at the coal terminal.

3.2.13 AIR QUALITY

3.2.13.1 Description of environmental values

An air quality assessment was undertaken for the proposed rail project. The assessment method was conducted to satisfy requirements in the ToR. Predicted air quality impacts are compared with relevant air quality guidelines, especially those specified in the Environmental Protection Policy (Air) (2008).

Dust impacts during the operational phase of the project were assessed for representative portions of the rail, in terms of ground-level concentrations of PM_{10}, $PM_{2.5}$ and TSP as well as dust deposition. Results from the atmospheric dispersion modelling indicate that the dust impacts drop very quickly with the distance from the rail. Dust generated from coal wagons will not lead to exceedances of the guidelines at sensitive residential locations. However, the 24-hour PM_{10} guideline of 50 $\mu g/m^3$ could be exceeded for up to 60 m from the rail. No exceedance of the guidelines is expected at sensitive receptors; however, at one receptor located close to the rail (receptor 4); the distance between the receptor and the extent of the predicted exceedance is less than 30 m.

3.2.13.2 Potential impacts and mitigation measures

Proposed dust mitigation measures adapted from Queensland Rail Coal Dust Management Plan (2010) will ensure that emissions from the project will not diminish or degrade the ambient air quality to the extent that it will adversely impact human health. This will be achieved through Waratah's EMP and application of dust mitigation measures including the following:

- Implementing partial covers for the coal wagons; and/or
- Wetting down the coal in each wagon before leaving the coal mine (to bind surface coal particles and provide a crust that is resistant to dust lift off); and

- cultural practices such as monitoring weather conditions regularly and minimising vehicle movements and speed when conditions are conducive for dust generation.

3.2.13.3 Greenhouse gas emissions and abatement

The studies undertaken for the EIS identified existing air quality parameters within the rail alignment assess potential impacts resulting from the project and suggest management measures to mitigate potential impacts. The EIS further provides an assessment of the greenhouse gases that will potentially be generated during the construction and operation of the mine.

Desktop studies have identified the likely greenhouse gas emission sources from the construction and operation of the railway. Annual greenhouse gas emissions have been estimated using applicable and recognised methodologies for reporting. It is expected that during operation, the rail will produce 430,702 t CO_2-e per annum. Scope 1 emissions account for some 64% of total emissions which were identified as direct emissions associated with diesel consumption in the locomotives. Scope 2 emissions account for 36% of total emissions for the rail, and have been estimated using the emission factor for electricity purchased from the Queensland grid.

Greenhouse gas emissions from all aspects of the project, including the rail, will have to be annually reported under the requirements of NGERS, and Waratah Coal will be a direct participant in the emissions scheme included in the CPRS as it is currently proposed. It is also expected that Waratah Coal will have to assess the energy efficiency of the project, and identify measures to improve energy efficiency, under the EEO Program.

The project can most effectively reduce its annual emissions through improvements in energy efficiency. Waratah Coal is committed to undertaking ongoing internal measurement and monitoring of emissions, in addition to mandatory reporting under NGERS and the EEO Program. The focus of the monitoring will be to identify sources with the greatest potential for emissions reductions. Greenhouse gas emissions may also be offset through investment in third party projects that reduce emissions below a demonstrated baseline, for example, through forestry and renewable energy projects.

3.2.14 Noise and vibration

Noise assessments have indicated that predicted noise levels along the rail corridor will comply with Queensland Rail criteria but exceed the night-time noise criterion for sleep awakening at four residences. These residences are within 700 m of the proposed rail corridor. Mitigation measures have been proposed to meet these night time criterion for 24 hour use of the rail corridor.

Vibration levels associated with coal train pass-bys have been examined for residential locations located within 200 m of the proposed rail corridor. The only receptor within 200 m of the rail corridor is Bakara. Vibration levels have been predicted based on levels sampled near Queensland Rail coal freight operations in South-East Queensland. The predicted levels comply with the vibration levels recommended to achieve human comfort. It is concluded that no adverse vibration impacts would result at Bakara during coal train pass-bys.

Noise and vibration will be managed by the incorporation of noise mitigation measures into the project EMP for construction and operation of the proposed rail and associated infrastructure.

Detailed information on the assessment of noise and vibration is found in **Volume 3, Chapter 11**.

3.2.15 WASTE

3.2.15.1 Waste generation

EIS studies have identified and assessed the potential impacts resulting from waste generation throughout the lifecycle of the project including the construction and operations of the rail alignment and describes the approach to be taken by Waratah Coal to waste generation, minimisation, management and mitigation measures with the aim of protecting environmental values from the associated impacts of the identified waste streams.

It is anticipated that the largest volume of waste will be associated with the construction of the railway track, rather than the ancillary activities associated with the construction or the long term operation of the rail alignment.

During the operation of the rail, the waste streams generated are anticipated to be significantly reduced in comparison to the construction phase of the project.

There will be a reduced workforce and demand for raw construction materials. Points of waste generation during the operation of the rail alignment are likely to be associated with:

- Track maintenance
- Operation of the maintenance facility for rail operations; and
- Maintenance of access roads.

3.2.15.2 Waste management

During the project construction and operation phases, waste will be managed such that the potential for adverse impacts to the health and well-being of local residents and project staff, and the environment are avoided. Where this is not possible, mitigation measures will be employed to reduce the potential for adverse impacts arising.

In order to properly manage the waste generated through the construction and operations of the rail alignment, Waratah Coal will develop a waste management strategy which incorporates waste management into daily operations and implements efficient practices throughout the lifecycle of the project. These principles will ensure early identification of anticipated waste streams and quantities, and allow effective implementation of appropriate management and mitigation measures to reduce the potential for impacts to occur. Waratah Coal will also ensure that as part of this process, licensed contractors will be engaged to remove and track and record any regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) generated onsite.

Despite an overall increase in waste compared to baseline conditions, the cumulative impacts of the waste are considered to be minor due to the implementation of best practice protocols and a responsible waste management approach, ensuring the potential for harm to the environment and human health is minimised, and where possible, avoided completely. This will ensure compliance with the State regimes.

3.2.16 TRANSPORT

3.2.16.1 Transport methods and routes

The construction of the railway will require the transport of several million m^3 of material, both within the rail corridor and imported from quarries. Operationally, the train line will cross several major transport corridors, as well as a number of minor roads and private property circulation roads. Throughout this assessment process, all these authorities have been included in stakeholder meetings.

The rail construction is expected to employ approximately 1,000 workers. To accommodate workers, several temporary camps will be provided along the proposed route, adjacent to existing infrastructure and townships. This will distribute the workforce and subsequent impacts of construction along the rail line. The construction activities will temporarily increase the demands on the local transport network. However, where feasible, transport of material and staff to the worksites will occur either along a service road parallel to the track, to limit travel distances on the public road network, or alternatively via rail as the track is being constructed. Access to the service track will be from the public road network at rail crossings.

The railway design considers three generic crossing treatments for transport corridors. These are:

- grade separation (via bridges) of major transport corridors – highways and the North Coast Railway;
- level Crossings on minor state controlled roads and local roads; and
- grade separation (via culverts) of private access tracks.

At level crossing points, detailed consideration will be given to the alignment of roads, relative to the rail line to provide adequate sight distance and suitable separation from intersections.

3.2.16.2 Potential impacts and mitigation measures

The rail construction and operation is not expected to compromise capacity on these roads due to the existing low volumes and the provision of internal movements along the service road. Further investigation is proposed into the structural life of pavements during the final design stage. A review of the acoustic impact of increased traffic within townships, such as Collinsville, is also proposed.

Generally, the use of rail for the bulk transportation of coal over such a large distance is the most appropriate solution with respect to traffic impact, particularly over the full life of the mine operation. The impacts of construction will be temporary, and these will be managed through the implementation of appropriate mitigation works. The ongoing traffic impacts due to

the operation of the railway will also be addressed by providing appropriate crossing facilities for a range of existing transport needs.

3.2.17 INDIGENOUS CULTURAL HERITAGE

The EIS provides an assessment and proposes management of potential development impacts on Indigenous cultural heritage in the rail corridor study area. In doing so, it provides a context for assessing Indigenous occupation of the planned rail corridor, recognises the presence of registered Indigenous heritage sites and provides an overview of the framework in which Waratah Coal and the identified Aboriginal parties will manage cultural heritage.

Desktop assessment identified the following Aboriginal Parties as registered Native title claimants over land which the proposed rail alignment traverses:

- Wangan and Jagalingou People Native title claim (QC 04/6; QUD 85/04);
- Jangga People Native title claim (QC 98/10; QUD 6230/98); and
- Birri People Native title claim (QC 98/12; QUD 6244/98).

Waratah Coal has developed CHMPs with the Wangan and Jagalingou, Jangga and Birri People's. Waratah Coal will also undertake public notifications pursuant to Part 7 of the ACH Act to develop a statutory CHMP in an area adjacent to the APSDA where there is currently no Native title claim. Waratah Coal is committed to continued engagement and negotiations with endorsed Aboriginal Parties and to developing (where not already developed) and implementing approved CHMPs.

To date, specific field surveys for the Waratah Coal project have not been conducted. Detailed cultural heritage surveys of the proposed rail corridor will be undertaken in accordance with the requirements of the agreed CHMPs.

3.2.17.1 Potential impacts and mitigation measures

No listed Indigenous cultural heritage will be impacted by the planned rail corridor development. Items of unrecorded Indigenous cultural heritage may occur within of near the proposed rail corridor and without appropriate site management initiatives, may be threatened by construction impacts. Unrecorded Indigenous heritage resources within impact areas will be identified during dedicated field surveys conducted by each relevant Aboriginal party as agreed in the CHMPs. The conduct of the cultural heritage assessments and the implementation of site protection or remediation measures will be specified in approved CHMPs, either already agreed or still to be negotiated with each Aboriginal party.

Waratah Coal is committed to working with the relevant Aboriginal parties to develop and implement Cultural Heritage Management Plans (CHMPs) and to provide management strategies that are agreed and appropriate for the protection of identified Indigenous cultural heritage. Impact mitigation measures that may be required include avoiding certain highly sensitive areas, carrying out more field investigations including sub-surface testing, recovering datable occupation material, and collecting and relocating cultural heritage items.

3.2.18 NON-INDIGENOUS HERITAGE

The EIS describes the potential effects of construction and operation of the Waratah Coal project's proposed rail project on non-Indigenous cultural heritage, and identifies suitable management and mitigation measures to minimise impacts.

The assessment of non-indigenous heritage for the rail project involved a comprehensive review of publically available information together with significant stakeholder consultation and a two stage field assessment. Results of these activities identified that the proposed rail project will have minimal impact on places of non-indigenous cultural heritage significance.

Of significance are two places that would meet the threshold for entry on the Queensland Heritage Register. These were Bowen Downs Road and Mountain Creek Changing Station. Assessment suggests that the proposed rail corridor will cross the alignment of the Old Bowen Downs Road and that through access should be maintained where it will be crossed by the proposed rail line. It is unlikely that the rail corridor will directly impact on Mountain Creek Changing Station as the proposed rail project is located approximately 20 km away from this site.

Waratah Coal is committed to minimising impacts to non-indigenous cultural heritage during construction and operation phases of the project. Relevant mitigation measures have been proposed to ensure potential impacts during construction and operation are

minimised. A project specific strategy will be developed and implemented for the project to manage impacts on known sites and on potential non-indigenous heritage sites that have not previously been identified within the project area. These measures will include:

- Outlining statutory obligations for all parties involved in construction activities;
- Providing an induction for all construction personnel regarding non-Indigenous cultural heritage management procedures; and
- Outlining procedures to be implemented in the case of finding non-Indigenous heritage material during construction.

4. SOCIAL VALUES AND MANAGEMENT OF IMPACTS

4.1 SOCIAL – MINE

The project provides an opportunity for substantial economic development in Central Queensland and will accelerate population growth, increase employment and training opportunities, and raise income levels. However, the project is expected to place increased demand on public infrastructure and services, including welfare services, add to the cost of living (particularly housing costs) and impact on local traffic.

4.1.1 COMMUNITY ENGAGEMENT

The community engagement process for the project as a whole is described in detail (Volume 5 Appendix 23) in the EIS. Following is a summary of the consultation process as it relates to the SIA in the vicinity of the mine:

- public consultations were held in Barcaldine, Jericho, Alpha in June and September 2010, following initial meetings with the Barcaldine Regional Council and Cental Highlands Regional Council;
- public comments were invited at each public meeting (and a comment form provided in which people could document queries or comments and send to Waratah Coal). Comments could also be provided via email (info@waratahcoal.com) or phone (1800 085 915), while additional information was available on the Waratah Coal website (www.waratahcoal.com); and
- field work was completed between July and September and included further consultations with regional councils and other interested parties.

4.1.2 SOCIAL BASELINE STUDY

An overview of the demographic and social characteristics of the Alpha area is presented below:

- Alpha, like the remainder of the BRC, experienced a decline in population over the 10 years from 1996 to 2006;
- the Planning Information and Forecasting Unit (within DIP) predicts that Alpha will grow by 0.2% per annum over the next 20 years;
- 96% of Alpha's population were born in Australia, 94% are Australian citizens, and 99% speak only English;
- the population is relatively old (a median age of 38);
- the Indigenous population comprises 3.6% of the total population, and the W and J People are traditional owners within much of the mine site area;
- there is a strong sense of community and a strong commitment to local organisations, including high levels of volunteering;
- the majority of the workforce is engaged in rural industries (predominantly beef cattle);
- there is high workforce participation and low unemployment (males 1.0%; females 1.4% in 2006), although average income levels are 8% lower than Queensland as a whole;
- the level of home ownership is high (47%) and there is only a relatively small rental market;
- house prices have risen sharply over the past three years but remain below urban areas or major rural centres (averaging above $200,000 in 2010);

- health and emergency services are limited (Alpha Hospital is old and does not have a resident doctor, and the ambulance is operated by hospital staff and a volunteer driver);
- education facilities are limited (Alpha has prep to grade 10 and Jericho has prep to grade 6) and education levels relatively low; and
- welfare indices developed by the ABS using 2006 census data indicate that Alpha contains a high proportion of relatively disadvantaged people and few people with high qualifications or highly skilled jobs when compared to Australia as a whole.

4.1.3 WORKFORCE

A construction workforce of approximately 2,500 contractors will be required at peak construction period. The workforce will be predominantly fly-in / fly-out (FIFO); however, expectation is there will be a portion of local workers in this project. Accommodation will be provided at a purpose built 2,000 person workers village adjacent to the site. The mine development is expected to operate on a two shift, seven day rotating roster.

A proposed workforce of 2,360 permanent employees / contractors will be required during the mine operations.

4.1.4 POTENTIAL IMPACTS

Studies undertaken for the EIS identified that the extension of mining in the Galilee Basin will provide both positive and negative outcomes to the broader community. For example, an increase in mining could impact the social fabric of towns and communities generally unfamiliar with mining. Currently, four mines which are currently proposed for the Alpha area are expected to produce around 120 Mtpa of coal per annum. This compares to 190 Mtpa of coal produced throughout Queensland in 2008/9, and is indicative of the scale of benefits that will be provided to Queensland and Australia once these mines reach full production. The Galilee Basin; however, is a rich pastoral area, stepped in history, and is increasingly dependent on tourism. The development of mining in an area with minimal previous mining history will cause irreversible change to the physical landscape and the social fabric of towns and communities in the vicinity of the mine and much of the railway.

The project does; however, provide an opportunity for substantial economic development in Central Queensland and will accelerate population growth, increase employment and training opportunities and raise income levels.

4.1.5 MITIGATION MEASURES AND MANAGEMENT STRATEGIES

While the development of four coal mines in the vicinity of Alpha provides a unique opportunity for Alpha and surrounding communities to benefit from sustainable and socially acceptable development, these benefits will only be realised if mine development is accompanied by carefully prepared and effectively coordinated development plans and strategies. A draft Social Impact Development Plan (SIMP) has been developed for the project which includes processes to develop strategies for managing and mitigating social impacts in response to the main social impacts that are predicted to occur as a result of the project and other large-scale resource projects being developed. During the finalisation of the SIMP, an Action Plan will be prepared for each impact (thus, one Action Plan may include several impact management or mitigation strategies). The Action Plans must be finalized in collaboration with other impacted stakeholders to encourage their input and support.

4.2 SOCIAL – RAIL

The Safety Institute of Australia presents a profile of the workforce for the project and other nearby resource projects in which describes and assesses the type, level and significance of the Project's social impacts (both beneficial and adverse). Social impacts mitigation strategies and measures are also discussed in the EIS. A comprehensive technical report describing the Social Impact Assessment (SIA) is included in **Volume 5, Appendix 22.**

The method for the SIA followed international best practice for SIA methodology and involved a comprehensive literature review and undertaking site visits and interviews with affected parties. The methodology adopted a precautionary principle, attempting to identify and consider impacts even though the potential risk of an impact occurring may be low, or the actual impact difficult to predict or quantify. The results of this survey are therefore considered to be conservative.

4.2.1 COMMUNITY ENGAGEMENT

The community engagement process for the project as a whole is described in detail in the EIS (refer Public Consultation Report). The following is a summary of the consultation process as it relates to the SIA in the vicinity of the mine:

- public consultations were held in Clermont and Collinsville in June and September 2010 and Mt Coolon in September, following an initial meeting with the IRC;
- public comments were invited at each public meeting (and a comment form provided in which people could document queries or comments and send to Waratah Coal). Comments could also be provided via email (info@waratahcoal.com) or phone (1800 085 915), while additional information was available on the Waratah Coal website (www.waratahcoal.com); and
- field work was completed between July and September and included further consultations with regional councils and other interested parties.

4.2.2 SOCIAL BASELINE STUDY

An overview of the demographic and social characteristics of the Belyando area is presented below:

- Belyando, like a number of other areas that lie within or overlap with the Bowen Basin, has experienced 1% annual growth over the period 1996 to 2006;
- the Planning Information and Forecasting Unit (within DIP) predicts 2% annual population growth for Belyando over the next 20 years;
- 92% of Alpha's population were born in Australia, 88% are Australian citizens, and 98% speak only English;
- the population is relatively young (a median age of 30);
- the Indigenous population is low (1.8% of the total population), however, the Wangan and Jagalingou People, Jangga People, Birri People and Juru People are traditional owners within the area, including parts of the proposed railway route;
- although a significant proportion of the population has settled in the district as a result of coal mining, there is still a strong sense of community and a strong commitment to local organisations, including high levels of volunteering;
- the majority of the workforce is engaged in the mining industry (predominantly coal mining); there is high workforce participation and low unemployment (males 1.5%; females 2.7% in 2006), with average income levels 49% higher than Queensland as a whole;
- the level of home ownership is low;
- house prices have risen sharply in Moranbah (since 2002) and Clermont (since 2004) and the average price in Moranbah ($432,000 in 2009) now exceeds urban centres such as Mackay;
- health facilities include hospitals in Moranbah and Clermont; while access to education facilities varies considerably (Moranbah and Clermont have high schools, but many areas are serviced only by small primary schools);
- education levels are comparable to the state average; and
- welfare indices indicate that Belyando has a low proportion of relatively disadvantaged people; above average level of access to economic resources; although relatively few people with high qualifications or highly skilled jobs.

Clermont was established in 1864 following the discovery of gold in the area in 1861. Clermont has experienced large variations in its population, and experienced a steady decline more recently.The Blair Athol coal mine, located 20 km north-west of Clermont, commenced in 1984 and resurrected Clermont's vitality. Although expected to close in 2016, production and employment levels will be maintained from the Clermont coal mine, which is located 12 km north-west of the township, and recently commenced production.

The majority of mine employees reside in Clermont. The SIA for the Clermont coal mine indicated that most local people thought that the mix of mining and agriculture was a positive feature of Clermont as both industries contribute to the attributes and atmosphere of the area. Clermont has maintained its rural setting and has maintained a strong sense of community. In fact, mining – and more specifically the vitality from high income levels and community contributions provided by Rio Tinto – may have strengthened the sense of community in Clermont.

Moranbah was constructed in 1971 as a mining town and has around a dozen coal mines within a 50 km radius. Census results from 2006 indicate that the town's resident population of 7,131 had:

- 124 males per 100 females;
- an average age of 29 (compared to 36 for Queensland as a whole); and
- an average income of double the average for Queensland.

An additional 1,129 census respondents were located in Moranbah on the night of the census who usually resided elsewhere. Many of these respondents were mine workers employed on a Fly-in / Fly-out (FIFO) or DIDO basis. When adding this group to the Moranbah residents there were 158 males per 100 females and an average income level which is 2.25 times the Queensland average.

4.2.3 WORKFORCE

The construction of the railway will extend for a three year period and require 1,000 workers. The construction workforce is expected to be based in camps at the mine site and at Merinda (near Bowen) and three temporary camps along the railway alignment (e.g. one near Collinsville, one near Mt Coolon and one mid-way between Mt Coolon and the mine site). The temporary construction camps are each expected to accommodate around 150 workers, who are likely to work 12 hour shifts on a FIFO basis (e.g. 21 days on 7 days off).

Around 60 employees are expected to run and maintain the railway network during operations. It is expected that these staff will generally reside in the Bowen area.

4.2.4 POTENTIAL IMPACTS

The project provides an opportunity for substantial economic development in Central Queensland and will accelerate population growth, increase employment and training opportunities, and raise income levels. However, the project is expected to place increased demand on public infrastructure and services, including welfare services, add to the cost of living (particularly housing costs) and impact on local traffic.

Results suggested that the main impact of the project in the Belyando area will occur as a result of the railway. While providing an opportunity for substantial economic development in Central Queensland, in the Belyando area it will have limited impact on population but will provide some contracting, employment and training opportunities, and contribute to higher income levels. However, the project will disrupt cattle operations and may impact adversely on local traffic.

4.2.5 MITIGATION MEASURES AND MANAGEMENT STRATEGIES

To manage potential impacts, Waratah Coal will engage in processes which minimse social impacts during the construction and operations of the rail alignment. These measures will include:

- preferential employment of local employees and local suppliers;
- engaging with affected property owners to minimise disruptions and reduce impacts on cattle productivity; and
- establishing an effective grievance mechanism for the management of issue identified by staff, contractors and other parties.

4.3 HEALTH AND SAFETY

Waratah Coal is committed to providing a safe and healthy working environment to its employees, contractors, and visitors and to operating the mine with minimal impacts upon the environment and community. The health, safety, environment, community and heritage matters will be managed through implementation of the Proponent's Integrated Management System through which personnel will be inducted and which will document the ongoing management requirements.

5. IMPACTS ON THE STATE AND LOCAL ECONOMIES AND MANAGEMENT OF IMPACTS

5.1 ECONOMY

5.1.1 DESCRIPTION OF AFFECTED LOCAL AND REGIONAL ECONOMIES

Three catchments have been used to establish and analyse the existing economic environment of the project and surrounding regions, the Mine Catchment, Broader Service Area and Abbot Point Catchment. Combined, these three catchments represent the Study Area for examining the regional economic impacts of the project.

The Mine Catchment consists of the Barcaldine Regional Council (BRC) and Central Highlands Regional Council (CHRCs), while the Abbot Point Catchment consists of the Whitsunday Regional Council (WRC). The Broader Service Area catchment has been developed to encompass the regional centres adjacent to the mine and export point sites from which workers and supplies will be sourced, and is made up of the Isaac Regional Council, Mackay Regional Council and Rockhampton Regional Council.

5.1.1.1 Mine Catchment

Barcaldine Local Government Area

Barcaldine Local Government Area (LGA) recorded a population of 3,376 residents in 2009, representing a decline in population of approximately 0.4% per annum on average since 2004. Without the project, Barcaldine LGA's population is projected to grow marginally through to 2031, to 3,435 residents.

The main industry in the region is agriculture, in particular beef cattle, contributing 22.0% of the local economies GRP and 34.8% of employment. Other key industries include transport, postal and warehousing, and public administration and safety.

Central Highlands Local Government Area

There were an estimated 30,403 residents in the Central Highlands LGA in 2009, representing growth of 2.5% per annum on average since 2004. The Central Highlands LGA population is projected to grow by 2.0% per annum on average through to 2031, to 46,872 residents.

Central Highlands LGA's economy is highly reliant on the mining industry, contributing 65.8% of local GRP and 26.5% of employment. Agriculture is also a significant employer in the region, accounting for 11.2% of total employment.

5.1.1.2 Broader Service Area

The Broader Service Area catchment consists of the Isaac Regional Council, to include the section of rail line that passes through that Local Government Area and the Mackay and Rockhampton Regional Councils to encompass the regional centres adjacent to the mine and export point sites from which workers and supplies will be sourced.

Isaac Local Government Area

Isaac Local Government Area (LGA)'s population has grown at a rate of 2.6% per annum on average since 2004, to 22,417 residents in 2009. Isaac LGA's population is projected to grow by 2.0% per annum on average through to 2031, to 34,580 residents.

Isaac LGA encompasses a large proportion of mining operations in the Bowen Basin. As a result, the local economy is dominated by the mining industry, with this industry accounting for 82.8% of Gross Regional Product (GRP) and 49.2% of employment.

Mackay Local Government Area

Mackay LGA is the most prominent and fastest growing population centre within the Study Area, recording population growth of 3.3% per annum between 2004 and 2009, to 116,123 residents. Mackay LGA is projected to continue to grow rapidly through to 2031, averaging growth of 1.8% per annum to 172,993 residents.

As the major service centre to the Bowen Basin, Mackay LGA has a relatively diverse economy compared to most other regions in the Study Area. Mining is the main contributor to GRP (13.5%), while key mining support service sectors such as transport, postal and warehousing (11.5%) and manufacturing (8.3%), are also major contributors to the local economy. Mackay LGA also has a sizable construction industry, contributing 9.8% of GRP and 8.9% of employment.

Rockhampton Local Government Area

Rockhampton LGA is the second largest population centre in the Study Area, recording a population of 114,105 residents in 2009. This represented growth of 2.0% per annum between 2004 and 2009. Rockhampton LGA's population is projected to grow at 1.3% per annum to 2031, to 153,256 residents.

Rockhampton LGA is an industrial hub, with significant goods based sectors such as transport, postal and warehousing and manufacturing, with these industries contributing 12.6% and 8.6%, respectively to GRP and 12.9% and 9.0% to employment, respectively.

5.1.2 POTENTIAL IMPACTS AND MITIGATION MEASURES

The beneficial and adverse economic impacts of the project are discussed for each component of the proposal. The impacts are anticipated to occur in the context of the local and regional economies. The EIS also discusses and outlines Waratah Coal's commitments to mitigation and enhancement strategies as well as monitoring regimes to be established to ensure regional economic values are enhanced or, at least, maintained once the project commences.

Analysis and modelling prepared in this report identifies the project will generate significant positive economic, employment and income impacts at the regional and State levels. Generally, key impacts of the project in the project catchment and Queensland include:

- Positive benefits:
  - an increase in export revenues of $4.6 billion per annum through the export of 40 Mtpa of high quality thermal coal;
  - an increase in industry output in Queensland of $231.9 million per annum on average during the three year construction period;
  - an increase in output of $205.4 million per annum on average in the Mine Catchment;
  - a $5.2 billion per annum on average boost to industry output in the Queensland economy over the first five years of operation;
  - support and development for local business and industry, through securing local contracts for the supply of goods and services for the project where possible and through other flow-on activities and increased household consumption;
  - capacity building and skills development in the local labour force through apprenticeships, traineeships and skills training, as well as ongoing skills transfer between imported and local labour and the permanent migration of some skilled labour; and
  - a decrease in unemployment and the unemployment rate as a result of jobs created by the Project, in particular in the Mine Catchment.
- Potential negative benefits:
  - upward pressure on labour prices due to the increase in demand for skilled labour, particularly in industries experiencing skills shortages, further increasing household incomes. This increase is expected to be over and above any increases in the cost of living, representing an increase in real wages;
  - a likely increase in residential property prices as a result of additional demand generated by contractors and flow-on employees migrating to the region. In the Mine Catchment, this is anticipated to be felt primarily in the major regional centre of Emerald, as well as the local townships of Alpha, Jericho and Barcaldine.

Waratah Coal has committed to mitigation and enhancement strategies as well as monitoring regimes to be established to ensure regional economic values are enhanced or, at least, maintained once the project commences.

5.2 SUSTAINABLE DEVELOPMENT

This Chapter describes the approach that will be taken to develop the project in a sustainable manner. This will be achieved largely through the identification of potential impacts on the natural and socio-economic environment, assessing impacts using best environmental practice methodologies. By identifying those actions, Waratah Coal has advanced sustainability goals. This approach reflects the existing practices of Waratah Coal to strive towards environmentally, socially and culturally acceptable project development.

The principles of sustainable development, including Ecologically Sustainable Development (ESD) plays an integral role in Waratah Coal's decision-making processes with respect to the planning and design of the project. Waratah Coal is committed to continuing to implement

the principles of ESD throughout the construction, operation, decommissioning and rehabilitation phases of the project.

This purpose of this section is to:

- provide an overview of the concept of ESD and outline the legislative and planning framework under which it is assessed;
- outline the sustainability objectives that have been identified for the project under this framework;
- describe how these objectives have been integrated throughout the EIS process and into all future phases of the project such as detailed engineering design, environmental management and Waratah Coal's annual environmental reporting; and
- provide a review of the project against relevant Commonwealth and Queensland legislation and planning documents including the National Strategy for ESD and in particular the Mining Sector Specific ESD Objectives.

Waratah Coal has developed an approach that establishes a strong foundation for the sustainable development of the project. Waratah Coal has developed and applied specific sustainability principles to the planning of the project. These principles, and the commitments and strategies identified when applying them to the impact areas, will be built on progressively as the project develops.

Specifically, this chapter meets the Terms of Reference (ToR) requirements as follows:

- it clearly demonstrates how the project conforms to the NSESD's objectives. This analysis has taken a life-of-project perspective and demonstrated that the project has strived to achieve a balance between environmental, social and economic development;
- the commitment of Waratah Coal to sustainability is clearly demonstrated. This sustainability commitment applies to the EIS and the life of the project; and
- explains how sustainability has been integrated into the project and EIS through the development and application of sustainability principles. This approach will be carried through for the project lifecycle, with sustainability considerations incorporated into management systems and plans and subject to continuous improvement.

Overall, this EIS demonstrates the sound sustainable basis for the project in that it:

- provides sustainable economic returns for Waratah Coal and its owners;
- provides sustainable social and economic benefits to stakeholders including Commonwealth and Queensland Governments, and the local and regional communities;
- minimises environmental impacts and continue to develop offset strategies to address residual impacts; and
- has applied a sustainability approach to guide planning, design, construction, operation and decommissioning of the project.

6. HAZARD AND RISK

6.1 HAZARD AND RISK ASSESSMENT – MINE

A desktop assessment was undertaken to examine the safety, health and risk issues associated with the development and operation of the mine and associated infrastructure. Desktop assessment included:

- Review of legislative requirements for the project;
- Identification of dangerous goods and hazardous substances likely to be used for the project;
- Preparation of a risk assessment for the construction and operation of the project;
- An outline of controls to be implemented for the project to protect the safety and health of employees and the public; and
- Development of detailed emergency plans and emergency response capabilities.

This process identified a number of potential areas of high risk. These included:

- Traffic incidents – offsite;
- Traffic incidents – onsite;
- Blasting and explosives handling;
- Exposure to high voltage;
- Working at height;
- Fuel storage and handling;
- Flooding;
- Bushfire; and
- Spontaneous combustion of coal stockpile.

Mine site construction and operational preliminary risk assessment results indicated that the baseline safety and health risk profile varied from low to extreme. Once mitigation measures and design treatments are applied to the assessed hazards the residual risks are either ranked as being low or moderate. The exception to these low to moderate risks being risks associated with the inclusion of highwall operations, which were assessed as being a high risk.

Across the baseline risk assessment, no extreme or high ranking risks were detected outside the mine site boundary; however, offsite hazards associated with vehicle movements were ranked high. Applied control measures and design treatments downgraded the associated risk to moderate.

6.2 MITIGATION MEASURES

Overall, the risks assessed are considered to be common to all open cut and underground mining activities and are subject to legislative obligations and controls measures which are provided by way of Commonwealth and State legislation.

Waratah Coal is committed to providing a safe work place for staff and the community. Waratah Coal also commits to minimizing the potential risk to the health and safety of onsite and offsite personnel as a result of construction and operational activities associated with the mine site. This will be achieved through the following measures:

- Defaulting under a formal Safety and Health Management System (SHMS) in accordance with all relevant legislative requirements during the construction phase;
- Undertaking the operations of the mine site under a formal SHMS in accordance with all relevant legislative requirements;
- Monitoring and implementing amendments to the SHMS where necessary and frequently ensuring its applicability and currency to be maintained and throughout the life of the Project; and
- Frequently liaising with internal and external stakeholders with respect to safeguarding and improving the SHMS.

6.3 HAZARD AND RISK ASSESSMENT – RAIL

Waratah Coal has undertaken a preliminary risk assessment for the rail alignment. The preliminary risk assessment is consistent with Australian Standard/New Zealand Standard ISO 31000:2009: Risk Management – Principles and Guidelines.

Overall, the risks assessed are considered to be common to rail activities and are subject to legislative obligations and controls measures which are provided by way of Commonwealth and State legislation.

No preliminary risk assessment has been undertaken for the decommissioning phase of the project as the rail is expected to remain operational. It is assumed that new technologies and innovations are too be expected throughout the rail's operational life and as such will alter current baseline risk assessment results which have been currently undertaken.

Results of the preliminary risk assessment for the rail identified that the baseline health and safety risk profile varied from low' to extreme. Once mitigation measures and design treatments are applied to the assessed hazards the residual risks are either ranked as being low or moderate.

The exception being the high risk ranking associated with the potential for collisions of trains and collisions at level crossings. Notwithstanding the risk treatments proposed, the historical data suggests that there will always be an inherent level of high risk associated with level crossings.

No extreme or high ranking risks were detected outside the rail's boundary; however, offsite hazards associated with vehicle movements were ranked high. Applied control measures and design treatments downgraded the associated risk to moderate.

6.4 MITIGATION MEASURES

Waratah Coal is committed to providing a safe work place for staff and the community. Waratah Coal also commits to minimizing the potential risk to the health and safety of onsite and offsite personnel as a result of construction and operational activities associated with the rail alignment. This will be achieved through the following measures:

- Defaulting under a formal Safety and Health Management System (SHMS) in accordance with all relevant legislative requirements during the construction phase;
- Undertaking the operations of the mine site under a formal SHMS in accordance with all relevant legislative requirements;
- Monitoring and implementing amendments to the SHMS where necessary and frequently ensuring its applicability and currency to be maintained and throughout the life of the Project; and
- Frequently liaising with internal and external stakeholders with respect to safeguarding and improving the SHMS.

6.5 DECOMMISSIONING AND REHABILITATION

6.5.1 MINE

The following decommissioning strategies are proposed for various remaining structures post-mine closure.

All infrastructure will be removed unless agreed with the subsequent post-mining landowner. This includes:

- a contaminated land assessment of relevant locations;
- remediating land from any contamination;
- removal of all items of the mine infrastructure area, and any temporary buildings and facilities;
- ripping, topsoiling, and seeding of this land; and
- establishing safety bunds and fencing of final void areas.

All items of the infrastructure area and including conveyors and any temporary buildings and facilities will either be removed from site or, if agreed by the landholder, left operational on site. After all external structures, concrete bases and footings have been removed; these areas will be investigated for contamination and remediated where necessary, ripped, profiled, topsoiled and seeded. Protection of these areas from re-compaction (i.e. vehicles or grazing animals) after ripping is required to allow the soil structure to reform. Drainage control through ripping, profiling or the provision of erosion control structures will also be undertaken.

The decommissioning strategy for the water supply pipeline will be either:

- abandonment – where the pipeline is purged, and physically disconnected from the point of supply, and sealed (capped) at both ends; or
- beneficial re-use – where sale or donation of the infrastructure to a third party occurs for other beneficial use.

Before deciding if abandonment (after capping) or beneficial re-use is the preferred option, Waratah Coal will liaise with relevant authorities and landholders in order to determine the most appropriate desired outcome. Once the relevant authorities agree the desired outcome, a decommissioning plan that takes into account the desired outcome will be prepared.

The power supply will be dismantled and removed off site unless a beneficial re-use can be identified. The transmission lines and poles may be retained for future use by local government.

Any landfills established as part of the mine operations will be decommissioned at the conclusion of mining, and a contaminated land assessment (which will include mitigation measures) consistent with the requirements of the Queensland Environmental Protection Act 1994 (EP Act) will be undertaken on the landfill site.

The objectives for rehabilitation throughout the construction, operational and decommissioning phases of the project are to:

- return the land to a post-mine land use that will be stable, self-sustaining and require minimal maintenance;
- create stable landforms with rates of soil erosion not exceeding the pre-mine conditions; and
- maintain downstream water quality, during the construction, operational and post operation phases of the Project.

To ensure that the objectives of mine closure, decommissioning and rehabilitation (both progressive and final) are achieved, Waratah Coal will establish criteria and performance indicators which, once achieved, demonstrate that decommissioning and rehabilitation strategies have been undertaken successfully and that desired outcomes have been achieved.

6.5.2 RAIL

At the completion of the construction phase all temporary facilities will be decommissioned and the sites rehabilitated. All sites will be contoured to minimise the potential for erosion and the surface scarified to support re-vegetation activities. Once the site is prepared, the stockpiled topsoil will be re-spread and seeded with a non-invasive seed mix and / or revegetated with endemic species.

The rail corridor will be progressively rehabilitated where ever practicable during the construction phase. At the completion of construction, the rail easement will be cleared of all remaining construction equipment to allow for the easement to be recontoured. Recontouring will be undertaken in a manner to take into consideration the existing landforms and drainage systems. On removal of all construction equipment from the easement, the stockpiled topsoil will be re-spread and over-sown with a non-invasive seed mix. More complex erosion control works may be required in places, and these will be developed in consultation with the relevant regulatory agencies and relevant property holders.

7. MANAGEMENT PLANS

7.1 ENVIRONMENTAL MANAGEMENT PLAN

Waratah Coal is committed to the preparation of specific Environmental Management Plans for each core project component (i.e. mine, rail and port) in accordance with Section 201 of the *Environmental Protection Act 1994* and to ensure compliance with best environmental management practices throughout the life of the Project.

Each specific EMP proposes a range of measures to protect the identified environmental values potentially affected by the development of the specific components of the Project. The measures proposed in each EMP will be used by the administering authorities to establish the approval conditions for the project. Key administering authorities for the project EMPs will be the Department of Environment and Resource Management (DERM). DERM will oversee the implementation of the statutory EMP required for the operation of the mine. The development of the EMPs for the rail and port are voluntary and will be implemented to address specific commitments and conditions resulting from the project EIS.

These EMPs are live, interactive document that will be updated in accordance with best practice environmental management practices, standard operating procedures, any Works Approvals and Licence conditions, any legislative requirements and in consultation with key project stakeholders. The draft EMPs are provided in **Volume 1, Chapters 7-9** and have been specifically prepared to provide environmental measures for Waratah Coal and its contractors to follow for the construction and operation of the mine and related infrastructure to ensure that:

- activities associated with the project's development do not adversely affect adjacent environmental and heritage values or the local community; and
- any potential environmental impacts of the development are managed in accordance with legislative requirements and best environmental management practices.

A draft EMP has been prepared to support an application by Waratah Coal for an Environmental Authority to operate the mine. The EMP proposes a range of measures to protect the identified environmental values potentially affected by the development of the mine. It is intended that the measures proposed in the document will be used by the administering authorities to establish the approval conditions for the project.

Waratah Coal is committed to ensuring continuous improvements in environmental management are made across all of its operations, and that all tasks are carried out in compliance with best environmental management practices throughout all project phases.

7.2 SOCIAL IMPACT MANAGEMENT PLAN

The strategies for managing and mitigating social impacts have been prepared in response to the main social impacts that are predicted to occur as a result of the project and other large-scale resource projects being developed.

The project is one of four large coal mines being developed in the Galilee Basin. The three other coal mines in the vicinity of Alpha, all of which have been identified as 'significant' by the Queensland Government, include Alpha Coal, Kevin's Corner and South Galilee. In addition to coal mines in the vicinity of Alpha, a number of other large scale projects are being developed and are expected to have significant impacts within the same geographical area as that impacted by the project. These include:

- BMA Bowen Basin Coal Growth – the construction of three additional coal mines in the vicinity of Moranbah, being developed by BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd (BMA);
- Drake Coal Project – a new mine near Collinsville, being developed by Drake Coal (which is a subsidiary of QCoal Pty Ltd, which operates the Sonoma coal mine, 6 km south of Collinsville);
- Abbot Point Expansion (increasing the capacity of Abbot Point to 80 Mtpa or 110 Mtpa); and
- Abbot Point Multi Cargo Facility, to facilitate the import and export of bulk commodities.

In addition to the above projects, a number of Coal Seam Gas projects are being developed in Central Queensland and generally involve the extraction of CSG in the Bowen and Surat Basins, the construction of gas pipelines to Gladstone, and the construction of Liquefied Natural Gas (LNG) plants and expansion of port facilities at Gladstone.

Although the feasibility of many of the above projects is currently being investigated, and some projects may not proceed in the near term, it is quite likely that several of the proposed projects will be developed within a similar timeframe to that proposed for the development of the Project. The cumulative social impacts of multiple large-scale resource projects are therefore identified and assessed throughout the SIA and SIMP. In summary, the cumulative impact of multiple large-scale resource projects being developed within a similar time frame, include:

- substantial growth in employment numbers and further reduction in unemployment levels in Central Queensland;
- increased demand for those locally available goods and services required for project construction and subsequently operations (contributing to higher price rises that in many other parts of Queensland);
- increased in-migration as a result of skill shortages in the construction and mining industries; and
- as a result of increased in-migration, further housing shortages in Central Queensland (and higher house prices and rental costs), increased use of public infrastructure and increased demand for public and private services.

During the finalisation of the SIMP, an Action Plan will be prepared for each impact (thus, one Action Plan may include several impact management and / or mitigation strategies). The Action Plans must be finalised in collaboration with other impacted stakeholders to encourage and allow their input and support.

7.3 CONCLUSION

Waratah Coal intends to establish a new coal mine, railway and coal stockyards and associated supporting infrastructure to export highly volatile, low sulphur, steaming coal to international markets.

The project will realise significant economic and social benefits on a regional, state and national scale. The rail corridor will open a new multi-billion tonne coal province with opportunities for thermal coal export to world markets for both Waratah Coal, as well as other Galilee Basin proponents through welcomed third party access arrangements. It will also provide much needed new rail infrastructure in Central Queensland to ease existing congestion on the current coal haulage systems.

Further, the project will generate considerable export income for the Australian economy with revenue of $4 billion per annum, or $85 billion over the life of the project. Federal and State Government revenue will also be increased through taxes and royalties of up $280 million dollars per year from the project alone.

The project will also assist in driving the growth of Central and North West Queensland, creating approximately 6,000 direct jobs during construction and 1,500 permanent employees for the long term operation of the mine, 60 rail and 150 port facilities. A flow through benefit of an additional 70,000 indirect jobs is anticipated, with the majority of these expected to occur in Queensland.

Throughout the design, construction and operational phases of the project, Waratah Coal will implement ecologically sustainable principles in line with industry best practice. As a significant project in regional Queensland, Waratah Coal will engage with local communities and conduct its operations in a way that respects and enhances existing community values and lifestyles.

Studies undertaken for the EIS conclude that the development of the coal mine and rail alignment will not impose significant impacts on the region's natural, social or economic environment. However, studies did identify that the following natural values will need further investigations and in some cases specific management plans to avoid and where needed manage potential impacts. These are:

- groundwater – particularly issues associated with regional drawdown of groundwater resources and the potential for groundwater contamination. Waratah Coal will mitigate against these potential issues by implementing site specific studies of vulnerable groundwater areas, management and containment measures for potential contaminants and a commitment to enter into agreements with landholders regarding groundwater usage (if required) and "make good" requirements if groundwater is impacted by project activities.
- terrestrial ecology – there will be unavoidable removal of natural vegetation communities and individuals of threatened species of flora. In order to minimse impacts associated with construction and operations of the project, Waratah Coal has committed to designing and implementing a suite of mitigation measures which include the development of an offset strategy that compensates for unavoidable clearing, in consultation with relevant authorities.

Given the geographic expanse of the project, stakeholder communication and social impact management will be a key element of Waratah Coal's project development plan. While the project offers significant positive benefit to the region, Waratah Coal is aware that negative impacts such as increased demand on public infrastructure and services, impacts to agricultural land and increases to the cost of living (particularly in relation to housing costs) that may result from the development of the project.

Waratah Coal will implement measures to reduce these issues including preferential employment of local employees and local suppliers, engaging with affected property owners to minimise disruptions and reduce impacts on cattle productivity and establishing a, effective grievance mechanism for the management of issue identified by staff, contractors and other parties.

Further, Waratah Coal is committed to effective ongoing community engagement throughout the Project's development and operational phases. This is an important and necessary process to build and maintain relationships with impacted communities and other stakeholders; to contribute as appropriate to the sustainable development of local communities; and to therefore earn and maintain a social license to operate.

Waratah Coal is committed to delivering a project founded on ecologically sustainable principles and commissioned with a social license to operate. Waratah Coal will deliver an environmentally, socially and economically sustainable project which will support and enhance regional advancement throughout its whole project life.