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1.1 OVERVIEW

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-west 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.

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 and 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 Environmental Impact Statement (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 assessments in this chapter describe the alignment as it was at the time of the field assessments, while the figures in this chapter depict both the alignment as it currently stands and the alignment as it was at the time of assessment. In addition, the subsequent changes to the rail alignment at the mine and port end (as described in Chapter 1, Section 1.1.2), are also shown.

1.1.1 LOCATION

The Project is located within the Galilee Basin in Central Queensland, Australia and includes both terrestrial and marine components. The coal terminal includes onshore and offshore components utilizing the multi cargo facility currently being planned by NQBP at the APSDA and waters of the Port of Abbot Point respectively, while the mine is situated 30 Km to the north-west of Alpha in central western Queensland. A new standard gauge rail system will link the coal terminal to the mine.

Figure 1 shows the study area and location of the key project components.

1.1.2 RAIL CORRIDOR LOCATION

1.1.2.1 Changes in 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) to accommodate design elements and community concerns. The majority of the changes are within the 1.6 km corridor. The calculations of the amounts of ecological values to be impacted were based upon a corridor of 100 m around the alignment as it was proposed in July 2010. As a consequence of the subsequent changes in rail alignment, the specific amount of Regional Ecosystems (REs) and other ecological values to be impacted will also have changed, and hence 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 is committed to undertaking detailed surveys of all remnant vegetation to be cleared prior to finalisation of the alignment.

1.1.2.2 Changes in alignment at the Mine

The rail alignment near the mine (between KP410-460) has been re-designed to limit the impact on Hancock Coal Pty Ltd (EPC 1210) 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 ML 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 with 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. Option 2 however, potentially impacts two threatened ecological communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999*, namely:

- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- Weeping Myall Woodlands (*A. pendula* dominant and co-dominant) (refer Volume 5 Appendix 5a).

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

1.1.2.3 Changes in 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. 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 also 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.

1.1.2.4 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 60Mtpa to 400Mtpa (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 Coal include Air Quality and Greenhouse Gas, Noise and Vibration and Visual Impact. These reports recommend the following additional mitigation measures:

1. 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 and 19.

2. Noise and Vibration

It is concluded that to achieve the 24 hour noise criterion for the rail corridor for the 400mtpa 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 & Vibration Assessment is provided in Volume 3, Chapter 11 and Volume 5 Appendix 20.

Figure 1. Key Project Components

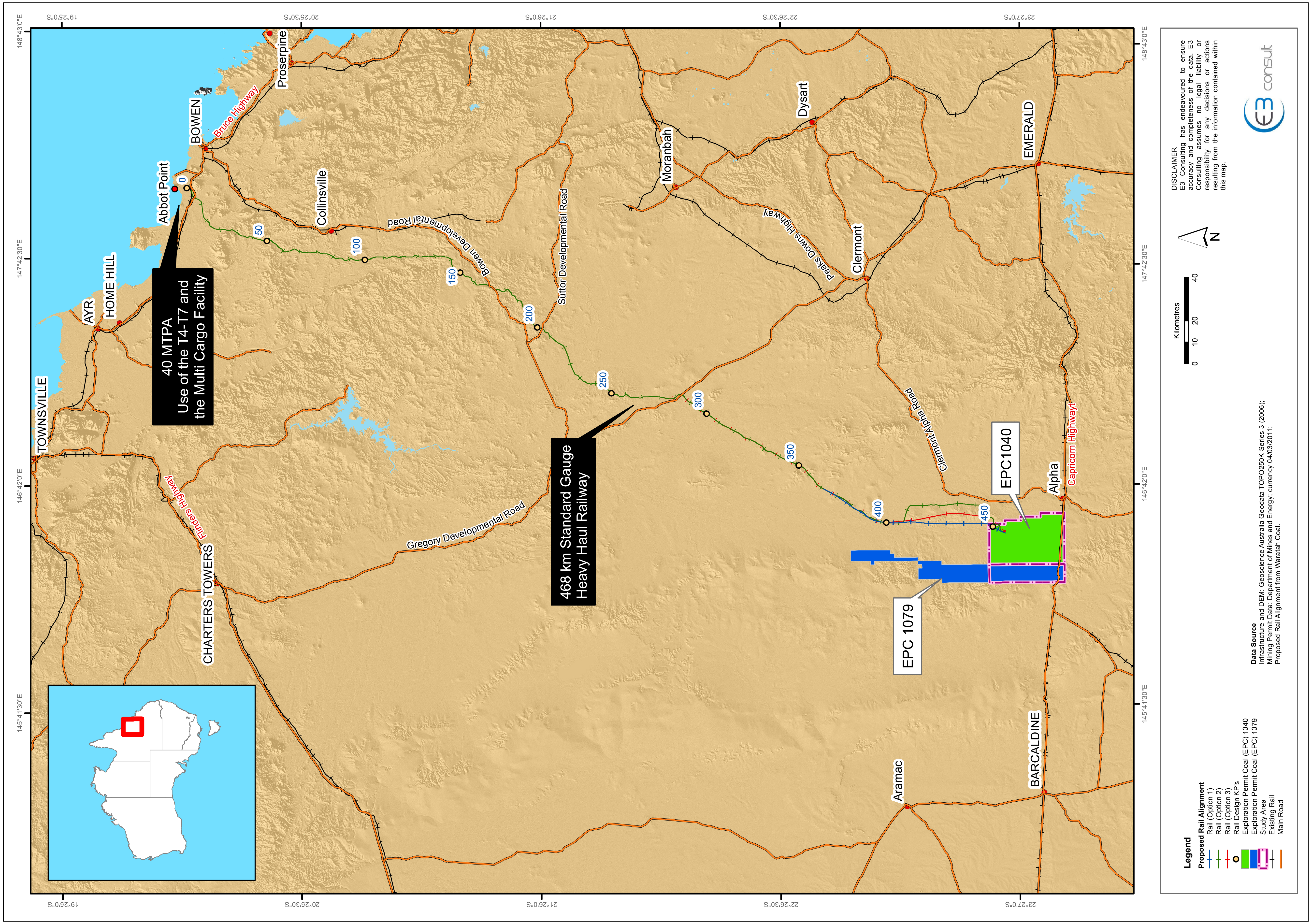


Figure 2. Overview KP05 – KP85 (Map 1 of 4)

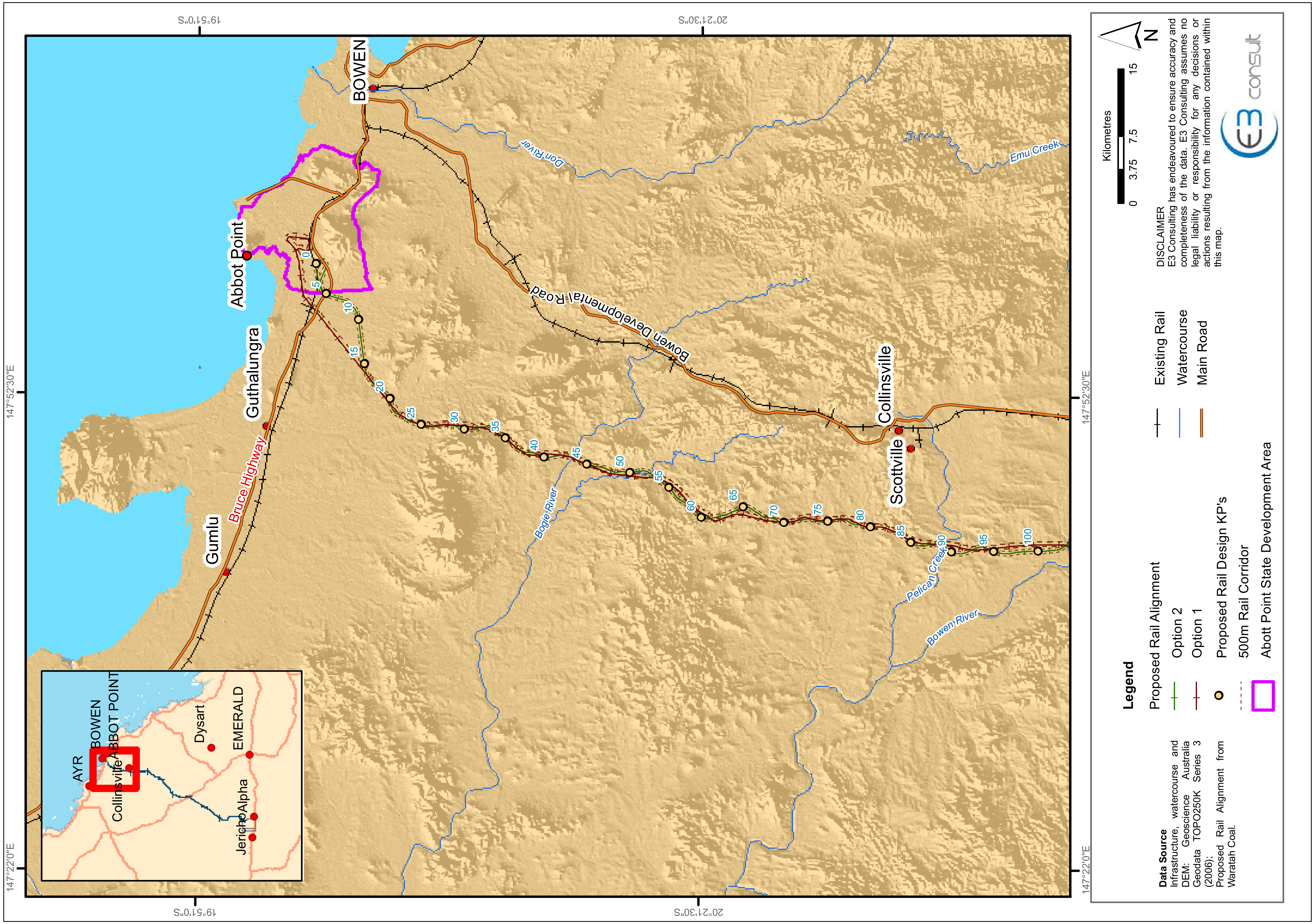


Figure 3. Overview KP85 – KP235 (Map 2 of 4)

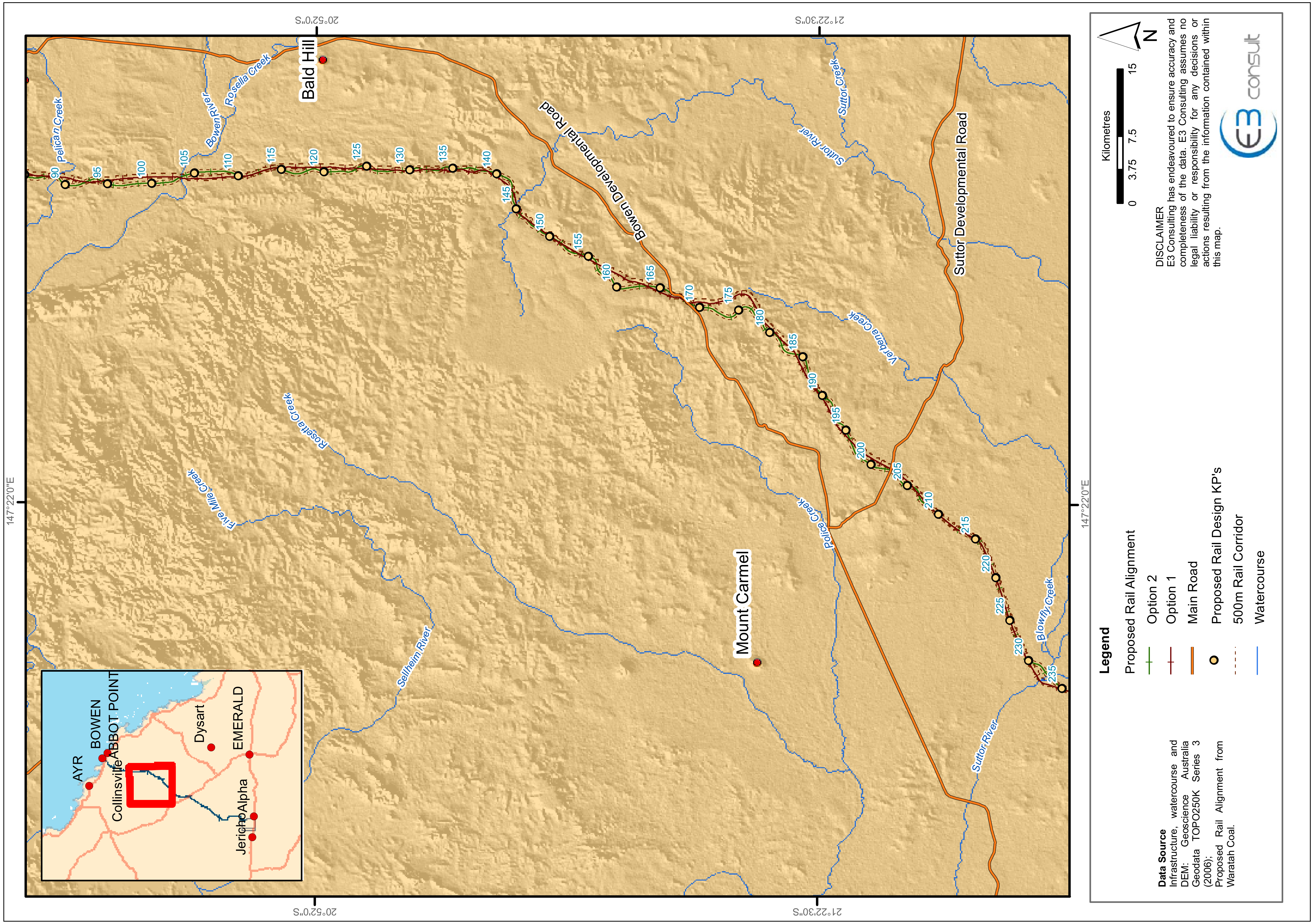


Figure 4. Overview KP235 – KP360 (Map 3 of 4)

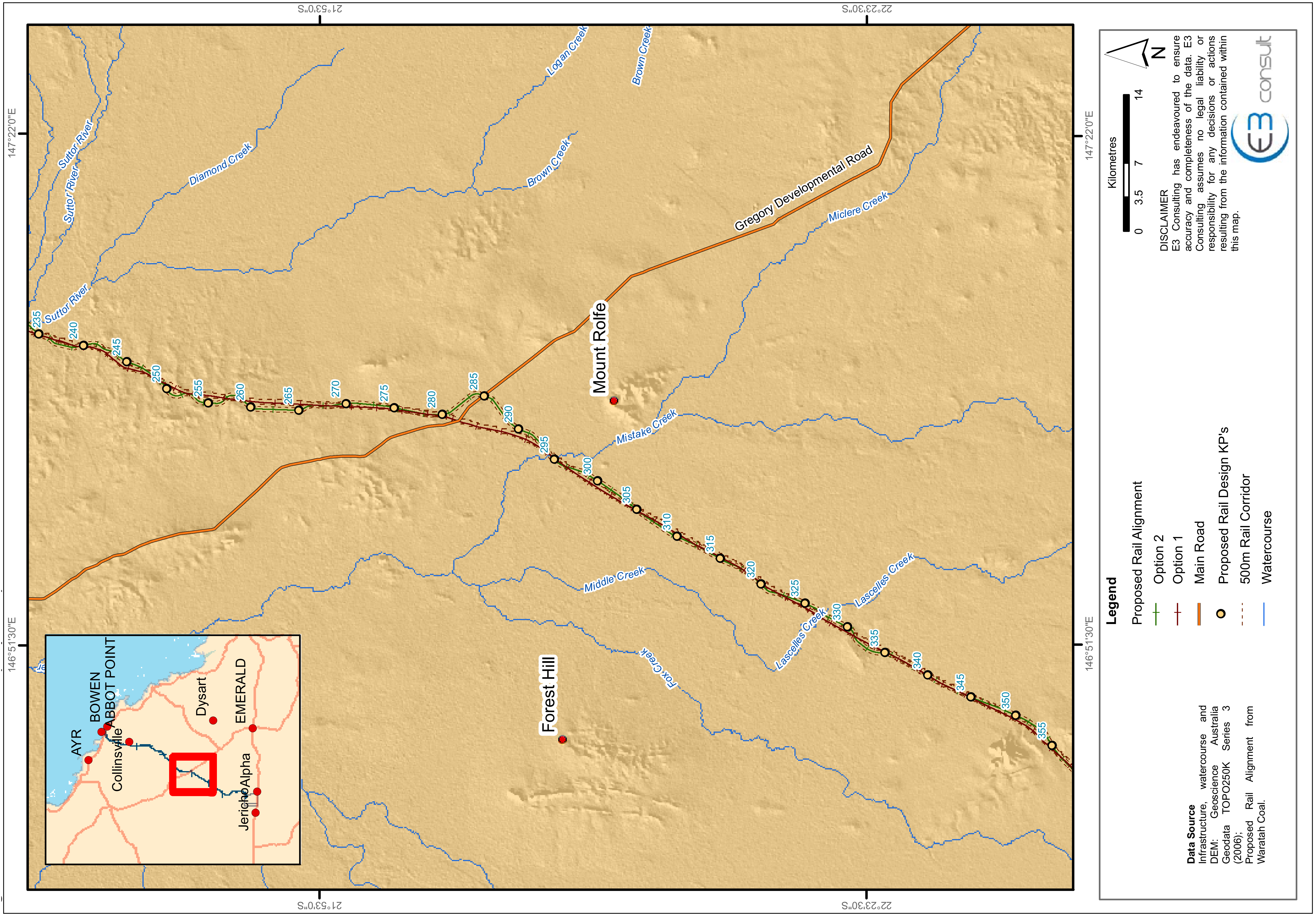
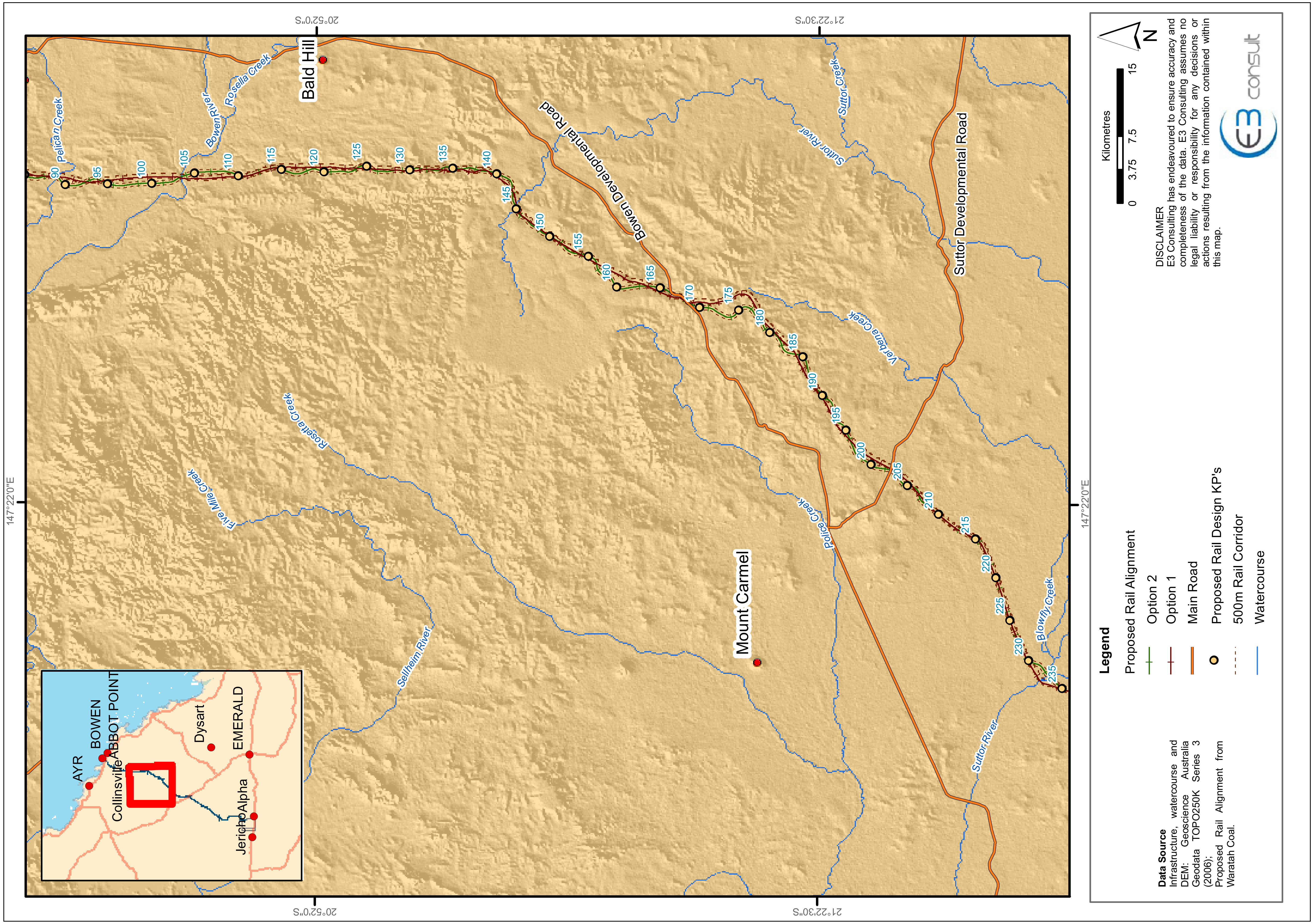


Figure 5. Overview KP360 – KP468 (Map 4 of 4)



3. 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 as close as possible to right angles and not be aligned parallel to roads on approach;
- Duplication of the rail alignment may 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 and 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), the specific amount of REs and other ecological values to be impacted will not have changed.

Waratah Coal also understands from the Rail Selection Assessment (refer section 1.1.3) 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=40Mtpa;
- Single line with up to 9 passing loops=60Mtpa;
- Single line with up to 12 passing loops=80-120Mtpa; and
- Single line with up to 16 passing loops with incremental duplicated sections between passing loops up to full duplication=120-400Mtpa.

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

- Up to 67 trains each way, assuming 300 days operation per calendar year;
- Trains will be approximately 3.2km in length;
- Trains will travel at a maximum of 80km/h fully loaded
- Trains will travel at a maximum of 100km/h empty; and
- Total number of trains will be 134 per day, one train every 22 minutes (assuming 300 days operation per calendar year).

1.1.2.5 Description of the corridor

The location of the rail corridor shown in Figure 1 runs from the coal stockyards (T4-7) to the mine and is approximately 468 km in length (excluding the balloons at either end). Waratah Coal is currently progressing the engineering design to a corridor width of 500 m wide between the mine and coal terminal. The final corridor will be reduced to approximately 60 - 80 m during operation. The final operating corridor will consist of the railway infrastructure, service road, drainage, as well as supporting infrastructure including power, communications and potentially a water pipeline.

The rail line traverses the Barcaldine, Isaac and Whitsunday Local Government Areas. A description of land tenure is provided in Volume 3, Chapter 4.

A brief description of the corridor is as follows:

- APSDA to Bogie River (5 km – 44 km): the route starts within the APSDA at the rail loop and then crosses under a new Bruce Highway overpass. The rail line then departs the coast in a south-westerly direction, passing through the undulating foothills between Mount Aberdeen and Mount Abbot, before crossing over the Bogie River with a major bridge structure;
- Bogie River to Bowen River (44 km – 103 km): the route crosses Sandy Creek before steeply climbing through the Peter Gordon Range where it crests and then travels downhill passing to the west of Collinsville

and the Mining Lease holdings of Xstrata Coal. In this section the route will pass underneath two high voltage transmission lines from Collinsville Power Station, will cross over the Bowen and Bogie Rivers, as well as Sandy and Pelican Creeks;

- Bowen River to Bowen Developmental Rd (103 km – 166 km): initially the route climbs steeply uphill from the Bowen River into the Leichardt Range, towards the head of the Suttor River. Across the top of the range, the highest point for the route, the railway traverses over undulating terrain towards the Bowen Developmental Road. In this section the alignment crosses the North Queensland Gas Pipeline (near the Bowen River), as well as a 4.5 km stretch of the Bowen River Floodplain;
- Bowen Developmental Rd to Suttor River (166 km – 234 km): as the rail line descends steeply through the Leichardt Ranges it heads in a south-west direction through open forested country and grasslands before crossing the downstream channels of the Suttor River. In this section the railway will cross the Suttor Developmental Road as level crossing and the Bowen Development Road as a road over rail bridge. The route will also pass within 10 km of the township of Mount Coolon;
- Suttor River to Gregory Developmental Rd (234 km – 285 km): this section sees the route initially deviate to the west around the heart of the Suttor River Catchment before travelling over easy rolling grade country and finishing with a grade separated crossing of the Gregory Developmental Road near the Twin Hill mines;
- Gregory Developmental Rd to Belyando River (285 km – 393 km): the route continues in a south-west direction across relatively flat terrain with easy rolling grades across predominantly grazing lands. The route avoids most of the extensive Belyando flood plain and passes more than 10 km from the Epping Forest and Mezappa National Parks. The rail line will require major bridge crossings over Lestree Hill Creek, Middle Creek, and Mistake Creek in this section; and
- Belyando River to Mine (393 km – 468 km): the route continues south-west where it crosses the confluence of the Belyando River and its downstream tributaries. At this point the crossing of the extensive Belyando Floodplain is less than 5 km. The corridor then continues in a southerly direction as it generally parallels the eastern edge of the Galilee Basin crossing Sandy Creek, leading into the loading balloon at the mine site.

1.1.3 RAILWAY SELECTION ASSESSMENT METHOD

Waratah Coal has engaged specialist consultants and contractors Worley Parsons, China Overseas Engineering Group Corporation (COVEC), and Trimble Planning Solutions to plan, design, construct and operate a new stand-alone standard gauge rail system from mine to the coal terminal. The rail development included a number of technical engineering studies into the feasibility of the railway corridor and associated infrastructure to ensure its financial viability and design capacity will meet future demands. The principal studies were:

- Infrastructure Options Study, Worley Parsons, 2008;
- Flood Investigation Study, Worley Parsons, 2009 and EnGenY, 2010;
- Ballast and Construction Aggregate Survey, Australian Mining Engineering Consultants, 2009;
- Concept Study - China First Project, Worley Parsons, 2009;
- Technical Screening Study – China First Project, COVEC, 2009; and
- Corridor Selection and Alignment Optimisation Study, Trimble Planning Solutions, February 2010.

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 QR National (QRN) operated Goonyella, Newlands 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 WorleyParsons, which were further refined using Trimble's Quantm Alignment Planning System to manage the complex range of constraints influencing the corridor selection process. This innovative technology allows planners to address the shortcomings of the conventional approach to transportation route planning being essentially a manual process where the rail planner uses professional judgment and experience in selecting alternatives that appears to the trained eye to provide the best fit. This process is labour-intensive and for this reason usually only a limited number of alternatives are generally considered.

The Quantm system; however, 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.

Flood studies provided the 1 in 100 year flood extents and definition of major watercourses to ensure the route had suitable flood immunity. Environmental mapping of key constraints such as National Parks and reserves, protected wetlands, large scale dams and sensitive ecological habitats were also included in the assessment. Existing infrastructure constraints were integrated into the analysis and included the latest mining tenements, townships, location of houses, transport infrastructure and utilities. Crossing of high impact constraints such as operating mines, houses and National Parks was generally discouraged.

Assessment of feasible rail routes consisted of a regional assessment of the heavy haul rail project requirements together with the development of a broad range of alternate corridors to meet those needs. Short listed corridors were then ranked on their suitability based on evaluation criteria such as constructability, civil works, environmental and land-use impacts, socioeconomic value and operational efficiency. The outcome of this was the selection of a concept corridor, which triggered a secondary more detailed corridor refinement phase to investigate location specific alternatives within the alignment.

Corridors between the mine site and Leichhardt Ranges generally exhibited easy rolling grades across the flat to undulating topography, with the extensive Q100 floodplains of the Belyando River, Mistake Creek and Suttor River, being the key drivers in influencing corridors. Routes traversing lengthy sections across floodplains were generally precluded due to both the expected high infrastructure costs required for constructing and maintaining flood protected embankments, together with the likely environmental impacts that will result to their aquatic supporting ecosystems and habitats.

Of particular importance was the crossing of the extensive Suttor River Floodplain that flows east to west across a large part of the study area. To mitigate this, the selected route was deviated to the west around the confluence of the Suttor River and its upstream tributaries prior to entering the Leichhardt Ranges near Mount Coolon. This approach is expected to provide a significant reduction to the number of major bridge crossings, culverts and flood protected embankments needed to cross this flood prone area as well as the resultant benefits to the environment.

Route options between the Leichhardt Ranges and coal terminal were predominantly influenced by the moderate to steep topography that exists throughout the Leichhardt and Clarke Ranges, together with the restriction to comply with the stringent heavy haul rail geometry requirements. Consideration was given to selecting corridors that provided a balance between reduced civil works and linear length. Tunnels were generally discouraged due to the known difficulties associated with operating a tunnel to support heavy haul railways.

The selected route crosses the Clarke Range to the west of Collinsville and through Peter Gordon Pass. This corridor is considered to have more accommodating topography and less existing infrastructure constraints than the existing QRN Newlands Corridor that currently supports the western Bowen Basin Mines to the east of Collinsville. It is also expected that this corridor will have limited noise, dust and vibration impacts to the township of Collinsville, while also avoiding the need to traverse the Sonoma State Forest area where the existing corridor is narrow.

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.

The corridor will not result in the sterilisation of known approved Mining Leases or negatively impact existing coal mines; however, the corridor will pass immediately to the west of Xstrata Coal's mining lease boundaries at Collinsville. The route avoids all approved Mineral Development License tenures; however, crosses a number of unavoidable EPCs.

It's expected that the operating corridor will foster the development of new mines in the Galilee Basin with it traversing approximately 50 km of this coal rich resource before heading north-east towards the coal terminal.

Through rigorous interrogations the preferred rail corridor has been refined down to 500 m wide. Further detailed investigations and surveys of geology, topography, flood impacts and culture heritage, together with ongoing consultation with affected landowner, will continue to be undertaken as part of refining the corridor from 1.6 km wide to a nominal rail reserve width of 60 - 80 m. Current and future planned studies that may influence the location of the final route include:

- the location of the marshalling yard west of the APSDA;
- ongoing negotiations with affected land owners and owners of other tenures (EPC, EPM, PPL, MDL, ML etc) to reveal possible barriers and negative impacts associated from operating the heavy haul railway;
- train performance modeling to establish suitable locations for passing loops and possible uphill / downhill gradients of the mainline; and
- geotechnical ground truthing at select locations along the corridor may require minor deviations to the route outside the corridor to avoid cuttings with shallow rock and groundwater, as well as identify suitable locations for structure crossings over rivers and existing infrastructure.

1.1.4 CO-LOCATION WITH OTHER PROPOSED RAIL PROJECTS

The proposed rail alignment has been developed and further refined based on constraints such as the 1 in 100 year flood extents and definition of major watercourses, environmental mapping of key constraints such as National Parks and reserves, protected wetlands, large scale dams and sensitive ecological habitats, existing infrastructure constraints (including the latest mining tenements, townships, location of houses, transport infrastructure and utilities). Crossings of high impact constraints such as operating mines, houses and National Parks were generally avoided. 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 an 'in principle' agreement with AMCI (proponent of the South Galilee Coal Project) to enable AMCI to access the Waratah rail alignment east of the mine at approximately KP455. In addition, is discussions are ongoing between Waratah Coal and Adani Mining Pty Ltd (proponent of the Carmichael Coal Project) regarding co-location of Adani's rail infrastructure with Waratah Coal's to limit environmental and land tenure impacts.

1.1.5 THIRD PARTY USAGE

Initially the rail component of the project is designed to transport 60 Mtpa. Initially this provides for a transportation of a total of 40Mtpa for the Waratah Coal project and provides opportunities for other third parties to utilise the remaining capacity of the infrastructure once built. Ultimately the proposed railway is capable of carrying up to 400Mtpa and can be developed in a staged manner to cater for existing and future coal mines within the Galilee Basin (refer section 1.1.2.4). As indicated in section 1.1.4 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.

1.2 KEY COMPONENTS

The rail involves the construction of a new heavy haul, standard gauge, non-electrified rail line between the mine site at Alpha and the coal terminal at the APSDA and Port of Abbot Point.

The main components of the rail (initially) are:

- two 8 km long rail balloons linking the two rail loading stations at the mine to the rail line; a 468 km single track, standard gauge heavy haul rail line between the mine and the APSDA including:
  - up to nine (9) passing loops;
  - nine (9) major bridge crossings of major rivers;
  - two (2) road over rail bridge crossings of the Gregory and Bowen Developmental Road; and
  - one (1) underpass for the Bruce Highway at the APSDA;
- two (2) rail balloon within the APSDA (length to be determined) linking to the dump stations at the coal terminal; the use of diesel powered trains approximately 3.2 km in length with a 20,000 tonne payload using distributive power and Electronically Controlled Pneumatic (ECP) air brakes for optimal fuel and train handling performance;
- a rollingstock yard with sufficient capacity to hold the entire rolling stock fleet and provide the following functions:
  - holding lanes for trains awaiting departure;
  - storage bays for rolling stock awaiting repair or taken out of cycle on rotation;
  - lanes for disconnecting and making of trains;
  - wagon maintenance workshop;
  - locomotive maintenance and refueling facility;
  - roll by inspection facilities;
  - Central Control Terminal (CCT);
  - equipment and fuel storage;
  - infrastructure maintenance facilities;
  - security facilities;
  - office space and staff parking; and
  - internal road network;
- four temporary construction workers villages;
- numerous temporary construction access roads and lay down areas;
- temporary hard rock and gravel quarries situated along the alignment;
- temporary sand and water extraction points situated along the alignment; and
- communication and signaling infrastructure.

The initial coal handling capacity of the proposed rail will allow for 60 million tonnes per annum (Mtpa); however, the 50 year design life of the railway will accommodate a startup coal export capacity of 25 Mtpa, escalating up to 400 Mtpa over a 15-20 year period. This can be increased capacity can be achieved with progressive duplication of the mainline including:

- up to sixteen (16) passing loops;
- nine (9) major bridge crossings of major rivers;
- two (2) road over rail bridge crossings of the Gregory and Bowen Developmental Roads; and
- One (1) underpass for the Bruce Highway at the APSDA;

1.2.1 RAIL DEVELOPMENT

The heavy haul railway will be of standard gauge track configuration and accommodate initially up to six x 3.5 km long passing loops. The exact length of the railway (currently estimated at 468 km) will not be finalised until the specific alignment within the 500 m wide corridor and train loadout facilities at the mine and coal terminal have been established.

The track will be of 68-75 kg/m Australian Standard (AS) plain carbon continually welded rail mounted on monoblock pre-stressed concrete sleepers, spaced 600 mm apart. These will be supported by a layer of deep clean ballast around 510 mm deep (measured from the top of the sleepers) with shoulders of 400 mm. Further refinement of track parameters will be conducted throughout the detailed design.

The corridor has been selected to accommodate 1 in 200 (0.5%) and 1 in 80 (1.25%) maximum loaded and unloaded grades, respectively, with no horizontal curves sharper than 1,000 m (Table 1). It is expected that significantly flatter geometry beyond these limits can be achieved between the mine site and Leichhardt Ranges where the topography is relatively flat. The alignment has been modelled subject to curve compensation (0.034%) to ease grades around tight horizontal bends.

Table 1. Design Criteria for the Preferred Corridor

CRITERIA TYPE	LIMITS
Railway Gauge	Standard (1435mm)
Maximum Limiting Grade – Laden	0.5% (1 in 200)
Maximum Limiting Grade – Empty	1.25% (1 in 80)
Minimum Horizontal Radius of Curvature	1000 m
Minimum Vertical Radius of Curvature	7200 m
Curve Compensation	0.034% (per degree of curvature)

The typical cross sections in cut and fill are illustrated in Figure 6.

Batter slopes on embankments will be typically 3H:1V (33%), while within cuttings, 3H:1V (33%) through soils and 1H:2V (200%) through rock to reflect the extra stability. Benches 3 m in width will be introduced where earthworks exceed 7 m in height. Further refinement of the geometric parameters may occur at detailed design.

A preferred corridor width of 60 – 80 m has been adopted to enable access for fencing, drainage and signaling; however, this is dependent upon the embankment heights and cutting depths, which may see additional widening through areas of extensive earthworks. Retaining walls may be required to limit long batters through deep cuttings and high embankments; however, this will be established as part of the final design. Where the available corridor space is limited, a constrained corridor with limited earthworks will be employed.

The railway will allow future capacities to be increased to 400 Mtpa, with the addition of further passing loops, rolling stock and progressive duplication of the mainline.

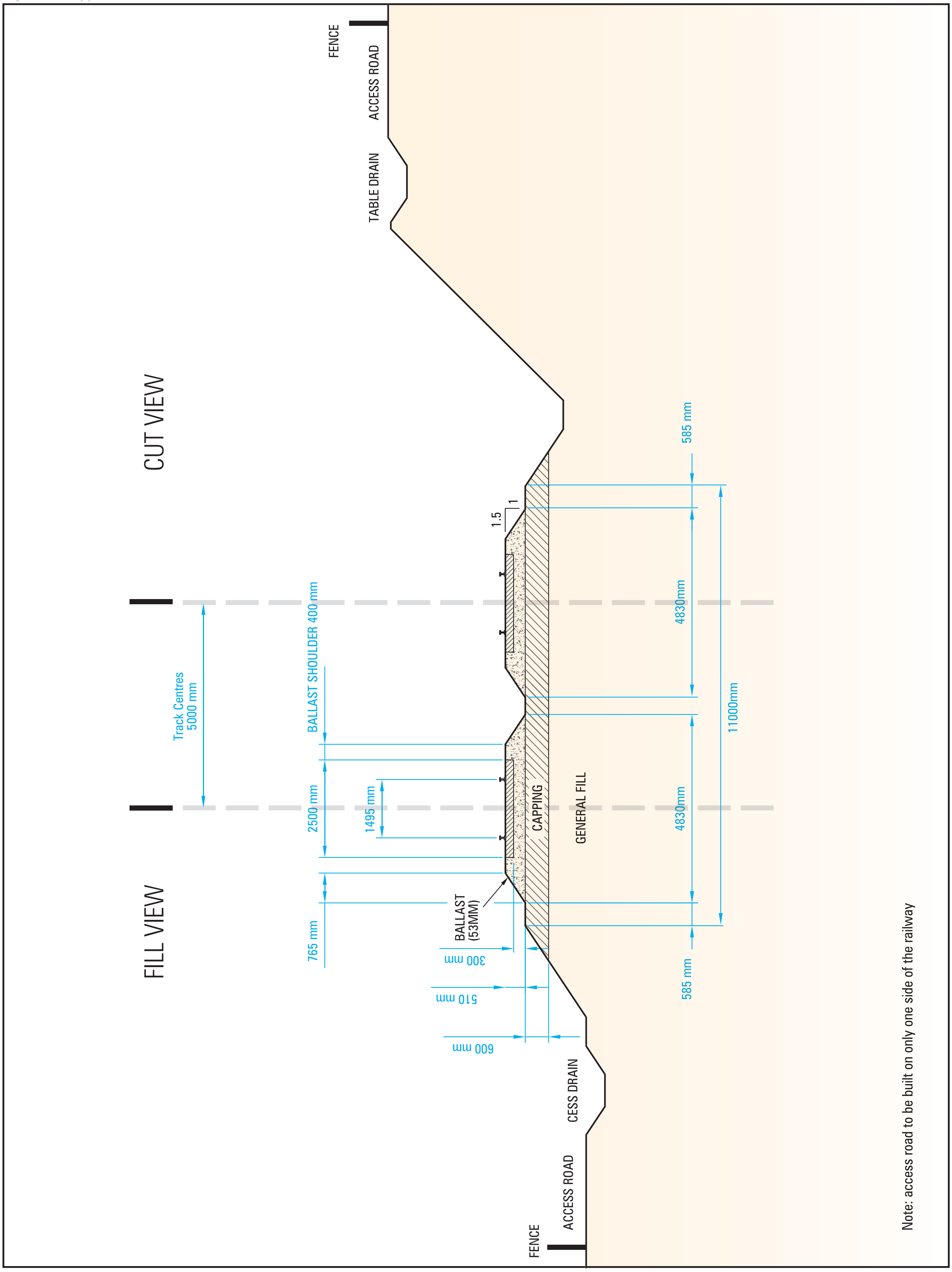
1.2.2 DEVELOPMENT SEQUENCE

The development of the rail line will occur in three simultaneous phases, with construction to commence in three (3) equal lengths along the corridor. The expected development sequence for the new rail line is shown in Table 2.

Table 2. Rail Development Sequence

WORKS PHASE	ACTIVITY
Pre-construction	Detailed planning, design and survey
	Land acquisitions
	Completion of geotechnical investigations
	Relevant approvals obtained
Early works	Clear and grubbing
	Establishment of access tracks to the easement
	Establishment of temporary works accommodation
	Establishment of works depots and laydown areas
	Establishment of borrow pits, quarries and sand extraction pits
	Establishment of water source points
Rail construction	Bulk earthworks
	Culvert construction, blasting and bridge construction
	Establishment of the track formation
	Sleeper placement and track laying
	Ballast laying
	Signaling and communications
Final Works	Decommission temporary facilities
	Complete final rehabilitation
	Trial running and commissioning

Figure 6. Typical Cut and Fill Cross Section



1.2.3 ROLLING STOCK

Currently two rolling stock configurations are being considered based on major coal transportation systems used in China and North America. Both train configurations are expected to deliver similar annual payloads, which is significantly more than the existing capacities of coal freight systems in Queensland. Key train parameters for each configuration are presented in **Table 3**, while **Plate 1** to **Plate 4** shows the wagon and locomotive types under consideration.

Standard gauge coal wagons within a range of 25 - 36 tonne axle loads (TAL) are being considered. Currently 36 TAL cars are not used in daily operation for coal, but are common in iron ore operation. At this point in time, only prototype 36 TAL coal wagons have been built. Wagon design is assumed on the basis of an enlarged AutoFlood III Aluminium Hopper Car, or alternatively C80 Gondola Car.

Motive power will be of standard diesel-electric locomotives, either the General Electric Evolution Series locomotive, or DF Series Chinese locomotive manufactured by China Nanche Group Ziyang Diesel Locomotive Co. Ltd. Use of electric traction although assessed, does not provide a cost efficient solution for the Project.

It is expected that initially between six to seven trains per day will be needed to deliver 40 Mtpa of product coal to the coal terminal. The initial capacity of the current design is estimated to be less than 10 train sets. An allowance of six passing stations spaced approximately 75 km apart on average will be required along the route to meet the annual carrying capacity from the mine of 40 Mtpa.

Each train will be approximately 3.2 km in length, using distributive power and ECP air brakes for optimal fuel and train handling performance. The effective length of the receiving and departure tracks in compliance with the length of the train and a safe stopping distance is estimated at 3.5 km.

Table 3. Key Train Operating Parameters

		NORTH AMERICAN	CHINESE
Locomotive	Type	General Electric ES44DCI	DF8DJ
	Length / Height	22.3 m / 4.7 m	22.3 m /4.736 m
	Weight in Working Order	196 t	150 t
	Continuous Tractive Effort	537 KN	480 KN
	Traction Power	3,357 KW (4,500 hp)	4,200 KW (5630 hp)
Wagon	Type	AutoFlood III Hopper	C80 Open Top Gondola
	Length / Width / Height	16 m / 3.25 m / 4.06 m	12 m / 3.28 m / 3.76 m
	Tare Mass	25 t	20 t
	Payload	118 t	80 t
	Braking System	Air Brake - ECP	Air Brake - ECP
	Mode of Discharge	Cylindrical Rotary	Cylindrical Rotary
Train Consist	Number of Locomotives per train	6	5
	Number of Wagons per train	180	250
	Payload	21,240 t	20,000 t
	Gross Tonnage	26,916 t	25,750 t
	Number of train sets for 40 Mtpa	6-7 trains per day	6-7 trains per day
	Train Configuration	Distributive Power	Distributive Power
	Train Loading Time	3 hrs 49 mins	3 hrs 30 mins
	Train Unloading Time	2 hrs 11 mins	4 hrs 12 mins

Plate 1. Proposed Chinese supplied DF8DJ locomotive

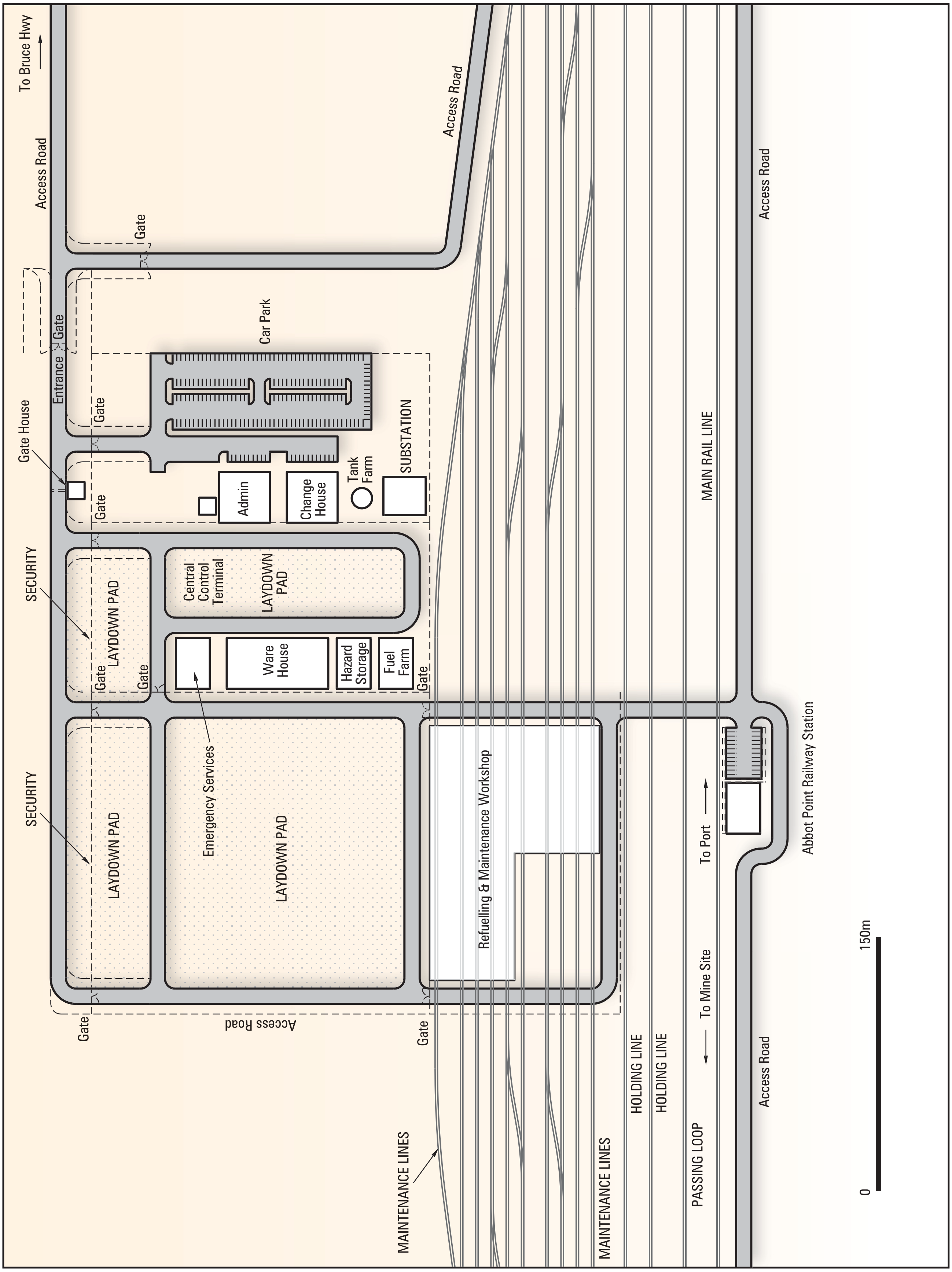
Plate 2. Proposed Chinese supplied C80 open top gondola

Plate 3. Alternative North American supplied General Electric ES44DCI

Plate 4. Alternative North American supplied autoFlood III hopper

Source: Jeffrey M. Tritthart, 2009

Figure 7. Proposed Marshalling Yard Arrangement



1.2.4 MARSHALLING AND MAINTENANCE FACILITIES

Marshalling yards for the maintenance, servicing and refueling of rolling stock will be located at the coal terminal end of the railway. This will be of sufficient capacity to hold the entire rolling stock fleet and provide for the following functions:

- holding lanes for trains awaiting departure;
- storage bays for rolling stock awaiting repair or taken out of cycle on rotation;
- lanes for disconnecting and making of trains;
- wagon maintenance workshop;
- locomotive maintenance and refueling facility;
- roll by inspection facilities;
- Central Control Terminal (CCT);
- equipment and fuel storage;
- infrastructure maintenance facilities;
- security facilities;
- water and wastewater handling and treatment;
- cleaning and decontamination of rolling stock;
- oil and sediment control traps; and
- staff and administration facility.

The proposed arrangement for the marshalling yards is shown at Figure 7.

1.3 SUPPORTING INFRASTRUCTURE

1.3.1 POWER SUPPLY

Power demands for the railway (non-electric traction) will be required to support the communication, signaling and lighting equipment at passing loops 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 quarries 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. 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.

Power demands for rail facilities at the coal terminal are likely to be provided from a dedicated supply to the APSDA.

As the railway is using non-electric traction, the demand for energy along the rail will be limited to supply for signals and other associated infrastructure. In remote locations energy will be obtained from the local electricity distribution grid where practical or alternatively provided through diesel generators and solar paneling. A detailed assessment of power requirements and supporting infrastructure for the construction and operation of the railway will be conducted as part of the final detailed design.

Waratah Coal will develop energy conservation strategies for the construction and operation of the rail. The strategies will be developed to minimise energy consumption throughout the duration of the project.

1.3.2 WATER SUPPLY

Construction water for the railway will predominately be required for:

- compaction / conditioning of earthworks;
- dust suppression;
- weed wash down bays;
- concrete works;
- quarry operations;
- 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.

At the coal terminal, water will be provided from the existing Bowen water supply network which is currently sourced from groundwater aquifers. A future water source from the Clair Weir on the Burdekin River is proposed by SunWater via a new 150 km channel and pipeline system that will supply the APSDA with 60,000 mega litres of water per annum (ML/a). The EIS for this project was released in November 2009 and if approved, construction is expected to commence in 2012.

At the rail maintenance yard, raw water will be supplied from the local Bowen water supply network or a new connection into the water for Bowen pipeline should that project proceed. In addition, an assessment will be undertaken to assess the viability of establishing a groundwater bore at the marshalling yards as an alternate water supply. Potable water will be obtained from the existing local network or will be supplied via a local water supply contractor.

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

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

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 farm 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.

1.3.3 SECURITY

Access to the rail infrastructure at the mine and coal terminal will be from secured entry points. All persons entering the infrastructure will be required to pass through controlled access points. A car park will be established in close proximity to the secure entrance for workers and visitors to reduce the number of vehicle movements within the controlled areas. Both locations will be enclosed within security fencing and will incorporate automated access controls, electronic security monitoring, and static and mobile security patrols to provide additional protective security measures.

The rail corridor will be fully fenced throughout construction and operations to prevent stock wandering into the construction area and to discourage access by the public. Temporary construction gates will be installed in existing fences where they are required to be cut to allow for access to the easement. During construction all entry points will be secured and manned 24 h/day (where practical). Static patrols will move throughout the construction corridor as a further protective measure.

1.4 RAIL INFRASTRUCTURE CONSTRUCTION ACTIVITIES

The following sections outline the construction activities associated with the rail infrastructure.

1.4.1 ESTABLISHMENT OF ACCESS TRACKS

During construction of the rail line, access to the easement will be via existing public tracks and roads wherever possible. In some instances there may be a requirement to either construct a new access track to the easement or utilise tracks on private property; however, the use of existing public tracks and roads is the preferred option.

Where new access tracks are required, these will be planned in consultation with the regulatory authorities and local landholders. The planning of all new access tracks will include consideration of public amenity, sensitive environmental areas and locating the tracks to reduce disturbance. Temporary gates will be established where any new access track intersects an existing fence line.

The rehabilitation strategy for all temporary access tracks will be prepared in consultation with regulatory authorities and property owners.

1.4.2 CLEAR AND GRUBBING

Prior to the commencement of the vegetation clearing activities the easement will be marked showing the area to be cleared. Any areas that are to be avoided (i.e. environmentally sensitive areas, sites of heritage significance) will also be clearly marked. Fauna spotters and cultural heritage observers will be utilised as required during the clearing activities to identify areas requiring additional protective management.

As areas are cleared, the fallen timber will be stick raked into piles within the easement and used as fauna habitat or mulched for future use in the rehabilitation program. Topsoil will be stockpiled separately from the fallen timber.

Where clearing activities occur in close proximity to waterways, suitable erosion control measures will be established to avoid long terms impacts. Vegetation and topsoil will be stockpiled away from the water course to reduce the risk of sedimentation due to overland flows.

Excavators combined with tree grabs and hooks will be used during the vegetation clearance activities. Excavators with attached mulchers, in addition to broad acre mulchers and horizontal tub grinders, will be used to mulch vegetation for later use as part of the rehabilitation works.

1.4.3 ESTABLISHMENT OF TEMPORARY WORKERS VILLAGES AND WORKS DEPOTS / LAYDOWN AREAS

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.

Temporary workers accommodation would be comprised of prefabricated single rooms with ensuite bathrooms, kitchens and dining halls, wet messes, shop and recreational facilities. Figure 8 provides an indicative layout of the proposed temporary workers village. Water, power and waste treatment facilities will also be incorporated into the temporary workers villages. To minimise the risk of spreading weeds each workers village will include a weed wash down facility.

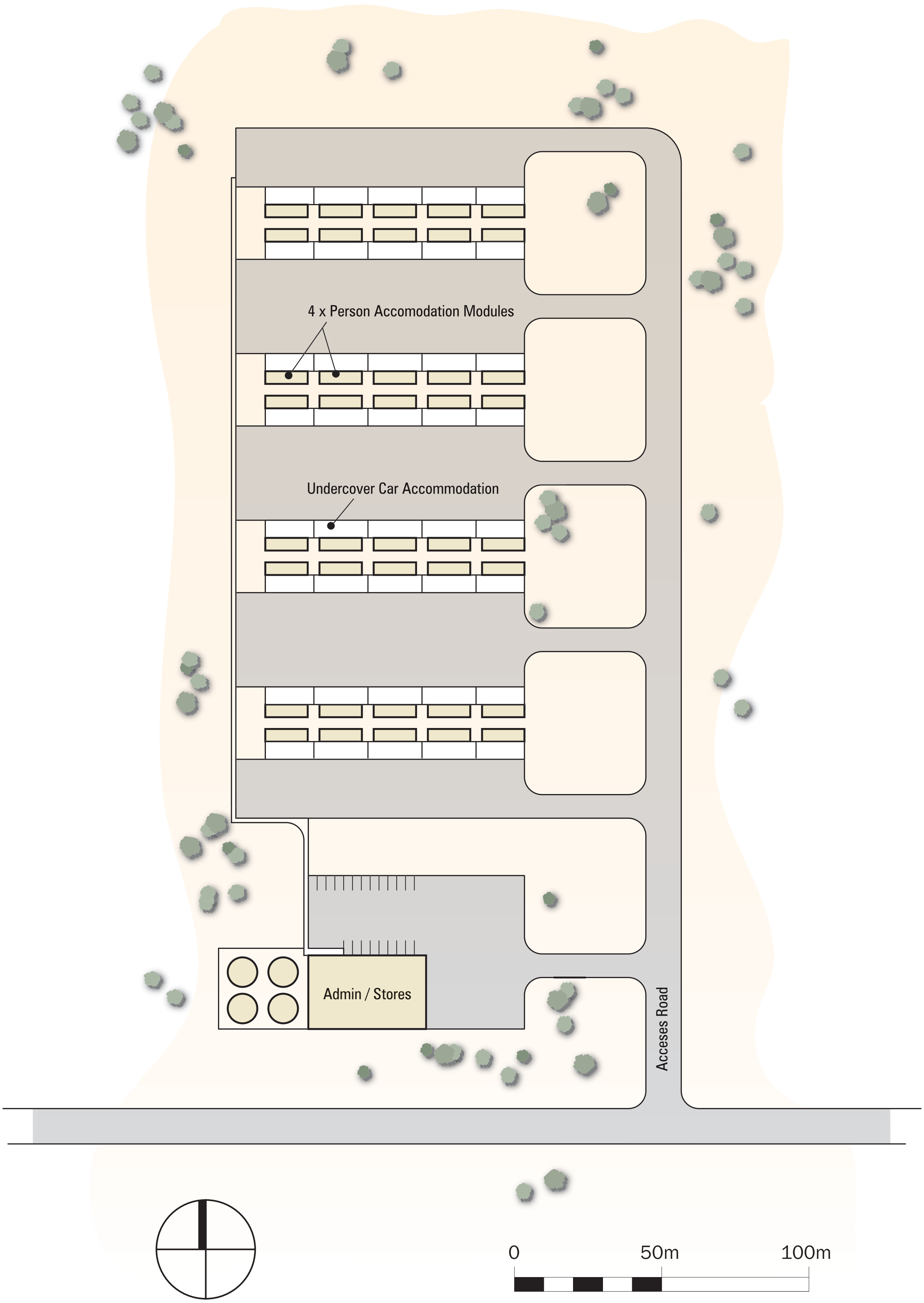
The workforce will be fly-in / fly-out from within Queensland and potentially from other Australian States via the Alpha airport. The workforce will be transferred from the airport to the camp and to the work sites via a communal transport service. Appropriate car parking will be provided at each accommodation village; however, this will be minimal given the fly-in / fly-out nature of the construction operations. Access into the accommodation facilities, depots and construction sites will be controlled 24 h/day via contracted security services.

Construction depots will be located at various sites along the rail easement and these may be collocated with temporary workers villages. Construction depots will be used for the storage of equipment, site office space, crew mustering points and as equipment and material laydown areas. Major laydown areas will be located at the coal terminal and mine ends of the railway, with smaller laydown areas located along the alignment. An example of a typical rail laydown area is shown in Plate 5.

When locating the workers villages and depot / laydown areas, the contractor will be required to liaise with the appropriate local authorities and landowners as well as take in a range of operational, environmental and community factors into consideration (i.e. the possibility of shift work operations requiring heavy or ongoing vehicle movements outside normal working hours). Preference will be given to locating temporary facilities on disturbed sites; however, other factors that will be considered include:

- the proximity to the rail easement to minimise travel distances;
- minimising the amount of vegetation clearance required;
- avoiding locations that are flood and bushfire prone;
- maximising the distances between the sites and noise sensitive receptors;
- minimising impacts to local communities; and
- the proximity to existing infrastructure (i.e. power and water supplies and waste treatment facilities).

Figure 8. Indicative Layout of Temporary Accommodation Camp during the Rail Construction



The workers accommodation villages and construction depots will require both potable and non-potable water supplies. The contractor will be required to secure these supplies prior to the establishment of the facilities. Where potable water supplies are not available it will be trucked to the site. Non-potable water will be sourced locally wherever possible via local surface water and groundwater supplies. Where non-potable water is not available it will be trucked in, but via different water tankers to the potable water supply.

Plate 5. Typical rail laydown area including stockpiles of sleepers and ballast

Source: AARC

Power will be supplied to the accommodation villages and depots via portable diesel generators, with bunded fuel tanks. The expected power supply requirements are 100 to 240 Kilovolts per annum (kVA). The contractor will be required to obtain all required approvals relevant to the power supply.

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

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.

1.4.4 ESTABLISHMENT OF QUARRIES AND GRAVEL / SAND EXTRACTION POINTS

The Project requires the establishment of quarry and sand extraction pits to provide materials for the development of the embankment and rail formation. The preferred option is to use existing quarries where possible; however, it is anticipated that new quarries and sand extraction points / pits will be required. Where new quarries and sand extraction pits are required, relevant approvals will be obtained and they will be open in line with the stage of construction and progressively rehabilitated.

1.4.5 BULK EARTHWORKS

The surface geology along the selected corridor generally ranges from level to gentle sloping volcanic and clay plains in the south, to moderate to steep undulating sandstone ridges with deep gullies through the north.

The southern part of the route (south of the Leichhardt Ranges) traverses level to gentle sloping topography and is characterised by its crossing of channel and alluvial clay plains, sandstone low hills and undulating sandy plains. Across floodplains, drainage lines are generally broad and shallow. Soil composition is comprised of mostly massive earths, yellow duplex soils and fine textures seasonal cracking clays.

Through the northern part of the study area the route traverses through the moderate to steep undulating slopes of the Leichhardt and Clarke Ranges. Here the route crosses stony low hills, rocky outcrops, gravelly ridges and exposed cliffs of sandstone, siltstone and basalt. Soil composition is comprised of coarse sandy slopes, yellow-grey duplex soils, red clay soils and cracking clays.

Where possible the route selection has focused on avoiding very steep slopes and erosion prone areas, as well as minimising the disturbances across alluvial floodplains of major drainage lines. The latter presents areas of volatile cracking clays prone to shrinkage and swelling as the soil wets and dries.

The route has allowed for the top 30-50 cm soil to be stripped. Dumping stockpiles that are protected from erosion during rain events will be established at detailed design. The excavatability of material is expected to reduce significantly with depth, with the upper residual soils being easy to rip, while deeper fresh igneous and sedimentary rock likely to occur 10-20 m below the surface requiring blasting.

At this point in the assessment the disturbance and exposure of soils that are vulnerable to erosion and structural degradation has not been assessed. This will be carried out at detailed design along with other geotechnical investigations to establish depth and quality of useable soils.

A range of heavy earthmoving and construction machinery will be used to develop the embankment and rail formation. The types of machinery that will be involved include dozers, graders, scrappers, tip and dump trucks, rollers, water tankers, excavators, backhoes, paving machines, pile rigs, fuel tankers and light utility vehicles. The actual numbers of each machinery and vehicle type won't be known until the construction contracts are let.

The fill required for the bulk earthworks will be obtained from the cutting excavations and local borrow pits.

Construction aggregate for the rail embankments will be sourced from material recovered from construction of the railway cuttings. The excess cut material is unlikely to be suitable for railway ballast, while a proportion of the surplus cut constitutes topsoil to be stripped and stockpiled for future rehabilitation works.

Where suitable construction material cannot be sourced from within the railway cuttings, a series of borrow pits will need to be established, or the material hauled from nearby quarries. The location and spacing of borrow pits have not been established, but will be located away from sensitive environments such as significant vegetation and surface drainage. Table 4 shows the estimated volume of constructed material based on preliminary estimates and are subject to change based on detailed design.

Table 4. Estimate volume of constructed material

CONSTRUCTION MATERIAL	ESTIMATED QUANTITIES M^3
Formation Works – Excavation	9.82 million
Formation Works – General Fill	5.83 million
Formation Works – Top 600 Capping Layer	2.2 million (in-situ)
Ballast	1.0 million (in-situ)

1.4.6 BLASTING

There will likely be sections within the rail easement where the existing geology may prevent the use of earthmoving machinery and will require blasting. Prior to any blasting occurring, a blasting plan will be prepared which will detail the process and safety precautions for undertaking the blasting, as well the process for advising the residents of nearby houses or communities of the blasting. Any blasting that is required will be undertaken by a suitably qualified professional and will be undertaken in a manner that fully complies with existing legislation and standards.

1.4.7 CULVERT AND BRIDGE STRUCTURES

Culverts (see Plate 6) will be used throughout the easement as part of the rail line construction to enable the natural drainage systems to continue to function and to provide for stock and farm equipment crossings where appropriate. The construction of culverts will be undertaken in parallel to the development of the embankment and rail formation. The culverts will be placed in concrete stabilised fill and protected by rock armor on the upstream and downstream faces. The design of culverts will be sufficient to prevent over topping in a 1 in 50 year average return interval (ARI) peak flow outside of floodplains and a 1 in 100 year ARI for culverts placed within floodplains.

Plate 6. Example of a reinforced concrete box culvert structure used for a water crossing

Source: AARC

Bridge construction will occur in parallel to the development of the embankment and rail formation. Earthworks will be undertaken to prepare the abutments and levels, while preliminary sediment control devices will be installed prior to the drilling and placement of bridge piles. Bridge structures (i.e. headstock, beams or spans) will be pre-fabricated and transported to each crossing site for assembly. Bridges will be designed to avoid over topping in a 1 in 100 year ARI (see Plate 7 and Plate 8).

Once the bulk earthworks and structures are well advanced, sleepers and track laying crews will commence the construction of the track infrastructure.

Plate 7. Similar bridge design to that proposed by Waratah Coal (but without electrification)

Plate 8. Similar bridge design as proposed by Waratah Coal (but without electrification)

1.4.8 TRACK INFRASTRUCTURE

The track will be of 68 – 75 kg/m AS plain carbon continuously welded rail. The track will be transported to the coal terminal stockpiles in 30 m sections where it will be welded into 350-450 m lengths (Plate 9). These will be hauled by rail to site, along the constructed sections of railway as required.

Mono-block pre-stressed concrete sleepers will be produced at suitably located batch plants and hauled to the relevant stockpiles at the coal terminal and selected locations along the rail alignment. It is expected that approximately 1 million sleepers will be required. To be consistent with current best practice for heavy haul rail, sleepers will be spaced 600 mm apart (see Plate 10) and fully immersed in a layer of deep-clean ballast. The sleepers will be pre-stressed fabricated and be delivered to strategic locations along the rail line to enable the construction of the rail.

Once the rail development has started, sleepers will then continue to be transported by train along the rail until construction of the rail is completed.

Plate 9. Stockpiled pre-welded 400 m rail lengths

Source: AARC

Plate 10. Sleeper laying machine in operation

Source: AARC

Once the laying of sleepers has commenced, each section of track will be laid in place by a track laying machine (see Plate 11) and then clipped to the sleepers. The train will then roll forward over the newly laid track where a new section of track will be positioned and welded together. This process will continue along the entire length of formation.

Plate 11. Track laying machine in operation

Source: AARC

Ballast aggregate will be sourced from either existing quarries where available or from new quarries established for the Project. Capping material will typically be sourced from cuttings or from local borrow pits if suitable material is not present. Ballast will be transported by truck to the rail construction stockpiles to be situated at the coal terminal and one or two locations along the alignment via existing roads or the cleared easement where possible; however, there may be a requirement to construct temporary haul roads to facilitate access to the easement. Ballast will be loaded onto ballast trains and emptied progressively along the rail line (Plate 12 and Plate 13). Specialised rail machinery including tampers and regulators will be used to lay (Plate 14) and compact the ballast to fully emerge the sleepers.

Plate 12. Ballast wagons unloading ballast

Plate 13. Ballast grader in operation

Source: AARC

Plate 14. Ballast tamper machine in operation

Source: AARC

1.4.9 SIGNALING AND COMMUNICATIONS

The railway will draw on the latest signaling and communication technology to ensure the safe and efficient delivery of coal from the mine site to Abbot Point.

A fibre optic cable installed along the length of the railway and linked to a CCT centre likely to be established within the APSDA is currently being considered. This will enable train dispatchers to control train movements and monitor train condition and occupancy in real time.

On-board computers will be installed on each train to provide a global positioning satellite interface with the CCT, which allows remote monitoring of the locomotives performance, data transmission to the control centre and automatic identification of locomotives and wagons. It is also proposed that all mainline and yard operational signaling will be in-cab type signaling.

Asset protection devices such as a hot box temperature detection system will also be installed along the main line to detect when axle bearings may overheat and cause derailment. In addition, barriers will be added at all crossings, while derailment detectors will be installed ahead of passing loops and main bridges to automatically stop trains operating in both directions in the event of a derailment.

All external signaling and communication infrastructure along the railway corridor will be installed with systems that protect equipment from lightning and other natural phenomena (flood and fire).

Turnouts of the mainline, yards and sidings will be tangential 1 in 18 turnouts designed for 80 km/hr operation.

1.4.10 REHABILITATION

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.

A weed management program will be implemented for all rehabilitated sites.

1.5 OPERATIONS

Waratah Coal plans to keep the supply chain from mine site to coal terminal operating at maximum efficiency, ensuring all components of the supply chain (mine, rail and coal terminal) are synchronised so that the product coal delivered to the terminal matches the size of ships that are scheduled to dock and can meet export demands globally. To achieve maximum land transport cost efficiencies for coal produced from the Galilee Basin, Waratah Coal proposes to use infrastructure and railway operations similar to those in the Western Australian Pilbara iron ore railways and the North American Powder River Basin coal system. This generally reflects the limits of current world heavy haul practice and will provide for a more efficient operating system than other current coal freight systems in Queensland.

The feasibility of a number of varying transport alternatives have been considered in past engineering studies. This included the assessment of a range of train configurations, axle loads and train lengths, resulting in different nett tonnages of coal for both narrow and standard gauge track configurations. Ten different options to Abbot Point were defined and analysed at production levels of 25 Mtpa and 75 Mtpa, giving a total of 20 options to Abbot Point. In assessing each of these options, current and forecast train traffic on existing QR operated rail lines was taken into account, as well as the impact from superimposing the tonnages from the Galilee Basin.

In addition to this, all known QR proposed upgrades on each of the routes were assumed to have been implemented. This included the assumption that the Newlands Line would be extended with the Northern Missing Link and upgraded to a capacity of 50 Mtpa. A broad-brush evaluation model was developed to compare the options. The evaluation model incorporated both the capital and operating costs for various scenarios on a comparable basis using discounting over a 50 year life, to produce comparative cost estimates that enabled the options to be ranked in terms of their cost efficiency. The outcomes clearly showed that a newly built heavy haul standard gauge railway becomes competitive at higher tonnages.

Use of the existing rural road network which is largely non bitumised and undulating, does not provide a technically feasible solution due to its low transport capacity unable to support heavy haul traffic. Investment into a new totally dedicated heavy haul road between the mine site and coal terminal also fails to provide an economically feasible option, with it requiring significant capital investment and likely to result in very high transport costs for hauling coal at the projected quantities. In terms of the transport capacity and efficiency of coal over this distance, use of railway transport has significant advantages that cannot be replaced through haulage along roads. The construction of a new dedicated heavy haul railway from the Galilee Basin will avert any extra pressure and interruption to the existing Central Queensland coal chains including those servicing the Bowen Basin.

Waratah Coal intends to construct a standard gauge railway with laden grades no greater than 1 in 200. This provides for a much more efficient heavy haul operating system and will allow twice as much coal per train to be hauled than is possible with Queensland's current narrow gauge system. This is also expected to result in lower long term operating costs due to flatter grades and larger radius curves.

The Project will see the operation (initially) of six to seven trains per day to deliver 40 Mtpa of product coal to the coal terminal. Six passing stations spaced approximately 75 km apart will be required along the route to meet this initial design capacity. The railway will allow future capacities to be increased to 400 Mtpa, with the addition of further passing loops, rolling stock and progressive duplication of the mainline.

Commissioning of the railway will involve initially running unloaded train sets over the railway, and then incrementally loading trains until fully loaded trains (20,000 tonnes net) are run. Each train will be approximately 3.2 km in length, using distributive power and ECP air brakes for optimal fuel and train handling performance. The exact makeup of the most efficient train configuration will be established through future train performance modelling.

At the mine, trains will be loaded using dual independent loaders, each with loading capacities of 6000 tph, operating in 24-hour daily circulation. For a net carry capacity of 20,000 tonnes, loading time for each train is estimated at 3 hrs 20 mins. At the coal terminal, dual three cell rotary dumpers with a rated capacity of 7,200 tph will empty cargo at 20 cycles/hr. Rotary dumpers offer a number of advantages over bottom dumpers including eliminating the problem with wasted volume under the sloping bottoms common in traditional hopper cars and generally allowing trains to be unloaded more efficiently. At normal operating speeds, a three-car dumper will take three minutes to operate, resulting in a full train being emptied within 4 hrs 12 minutes. Transit cycle time from the mine to coal terminal and return is estimated to be within 24 hours.

The railway line would be open to third party users and free up costly bottlenecks already inhibiting Australia's coal industry. This includes the current restrictions with rail capacities that service the Bowen Basin and Hunter Valley, which coupled with strong demands of coal overseas and production delays at the mines, has resulted in queues of bulk carriers at Dalrymple Bay and the Port of Newcastle. The proposed railway will encompass over 50 km of the Galilee Basin and open up access to other mining proponents which hold significant JORC inferred resources of thermal coal.

1.6 WORKFORCE

The construction of the rail is due to commence in 2012 and is expected to take 36 months to complete. The scheduling of the main construction tasks are shown in Figure 9.

Major construction centres to provide logistical support, accommodation, project coordination locations and other support services are likely to be located at Abbot Point, Collinsville and at the mine site at Alpha, with sub-camps likely to be located adjacent to major roads at approximately 100 km intervals.

It is Waratah Coal's intention to permanently base and accommodate all 460 workers involved in the railway and port in the Bowen area (refer section 2.3 of Chapter 9, Volume 1).The construction of the railway will require approximately 1,000 personnel and 900,000,000 man days spread over 36 months. This workforce will be accommodated in temporary camps to be built and operated by the construction contractors. The major components of the workforce are likely to consist of the following:

- camp construction and camp maintenance crew;
- service road maintenance crews;
- earthworks construction crews (eight);
- minor waterway constructions crew, four crews each supporting two earthworks crews;
- bridge construction crew, three crews – east and west;
- tracklaying: one tracklaying crew each for the mainline, with a second crew based on Collinsville being responsible for the crossing loops and yards;
- turnout laying crew: one specialist crew will lay all turnouts;
- rail and turnout grinding crew: grind all rail prior to commissioning;
- signalling crew;
- operational, provisioning and maintenance facilities construction crew;
- rollingstock procurement staff;
- rollingstock commissioning staff;
- staff to design and commission infrastructure maintenance; and
- engineering supervision staff.

At this stage it is not possible to identify the likely workforce number for the decommissioning and rehabilitation phases and these numbers won't be known until the final decisions are made around which infrastructure will remain commissioned at the end of the Project.

Figure 9. Construction tasks and scheduling for railway facility