Section 2

DESCRIPTION OF THE PROJECT

2. Description of the Project

The purpose of this Section is to describe the Project through its lifetime of construction, operation and decommissioning. The Project Description also defines the design and operating parameters agreed for the Project which form the basis of the technical impact assessments that make up Section 3 to Section 16 of this EIS.

2.1 Overview of Project

This EIS assesses the construction of the railway and associated works, as described in the following sections, but excludes the development of any rail spurs to proposed coal mines or upgrades of other railways or ports. Connections to any mines, including the Wandoan mine spur (located approximately 4 km north of the township at chainage 10.5 km) will need to be assessed by the Proponents of those projects and will be subject to a separate assessment and approval process.

The Project is described as an open access, multi-user railway initially consisting of a single track with up to eight passing loops. The corridor width will be approximately 60 m, with wider sections as required to accommodate locations on embankment and in cutting. Provisional allowance is made in the design for future electrification of the Project. Minor widening of the formation may be required to allow for pole construction to support overhead power equipment within the multi-user corridor should they be required. At this stage no additional design work is being undertaken for the possible future electrification of the Project, however any future upgrades should not require a widening of the corridor.

The preferred alignment has been optimised for coal/freight traffic and can accommodate the operating scenarios referred to in the ToR:

- Narrow gauge coal railway;
- Narrow gauge coal/freight railway; or
- Dual gauge coal/freight.

The Project will have a minimum design life of 50 years, and is expected to reach full operational capacity within five to ten years of construction. Attainment of full capacity is dependent on the growth in demand for services from mines and other freight users, as described in Section 1.3.1, and completion of planned upgrades of the Moura Rail System and Port of Gladstone. These projects are proposed independently of this Project, however the timeliness of these projects will facilitate the commercial feasibility of this Project.

Pre-construction activities are scheduled to start mid 2009 with the bulk of the Project construction works commencing in late 2009. Commissioning of the rail line is proposed to take in the order of three months with the track programmed for completion by March 2012.

2.2 Location

The Project is located in central Queensland south west of Gladstone. The alignment travels north from Wandoan approximately 400 km north west of Brisbane, passing to the west of Cracow, and continues to join the Moura Railway System near Banana (see Map 1 – Locality in the Map Folio). The Project is located wholly within the catchment of the Dawson River and intercepts a number of valleys between a series of hills and ridge lines that extend from the western side of the Great Dividing Range. Section 13 of this EIS provides regional and local context and Section 4.5 describes the land uses and infrastructure of the study area.

Volume 3 – Map Folio of the EIS provides aerial photographs and maps that show the precise location of the Project area, and in particular the location of boundaries of land tenures, the proposed construction footprint in relation to property and natural features such as creeks and heritage interest areas.

2.3 Pre-Construction Activities

Due to the scale of the Project and planned timeframes, early construction works are likely to be necessary so that essential infrastructure and services are available prior to major construction works commencing. Pre-construction activities are likely to include:

- The land acquisition process. There are a number of options available to acquire the land necessary for the Project. The process for acquisition is detailed in Section 17.5;
- Obtaining environmental approvals. A matrix of likely approvals is outlined in Table 17-2;
- Vegetation clearing (nature, extent and pre-clearing activities detailed in Section 2.3 and Section 18.6.6).
- Establishment of site access tracks including the potential upgrade, relocation, realignment and deviation of roads and other infrastructure such as communications network (detailed in Section 10);
- Site establishment of workforce accommodation and offices;
- Water reticulation for construction site and construction camp;
- Sewerage treatment plant (STP) and water treatment plant (WTP) infrastructure for construction, operation and maintenance phases (as required); and
- The procurement of major long-lead items (signalling equipment, drainage, ballast and bridge materials).

The timing and exact nature of these early works will depend on discussions between the Proponent, the constructor, Councils and land owners as well as the obtaining of the relevant permits and licenses.

2.4 Construction and Commissioning

2.4.1 Design Parameters

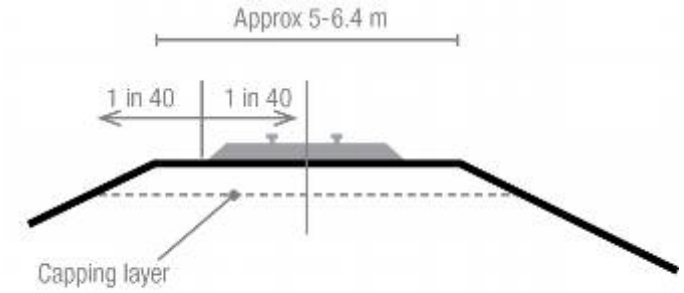
The engineering design of the preferred alignment (Section 1.6.3) is based on a series of agreed design parameters (Table 2-1). These design parameters may change marginally as the design and technical studies progress and there are likely to be some vertical and horizontal changes to the preferred alignment that is presented in this EIS.

Table 2-1: Agreed Design Parameters

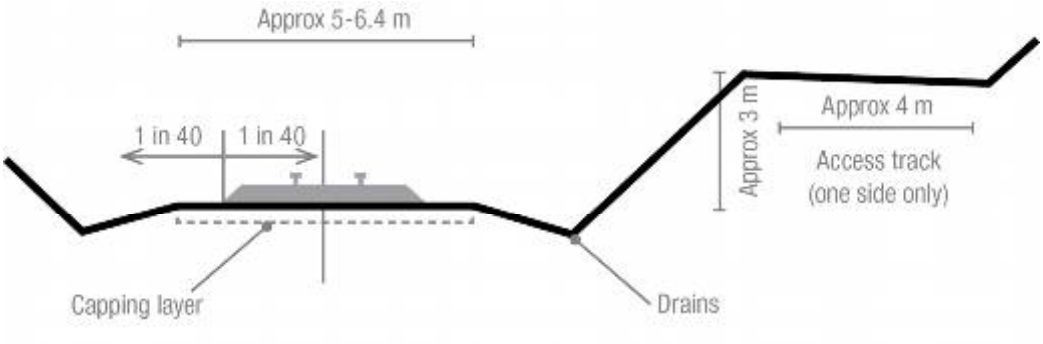
Aspect	Agreed Design Parameter
Design life	50 years
Net tonnage per annum	42 Mtpa Coal; 4 Mtpa Freight
Traction force	Diesel only
Maximum vertical grade	1 in 100 (desirable) 1 in 200 (passing loops)

Aspect	Agreed Design Parameter
Maximum design speed	100 km/h (freight) 80 km/h (coal)
Track length	Continuously welded rail
Rail flood immunity	Bridge structures – 100 year ARI Culvert structures – 100 year ARI
Scour protection	Method situation specific in accordance with Austroads waterways design guide.
Major roads	Grade separated (subject to review)
Minor roads	Public level crossing with active protection (subject to review)
Minimum crossing treatment for private crossings, easements	Occupation crossing (private level crossing with passive protection)
Stock crossings	7.0 m span underpass structure

Indicative cross sections are provided in the following Figures to show the railway profile. Sections showing single track (Figure 2-1) as well as passing loops (Figure 2-2) are included for areas on embankment and in cuttings.



Indicative formation detail in fill



Indicative formation detail in cut

Figure 2-1: Indicative Sections Single Track Construction

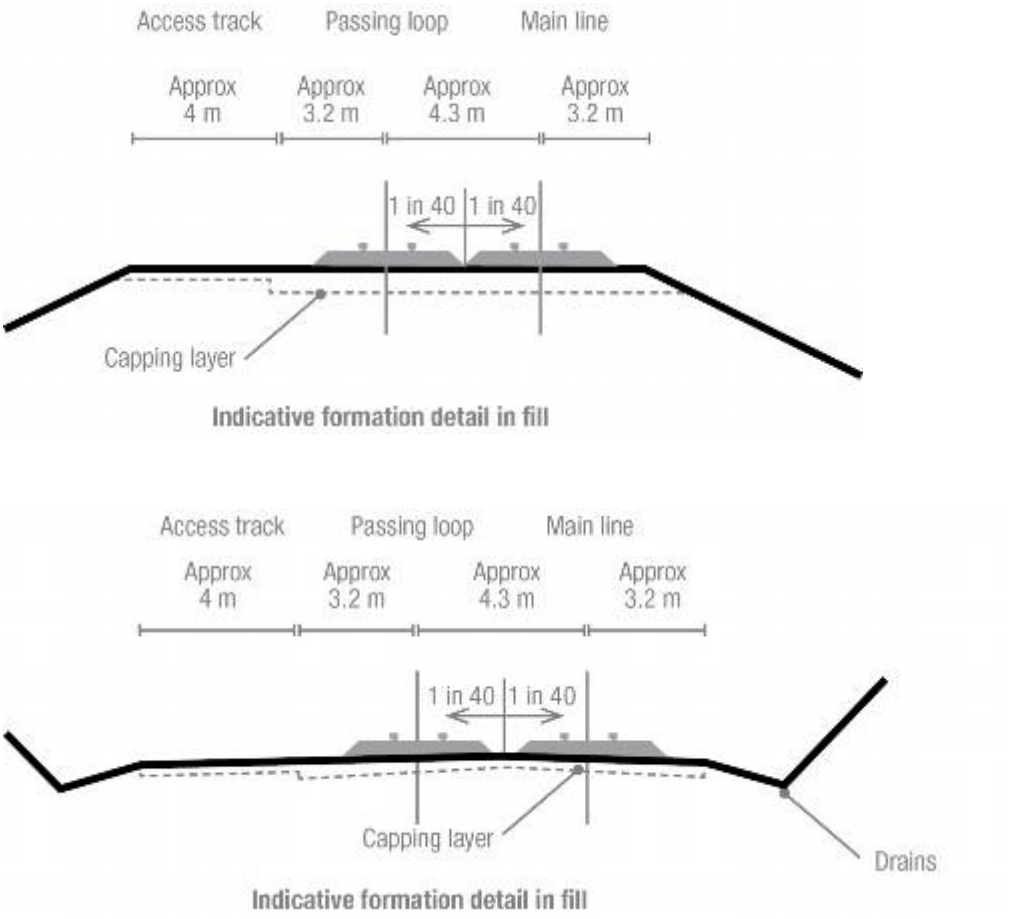


Figure 2-2: Indicative Sections at Passing Loops

2.4.2 Construction Sections

To meet the proposed construction timeframes it is assumed that construction works for the bridges and earthworks will occur in at least four sections simultaneously as shown in Map 3 – Work Sections in the Map Folio and described in Table 2-2.

Table 2-2: Assumed Work Sections

No.	Work Section	Description
1	0-18 km	Wandoan to a point north of Wandoan
2	18-75 km	North of Wandoan to a point south of the Auburn Range outcrop at about the location of the Taroom spur junction
3	75-120 km	Auburn Range crossing section
4	120-210 km	North of Auburn Range to Banana on the existing Moura rail line

Within each of these assumed sections, construction will involve:

- Earthworks (stripping, bulk cut and fill and foundation stabilisation);
- Drainage works (culverts including upstream and downstream protection works);
- Structures (foundations, abutment piers, headstock, deck units); and

- Pavement (capping layer, road reconstructions/diversions).

Continuous construction is assumed for track works, signalling and communications based on one mobilisation from north to south.

The largest bridge structure is the crossing of Downfall Creek, located north of Wandoan (approximate Ch 89000 m) which has been scheduled in its own right and is critical to the overall construction programme. Construction of the Downfall Creek bridge is predicted to take 30 months which puts it on a parallel critical path with the earthworks and track works.

2.4.3 Earthworks

Earthworks will include site set out and pegging, clearing, ground improvement measures and bulk earthworks. The equipment used in these activities will include dozers, excavators, scrapers, pilling machines, rollers, water carts, trucks and similar equipment.

Bulk earthworks refer to the major cut and fill operations and the winning of suitable construction material for use in the railway embankment. The maximum cutting depth is expected to be in the order of 25 m and the height of the fill embankments in isolated sections can be up to 20 m. Alignment optimisation has been undertaken to minimise haulage distances, surplus and shortage of earthwork material. It is anticipated that a total surplus of material will be produced after balancing of the total cut and fill from earthworks. It should also be noted that the length of the proposed works is extensive and balancing of localised earthworks sections along the route will vary. Where it becomes uneconomical for extensive haulage of materials between earthworks sections, alternative sources of materials (including the establishment of local borrow pits) may be required, subject to obtaining all necessary approvals. In a number of areas it may be necessary to spoil material off-site due to excess cut or borrow material for either the construction of the rail formation or road modification works. Table 2-3 outlines the earthworks quantities for the preferred alignment. These earthworks quantities include major road modification works.

Table 2-3: Estimates of Earthworks Quantities Balance

Chainage (km)	Cut to Fill (m^3)	Cut to Spoil (m^3)	Borrow to Fill (m^3)
0-9	928,000	-	-
9-18	345,500	17,000	-
18-75	2,930,500	-	282,000
75-120	3,064,100	737,500	-
120-214	3,098,100	168,000	121,100
Total	**10,366,200**	**922,500**	**403,100**

2.4.4 Embankment Fill

Results from the preliminary geotechnical investigations suggest that the majority of material won from cuts along the railway will be suitable for re-use as general fill within the railway embankments. Some selective placement will be required so that reactive clays and dispersive or erodible soils are contained deeper within the core of the embankments, and select material is reserved for verges and capping. Where individual materials fail to comply with specification requirements then mixing or treatment may be required to ensure conformance.

2.4.5 Outer Verge and Capping Layer

Typically more select materials with lower plasticity and those which are less dispersive are required for embankment verges and the capping layer.

Results from the preliminary geotechnical investigation suggest that suitable verge material could be won from cuts along the preferred alignment with the exception of chainage 0 km to chainage 39 km where the use of flatter fill batters in this section of the route may obviate the need for verge material and may assist in balancing cut and fill volumes.

2.4.6 Ballast

Results of the preliminary geotechnical investigation suggest rock won from cuts near Cracow may be suitable for use as railway ballast, subject to confirmation through further sampling and detailed laboratory analysis. Rock from cuts in other areas along the preferred alignment is mostly sedimentary and therefore unsuitable for use as ballast.

It is considered unlikely that sufficient volumes of ballast will be won from within the proposed cut areas, and as such additional material will need to be sourced from existing commercial quarries or quarries established for the Project. Ballast will be stored on site within the corridor boundaries where possible. Existing commercial quarries at the north end of the Project include Kianga Quarry and Fairview Quarry (both near Banana), and for the south end of the Project, Jimbour Quarry at Dalby and Boral Quarry at Amby. All of these hard rock quarries produce aggregate, road base and ballast material. Additionally, a disused hard rock quarry located near Cracow, may be suitable to provide ballast for the Project. It is likely that existing commercial quarries located at the southern end of the route, Jimbour and Boral Quarries, will be used for structural concrete aggregate.

Geotechnical investigations of potential new borrow areas away from the study area have not yet been carried out, but will be completed as a component of the detailed engineering.

2.4.7 Unsuitable Materials

Parts of the flood plain regions indentified along the creek channels and in low lying areas will be subject to regular flooding during and following heavy or prolonged rainfall and this saturation can have an affect on sub-grade strength. Identified soft clays and saturated loose sands within alluvial deposits will likely be classified as unsuitable material to be beneath fill embankments, requiring excavation and replacement with a suitable fill material.

Reactive clays (including black soil) are susceptible to significant changes in volume as they shrink and swell with seasonal changes in soil moisture content, and may therefore be considered as unsuitable to be beneath and/or within parts of fill embankments. It is anticipated reactive clays (with varying classes of reactivity) will be encountered within parts of the identified alluvial flood plains, and also in some residual soils and extremely weathered rock. Where required material fill to replace reactive clays will be sourced from the site corridor or designated quarries (refer to Section 2.4.6).

2.4.8 Proposed Excavation Methods

Along most of the preferred alignment, excavation will be undertaken with conventional earthmoving equipment. Some areas may require ripping and/or blasting. Further geotechnical investigations are required to determine the extent and likelihood of blasting.

2.4.9 Batters

Cut and fill batter slopes will vary in angle depending on the length of slope and type of material. Slopes will vary in angle from 1V:3H to 2V:1H. Specific stability analysis will be required as the Project progresses to determine the exact batter slopes.

2.4.10 Track

The track structures considered for the Project comprises of 60 kg/m continuously welded rail (CWR) on 26 tonnes axle load (TAL) concrete sleepers to meet the design life of 50 years. A 1 in 100 gradient track alignment has been used and a total of eight passing loops assumed for the Project. The three kilometre loops have been tentatively positioned at the most appropriate vertical and horizontal alignment locations to provide maximum gradients for passing loops of 1:200. The locations are near the following chainage:

- Ch 6000-9000;
- Ch 27200-30200;
- Ch 55000-58000;
- Ch 78500-81800;
- Ch 113400-116400;
- Ch 131400-134400;
- Ch 149000-152000;
- Ch 184500-187500.

For the purpose of the EIS, it has been assumed that pre-welded rail lengths will be used and railed to site via the North Coast and Moura lines. It has also been assumed that mobile batch plants will not be used for the purpose of manufacturing concrete sleepers which will be manufactured in Rockhampton and transported to site.

While the passing loops (and the impacts) have been assessed as part of the EIS, the locations may change during detailed design as the preliminary design is refined in conjunction with train performance and operational capacity modelling activities. An allowance has been made for a refuge siding at two of the passing loops and a turnout allowance has been made for the proposed Wandoan mine spur junction.

2.4.11 Cross Drainage

Preliminary design indicates there will be a total of 47 bridges and 52 major culverts constructed for the Project. Bridge lengths range from 50 to 600 m (required waterway opening), but on average will be approximately 200 m (see Table 2-4 for a selection of bridge openings). A more detailed analysis of bridge openings will be undertaken in subsequent design stages of the Project. Scour protection will be required at a number of culvert and bridge locations. Detailed scour analysis will be undertaken in subsequent stages of this Project in conjunction with 2D hydraulic analysis.

Table 2-4: Rail Bridges

Creek Name	Chainage (Km)	Bridge Length Required (m)
Juandah	11.0	476
Roche	19.3 + 19.8	250 + 250
Bullock	34.8	90
Bungaban	41.9	150
Cockatoo	62.0	500
Cabbage tree	82.3	100
Downfall	90.0	415
Cracow	106.7	100
Delusion	133.4	125
Oxtrack	138.2	75
Boam	155.4	75
Castle	165.3	220
Lonesome	173.4	350
Banana	208.2	350
Orange	122.6	100
Catchment B37	142.6	50

2.4.12 Structures, Bridges and Crossings

Access for local road users and land owners will be maintained throughout Project construction and for the long-term operation of the rail line. To achieve this, a number of road crossings (grade separated and level crossings), stock route crossings and occupation crossings are necessary, along with temporary diversions during construction. At this stage of the Project a number of assumptions have been made to estimate the numbers and types of crossings required. Further work is required during detailed design to determine the appropriate location and structure type, in parallel to consultation with individual property owners, State and Council authorities. The details and location of occupation crossings will be negotiated on a case-by-case basis with individual landholders.

Structures will be designed for maximum off-site fabrication. Construction of concrete rail bridges will include pile driving and construction of in situ concrete piers and headstocks. Precast concrete girders will be used to form the bridge superstructure. It is envisaged that all materials for concrete bridge structures will be delivered by road.

The largest and most significant rail bridge is the crossing of Downfall Creek. This bridge is estimated to be 415 m in length and up to 50 m above the creek floor. Preliminary bridge design has adopted 65 m steel truss spans. The piers and headstocks will be constructed in situ at the Downfall Creek construction site. As such, it has been assumed for the EIS that a concrete batching plant may be required within works section 3 at Downfall Creek.

Road crossings will be designed in accordance with the DMR 'Road Planning and Design Manual' and specifications agreed with DMR and local councils in accordance with relevant safety standards (see Section 10). All crossings will have adequate sight distances plus relevant signage and signalling. Details on track safety are addressed in Section 15.

Where the railway crosses Stock Routes, grade separated structures will be installed (see Figure 2-3, Figure 2-4 and Figure 2-5). The design and location of these structures will be finalised in consultation with the Department of Natural Resources and Water's (DNRW) Stock Route Management Group.

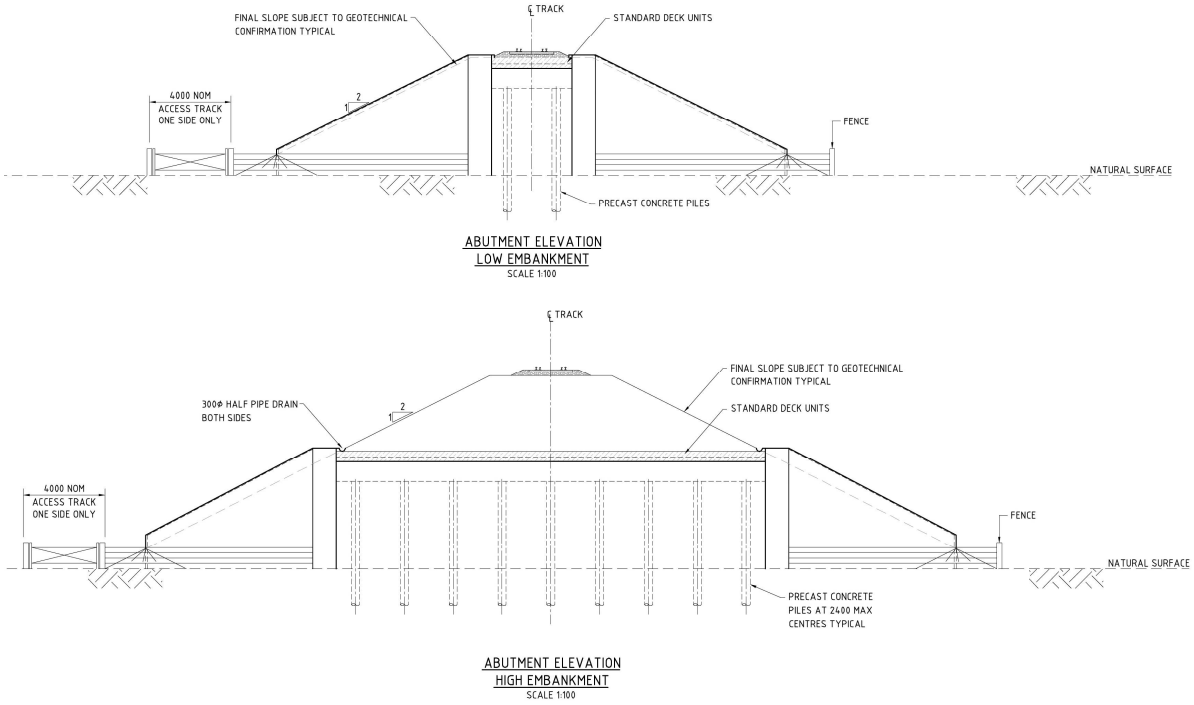


Figure 2-3: Indicative Stock Crossing Cross Section

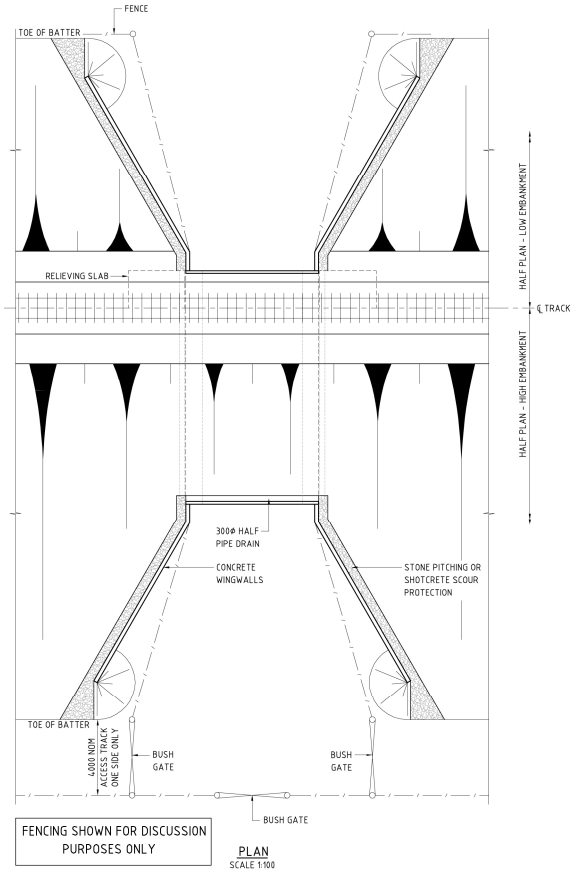


Figure 2-4: Indicative 7 m Stock Underpass. Type A Abutment Details

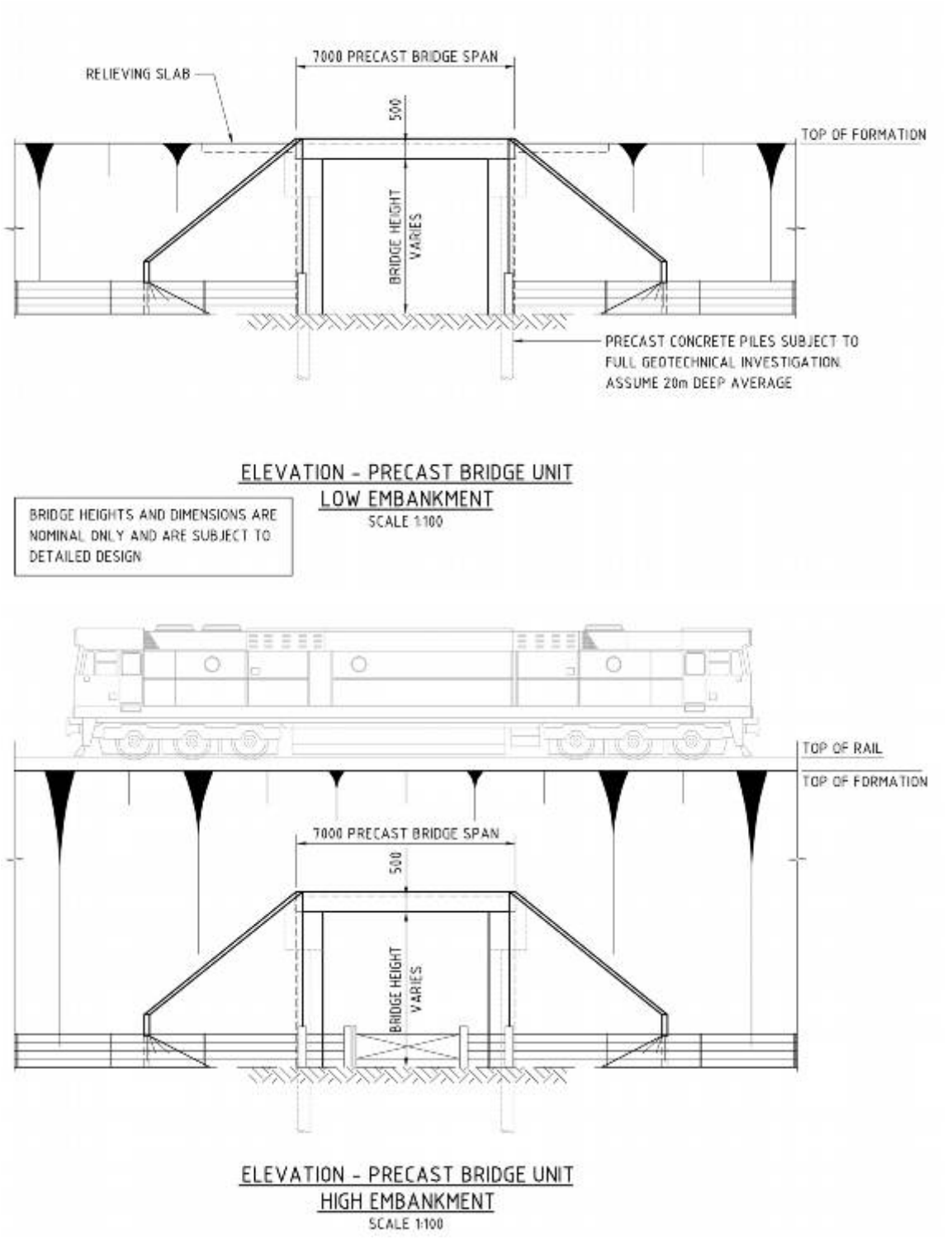


Figure 2-5: Indicative 7 m Stock Underpass. Type A General Alignment

2.4.13 Signalling

The installation of signalling and communications equipment will occur simultaneously with the track works. The current proposal is for Remote Control Signalling (RCS) to be installed. This will require the installation of colour light signals at passing loops to control train movements. There will be eight signals at each loop (a distant, a home and two starting signals at each end). Where the railway crosses public roads, active protection will be provided by flashing lights. Within the passing loops and at level crossings, track circuits will be used for train detection.

2.4.14 Telecommunications

Telecommunication services are required to provide the facility for communications from:

- Train to control (voice);
- Control to interlocking (non-vital data);
- Interlocking to interlocking (vital data);
- Control to mine (voice);
- Wayside equipment to train (non-vital data and voice recording); and
- Wayside equipment to control (non-vital data).

Based on preliminary desktop surveys of the likely radio communication links, it has been assumed that a number of new radio repeater sites will be required.

The radio repeater sites may include a number of green field sites, established for the Project, comprising a small building, access roads (where required) with a radio mast (typically 10-20 m high), radio antennas, modular radio equipment, 240 Vac power feed to this building from local power utility with solar power/batteries backup system. The exact location of these sites has not been determined at this stage and may be subject to separate environmental assessment and approvals as discussed in Section 17.

2.4.15 Power Supply

A power supply is required for all signalling, telecommunication, train control and wayside equipment.

An initial study has confirmed power should be taken from an electricity service provider at each proposed passing loop. Diesel/alternator sets at each loop will guarantee supply. Power from an electricity service provider is also assumed for radio repeater sites, with solar panels and batteries as backup, and at each level crossing. Wayside equipment (Dragging Equipment Detectors, Hot Boxes, etc.) will be solar/battery powered.

Each generator installation is assumed to include an above-ground diesel storage tank with appropriate containment constructed in accordance with relevant environmental legislation. Fuel level monitoring will form part of the trackside signalling and asset management systems so that at certain trigger levels (50%) low fuel levels will be automatically notified to the control facility.

Delivery of all signalling and communications equipment during construction will be by road.

2.4.16 Fencing

The multi-user corridor will be fenced along the entire length. It is proposed that fencing be of the standard shown in Figure 2-6, however alternatives will be considered depending on material

availability and the land use for the adjoining property. Maintenance of fences along the railway will be the responsibility of the Rail Manager.

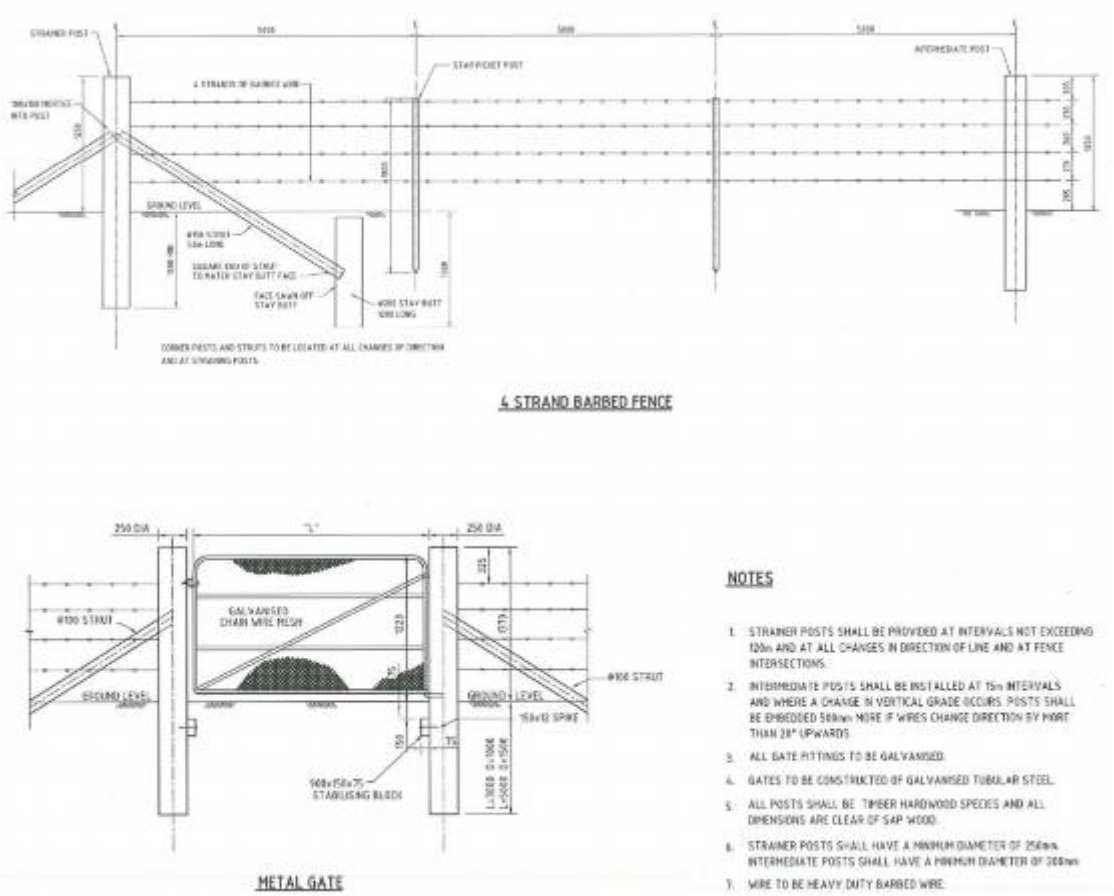


Figure 2-6: Indicative Fencing

2.4.17 Commissioning

It is assumed that once all construction activities are completed, commissioning will occur progressively across the entire Project as a single activity. Commissioning tasks will involve testing the track and signalling systems to ensure safe operation and reliability. Minimal environmental or community impacts are envisaged during commissioning.

2.5 Operation and Maintenance

2.5.1 Operating Parameters

Based on design, train performance and traffic modelling studies undertaken to date, the following operating parameters have been assumed for the purposes of this EIS.

Type of Trains

Initially, all trains will be diesel hauled trains. Initially coal trains are likely to have the same configuration as those used on the Blackwater line comprising 86 wagons, carrying 7,224 t net and be approximately 1,600 m in length. As coal demand increases trains that are 1.5 times the length of Blackwater trains (approximately 2,400 m long), comprising 136 wagons and carrying 11,480 t net, may be introduced.

Freight trains are anticipated to be standard interstate single stack container configuration approximately 1,800 m in length.

Train Number, Speeds and Travel Times

The number of trains capable of running on the railway will ultimately depend on: the final grades and preferred alignment, the type of trains, traffic volumes on connecting railways, and loading and unloading times. It is anticipated that the majority of initial demand for the railway will come from the proposed Wandoan Mine Project. The output from the mine is likely to reach capacity after five to ten years of operation. The construction timeframes associated with other proposed mines are unknown at this stage, but are likely to take longer than the Wandoan mine.

A series of operational performance criteria were developed in collaboration with the Proponent as the basis for developing preliminary alignments and infrastructure requirements during Stage 2 Feasibility. These criteria assumed 42 Mtpa (20 Mtpa from Wandoan Mine, 15 Mtpa from mines south of Wandoan, 7 Mtpa from mines along the preferred alignment in the vicinity of Taroom).

Trains will have a maximum speed of 80 km/h for coal and 100 km/h for freight, with assumed average speeds of approximately 61 km/h for 2,400 m long loaded coal trains, 79 km/hr for unloaded 2,400 m long coal trains and approximately 70 km/h for freight trains.

Based on these tonnages and the assumed operational parameters described above for train types, number and speed, preliminary operational train performance and capacity modelling demonstrates that the railway will ultimately support about 24 train movements per day. This comprises 22 coal train movements and two freight train movements. Trains are expected to operate 24 hours a day 320-340 days a year.

2.5.2 Maintenance

A maintenance track will run the full length of the railway adjacent to the rail line and within the fenced rail corridor. Maintenance gangs will carry out general ongoing maintenance activities of clearing, drainage, repairing fencing, assisting in track and bridge inspections, monitoring grease points, maintaining earthworks, vegetation control and weed management.

Signalling and communication maintenance will be undertaken for at-grade signalised crossings as part of their general duties. Regular track inspections will occur throughout the year.

Personnel engaged by the Rail Manager to undertake maintenance work will require appropriate accreditation and licensing.

The requirements for the following support facilities will need to be reviewed in more detail with the rail operator:

- Crew change facilities;
- Infrastructure maintenance facilities and sidings;
- Locomotive servicing and provisioning facilities; and
- Operating protocols.

2.6 Rehabilitation and Decommissioning

2.6.1 Rehabilitation of Construction Site

The construction camps and all associated buildings and service infrastructure along with temporary access tracks will be removed and the site rehabilitated following completion of the construction works. Rehabilitation will require the demobilisation of all temporary construction features such as lay-down areas, concrete batching plants, sheds, fuel stores and environmental controls such as temporary drainage, erosion and sedimentation structures. This process will be managed in accordance with a site rehabilitation plan and environmental management plan. Where feasible, opportunities for rehabilitative landscaping will be identified. In the decommissioning process items and features with legacy value will be assessed and may be donated to the local community.

2.6.2 Decommissioning of the Railway Line

The design life of the railway is a minimum of 50 years. When decommissioning does occur, detailed strategies will be developed to ensure it occurs in accordance with standards applicable at that time. It is reasonable to anticipate that environmental requirements for decommissioning will be no less stringent than current standards. It can be assumed that the goals in decommissioning will be to leave the site in a permanently safe condition and to optimise resource recovery from the infrastructure. The extent to which the rail line is dismantled will be defined by the necessity to achieve a safe environment in a timely and cost-effective manner in accordance with the proposed change of use.

2.7 Workforce and Accommodation

2.7.1 Construction Workforce Requirements

A workforce of approximately 1000 people has been assumed for the construction of the proposed rail. For the purposes of estimating impacts, a higher peak construction workforce of 1350 people has been assumed based on the capacity of the three construction camps (see Section 2.7.3). The assumed construction workforce of 1000 people is derived from preliminary calculations of the people weeks required to carry out the relevant activities shown in Table 2-5 and are based on the following assumptions:

- 33 month construction timeframe (6 months early works, 24 months main construction and 3 months commissioning);
- 20 productive days a month;
- All the labour is based in the proposed construction work camps (refer Section 2.7.3; and
- 450 persons camp capacity at each of the three assumed construction camps.

Table 2-5: Estimated Construction Workforce (People Weeks)

Activity	People Weeks
Bulk earthworks	8,950
Pavement	3,898
Clear vegetation and stockpile	974
Landscaping and topsoil	1,636
Mobilisation of plant	234
Fencing	974

Activity	People Weeks
Demobilisation of plant	182
Cultural heritage	400
Downfall Creek Bridge	1,600
Bridges and stock crossings	4,664
Drainage works	4,267
Trackwork	1,344
Supervision and field engineering	4,544
Admin/management/client inspection	4,644
Camp operation personnel	2,752
Mechanical workshop	2,064
Quarry operations	1,000
Concrete batch plants and testing labs	3,405
Subtotal	**47,532**
20% for wet weather and ancillary works	9,506
People Weeks Total	**57,038**

Figure 2-7 depicts the assumed construction workforce in Person Weeks for each of the 33 months of the Construction Phase. Deployment for the workforce will initially involve a number of small work gangs undertaking the early construction works as described in Section 2.3. Once early works are completed, it has been assumed that construction works will commence on four work-fronts and on the construction of Downfall Creek Bridge. This means that demand for construction workers will increase sharply at the start of the main construction activities.

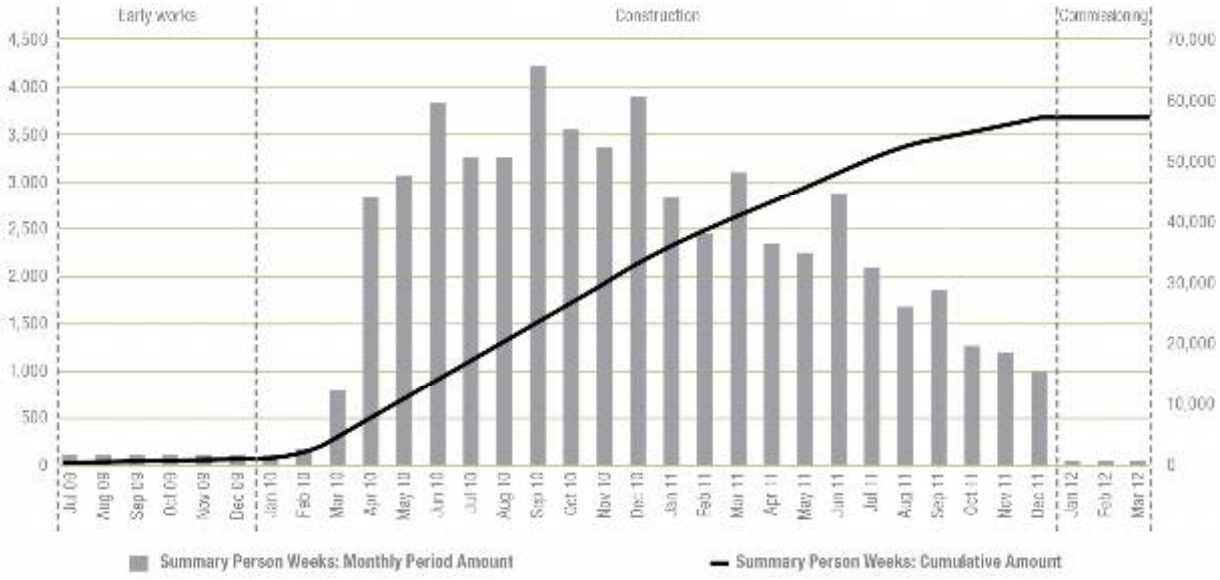


Figure 2-7: Construction Phase Workforce Schedule

Employment opportunities exist throughout the construction period for professional, skilled and semi-skilled labour. Due to the current skill shortages within the region, it has been assumed that only 10% of the required workforce will be sourced locally (refer to Section 14.3). As a positive

legacy of the Project, new skills and suitable training opportunities will be identified through liaison between the Proponent and local employment agencies and training providers. It is however the responsibility of the construction contractor to ensure that suitably skilled personnel are employed for the Project.

2.7.2 Operation Workforce Requirements

The workforce required during the operation of the Project broadly fits into two categories:

- Personnel required for the operation of the trains; and
- Personnel required to maintain the service and infrastructure.

An estimated 44 train drivers will be required for the operation of the SBR Project. This is based on a requirement for two drivers per train and an assumed 22 coal train movements per day. A number of general freight train drivers will also be required. However, freight train movements are likely to be low initially, increasing as the level of service and number of general freight train movements increases.

A small number of support and maintenance workers will be required for the operational phase of the Project. The support and maintenance workforce is likely to be sourced from local communities and can be assumed to be relatively stable throughout the life of the Project.

2.7.3 Temporary Accommodation

Accommodation will be required for the construction workforce for the assumed 33 month Construction Phase as described at Section 2.7.1.

A construction phase accommodation strategy has been developed on the basis of two assumptions:

- The preferred contractors will wish to import most construction workers from outside the region; due to the availability of sufficient workforce resources from within local communities and existing workforces available to the contractors responsible for the construction of the Project; and
- Due to the distances between the existing communities (Wandoan, Taroom, Theodore and Banana) and the construction work-fronts, it has been assumed that it is less feasible to integrate the construction workforce into the existing urban communities and more desirable for the construction camps to be located close to the work-fronts.

As a result and for the purposes of this EIS, it has been assumed that three temporary construction camps, each with the potential to house approximately 450 construction workers, will be provided to meet the housing needs of single and accompanied construction workers. A capacity of 450 people per construction camp has been allowed for in order to account for any imbalance of work and casual accommodation. It is highly unlikely that all three construction camps will be at capacity at any one time, however, for a conservative assessment of potential social impacts associated with the Project, it has been assumed that the peak construction workforce for the Project is the equivalent of 450 workers at each of the three construction camps, or a total of 1350 people (see Section13).

For the purposes of this EIS, three locations have been identified for the construction camps:

- The intersection of Defence Road and Castle Creek Road;
- Nathan Road at Pigeon Creek; and
- Nathan Road at Bungaban, Twelve Mile Road.

Locations for the construction camps are shown in Map 4 – Indicative Construction Camp Locations in the Map Folio.

It should be noted that the provision of the construction accommodation is the responsibility of the contractors for the Project, and it is probable that the contractors may prefer different accommodation arrangements. This may impact on:

- Site locations for any temporary construction phase accommodation;
- The size and number of construction camps; and
- Other local arrangements, such as the use of existing or other purpose built facilities, that may form part of the accommodation strategy.

Issues associated with alternative accommodation strategies will need to be addressed prior to the start of the Construction Phase. Approvals for the construction camps may be obtained as part of the rail corridor approval. Alternatively, separate development applications may be required to the respective local government. A number of environmental issues requiring a license and other approvals will also need to be addressed. Further detail on the necessary project approvals is contained in Section 17.4.

In providing any temporary accommodation, a range of land use, local amenity and environmental issues will need to be adequately addressed to ensure satisfactory outcomes. This is likely to include a discussion of appropriate separation distances between the proposed facility and existing or proposed urban or residential land uses. Issues that will need to be considered include:

- Site access arrangements including the standard and suitability of the local road network for the increase in construction workforce traffic;
- Potential amenity impacts of the proposed facility on adjoining land uses, including noise and safety impacts on the local road network, the impact of noise and lights from on-site facilities (such as on-site car-parking, outdoor wet and recreation areas and indoor communal areas and the potential for odour from bin storage and sewage treatment areas) that may detrimentally impact on the amenity of surrounding residents and other sensitive land uses.
- Potential environmental impacts including proposed sewage treatment and disposal (see discussion at Section 2.8.4).

These issues are relevant regardless of the number and location of construction camps.

2.7.4 Construction Camp Facilities

For the purposes of this EIS, it has been assumed that the three proposed construction camps will be of similar size and built to current industry standards.

The camps will consist of a central shared facility, with bunkhouse accommodation incorporating sleeping space, showers and toilets, and personal storage for workers in self-contained facilities. The buildings and infrastructure at the construction camps will be constructed using conventional demountable components sited on blocks with covered walkways. It is anticipated that there will be one major site office located adjacent to each camp, which will act as a logistics base and storage depot for materials, equipment and earthmoving vehicles with an attached workshop area. The site office will house day-to-day workforce activities (e.g. catering, washroom and toilets). The construction camp will also contain the following facilities:

- Kitchen and dining room;
- Enclosed food storage (including cold storage), preparation and service areas;

- Laundry facilities;
- Site medical facilities (refer to Section 15 for details on Emergency Response Procedures);
- 24 hour 7 days a week site security;
- Recreation centre including gymnasium equipment;
- Communications room;
- Fuel, chemical and waste storage;
- Maintenance workshop;
- Vehicle wash down area for weed management;
- Temporary storage for domestic waste and recycling collection; and
- Onsite sewage treatment plant (refer to Section 2.8.4).

Installation and operation of the accommodation camps and site offices will require, but is not limited to:

- Geotechnical report for each site;
- Creation of clear, level, compacted and easily accessible sites;
- Installation of buildings, landings, stairs, handrails, covered walkways, breezeways and concrete paths;
- Reticulation for power, potable water and sewerage;
- Surface and stormwater drainage;
- Dust suppression;
- Pest control by a licensed operator for vector and vermin control; and
- Boundary fencing with appropriate security and access

2.7.5 Operational Accommodation

It has been assumed that most coal train operation crews that are likely to be attracted to the Project, will either currently be located in Gladstone or will relocate to either destination for the SBR Project; that is either Gladstone or Wandoan. For the purposes of this EIS it has been assumed that most will be accommodated in Gladstone. As a result there will be little demand for accommodation within the local communities as a direct result of the operational workforce for the Project.

It is considered that there may be a requirement for overnight accommodation for coal-train operation crews. Initially this would suggest a requirement for overnight accommodation near the Wandoan Coal Mine. This will be hotel-style accommodation and will be available only to the operation crews. Crews will stay between shifts then make the return trip to Gladstone. Several staff will be required to permanently operate the facility.

Further details of the accommodation of permanent workforce is provided in Section 13.4.6.

2.8 Associated Infrastructure Requirements

2.8.1 Transport

Both State controlled and local roads will be used as haul roads for construction materials, plant and equipment. The likely routes are shown on Map 27 – Local Road Network in the Map Folio. With the exception of Nathan Gorge Road (gravel), all proposed major delivery routes are sealed roads. The bulk volumes of construction materials that require road haulage relate to structures, drainage,

roadworks, fencing and sleepers for track works. A percentage of these trips will typically involve over-dimension (long) loads. Temporary infrastructures, such as accommodation units also require road haulage.

The existing rail infrastructure will be utilised to transport certain materials to site. For the purpose of this EIS it has been assumed that rail and ballast for track works will be transported via rail to site, thereby reducing the potential impacts on the existing road network.

Full details of transport volumes, modes and routes are provided in Section 10.

The preferred alignment requires a total of 140 crossings including state-controlled roads, Council roads, Stock Route crossings and private occupation crossings. The design of these crossings will be in accordance with the relevant DMR or Council safety standards and in consultation with affected stakeholders.

A small number of temporary and permanent road diversions are proposed, as described in Section 10.4.5. Temporary localised road closures may be required during the construction phase; for which temporary diversions will be provided. A permanent maintenance service road adjacent to the rail line will be constructed. This service road is to be used initially as a construction access track and then by maintenance vehicles for works on the rail infrastructure. Temporary access for vehicles delivering materials, equipment and workforce will be required from local roads to the actual construction site. Written agreements will be required with property owners to accommodate the construction access requirements through private property

2.8.2 Water Supply and Storage

Water demands for the Project require different water quality standards: potable water fit for human consumption and both medium and low quality raw water suitable for construction. The criteria for each water quality and legislative requirements surrounding its use are detailed in Section 6.

Water demand estimates have been generated and are shown in Table 2-6. From this table it is evident that the water requirements for the Project are between 6,250 ML and 9,600 ML for the 33 month Construction Phase. A contingency has been included in these estimates as demand will be affected by environmental conditions such as rainfall and evaporation rates experienced during the construction period, and also the adopted construction methodology and programme.

Table 2-6: Estimate of Water Requirements

Description	Min Water Required (ML)	Max Water Required (ML)
Bulk Earthworks	2,700	3,290
Concrete	10	18
Pavement	160	250
Dust Suppression	3,200	4,300
Miscellaneous	130	130
Construction Camps	50	80
Subtotal	**6,250**	**8,100**
Contingency	-	1,500
Total	**6,250**	**9,600**

Potable water will be obtained from the local government water reticulation network. Potable water will be transported by road from the source to the construction camps as described in Section 6.

The proposed source of raw water (medium and low quality) is yet to be determined. At this stage of the Project, two main potential water sources have been identified:

- Groundwater – to include artesian, sub-artesian and coal seam gas water; and/or
- Surface water – to include watercourses, springs and overland flow.

Assessments of impacts, feasibility assessments and water quality of both these options are discussed in Section 6 and will be used to determine appropriate water supplies for the Project. The necessary permitting requirements under the *Water Act 2000* will be assessed and acquired as appropriate. Details of Project approvals are set out in Section 17.

Discussions with the DNRW indicated that as part of the approvals process, detailed groundwater impact assessment studies will need to be undertaken once the water demands and sources of raw water have been confirmed.

Where it is feasible, recycling of water will be implemented to reduce the total load on the water supply. Demand estimates will be reviewed during detailed design and the opportunities to optimise the use of recycled water will be investigated.

2.8.3 Stormwater

Stormwater drainage systems will generally be required for:

- Access track and rail line within the multi-user corridor;
- Construction camp and site office facilities; and
- Maintenance buildings.

Stormwater runoff from the proposed rail will use natural drainage and treatment measures, constructed and maintained in accordance with the current version of *Soil Erosion and Sediment Control Guidelines for Queensland Construction Sites* (1996). Stormwater from buildings within the construction camps will be collected and stored for reuse within the sites. Details of stormwater management are discussed in further detail in Section 6 and Section 9.

2.8.4 Sewerage Treatment

The construction camps will incorporate a package sewage treatment plant to cater for the construction workforce. The treatment plants will each have a capacity of 450 equivalent persons. After treatment, the effluent will be irrigated via sprinklers in specially designated areas at least 500 m from the accommodation camps or other residential land use. These areas will be signposted and fenced to exclude the entry of stock and any unauthorised personnel. Consultation with the relevant government agencies and landowners will be required to facilitate the environmental approvals and contract management for this activity.

2.8.5 Electricity and Communications

Electricity supply demand will be met by either:

- New or upgraded transmission line from a local source; and/or
- Supply and operation of a stand alone diesel generator at each camp.

Consideration will be given to opportunities to maximise energy efficiency throughout the construction camps based on the principles of reduced energy consumption through building orientation, material selection, high efficiency lighting and appliances, solar hot water systems and the promotion of a healthy indoor environment through natural air movement.

Telecommunication services will be provided to each construction camp and will include a telephone system with facsimile support, a number of satellite phones, internet access and radio.

2.8.6 Service Relocations

A preliminary desktop study has identified various Telstra and Ergon Energy cables and transmission lines within the multi-user corridor. The precise location and extent of required infrastructure relocation will be defined during detailed design and an appropriate management process agreed with the service providers. At this stage no major service relocations are anticipated.

2.8.7 Waste Management

The Project will generate a range of solid, liquid and gaseous wastes, including regulated wastes during construction and operation phases. The following construction activities are anticipated to be the principal waste generators:

- Operation of the construction camps;
- Construction site sanitary facilities;
- Plant and equipment maintenance;
- Concrete batch plant operation (bridges);
- Road and rail construction;
- Concreting activities;
- General construction waste; and
- Decommissioning of construction sites.

Appropriate waste management strategies will be developed in consultation with the relevant local government. Any strategy must include an objective of maximising the recycling of waste and disposing of the remainder to appropriate facilities. Details of waste generation and management are addressed in Section 9.