3 Project description

3.1 Introduction

The Project is to construct and operate an open cut coal mine and associated infrastructure. This will enable extraction and processing of raw coal, and transport 12 Mtpa of product coal by rail to four of the six large coal-fired power stations operating in NSW.

3.2 Overview

The Project's customers will be Macquarie Generation (Bayswater and Liddell power stations), Origin Energy (Eraring Power Station) and Delta Electricity (Vales Point power station). In addition, some coal may be transported to the Port of Newcastle for export. Coal will not be transported to Mt Piper or Wallerawang power stations.

The Project will include:

- an open cut mine;
- a coal handling and preparation plant (CHPP);
- a train loading facility and rail spur;
- a locomotive provisioning facility (subject to ARTC requirements);
- a mine infrastructure area; and
- supporting infrastructure including: access roads; water supply and storage; and electricity supply.

An indicative Project layout is provided in Figure 1.2 and a summary of its main aspects is given in Table 3.1.

Table 3.1 Project summary

Aspect	Description
Proponent	Cobbora Holding Company (CHC) Pty Limited. CHC's coal customers are Delta Electricity (Vales Point power station only), Macquarie Generation and Origin Energy.
Project life	The mine life is 21 years.
Project schedule	Project construction will take about 2.5 years from the last quarter of 2013 to the second quarter of 2016. Product coal delivery will begin in mid-2015 and is scheduled to continue until 2036.
Mine	Mining will occur in three areas covering some 3,950 ha and incorporating multiple mining faces that will be developed progressively.
Resource and ROM coal production	The JORC-compliant coal resource to be mined is 440 Mt (measured), 305 Mt (indicated) and 700 Mt (inferred), as at 30 April 2012. Run of mine (ROM) coal will be extracted at a rate of up to some 20 Mtpa.

Table 3.1 Project summary *(Cont'd)*

Aspect	Description
Waste rock	So the mining pits can be established, excavated waste rock will be initially placed in out-of-pit emplacements, which will also form environmental bunds. Once the pits are established, material will primarily be placed in open cut mine voids so as to minimise out-of-pit emplacement.
Mine waste	Maximum waste rock thickness is 75 m, minimum 0.3 m.
Coal handling and preparation plant	Saleable product will be coal that has been beneficiated (cleaned) via dense medium separation and possibly some unprocessed bypass coal. ROM coal will be processed to produce up to 12 Mtpa of product coal.
Coarse rejects and tailings	Coarse rejects will be emplaced with waste rock; tailings will be pumped to rejects emplacements in the mine footprint.
Rail spur and balloon loop	Coal will be loaded onto trains at a dedicated rail spur and balloon loop. A 28 km rail spur and balloon loop will link the coal loading facility to the Dunedoo–Gulgong Railway at Tallawang.
Locomotive provisioning facility	A locomotive provisioning facility, owned and operated by a third party, will be built subject to ARTC requirements, along the rail spur on land CHC owns.
Water demand, supply and disposal	Water demand will be up to 3,700 ML per year, largely for process water in the CHPP and dust suppression. The main water sources will be harvested surface water and water collected in the mine. Where required, the Project will use up to 3,310 ML of water per year from the Cudgegong River, as allocated under the Project's high security Water Access Licences. Water from the Cudgegong River will be delivered by a 26 km long pipeline from a pumping station 5 km south of Mebul to the site's raw water dam. Water management will focus on separating clean water, overburden water (runoff from disturbed mining areas), infrastructure water (runoff from infrastructure areas), pit water (water from the base of the pit) and process water. Clean water will be diverted around disturbed areas; overburden water will be used on site (although some may be displaced from sedimentation dams into creeks if water quality criteria are met); infrastructure water will go to the process water circuit; and pit water and process water will be re-used. Pit water and process water will not be discharged off-site.
Mine access	The mine will be accessed via a diversion of Spring Ridge Road off the Golden Highway. All Project-related heavy vehicles and the majority of Project-related light vehicles will access Spring Ridge Road from the Golden Highway.
Employment	The average construction workforce is projected to be about 350 people, peaking at about 550. The operations workforce is projected to be about 300 in 2016 and 2017, increasing to peak at about 590 people between 2027 and 2030.
Operations hours	Mining operations will occur 24 hours a day, seven days a week.
Rehabilitation	Mine rehabilitation will be progressive.
Decommissioning and closure	The final landform will be developed to be consistent with the surrounding topography and land use (ie a mix of agricultural land and woodland). Two of the three mining areas will be back-filled to above the final water table. A void and lake will be left in the third mining area. Mine infrastructure generally will be removed and the areas rehabilitated at the end of mining operations, although some infrastructure (eg the water supply pipeline) may, in agreement with landholders and regulatory agencies, be left to provide additional water to local users.

3.3 Coal resource

Coal will be extracted primarily from the Flybowers Creek Seam, the Ulan Upper Seam and the Ulan Lower Seam. About 390 Mt will be extracted at a rate of up to approximately 20 Mtpa over the 21 year life of the mine.

ROM coal will be beneficiated (cleaned) to produce a coal with an ash content of around 24%, which is suitable for use in coal-fired power stations in NSW. Coal properties are summarised in Table 3.2. Some ROM coal may be washed to produce coal for spot sales, most likely to the Project's existing customers or for export.

Table 3.2 Typical product coal characteristics

Coal property	Range	Typical value
Moisture content (%)	8 to 11	10
Gross calorific value (as received) (MJ/kg)	21 to 24	21.5
Carbon (dry ash free)	35.3 to 36.7	35.7
Ash (as received)	22 to 26	24

3.4 Mine layout

The pits and out-of-pit waste rock emplacements have been designed for the most efficient extraction of coal while avoiding or minimising adverse impacts on features such as creeks and ecologically important vegetation. The mine will be divided into three mining areas: A, B and C (Figure 3.1). The main infrastructure area (MIA) and coal handling and preparation plant will be located centrally to the three mining areas. The factors considered in the mine's layout, including the use of three mining areas, are described below.

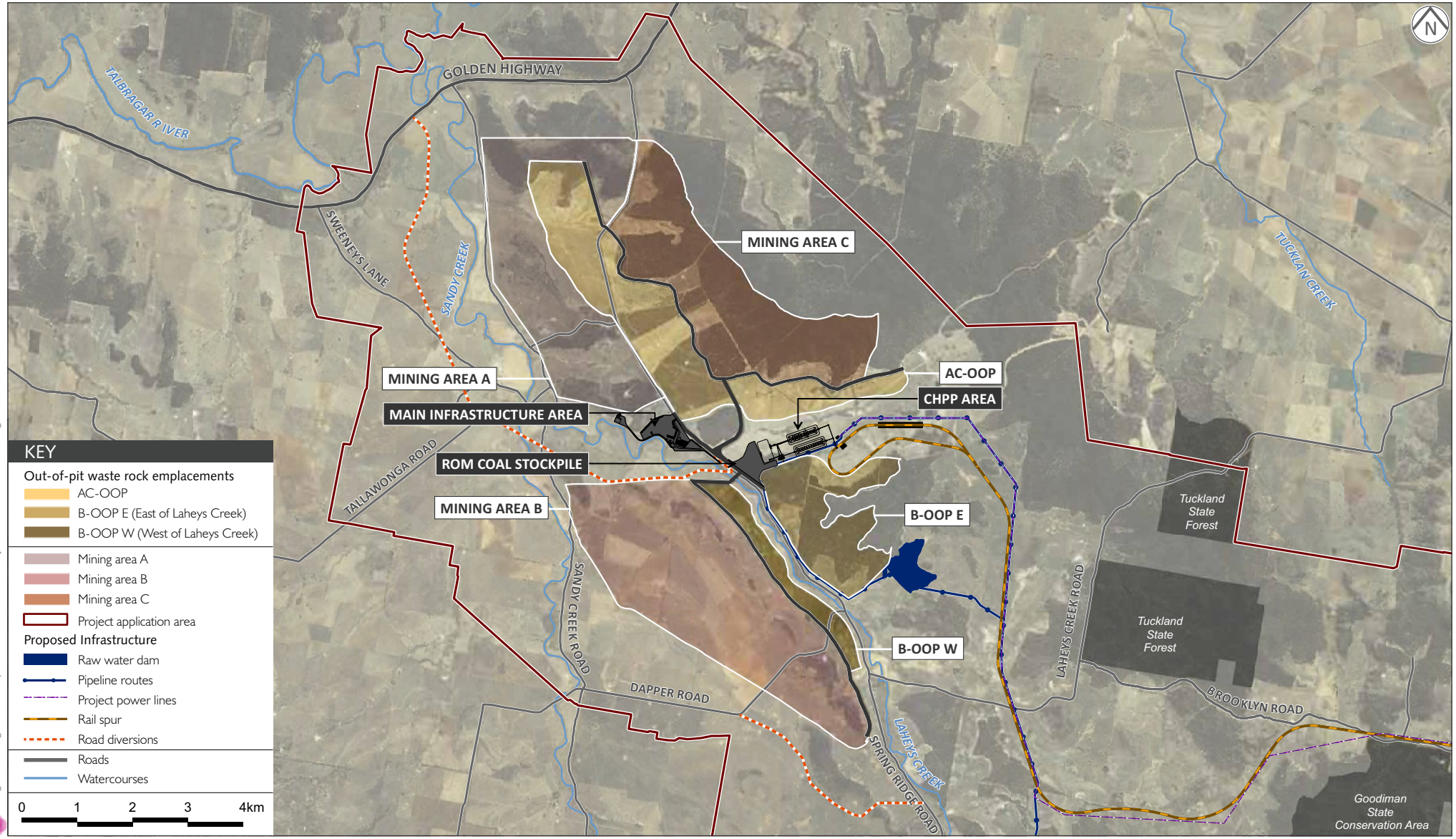
3.4.1 Product coal specifications

The Cobbora coal resource is at the very southern extent of the Gunnedah Basin and has been subject to a range of geological processes (see Section 2.2 'Geology'). As a result, the quality of the coal is variable, with ash (non-combustible material) content generally varying between 25 and 45% and the energy content varying between 19 and 30 MJ/kg.

The quality of the beneficiated product coal will need to be within narrow quality parameters as contracted with the Project's customers. This will be achieved by blending coal of different qualities from different parts of the same seam or from different seams that are simultaneously exposed. To access this range of coal, mining in different areas is necessary.

3.4.2 Production rate

The coal production rate is determined by the rates of coal extraction and beneficiation. For the given mining equipment fleet, the extraction rate is largely dependent on the strip ratio. The strip ratio is the amount of waste rock that needs to be removed before coal can be extracted and is expressed as the ratio of waste rock to coal. For the Project after Year 1, the annual strip ratio typically varies between 2:1 and 3:1 (waste rock [bcm]:ROM coal [Mt]) but can range between 1:1 and 7:1. The beneficiation rate is mainly determined by the coal's ash content and it too varies across the seams to be mined. Thus, to achieve a consistent production rate and meet contractual requirements mining in areas with different strip ratios and coal ash contents is necessary.



Integrated Design Solutions | 030518 Cobbora Coal Project - EA F3-1 Rev A - 23 August 2012

EMM

Cobbora Holding Company Pty Limited

Mine Operations and Infrastructure Areas

Cobbora Coal Project - Environmental Assessment

Figure 3.1

3.4.3 Requirement for multiple mining areas

Coal needs to be simultaneously extracted from multiple locations to meet product coal specifications and to allow a steady rate of coal production. These requirements can only be achieved by operating the three mining areas simultaneously.

These mining areas are defined by the location of the coal. Mining areas A and C are generally separated by a zone with no coal and which will be used for the waste rock out-of-pit emplacements. This forms the inverted U-shape of mining areas A and C (Figure 3.1). Mining area B is separated from mining area A by Laheys Creek that will not be mined to avoid significant impacts associated with diverting this creek.

3.4.4 Mining efficiency

In addition to allowing the Project to deliver coal of the required quality and rate, mining three areas will allow the Project to operate efficiently through the following:

- minimisation of haul distances and any need for double handling of waste rock and coal because of the centrally located main mine infrastructure and CHPP;
- efficient scheduling of the use of mining equipment, allowing specialised pieces of equipment to be moved around the mine rather than waiting until it is next required (as occurs in mines with a single mining area);
- rapid horizontal development of the mine that could not occur without multiple mining areas. This is because the average depth of coal is relatively shallow, approximately 45 m below the ground surface, and the steps that precede coal extraction including clearing, haul road development, drilling, blasting and waste extraction could not occur at a sufficient rate to allow coal production rates to be achieved if there was only one or two mining areas;
- efficient arrangement of the working area in each mining area to allow mining processes (as described in the bullet above) to be undertaken without interfering with each other;
- increased water management flexibility, including the ability to store excess water in a mining area as a ‘last resort’ contingency. If this occurs it would be followed by the use of this water in the CHPP. If there was only one mining area, this contingency would not be available as coal could not be extracted from a flooded pit. As a result, the excess water could not be used in the CHPP and the only option would be to release the water off-site; and
- storage of tailings at or close to the base of the mining areas without interfering with active mining.

3.5 Mining method and progression

A conventional truck and excavator operation is proposed. Trucks will haul the waste rock to either the out-of-pit emplacements or, when practicable, areas in the mined-out voids so as to maximise in-pit dumping. Trucks will haul ROM coal to the CHPP where it will be tipped into the hopper above the primary crushers or onto stockpiles for later rehandling.

Indicative plans showing the mine at years 1, 2, 4, 8, 12, 16, 20 and 21 are presented in Figures 3.2 to 3.9. The mine will be developed generally in accordance with these plans and the exact locations of various components will be defined during detailed design following further examination of operational factors. Throughout the life of the mine, the mining areas and out-of-pit emplacements will remain within the disturbance footprint shown for these components and infrastructure will be constructed within the disturbance footprint of the infrastructure areas.

Mining operations will begin in areas A and B in Year 1, with most initial disturbance being due to establishment of out-of-pit emplacement areas. Mining in area C will start in Year 2, as will rehabilitation of the initial emplacement areas. Mining and progressive rehabilitation will continue throughout the life of the Project (see Section 3.19 'Rehabilitation').

The ongoing mining sequence will include:

- pre-clearance surveys;
- construction of water and sediment control structures;
- clearing of vegetation and stripping and stockpiling topsoil;
- blasting waste rock (where required) before using excavators and trucks to remove it;
- blasting coal seams (where required) and then extracting the coal using an excavator or front end loaders with the coal trucked to the CHPP;
- using waste rock and coal rejects to backfill the mine void (when practicable);
- progressive rehabilitation; and
- pit closure.

These activities are further described below.

3.5.1 Pre-clearance surveys

Pre-clearance surveys will identify specific environmental features that need to be managed. They will include inspections for habitat features that can be relocated; identifying opportunities for seed collection; and determining the presence of threatened fauna, including animals occupying trees (arboreal fauna) (see Chapter 10 'Ecology').

3.5.2 Construction of water and sediment control structures

The water management system has been designed to segregate clean, overburden, pit, infrastructure and process water; and to provide operational flexibility. Clean water diversions, and erosion and sediment controls, will be established as part of initial works in each area. Water and sediment control structures will include:

- diversion channels to divert clean surface water runoff from undisturbed catchments around the mine as far as is practicable;
- sedimentation dams in mine and infrastructure areas to collect surface water runoff from disturbed mine areas;

- a raw water dam, overburden/infrastructure water dams and process water dams (see Section 3.13.2);
- sumps in the pit floors to collect pit water, including groundwater seepage;
- a network of pumps and pipelines to manage water across the site; and
- flood mitigation works, such as levees, along the edge of mining areas and a dry detention basin.

Water management is described in Chapter 8 'Surface water'.

3.5.3 Vegetation clearing, topsoil stripping and stockpiling

Generally, vegetation will be cleared six to 12 months in advance of mining. Topsoil will be stripped before mining. Vegetation clearing management measures are described in Section 10.4.2 'Ecology' and soil stripping management measures are described in Section 9.4.1 'Soils and agriculture'.

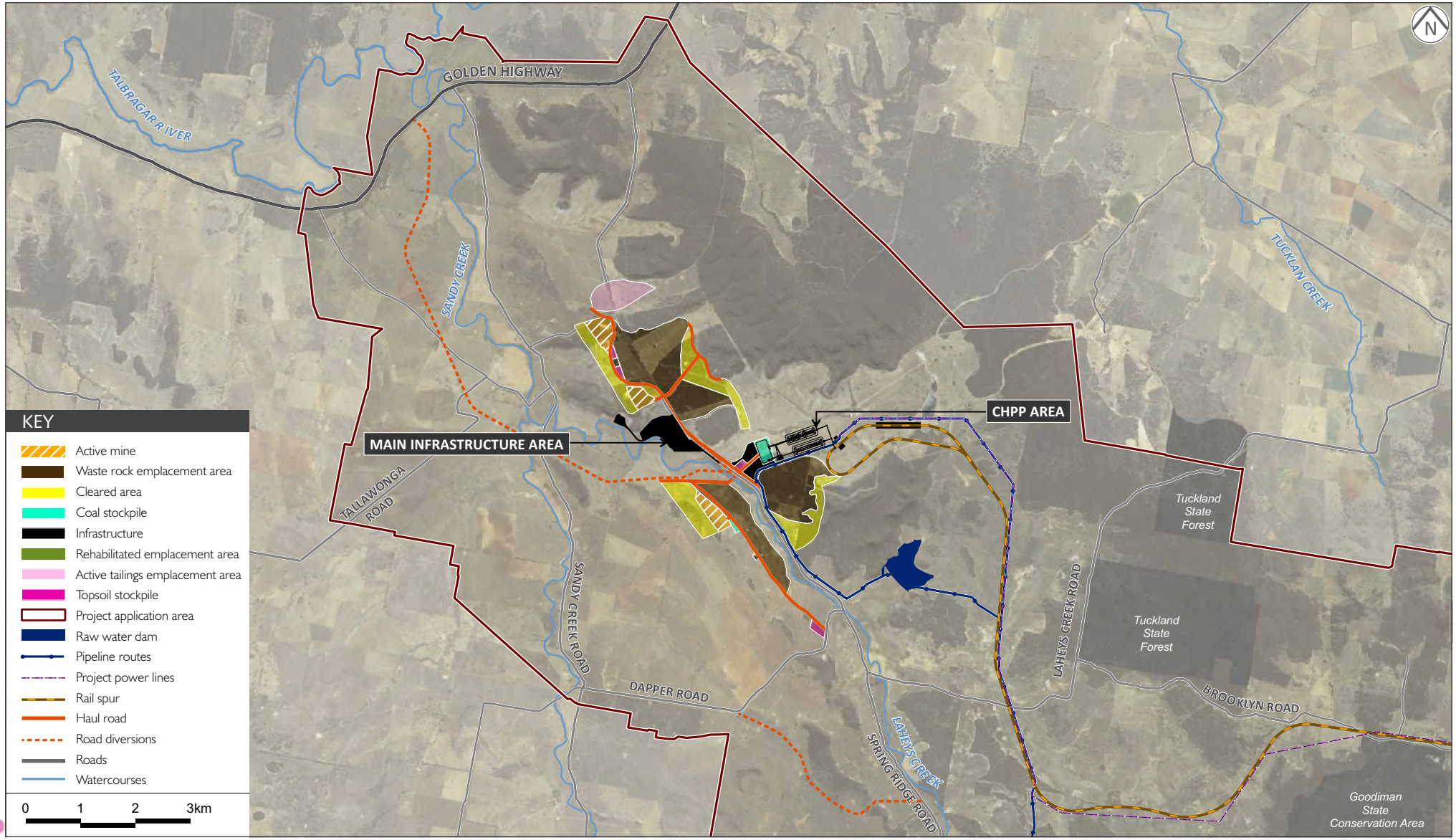
3.5.4 Blasting

Blasting will be designed to fragment the waste rock while protecting nearby residences, culturally important buildings, public infrastructure, mine infrastructure and sensitive environments from damage. Blasting procedures will also ensure mine employees and the public are safe.

To fragment the waste rock will require blasts with a maximum instantaneous charge (MIC) of up to 3,500 kg. Smaller blasts will be used to fragment coal where required to provide for efficient coal extraction.

Blasting will occur during daylight hours, generally between 8.00 am and 6.00 pm Monday to Saturday. Up to 600 blasts per year will occur at the peak mining rate.

Temporary roads closures will be necessary where blasts are within 500 m of a road. The frequency of road closures will be minimised and they will generally be closed for less than 15 minutes (and will not coincide with school bus times). At least 24 hours notice will be provided and signs will be erected at the nearest major intersection at both ends of the road to be closed. The signs will warn drivers of closures, the likely duration and alternative routes. Personnel supervising road closures will receive traffic control training in accordance with Roads and Maritime Services (RMS) and council requirements. Roads will be inspected after blasting but before reopening to check no fly rock is on the road.



Integrated Design Solutions | 030518 Cobbora Coal Project - EA F3-2 Rev B - 19 September 2012

EMM

Cobbora Holding Company Pty Limited

Indicative Mine Plan - Year 1

Cobbora Coal Project - Environmental Assessment

Figure 3.2