2.0 PROJECT NEEDS AND ALTERNATIVES

2.1 PROJECT JUSTIFICATION

Queensland is one of the world's largest producers of seaborne traded coal, producing 202 Mt of saleable product in 2010. The coal industry is a major contributor to Queensland's economy through its purchase of goods and services, provision of employment and payment of State and Federal taxes and charges. As stated in Section 1, the IEA predicts that world coal demand will increase at an average annual rate of 1.9% between 2007 and 2030 (Geosciences Australia & ABARE 2010). This rate will likely to be higher in lesser developed countries.

Queensland possesses over 30 billion tonnes of identified black coal resources and, with efficient rail and port infrastructure, is strategically placed to capitalise on the rising demand for high quality thermal coal. The Surat Basin contains Queensland's largest measured and indicated open-cut thermal coal resource (4,198 Mt in-situ) (DNRM 2003). These coals are highly volatile, reactive and clean burning (DME 2007). As such, they are suitable for both domestic or international power generation and industrial use.

The Project is located in the Surat Coal Basin, within the Western Downs Regional Council local authority area, 35 km west of Wandoan. The DNRM, formerly DEEDI, recognises that, pending the establishment of new rail and port infrastructure, the largely undeveloped Surat Basin coal province is set to emerge as a major source of high-volatile thermal coal for export (DEEDI 2011). The Elimatta Project proposes to be at the forefront of this development. With an estimated resource of approximately 259 Mt and production rate of 5 Mtpa of product coal over more than 32 years, the Project will assist in satisfying the increasing international demand for thermal coal.

The Project will bring positive flow-on effects to the local and regional economy and community. Commencing in 2015 (pending approvals), the Project will directly employ up to 500 people for the 22 month construction period and then an average of 300 during on-going operations for a mine life in excess of 32 years and a project duration including construction and decommissioning of up to 40 years. In addition, many more people will be employed in support industries and will be required for periodic large maintenance tasks and special projects. Economic and social assessments (discussed further in Section 4.10 and 4.12) have identified this as a significant increase in the size of the regional labour force and a diversification of industry in what is currently a predominately agricultural (grazing) area.

Due to the initial limited capacity of the local labour market, a majority of the 300 operational staff will be sourced from the Fraser Coast Region. The Fraser Coast Region has been identified as a labour rich region of Queensland with limited local employment opportunities. Suitably qualified locals will be preferentially employed where available. If required, expert technical positions will sourced from further afield.

The development of the Elimatta Project will deliver significant economic benefits. The cost of constructing the mine and rail infrastructure directly attributable to the Project is estimated to be more than $1.03 billion. During the construction period the Project will generate $725 million in Gross State Product (GSP) and create and sustain 1,005 jobs (including the 500 construction jobs). Regional incomes will increase by $150 million during the construction period.

During the operational phase of the Project, which is estimated to exceed 32 years, industries associated with mining will be positively impacted through the required provision of services and

equipment, and the supply of consumables to the Project. The Elimatta Project will have a positive impact on the State economy increasing GSP by an average of $564 million per annum over the life of the mine. During the production period, regional incomes will increase by $230 million.

Ongoing supply lines during the operational phase of the Project are likely to be north via Taroom in the Banana Shire. As such, the local economies of both Taroom and Wandoan are expected to benefit from the economic flow on effects of the Project through the provision of goods and services. The development of the Elimatta Project is also likely to have a positive impact on the establishment of additional new spin-off businesses and encourage support infrastructure development in the region to service the Project's needs.

Development of the Elimatta Project will also contribute significantly to the establishment of transport infrastructure in the region. The West Surat Link (WSL), a proposed Rail and Services Corridor connecting the Project site area and the Surat Basin Rail line north of Wandoan, will provide services capacity to facilitate other developments in the area. Development of these rail links will provide long term benefit to local businesses and other regional users.

The Elimatta Project will produce coal for the export markets. In accordance with Queensland legislation, the Proponent will pay royalties to the Queensland Government for the right to mine the State's resources as well as payroll tax and charges for other State provided services. The Project will also pay Commonwealth Government corporate tax, mineral resources rent tax (potentially), carbon tax and goods and services tax. Expressed in today's dollars, it is estimated that the Commonwealth Government will receive in excess of $1.08 billion over the estimated production life of 32 year while the State Government will receive in excess of $2.4 billion.

2.2 ALTERNATIVES TO THE PROJECT

2.2.1 Do Nothing

Geosciences Australia & ABARE (2010) identified a continuing increase in global demand for coal. Should the Project not proceed, this demand could be potentially filled by an international competitor, generating a loss of revenue, royalties, economic development and business opportunities.

The consequence of not proceeding with the Project would be that a significant coal resource would remain undeveloped and economic proceeds through taxation and royalties would not be realised for the State of Queensland. Estimates of royalty contributions from the Elimatta Project exceed $712 million to the State government and $503 million to the Commonwealth government. There is a significant opportunity cost to both State and Federal revenues without the development of the Project.

If the Project remained as a future development option, proceeds and benefits could well be deferred, as opposed to simply not proceeding with an otherwise feasible development which would result in benefits foregone.

2.2.2 Alternative Land Uses for the Project

2.2.2.1 Cattle Grazing

The Western Downs is currently recognised as an agricultural area. The principal current land use on the mine site area and rail and services corridor is beef cattle grazing with parts of the land used for

winter forage crops, weather conditions permitting. Historically, sheep were also grazed on the site. Sheep grazing ceased prior to 1912 before being unsuccessfully retried in the 1950s.

The continuation of cattle grazing on the Project site as an alternative to the Project proposal would result in the significant coal resource remaining undeveloped. Retaining beef cattle grazing as a land use would result in a significant opportunity cost to both state and national economies (as discussed in Section 2.2.1).

Open cut coal mining is a temporary land use. At the completion of the Project the mine area will have been returned to its pre-mined land suitability of cattle grazing. The Project land rehabilitation strategy is discussed in Section 3.7.

2.3 ALTERNATIVES WITHIN THE PROJECT

During the scoping and planning of the Elimatta Project, a range of alternatives were considered for many of the key components of the development. For each alternative, the environmental, social and economic facets were reviewed to finalise the most suitable Project proposal. The concept of ecologically sustainable development (ESD) played an integral role in this review process.

Within Australia, the broad concept of ESD is incorporated into the *National Strategy for Ecologically Sustainable Development* (ESDSC 1992), which defines ESD as:

> *"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased"*

This definition involves a cluster of elements or principles, as highlighted by Preston (2006). These include:

- Principle of sustainable use;
- Principle of integration;
- Precautionary Principle;
- Inter-generational and intra-generational equity;
- Conservation of biological diversity and ecological integrity; and
- Internalisation of environmental costs.

Given the difficulty in recognising the identifiable point at which a project can be assessed as achieving ESD, the two main features which distinguish an ecological sustainable approach to development are (ESDSC 1992):

- consideration, in an integrated way, of the wider economic, social and environmental implications of development; and
- a long-term, rather than short-term, view when taking development decisions and actions .

The Elimatta Project has incorporated these key features into the project planning and design phase and demonstrates them throughout the EIS process, during the assessment of impacts and

development of proposed mitigation and management measures.

The following alternatives within the Project will be discussed:

- Mining and Production (Extraction and Processing);
- Product Handling (Rail and Port);
- Spoil Dumps;
- Tailings Storage Facility;
- Mine Infrastructure Area;
- Creek Diversion;
- Workforce and Accommodation;
- Water Supply; and
- Power Supply.

2.3.1 Mining and Production

2.3.1.1 Extraction

Coal mining operations in Queensland may be either underground or open-cut operations depending on the quality of the coal resource and its proximity to the surface. In the case of the Elimatta deposit, because of its relatively shallow nature it will be developed as an open-cut operation. Deeper coal seams which are uneconomic to develop given today's investment standards may at some future time also be developed.

The early Project concept studies (pre-2009) reviewed scale of operation (range 3.0 to 7.0 Mtpa product), mining methods (dragline and/or truck shovel) and mining sequence (east to west or shallow to deeper). Balancing equipment use, access to transportation and port services, water and power requirements lead to a project sized at 5.0 Mtpa product as the optimum output level.

A project feasibility study mine plan (post-2009), with a reconfiguration of the pit layout and mining direction following a redesign and retiming of the staged diversion of Horse Creek (discussed further in Section 2.3.6), provides access to the whole of the coal resource within the mining tenement area. The mine plan adopted for the Project commences in lower strip ratio areas in the centre of the tenement area and "spreads" outward to the tenement boundaries with nearly all of the mine waste material placed inside the excavation area.

Two surface mining methods were considered – overburden removal with draglines augmented with truck/excavators or all truck/excavator. The geometry of the deposit favours all truck/excavator over draglines.

The proposed mining schedule at Elimatta has been developed to optimise resource recovery and Project feasibility whilst minimising environmental impacts. The schedule has been developed considering the quality and quantity of coal; developing an optimum sustainable rate of extraction,

whilst minimising the initial development costs, Project disturbance area and the cost per unit extracted. To minimise the economic and environmental costs of double handling the ROM or product coal, capacities have been matched throughout the extraction, processing and product handling stream. Timing of Project development and the ramp up in production is aligned with the development of the new SBR and port capacity at the Wiggins Island Coal Terminal in Gladstone.

2.3.1.2 Processing

Truckloads of ROM coal will be dumped directly into a conventional dump hopper structure incorporating feeder breakers to prepare the ROM coal for subsequent sizing stages and treatment through the coal processing plant. On-ground feed breakers were considered as an alternative. Whilst reducing capital costs, an "on the ground" feeder system increased operating costs.

The ROM bin design is based on rear dumping by 250 t class rear dump trucks or large front end loader. This provides flexibility of operations by allowing direct truck dumping as well as ROM re-handling for fed blending purposes.

Feasibility studies also considered the opportunity for some ROM coal of a sufficiently quality to bypass the washing process. While potentially reducing operating costs as well as water consumption, this option was discounted on the basis that insufficient suitable ROM coal was available to justify the expenditure on the additional infrastructure required for the by-pas system.

The CHPP will have a name plate capacity of 1100 – 1200 tph. This will allow for the processing of up to 8.4 Mtpa of ROM coal – averaging 7.2 Mtpa. A circuit optimisation study was conducted to determine the optimal CHPP design. The feed size and circuit configuration are designed to maximize plant yield and Project revenue while optimising power and water efficiency.

The course and fine circuits of the CHPP are based on conventional dense medium cyclones (DMCs) and spirals process, with the fine fraction discarded as tailings (without flotation). These conventional methods are commonly used in CHPPs throughout Queensland's Bowen and Surat Basins, in the latter case, handling similar ROM coal from the same or similar coal seams to those encountered at Elimatta.

2.3.2 Product Handling

A rail line is proposed to link the Elimatta Project with the Surat Basin Rail and thence to Gladstone. The mine is scheduled to produce an average of 5 Mtpa of product coal for export. Consideration was given to transporting this product via road or conveyor to join the SBR. However, on a whole of project cost basis, rail is preferred. Rail also has the added benefit of providing transport capability for other developments around Elimatta without the need for a new corridor.

2.3.2.1 Rail Infrastructure

The WSL will connect the Elimatta Project with the SBR at a junction approximately 10 km north of the Wandoan Township. A wide corridor was initially selected for this 36 km alignment. This was subsequently reduced to 3 specific alignment options: north, south and central (shown in Figure 2.1). The preferred alignment is an iteration of the southern option.

The final 36 km rail alignment was determined after consideration of a range of stakeholders and issues, including:

- Affected properties and places of residence;
- Neighbouring mining tenement holders and stakeholders with an interest in the rail connection;
- Flood levels of creeks traversing the site of the proposed Corridor;
- Environmentally sensitive areas;
- Infrastructure including bridges, embankments and cutting requirements;
- Remnant vegetation;
- Adjacent power and water supply lines; and
- Future rail use.

The interests of local landholders were considered by determining the areas suitable for a rail corridor that had minimal disturbance to properties and impacted as few sensitive receivers as possible. Aligning the Corridor close to existing property boundaries, where possible, or away from known residential locations and bore sites has minimised impact to properties and landholders. Economics were also addressed by determining the areas that would minimise embankment and cutting requirements, and considering flood levels of local creeks, which could potentially inhibit operation of the rail and transport of coal to terminal for export.

Design of the final alignment also sought to reduce environmental impacts by minimising disturbance to remnant vegetation, particularly in riparian areas, corridors, wetlands and other sensitive locations. The feasibility and practicality of developing power and water supply lines adjacent to the rail alignment was taken into account, as was the viability of connecting the proposed WSL alignments with the existing SBR.

Future rail users were also considered. The final alignment of the WSL provides opportunity for potential extension west beyond the Elimatta Project site, allowing future projects to utilise the Corridor. Rail design accounted for potential increased tonnages as high as 30 Mtpa, creating opportunity for multiple users.

The final alignment was also developed to ensure that the railway could be safely constructed, operated and maintained. Practical and acceptable maintenance access along the corridor and improved access to high maintenance areas were considered critical to enable inspection and ongoing maintenance to be successfully undertaken.

These design considerations have reduced the anticipated environmental, social and economic impact of the Rail and Services Corridor development to a practical minimum.

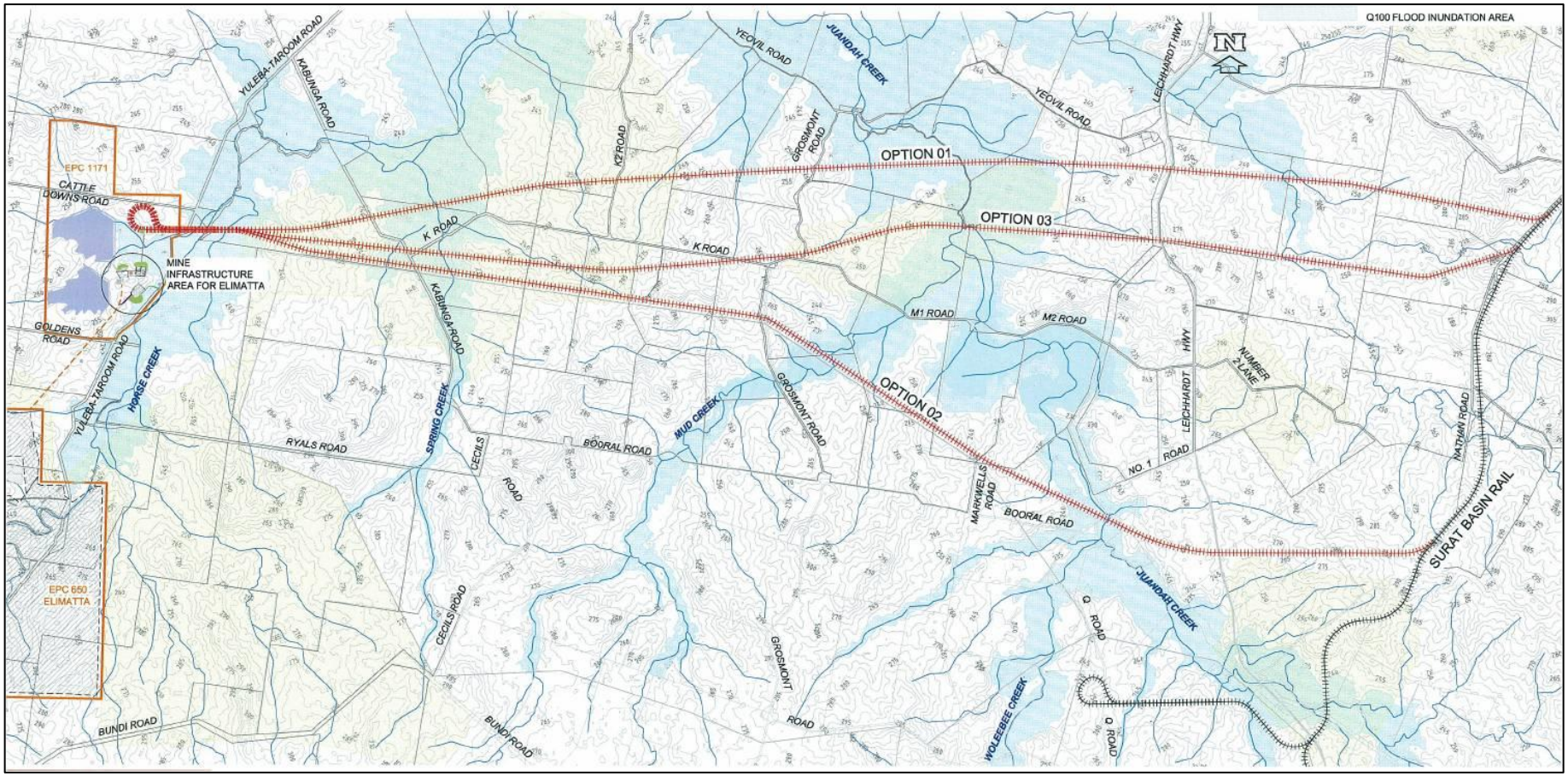

Figure 2.1 Early West Surat Link Alignment Options

2.3.2.2 Port Facilities

Gladstone is the logical choice as the point of export given the proposed development of the SBR linking the Surat Basin area to the existing central Queensland coal rail system. Gladstone is the closest port to the Project.

The southern Queensland, Port of Brisbane was also considered. However, the rail infrastructure and port capacity (including vessel size limits) to support the development of the Elimatta Project were insufficient. Further expansion and upgrading of the existing facilities to a suitable capacity would come at a significant environment, social and economic cost.

Other port options in northern Queensland, including the Hay Point Coal Terminal, Abbott Point Coal Terminal and Dalrymple Bay Coal Terminal were also considered. The logistics of transporting coal from the Surat Basin to these terminals was unfeasible and incurred a large environmental cost through increased transport emissions.

The Wiggins Island Coal Export Terminal (WICET), currently being developed north-west of Gladstone, was the preferred port option based on location and the availability of port and rail infrastructure capable of servicing the requirements of the Elimatta Project. The WICET, at full capacity, will duplicate the existing capacity of the Port of Gladstone's RG Tanna Coal Terminal and provide the level of throughput required to meet customer coal export demands from 2014. The existing Barney Point Coal Terminal, in Gladstone, was also considered. However, this facility is limited in expansion capacity and has unsuitable maximum serviceable vessel size limits.

2.3.3 Spoil Dumps

Spoil dumps will include both over- and inter-burden waste material as well as coarse reject material from the CHPP. The design and location of spoil dumps was determined based on the size of MLA 50254, along with trucking considerations. These restrictions limited the location and extent of out-of-pit spoil dumps. From a visual amenity and post-mine land-use aspect, this restriction was considered beneficial in that it limited the extent of potential impacts.

Initial out-of-pit dumps are located in a barren zone to the north and a high strip ratio area to the south-west of MLA 50254. Following the early stages of mining, in-pit dumping will ensue. The strategy for in-pit dumping is to minimise depressions in the final landform to reduce subsequent ponding and flooding and associated environmental implications.

2.3.4 Tailings Storage Facility

The waste by-products of coal processing will consist of both coarse and fine rejects material (tailings). The development of the Project considered several tailings disposal options. Handling options were limited by plant location, volume of reject material and confines of the MLA area.

Co-disposal was initially considered as a suitable approach. However, it was concluded that there was insufficient volume available to accommodate co-disposed tailings and coarse rejects within the available lease area.

The preferred tailings disposal option is for a separate trucked coarse material and pumped tailings rejects disposal system; typical of proposed mines in the Surat Basin. Tailings will be pumped, thickener underflow, to dedicated tailings storage facilities (TSF). Minimum tailings storage requirements for the life of the mine are 48 million m^3. Tailings will be pumped at the optimal initial

percentage solids to promote consolidation. Improvements in consolidation rates will result in maximised water return and a trafficable surface which can be sealed and rehabilitated.

The layout of the out-of-pit TSFs were designed to avoid potential environmental impacts associated with the modelled flood zones of Horse Creek and its tributaries. In an effort to minimise the overall disturbance footprint of the Project, in-pit tailings storages will also be utilised during the life of the mine.

2.3.5 Mine Infrastructure Area

During the Project pre-feasibility stage, there was consideration given to locating the entire Project and associated infrastructure (including CHPP) on the southern MLA area (Option 1 in Figure 2.2). However, early studies identified that virtually all of the area of MLA 50254 was underlain by economically viable coal resources. This necessitated exploring an option to locate the mine infrastructure and CHPP to the north, on MLA 50270, to avoid the sterilisation of the identified coal reserves (Option 2 in Figure 2.2).

The proposed mine infrastructure layout on MLA 50270 was developed taking into account social, economic and environmental considerations. The layout and location of the MIA, CHPP, Water Management System (including TSFs) and Accommodation camp were selected to minimise environmental disturbance by considering topography of the site; the proposed MLA boundary; and, to avoid the modelled flood zones of Horse Creek and its tributaries. The design of the layout also considered the location of the proposed WSL rail line and balloon loop and the requirements to establish a suitable link between the CHPP operations and the rail load out facility.

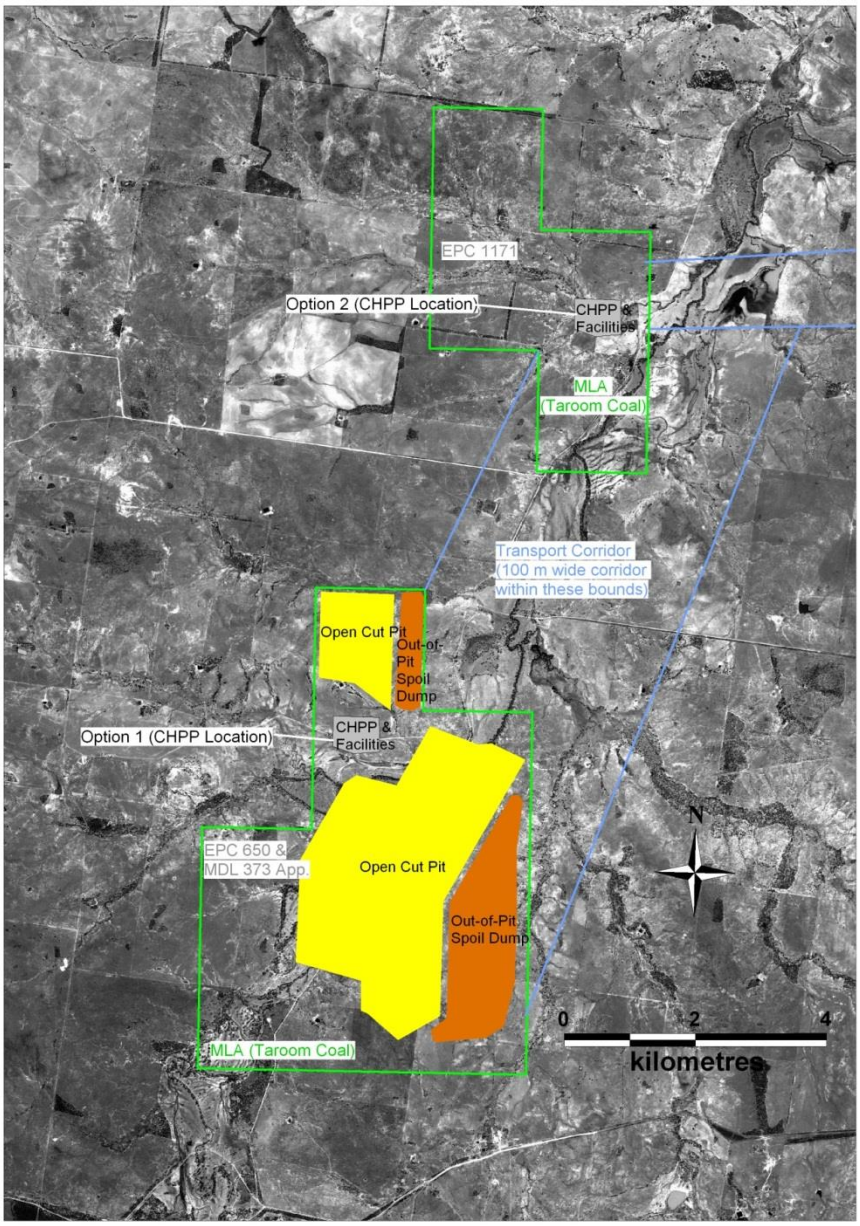

Figure 2.2 Conceptual Project Layout Options - August 2008

2.3.6 Creek Diversion

The main channel of Horse Creek passes through the mining area within MLA 50254 from the south to the north and overlies a significant coal resource within the mine area. As a result, the option of not diverting the creek is not a viable alternative for the Project. Taroom Coal is proposing to relocate Horse Creek in four stages, while conserving the locations where the creek enters and exits the mine area, at the mining lease boundary.

Preliminary studies explored two diversion options, an eastern route requiring access to land outside the MLA and a western route entirely within the proposed MLA. When developed further, it was

recognised that the eastern alignment had the potential to increase sedimentation downstream of the MLA following a relatively flat channel area and thus increase environmental harm.

The western alignment, which maintains a relatively uniform decline gradient across the Project site and therefore maintains a consistent flow velocity, was the preferred option. This alignment also allows for a sufficient channel width to promote the development of a suitable meander pattern.

2.3.7 Workforce and Accommodation

Several options were reviewed for sourcing and accommodating the workforce requirements of the Project. During construction, the Elimatta Project will require a maximum of approximately 500 personnel. This will reduce to an average of 300 during production, with additional staff required during periodic large maintenance tasks and special projects.

As the Project site is relatively remote from the regional centres of Wandoan and Taroom – 45 km to 55 km depending on the route used – and the fact that neither of the centres have a permanent population large enough to provide only a small part of the workforce requirements, an accommodation village is proposed to be built on site. The benefits of locating a dedicated accommodation village within the Project site boundaries are:

- Less time spent travelling to and from work, especially if 'travel time' is included as part of the working shift; and
- Improve the safety of the workforce and the public by controlling and limiting transport movements.

Consideration had been given to locating the accommodation facilities in the township of Wandoan or Taroom. However, this wasn't considered feasible and introduced additional undesirable social and economic impacts.

Although some alternatives have been considered, the location of the accommodation onsite is deemed to be the best option given the proposed mine development schedule. The topography surrounding the proposed location on MLA 50270 should provide attenuation from the noise of the plant and mine areas. This location also minimises travel distances to and from the operations and will not sterilise any identified coal resources.

At present, it is considered practicable that the Project's workforce will be sourced from the Fraser Coast Region of Queensland; particularly the townships of Maryborough and Hervey Bay. NEC, acting as an agent for Taroom Coal, has an office in the Maryborough township and considers this region to have a suitable pool of skilled workers to supply the Elimatta Project. Suitably skilled local employees will be provided with the opportunity to contribute to the Project, but it is expected that these staff will form a small percentage of the overall workforce requirements.

Other source committees for the fly-in fly-out (FIFO) workforce were considered, such as Brisbane. However, the establishment of a sufficient diversity of industries in these areas and existing demand (and shortage) of skilled labour made these areas a less attractive option from a social and economic impact perspective.

It is proposed that the workforce will be transported to site by FIFO operations between Taroom and Hervey Bay or Maryborough aerodromes. A comparison between bus and air transport options was considered during the feasibility study. It is Taroom Coal's preference to transport the workforce via

air due to the remote location of the Project and associated transport timeframes. For the purposes of this EIS, it is assumed that the workforce will travel via the preferred air transport option, with a bus service provided for employees within the local area.

Transport assessments have indicated that the Taroom aerodrome is the preferred local airstrip from which to base FIFO operations. The Wandoan airstrip was considered. However, the existing Wandoan site has limited capacity for expansion to cater for the required aircraft size. This assessment is consistent with the conclusions obtained during the Xstrata Wandoan EIS process. Xstrata Coal is considering the option of developing a greenfield site in Wandoan versus upgrading the existing Taroom aerodrome. Taroom Coal will liaise with Xstrata Coal regarding airport developments to finalise the preferred option.

2.3.8 Water Supply

During the production life of the mine, the demand for offsite water supply will be approximately 2,500 Million litres per annum (MLpa). Based on the expected annual water requirements identified during the Elimatta Feasibility Study, two water supply options were considered for the Project:

- Direct utilisation of a CSG extraction water; and
- Connection to a water distribution pipeline network providing initially processed CSG water and then water from the Nathan Dam on the Dawson River.

CSG extraction water from a local tenure holder, while a potentially viable option, lacks the supply security required as a long term source. Additionally, at the time of confirming supply options, CSG producers were effectively banned from discharging (and therefore directly supplying) untreated CSG water. Treatment options were considered excessive and unfeasible given the lack of future supply security.

SunWater is proposing to build, own and operate the Woleebee Creek-Glebe Weir Pipeline Project which will deliver treated water from CSG producers and other sources to users such as Taroom Coal. In the long term, this supply will be supplemented by the Nathan Dam and Pipelines Project. Overall, this pipeline network will guarantee water delivery to mining and irrigation customers in the Surat Basin.

Due to a requirement for a long term, secure supply, a connection to the SunWater pipeline network is the preferred option. The Woleebee Creek-Glebe Pipeline is expected to be complete and operation by 2013. A pipeline, connecting the Elimatta Project to the supply source, will run adjacent to the WSL rail alignment within the Rail and Services Corridor. This was a design consideration of the final rail alignment.

2.3.9 Power Supply

The electricity peak power demand for the CHPP operations, accommodation village, water treatment plant and general mine infrastructure for the Project has been calculated to be 13,550 kilowatts (kW) at full production, with an average demand of 11,590 kW. At full production, annual energy demand is approximately 75,000 Megawatt hours per annum (MWh/a).

Two options for a permanent power supply for the Project were identified during pre-feasibility studies: These included:

- Connect to the State Power Grid – through Ergon Energy; or
- Generate power on site using either diesel or CSG as fuel.

Ergon Energy initially indicated to Taroom Coal that a suitable supply connection could not be established in the required timeframe to service the Project. Therefore, diesel power generation had been included in the construction cost schedules and onsite power generation was the primary power supply option considered during the feasibility studies until a grid connection could be established.

Following the feasibility study, regional developments resulted in an increased focus on delivering supply to the western Surat Basin. As such, an application has been lodged with Ergon Energy Limited (Ergon) for a connection to existing infrastructure. Elimatta has grid connection options to Ergon substations located at Wandoan and Wandoan South, with Wandoan South currently preferred, based on guidance advice from Ergon.

The permanent power supply to the Project will be via a 66kV high voltage connection. It is likely that Ergon will own and operate the infrastructure to a connection point on the mine site.

Connection to the Ergon grid via a powerline adjacent to the proposed railway is a possible supply route option and is likely to be available in line with the commencement of Project operations. A power line, connecting the Elimatta Project to the supply source, would run adjacent to the WSL rail alignment within the Rail and Services Corridor. This was a design consideration of the final rail alignment.