

Xstrata Mangoola Pty Limited

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**Environmental Assessment for  
Section 75W Modification to  
Approved Mining Operation,  
Mangoola Coal – Relocation of  
Mining Infrastructure Area**

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September 2009



# **Environmental Assessment for Section 75W Modification to Approved Mining Operation, Mangoola Coal – Relocation of Mining Infrastructure Area**

**Prepared by**

**Umwelt (Australia) Pty Limited**

**on behalf of**

**Xstrata Mangoola Pty Limited**

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Report No.	2497/R14/Final	Date: September 2009



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# 1.0 Introduction

## 1.1 Project Context

Xstrata Mangoola Pty Limited trading as Mangoola Coal, a wholly owned subsidiary of Xstrata Coal Pty Limited, has an existing Project Approval (06\_0014) granted in June 2006 to construct an open cut coal mine near Wybong, west of Muswellbrook NSW. The mine has approval to extract up to 10.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal for a period of 21 years. **Figure 1.1** shows the regional context of the project site.

After acquiring the project from Centennial Hunter Pty Limited in 2006, Mangoola Coal has undertaken detailed design and feasibility work and ascertained a more suitable location for the Mining Infrastructure Area (MIA). Mangoola Coal has also undertaken detailed design of the Coal Handling and Preparation Plant (CHPP), which has resulted in minor changes to the CHPP design.

Mangoola Coal is seeking approval to modify the existing Project Approval to allow for the relocation of the MIA and the minor changes to the CHPP.

**Figure 1.2** shows the location of the currently approved facilities area (now referred to as the MIA) and the proposed location of the MIA within the project site. The location of the CHPP is also shown on **Figure 1.2**. Since acquiring the project, Mangoola Coal has established that the original conceptual designs did not allow a sufficient area for the MIA.

## 1.2 The Proposed Modification

Mangoola Coal is seeking a modification to its existing Project Approval (06\_0014) to establish the MIA approximately 1 kilometre to the north-north-east of the approved location, and to change minor components of the CHPP within the existing Project Disturbance Boundary.

## 1.3 Schedule of Lands

The proposed location of the MIA is situated on land parcels described in **Table 1.1**.

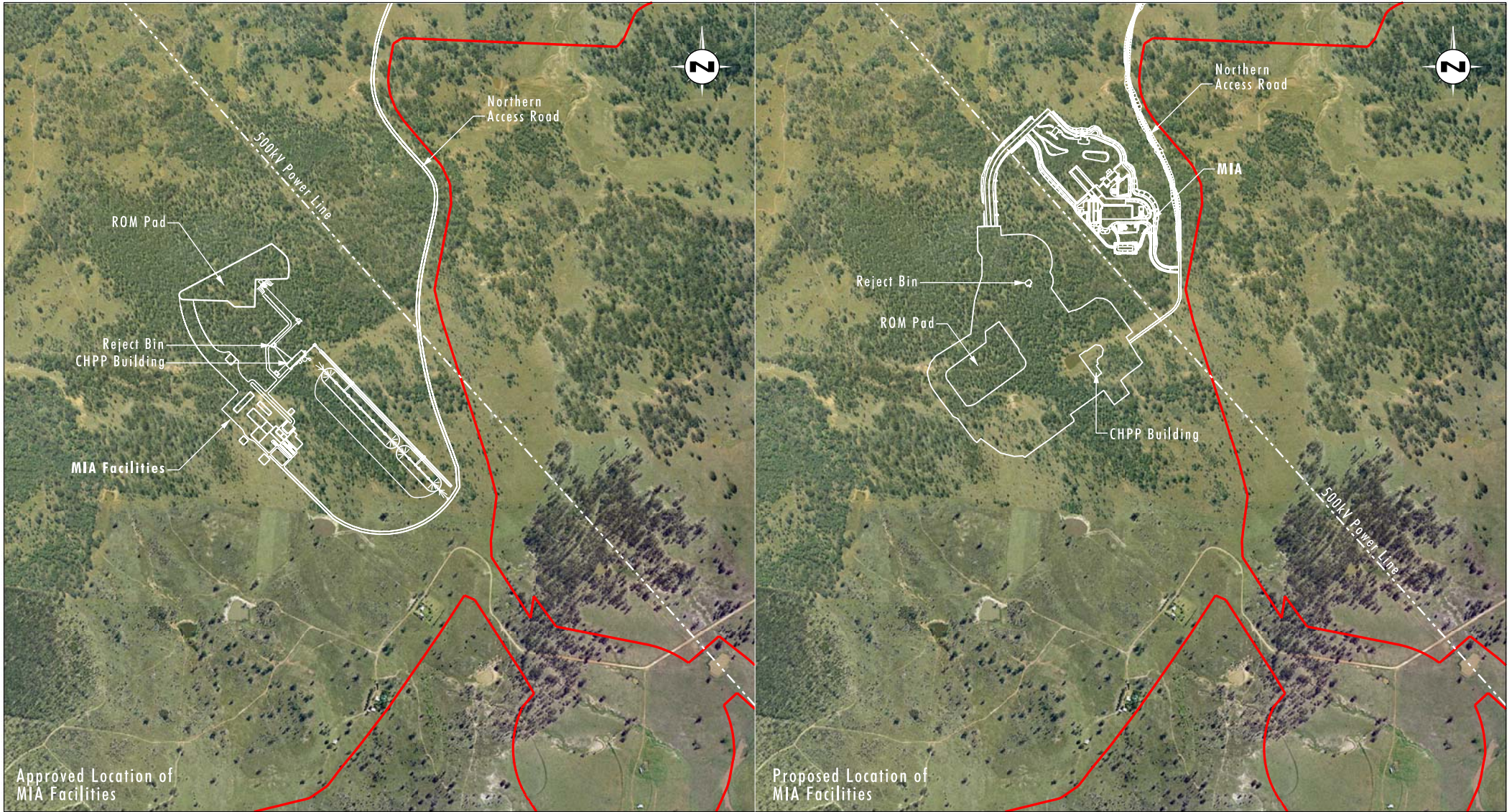
**Table 1.1 - Land Parcels associated with the Proposed Location of the MIA**

Lot	Deposited Plan (DP)
215	750968
216	750968

The land on which the proposed location of the MIA is to be situated, within the parcels noted above, is wholly within the approved disturbance area and is located on land owned by Mangoola Coal. The minor changes to the CHPP will remain within the area of the approved CHPP, on land owned by Mangoola Coal.



FIGURE 1.1  
Locality Plan



Source: Umwelt (2006), Parsons Brinckerhoff (2009)

**Legend**

Approved Mine Disturbance Boundary

FIGURE 1.2

Approved and Proposed Location of the MIA and CHPP

## 1.4 Consultation

As part of this Project, consultation has been undertaken with the Department of Planning (DoP). This consultation has involved correspondence and liaison, which included an introduction to the Project and discussion and confirmation of the appropriate approval path for the proposed modifications.

## 1.5 Project Team

Umwelt (Australia) Pty Limited (Umwelt) has prepared this Environmental Assessment (EA) on behalf of Mangoola Coal. Specialist studies completed as part of the EA process included:

- O'Hanlon Design Pty Ltd (O'Hanlon Design) – Visual Impact Assessment;
- Sinclair Knight Merz Pty Limited (SKM) – Air Quality Impact Assessment; and
- Wilkinson Murray Pty Limited (Wilkinson Murray) – Noise Impact Assessment.

## 1.6 Report Structure

The purpose of this EA is to enable the consideration of the environmental and social impacts associated with the proposed modifications to Mangoola Coal operations. The EA has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Regulations. An overview of the layout of this EA is provided below.

**Section 1.0** provides background and context for the proposed modifications and the project team involved in producing the EA.

**Section 2.0** provides a detailed description of the proposed modifications to the approved operations.

**Section 3.0** describes the planning context for the proposed modifications, including the applicability of Commonwealth and State legislation.

**Section 4.0** contains an identification of the key issues and an analysis and assessment of the environmental impacts of the proposed modifications.

**Section 5.0** contains the conclusion for the EA.

**Section 6.0** provides a list of references referred to in the EA.

**Section 7.0** provides a list of abbreviations and glossary of technical terms

## 2.0 Description of Proposed Modifications

### 2.1 Introduction

The proposed modification to Project Approval 06\_0014 includes the following aspects:

- the relocation of the MIA to a location approximately one kilometre north-north-east of the approved location;
- changes within the approved CHPP area, including:
  - change in orientation of the CHPP building from north-east – south-west to north-west – south-east;
  - change in the position of the ROM stockpile pad to approximately 100 metres to the south; and
  - an increase in the height of the reject bin from the approved height of between 210 and 215 metres RL to an approximate height of 218 metres RL.

The CHPP building, ROM pad and reject bin remains within the previously approved CHPP area. Its location is shown on **Figure 1.2**.

### 2.2 Approved Location and Components of Mining Infrastructure Area

The Project Approval provides for a 'Facilities' area (now referred to as the MIA) to be located next to the CHPP (refer to **Figure 1.2**).

This Facilities area comprised:

- a workshop and refuelling facility;
- administration and employee facilities;
- electrical and power reticulation;
- telecommunications cables;
- water supply and sewerage; and
- explosives store.

The overall environmental impact of these facilities was assessed in the original EA (Umwelt, 2006) as part of the mine and related infrastructure.

## 2.3 Proposed Location and Components of Mining Infrastructure Area

The proposed MIA has now been subject to final design, and is intended to comprise the following elements, as shown on **Figure 2.1**:

- an administration building;
- a heavy vehicle workshop;
- fuel and oil facilities;
- a substation and compressor slab;
- a store compound;
- a helipad;
- mine rescue garage;
- sewage and water treatment plants;
- a tyre change area including a hardstand;
- washing areas for light and heavy vehicles;
- bulk LPG storage;
- staff, visitor and mine vehicle car parks;
- internal access roads; and
- water quality controls, including:
  - sedimentation dam (approximate 4 ML capacity);
  - drainage system and clean and dirty water separation; and
  - two oil-water separators, one for the vehicle wash down area and one for the remainder of the MIA.

In addition, this modification also seeks to change the orientation of the CHPP building, a slight change in position of the ROM stockpile pad and to increase the height of the reject bin from between 210 and 215 metres RL to an approximate height of 218 metres RL.

The proposed location of the main workshop, within the MIA, on the northern side of the existing 500 kV transmission line that bisects the site means that mining trucks are required to pass under the transmission line. This process is managed with Transgrid who have the authority to grant access to the transmission line easement.



Source: Umwelt (2006), Parsons Brinckerhoff (2009)

**Legend**

Approved Mine Disturbance Boundary

FIGURE 2.1

Conceptual MIA Design

## 2.4 Comparison between Approved and Proposed Development

The proposed MIA will be a standalone area which will allow the administration and workshop areas to be isolated from the operational aspects of the mine and the CHPP (refer to **Figure 1.2**).

It is totally contained within the approved disturbance boundary for the project and will not require any modification to the footprint of the project. It is located on land already owned by Mangoola Coal, and is readily accessible by the already approved and constructed Northern Access Road that allows access to the site.

The proposed MIA contains largely the same elements that were contained in the approved Facilities area (albeit now defined in greater detail), with some additions for safety reasons, such as a helipad and mine rescue station.

The proposed area has been specifically designed to accommodate all aspects of the support services required by the mine.

The proposed MIA will perform the same function as in its original location, and allows for less congestion in the CHPP area.

## 2.5 Justification and Alternatives

Mangoola Coal's detailed design of the MIA and CHPP has resulted in a new location being preferred for the MIA and minor changes to components of the CHPP, based on:

- the total area required to safely conduct activities associated with the CHPP;
- a reduction in safety issues associated with the stockpiling of coal on the ROM pad by moving the Workshop away from this area;
- a reduction in impacts associated with noise from the CHPP on workers at the Workshop due to the movement of the Workshop away from this area;
- reduced travel distance for administration and workshop personnel;
- improved drainage around the MIA; and
- re-design of minor components of the CHPP area including: orientation of the CHPP building; position of the ROM stockpile; and height of the reject bin. These designs have been updated in response to specific site safety issues.

The new location of the MIA and the changes to the components of the CHPP were developed in response to a review of issues, especially relating to safety, which indicated that the alternatives to leaving the facilities in their originally approved location was no longer considered feasible for the reasons indicated above.

## 3.0 Planning Context

### 3.1 Approval Path

Mangoola Coal seeks to modify the existing Project Approval 06\_0014 pursuant to section 75W of the EP&A Act. The Minister for Planning is responsible for approving modifications under this section.

Project Approval 06\_0014 was granted under Part 3A of the EP&A Act and as such, section 75W is applicable for a modification to the approval. As noted in **Section 1.4**, DoP has confirmed that section 75W is the appropriate approval path for this modification.

### 3.2 Commonwealth Legislation

A summary of the Commonwealth legislation potentially relevant to the proposed modifications to the Mangoola Coal Project Approval is provided in **Table 3.1**.

**Table 3.1 – Relevance of Commonwealth Legislation to the Proposed Modification to Mangoola Coal Project Approval**

Act	Comments	Approval Required for Proposed Modification
<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>Under the EPBC Act the approval of the Commonwealth Minister for the Environment is required for any action that may have a significant impact on matters of national environmental significance, including world heritage properties, National Heritage Places, Ramsar wetlands, cetaceans, migratory species, threatened species, critical habitats or ecological communities listed in the EPBC Act, Commonwealth land, marine area or reserves and nuclear actions.</p> <p>As the proposed modifications are totally contained within the approved disturbance boundary (Project Approval 06-0014) for the project and will not require any modification to the footprint of the project, approval from the Commonwealth Minister for the Environment is not required for this proposal.</p>	No

### 3.3 NSW Legislation

#### 3.3.1 Environmental Planning and Assessment Act 1979

Mangoola Coal is seeking to modify the Project Approval for Mangoola Coal Mine, pursuant to Section 75W of the EP&A Act. The Minister for Planning is responsible for approving the proposed modifications.

#### 3.3.2 Other State Legislation

A summary of the other State legislation relevant to the proposed modifications is provided in **Table 3.2**.

**Table 3.2 - Summary of State Legislation and Relevance to the Proposed Modifications**

Act	Comments	Further Approval Required for Proposed Modifications
<i>Mining Act 1992</i>	<p>Mangoola Coal currently holds Mining Lease 1626 for the approved Mangoola Coal operations.</p> <p>As part of its Mining Lease requirements, Mangoola Coal must meet a number of conditions relating to safety, environmental management, waste disposal and payment of royalties to the State.</p> <p>Mangoola Coal will update the Mining Operations Plan (MOP) and submit it for approval to the Department of Industry and Investment (DII). The updated MOP will incorporate the changes proposed in this modification.</p>	Yes
<i>Coal Mine Health and Safety Act 2002</i>	<p>The principal aim of the <i>Coal Mine Health and Safety Act 2002</i> is to secure the objectives of the <i>Occupational Health and Safety Act 2000</i> in relation to coal operations. It does this by imposing certain specific safety requirements on coal mines. There are no requirements under the Act applicable to the proposed modifications.</p>	No
<i>Protection of the Environment Operations Act 1997</i>	<p>Mangoola Coal holds Environmental Protection Licence (EPL) No. 12894 for the Mangoola Coal operations.</p> <p>It is not anticipated that a modification to the EPL would be required as a result of this Project. Construction and operation of the MIA would be undertaken in accordance with controls specified in the EPL.</p>	No
<i>Water Management Act 2000</i>	<p>The proposed modifications will utilise the existing licences as part of the Mangoola Coal mine and no additional licences will be required under <i>Water Management Act 2000</i> (WM Act) for the proposed modifications.</p>	No
<i>Water Act 1912</i>	<p>There are no groundwater related works required as part of this modification, therefore there is no requirement for licences under Part 5 of the <i>Water Act 1912</i>.</p>	No
<i>Environmentally Hazardous Chemicals Act 1985</i>	<p>Under the <i>Environmentally Hazardous Chemicals Act 1985</i> a licence is required for any storage, transport or use of prescribed chemicals. Should such a licence be required under this Act as part of the Modification, Mangoola Coal or the relevant sub-contractor will obtain a licence prior to the storage, transport or use of prescribed chemicals.</p>	No
<i>Threatened Species Conservation Act 1995</i>	<p>Under the EP&amp;A Act, impacts on threatened species listed under the <i>Threatened Species Conservation Act 1995</i> (TSC Act) are required to be assessed.</p> <p>The proposed modifications are within the approved disturbance boundary for the Mangoola Coal mine and therefore no further approvals are required as part of this modification.</p>	No
<i>Heritage Act 1977</i>	<p>The <i>Heritage Act 1977</i> provides for the conservation and management of the State's built, marine, moveable and natural heritage.</p> <p>The proposed modifications are within the approved disturbance boundary for the Mangoola Coal mine and therefore no further approvals are required as part of this modification.</p>	No

**Table 3.2 - Summary of State Legislation and Relevance to the Proposed Modifications (cont)**

Act	Comments	Further Approval Required for Proposed Modifications
<i>Roads Act 1993</i>	<p>The <i>Roads Act 1993</i> determines the rights of the public and adjacent land owners to use public roads, and establishes procedures for the opening and closing of public roads. Under the <i>Roads Act</i>, applications are required to be made to the Minister for the closure of Crown roads and for works on public roads.</p> <p>The proposed modifications are within the approved disturbance boundary for the Mangoola Coal mine and will be accessed via the approved Northern Access Road. Therefore no further approvals are required as part of this modification.</p>	No
<i>Crown Lands Act 1989</i>	<p>The <i>Crown Lands Act 1989</i> provides for the administration and management of Crown land in the eastern and central divisions of the State.</p> <p>The proposed modifications are within the approved disturbance boundary for the Mangoola Coal Mine and therefore no further approvals are required as part of this modification.</p>	No
<i>Aboriginal Land Rights Act 1983</i>	<p>The <i>Aboriginal Land Rights Act 1983</i> provides for the constitution of local, regional and State Aboriginal Land Councils. Part 6 of the Act prescribes a mechanism for Land Councils to claim Crown land. No land rights claims currently exist over the Crown land within the Mangoola Coal project area. Therefore Part 6 of the Act is not relevant to this assessment.</p> <p>The proposed modifications are within the approved disturbance boundary for the Mangoola Coal mine and therefore no further approvals are required as part of this modification.</p>	No
<i>Dams Safety Act 1978</i>	<p>The <i>Dams Safety Act 1978</i> requires that large dams that may constitute a hazard to human life and property must be periodically reviewed by the NSW Dams Safety Committee. These dams are known as prescribed dams and are listed in Schedule 1 of the Act.</p> <p>The proposed modifications do not involve any dams that would require review by the Dams Safety Committee.</p>	No

### 3.4 Environmental Planning Instruments

#### 3.4.1 Muswellbrook Local Environmental Plan 2009

The provisions of the *Muswellbrook Local Environmental Plan 2009* (MLEP) regulate planning and development within the shire of Muswellbrook.

The aims of the MLEP include:

- (a) to encourage the proper management of the natural and human-made resources of Muswellbrook by protecting, enhancing or conserving:

- ...(ii) timber, minerals, soils, water and other natural resources. (clause 1.2(2)(a)(ii))
- (g) to provide a secure future for agriculture by expanding Muswellbrook's economic base and minimising the loss or fragmentation of productive agricultural land. (clause 1.2(2)(g)).

The proposed modifications are situated on land zoned E3 – Environmental Management in the MLEP. The land for the proposed location of the MIA is also listed as being Environmentally Sensitive Land under the MLEP. The MLEP permits extensive agriculture without consent, and a number of types of development with consent.

The Environmentally Sensitive Land designation means that (Part 7 additional local provisions MLEP):

- (3) Development consent must not be granted for development on environmentally sensitive land—biodiversity unless the consent authority is satisfied that the development satisfies the objective of this clause and:
  - (a) the development is designed and will be located and managed to avoid any potential adverse environmental impact, or
  - (b) if a potential adverse environmental impact cannot be avoided, the development:
    - (i) is designed and located so as to have minimum adverse impact, and
    - (ii) incorporates effective measures to remedy or mitigate any adverse impact caused.

The relocation of the MIA has been designed to minimise environmental impacts through the incorporation of appropriate sediment and erosion control measures and the commitment to plant a visual screen from the two viewpoints which will be affected by the proposed modification.

There is a note in the MLEP indicating that the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 may apply to land within this zone. Further information is provided on this State Environmental Planning Policy below.

### **3.4.2 State Environmental Planning Policies**

#### **3.4.2.1 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007**

The aims of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, also known as the Mining SEPP, are in recognition of the importance to New South Wales of mining, petroleum production and extractive industries, and are as follows:

- (a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and
- (b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and
- (c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.

As indicated above, the proposed location of the MIA is within the E3 zone of the MLEP. Clause 8 of the Mining SEPP relates to determination of permissibility of mining under local environmental plans. This is relevant where there are additional provisions relating to land, such as the designation of land as being Environmentally Sensitive.

Clause 8 states the following:

- (1) If a local environmental plan provides that development for the purposes of mining ... may be carried out on land with development consent if provisions of the plan are satisfied:
  - (a) development for that purpose may be carried out on that land with development consent without those provisions having to be satisfied, and
  - (b) those provisions have no effect in determining whether or not development for that purpose may be carried out on that land or on the determination of a development application for consent to carry out development for that purpose on that land.
- (2) Without limiting subclause (1), if a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if the consent authority is satisfied as to certain matters specified in the plan, development for that purpose may be carried out on that land with development consent without the consent authority having to be satisfied as to those specified matters.

Clause 7 of the Mining SEPP is also relevant as it allows for development permissible with consent under a number of circumstances including:

- (b) Mining carried out:
  - (i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or
- (d) facilities for the processing or transportation of minerals or mineral bearing ores on land on which mining may be carried out (with or without development consent), but only if they were mined from that land or adjoining land,

As noted in **Section 3.4.1** extensive agriculture is permitted in Zone E3 without consent, so therefore the operation of Clause 7 of the Mining SEPP applies to this modification.

## 4.0 Existing Environment and Impact Assessment

### 4.1 Identification of Key Issues

The proposed MIA is situated in the eastern portion of the approved disturbance area (refer to **Figure 1.2**). The land associated with the new location of the MIA is owned by Mangoola Coal. The proposed minor changes to the CHPP are located within the approved location for the CHPP, also within the approved disturbance area (refer to **Figure 1.2**). The proposed location of the MIA is on the northern side of the existing 500 kV transmission line that bisects the site.

The proposed locations of the MIA and the CHPP have previously been assessed and approved for ground disturbance as part of the Mangoola Coal Project Approval (PA 06\_0014). Therefore, the environmental values of these areas (including ecology, Aboriginal archaeology and historic heritage) have been previously assessed and the areas approved for disturbance for open cut mining and associated purposes. As such, further assessment of footprint related issues, such as ecology, Aboriginal archaeology and historic heritage are not considered relevant for the proposed modifications.

In addition to the issues noted above, no further assessments relating to traffic, socio-economic and greenhouse gas and energy (GHG&E) have been undertaken for the proposed modification. The proposed modifications involve the relocation of components of the approved mine infrastructure, and involve no increases to production rates, and no changes to the mining methods or access to the site. Consequently, this modification does not result in any material change to traffic, socio-economic or GHG&E impacts associated with the Project. However, other environmental issues that relate to potential offsite impacts have been assessed for the proposed modifications. These include visual, air quality, noise and surface water assessments as outlined in the following sections.

### 4.2 Visual Impact Assessment

An assessment on the visual impacts associated with the proposed modifications has been undertaken by the visual consultant O'Hanlon Design Pty Limited (O'Hanlon Design). The full report is attached as **Appendix 1**.

The objective of the visual impact assessment was to assess the visual impact of the relocation and amendments to the MIA and CHPP.

This assessment included a site inspection conducted on 4 August 2009 and comparisons were made with the visual assessment undertaken as part of the Anvil Hill EA (Umwelt, 2006). During the inspection the heights of vegetation was surveyed in four locations within the approved disturbance boundary to quantify the current height of vegetation adjacent to the proposed MIA (refer to **Appendix 1**). The purpose of the assessment was to determine the potential screening of the vegetation that would remain after clearing of the MIA benched area and the effect of the screening on the visibility of the MIA.

The assessment utilised the same View Points (VP) as the original Anvil Hill Environmental Assessment (Umwelt, 2006). These areas were selected to provide the worst case scenarios for the visual assessment of the project. The view points were originally selected based on the surrounding topography and relationship with components of the project sites.

Similar to the original facilities location, the proposed location of the MIA remains within the moderate to high scenic quality zone. It is located on the edge of the plateau facing east

towards Mangoola Road and is therefore still closest to VP1, VP2, VP3 and VP4 (refer to **Figure 4.1**). The base level of the main infrastructure elements was originally designed as between RL180 and RL185. The proposed base level has been revised to approximately RL195. The office and bath house building has been reoriented and now faces north/south. The workshop building (approximately 20 metres high) will now have a finished level of approximately RL215. Light towers around the buildings and workshop of the MIA will also have a finished height of approximately RL212. The workshop roof access tower will have a finished level of approximately RL217. These levels are approximately 10 metres higher than the original levels.

The CHPP remains in a similar location to the original design. The main elements in the CHPP area are the rejects bin, ROM pad, the surge bin and the CPP building. These items are all set at varying levels based around RL190 and have varying heights. The original base assessment level was RL180 to RL185. The original assessment assumed an overall development height of RL210 to RL215. However specific details of the rejects bin height and its location were not assessed. The amended design data indicates the rejects bin exceeds the original assessment parameters by approximately 3 metres.

With the exception of VP3 the assessment of the changes indicates that the relocation of the MIA will remain consistent with the original assessments completed as part of the Anvil Hill EA (Umwelt, 2006). In each case the incremental increase or decrease is not significant enough to warrant a change in rating.

At VP3, on the corner of Mangoola and Roxburgh Road, the relocation of the MIA will potentially increase the impact from moderate to moderate/high. This is due to a combination of the more prominent close middle ground location of the MIA on the north east facing edge of the ridge and the prominent location of the viewing point at the junction of these secondary travel routes. There are no privately owned residences in the vicinity of VP3 and the increase in impacts is only likely to affect passing traffic. The privately owned residences further to the north, east and south of VP3 are located on the eastern side of natural topographic features.

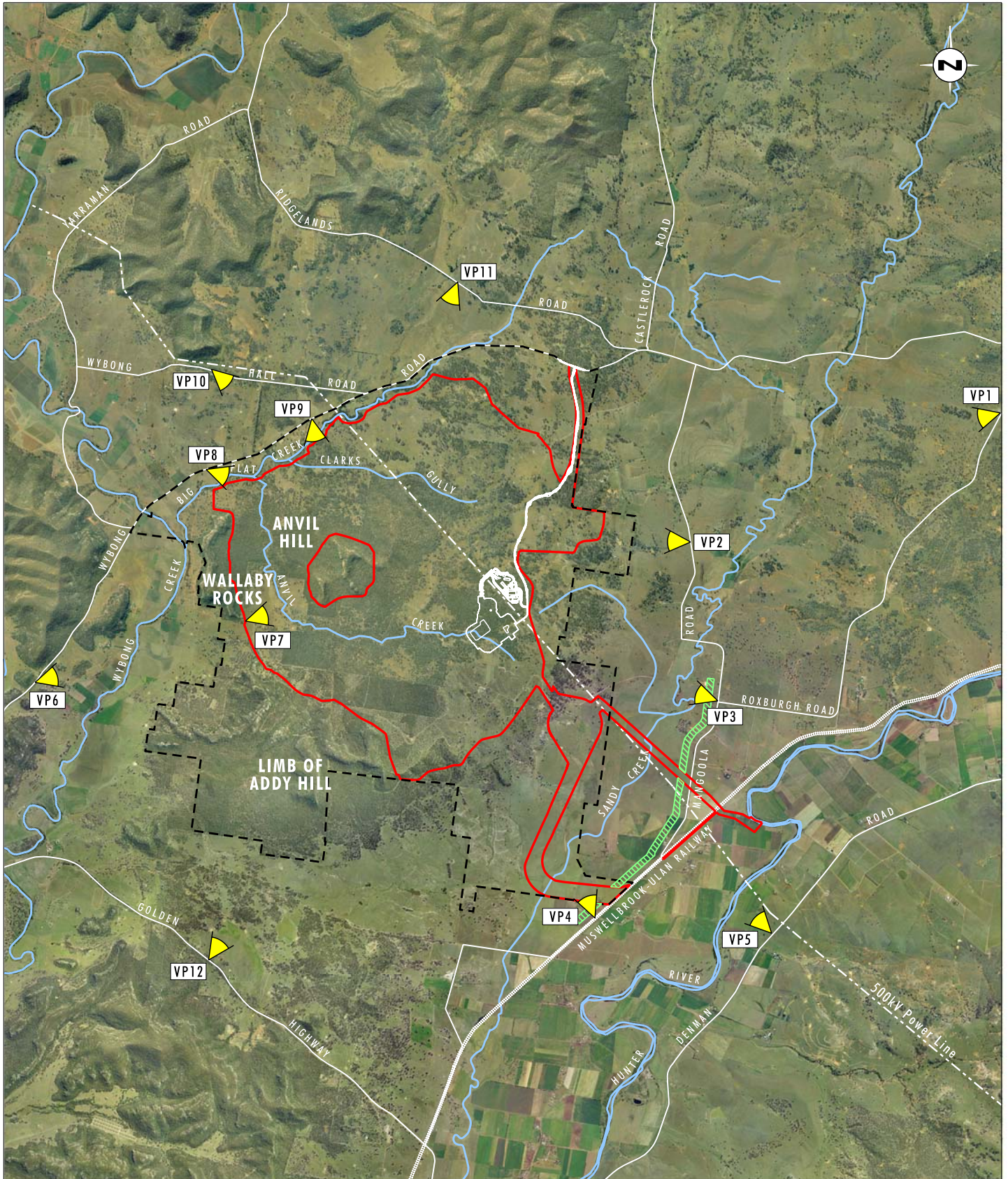
The site vegetation assessment has revealed that insufficient screening will remain on the southern and eastern slope below the MIA to screen the building from viewers at VP2, VP3 and VP4.

#### 4.2.1 Mitigation Measures

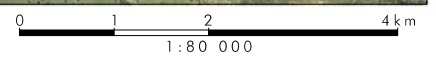
To mitigate the visual impacts of the proposed location of the MIA Mangoola Coal proposes the creation of a planting screen along the western edge of Mangoola Road from VP4 (south of the MIA) to the northern side of VP3 (refer to **Figure 4.1**). The proposed planting screen will be designed to be:

- quick growing;
- adjacent to the western edge of the road; and
- provide screening between 1 metres and 3 metres above the level of the carriageway.

The mitigation measures outlined above would result in the planting screen, upon maturity, screening the potential visual impacts to viewers from VP3 and VP4. The planting of the visual screen is due commence in late 2009.



Source: Umwelt (2006)



**Legend**

- ▭ Proposed Disturbance Area
- Project Area
- ▲ Viewpoint
- VP6 Viewpoint Number
- Proposed Vegetation Screening

FIGURE 4.1

Visual Assessment Locations

### 4.3 Air Quality Impact Assessment

An assessment on the impacts associated with the proposed modifications has been undertaken by Sinclair Knight Merz Pty Limited (SKM). The full report is attached as **Appendix 2**.

The assessment undertaken by SKM was an air quality assessment of the difference between two configurations for mine facilities at the Mangoola Coal mine, being the approved configuration and the proposed modified configuration (refer to **Figure 1.2**). The assessment was based on a review of the mine facilities and identification of key dust generating sources. Potential changes to dust emissions were examined, in the context of the total dust emissions from the site, and the likely changes to off-site air quality impacts were assessed.

Dust emissions will arise from various sources at the mine facilities, the key sources being:

- wind erosion from the ROM pad and product stockpiles;
- unloading of coal to stockpiles and trains;
- pushing ROM and product coal by dozers; and
- handling ROM coal at the CHPP.

The proposed changes will affect wind erosion from the ROM pad and product stockpile. In addition, the change to the location of the ROM pad will also slightly increase (approximately 100 metres) the distance for trucks hauling coal from the pits. None of the activities at the MIA will be significant sources of dust. The approach to this assessment has been to quantify the likely change to total dust emissions from the mine, considering the proposed changes to the mine facilities. This was done by updating the dust emission calculations, presented in the Anvil Hill EA (Holmes Air Sciences in Umwelt, 2006). The following modifications were made to the Anvil Hill dust emissions inventory:

- area of ROM pad set to approximately 3.5 hectares (a decrease in size of approximately 0.9 hectare from the approved mine);
- area of product stockpile set to approximately 5 hectares (an increase in size of approximately 1 hectare from the approved mine); and
- length of haul route from pits to ROM hopper increased by approximately 100 metres, where relevant.

The changes to the dust emissions inventory were made to demonstrate the change in total dust emissions for each stage of operation.

The calculations show that the total dust emissions will be very similar for both the approved mine and the mine with the proposed modification to facilities. The difference between these two scenarios is less than 0.1 per cent. Typically, the percentage change to dust emissions will translate into approximately the same percentage change to off-site dust concentrations and deposition levels, as predicted by an air dispersion model (ISCST3 in this instance). This level of change to off-site air quality impacts will be undetectable.

The change in total dust emissions was found to be insignificant for all assessment years. The assessment concluded that the proposed changes to the mine facilities will have a negligible effect on off-site air quality, compared to the approved mine.

## 4.4 Noise Impact Assessment

An assessment of the impact of the proposed location of the MIA has been undertaken by acoustics consultants Wilkinson Murray Pty Limited (Wilkinson Murray). The full report is provided as **Appendix 3**.

The Wilkinson Murray assessment has examined the impact of the proposed new location of the MIA compared to the currently approved location. This was achieved through running the noise model Cadna A which takes into account equipment noise levels and location, ground topography, ground and air absorption and distance attenuation.

Point source calculations were made at six surrounding residences (one of these, residence number 10, is now mine owned), which were predicted under still isothermal daytime conditions. These meteorological conditions were chosen to provide a comparative assessment, to determine the need or otherwise for further analysis. Similarly, day time scenarios were used to provide a point of comparison. The comparative results of this assessment are provided in **Table 4.1**.

**Table 4.1 - Comparative Results for the Predicted Noise Levels Associated with the Proposed Modifications (Day time)**

Residence Number	Noise Level (dB(A)) – EA Design	Noise Levels (dB(A)) – Proposed Mangoola Design	Predicted Noise Level Changes
10	21.1	20.0	-1.1
25	28.2	28.1	-0.1
83	16.8	17.8	+1.0
96A	21.4	20.8	-0.6
198	18.4	17.3	-1.1
125E	21.2	20.4	-0.8

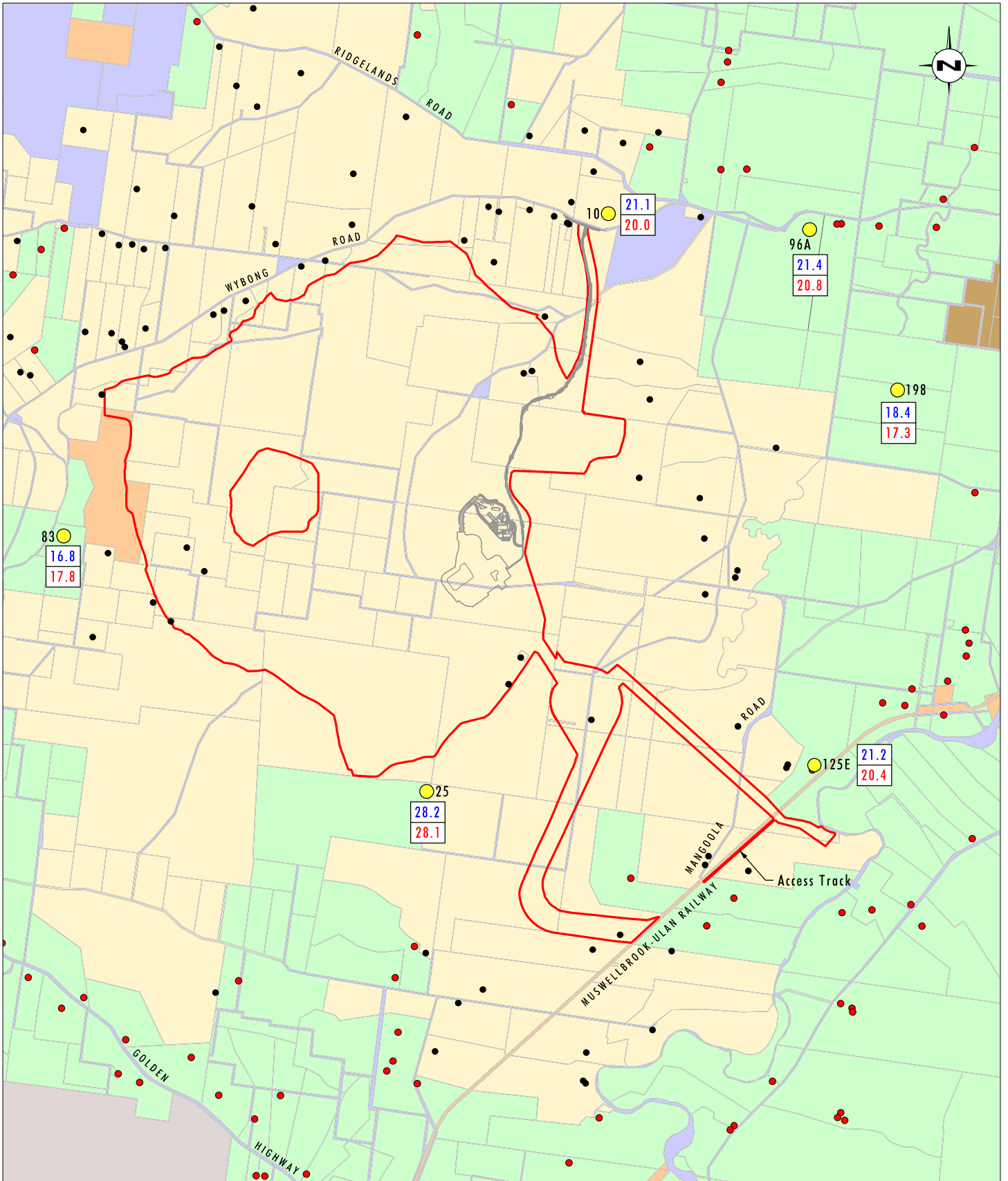
The range of changes in noise levels associated with the proposed modifications at these residences ranged from -1.1 dB(A) to +1.0 dB(A) (refer to **Table 4.1**), with a reduction predicted at five of the six residences (residence numbers 10, 25, 96A, 198 and 125E).

A slight increase of 1.0 dB(A) is expected at the closest residence on the western side of the mine (refer to **Figure 4.2**). This residence, number 83, is located immediately south of Wallaby Rocks and, in relation to noise generated by the MIA, has a predicted noise level of 17.8 dB(A) (refer to **Table 4.1**).

### 4.4.1 Cumulative Impacts

In general, the relocation of the MIA has resulted in a reduction in noise levels from infrastructure sources at properties to the north, north-east, south and south-east of the mine. A slight increase is expected at the residence assessed to the west of the site (residence number 83). It is worth noting that this property has acquisition rights due to air and blasting impacts following the original EA (Umwelt, 2006).

**Table 4.2** below presents the potential worst case scenario (for all years) for day time noise impacts (i.e. noise generated from the MIA, CHPP and mining operations) identified as part of the original assessment (Umwelt, 2006). These figures are presented for all six assessed residences. The table also includes the noise impact assessment criteria that apply to the Mangoola Coal project. The 2006 values are provided as context, rather than to facilitate a



Source: Dept. of Lands (2003), Wilkinson Murray (2009)

0 1 2 3 km  
1:60 000

**Legend**

- Approved Project Disturbance Boundary
- Private Residence
- Mine Owned Residence
- Assessed Residence Location

28.2 Noise Levels (dB(A)) from MIA (day time scenario) Approved Project  
28.1 Noise Levels (dB(A)) from MIA (day time) Proposed Modification

**Land Ownership Status:**

- Xstrata Mangoola Pty Limited
- Crown Land
- The State of NSW
- Private
- Other Mine Owned

FIGURE 4.2

Residence Locations used for Noise Assessment

direct comparison of noise levels. The MIA noise assessment is based on still daytime isothermal conditions, whereas the 2006 assessment has calculated 10<sup>th</sup> percentile operational noise levels under the full range of weather conditions.

**Table 4.2 - Calculated Noise Levels (Day time)  
and Noise Impact Assessment Criteria**

Residence Number	Worst case day time noise levels EA Design (dB(A))	Noise impact assessment criteria Day dB(A) <sub>L<sub>Aeq</sub>(15 minute)</sub>
10	44	*
25	54	**
83	35	***
96A	34	34
198	34	34
125E	36	36

Source for noise impact assessment criteria: Project Approval for Application 06\_0014 Schedule 3 Clause 3, Table 1 as modified 23 June 2009

Note:

\* indicates that property has already been acquired by Mangoola Coal

\*\* - indicates landowner already has acquisition rights due to impacts from noise and blasting.

\*\*\* - indicates that landowner already has acquisition rights due to impacts from air and blasting.

As there is a reduction in noise levels predicted at the three properties that do not already have acquisition rights (residence numbers 96A, 198 and 125E), the modification will not result in any increase in noise impact at these properties.

#### 4.4.1.1 Impacts on residence number 83

Residence number 83 was identified as being marginally affected by operational noise (i.e. worst case scenario of 35 dB(A) at Year 20 in the day time and evening) in the original Anvil Hill Project assessment (Umwelt, 2006)<sup>1</sup>. The marginal change arising from the modification to the MIA will not result in a cumulative noise impact (from the MIA and the operation of the mine) at this property exceeding the land acquisition criteria for noise of 40 dB(A) set for the project. That is, the predicted noise level including the proposed modification will not result in a significant impact from noise at this property. It is relevant to note that residence number 83 is already listed in Appendix 5 of the Project Approval as a landowner with acquisition rights. This is due to the predicted impacts at this property arising from air quality and blasting.

On the western side of the mine, residence number 83 is the closest privately owned property. There is some vacant land immediately to the south of this property. However, any additional impacts from noise are expected to be of a similar nature to those assessed at residence number 83 – that is around 1 dB(A). Given that this area had a predicted noise level of less than 37 dB(A) as part of the Anvil Hill Project EA (Umwelt, 2006), it is considered that any impacts from noise arising the change in location of the MIA will not be significant. Therefore, no additional privately owned properties – either vacant or occupied – will be adversely affected by noise due to the proposed modification.

<sup>1</sup> Refer to Appendix C, page C-2 Calculated 10<sup>th</sup> Percentile Operational Noise Levels to Anvil Hill Project Noise and Vibration Assessment, Wilkinson Murray, August 2006

In summary, this comparative assessment confirms that the cumulative effect of the noise generated from the already approved mine means that the noise generated by the MIA on its own is not acoustically significant and the modifications have no detrimental noise impact.

## 4.5 Surface Water Assessment

The aspects of the proposed modification that may impact on surface water management include:

- relocation of the MIA (including administration building, heavy vehicle workshop, car park and other associated facilities) to a location approximately 1 kilometre north north-east of the approved location;
- change in orientation of the CHPP building from the north-east/south-west to north-west/south-east; and
- re-positioning of the ROM stockpile pad approximately 100 metres to the south of the approved location.

The proposed modifications are shown on **Figure 1.2**. Vehicle access to the MIA will be via the existing approved northern access road.

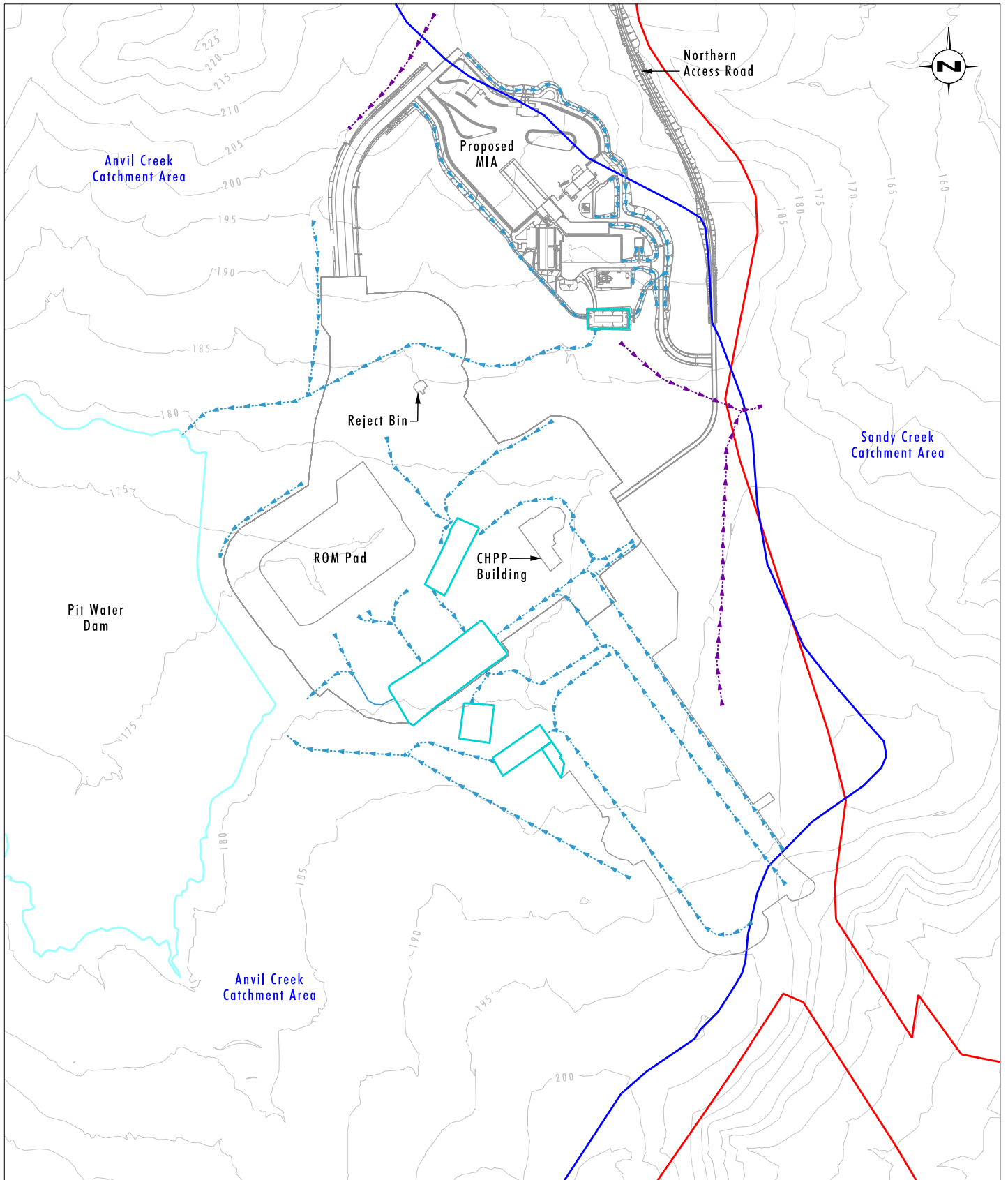
The proposed MIA location lies within the catchment areas of Anvil Creek and Sandy Creek. The proposed modifications to the CHPP layout lie within the catchment area of Anvil Creek. The current approved development within Anvil Creek catchment area includes water management infrastructure, the Main Pit and South Pit, haul roads, overburden emplacement areas, coal handling facilities and the coal preparation plant. The relocation of the MIA and the proposed minor changes to the CHPP will result in no change to the approved disturbance footprints within the Anvil Creek catchment area.

Approximately 1.6 hectares of the footprint of the proposed MIA is located in the Sandy Creek catchment area. It is also proposed, in accordance with the strategies contained within the *Xstrata Mangoola Site Water Management Plan*, to divert runoff from an undisturbed area of approximately 12 hectares of the Anvil Creek catchment area upslope of the CHPP location to the Sandy Creek catchment area (refer to **Figure 4.3**). Final design of the diversion and associated water management works will ensure there is no exceedance of the hydraulic capacity (i.e. flow rates and velocities) of the receiving tributary of the Sandy Creek drainage system.

Sandy Creek has a catchment area of approximately 14,520 hectares. The existing approval included disturbance of an estimated 405 hectares (i.e. 2.8 per cent based on conceptual design) of the Sandy Creek catchment area for sections of the Southern Pit, a tailings dam, access road, conveyor, rail loading facilities and the rail loop. The proposed modification will result in a net minor increase in the catchment area of Sandy Creek of less than 0.1 per cent. This will result in a very minor increase in annual flow volumes within Sandy Creek in comparison to the currently approved development.

### 4.5.1 Water Management Strategy

The water management strategy for the MIA has been designed by Parsons Brinckerhoff to minimise the potential impacts on the surrounding environment and downstream catchment areas. The objectives of the water management strategy are to:



Source: Parsons Brinckerhoff

0 100 200 400 m  
1:10 000

**Legend**

- Approved Mine Disturbance Boundary
- Catchment Boundary
- Sediment/Control Dam
- - - Diversion Drain
- . - . Catch Drain

FIGURE 4.3

Conceptual Water Management Controls for MIA and CHPP

- maintain water quality in downstream drainage systems;
- minimise the erosion potential of the site; and
- integrate the MIA into the Mangoola Coal water management system.

The proposed water management system for the MIA is consistent with the strategies outlined in the Anvil Hill Project EA (Umwelt, 2006) and the *Xstrata Mangoola Site Water Management Plan* (GSS, 2008).

It is proposed to separate clean and dirty water management systems by a series of diversion drains, catch drains, culverts and sediment/control dams (refer to **Figure 4.3**).

Major diversion drains and catch drains will be sized to safely convey the 100 year Average Recurrence Interval (ARI) critical storm duration to downstream systems. Diversion drains and catch drains will typically be vegetated and constructed with longitudinal grades of 0.6 per cent to 1 per cent and 1:3 (vertical:horizontal) side batters to ensure that the design flow velocities are non-scouring. Rip rap and geotextile liners will be used in drains where required (i.e. typically where grades exceed 1 per cent) to minimise potential erosion. Rock protection and energy dissipation structures will be installed at the downstream outlets, to ensure that runoff does not cause scour or erosion in downstream drainage systems.

The dirty water management system includes a series of catch drains and sediment/control dams located to capture and treat runoff from hardstand areas. All hardstand areas will be free draining. The runoff from the disturbed areas will be treated and used in the mine water management system.

The dirty water management system will be designed in accordance with *Managing Urban Stormwater: Soils and Construction* (the Blue Book), *Volumes 1 and 2E - Mines and Quarries* (Landcom, 2004 and 2008) to treat and convey runoff from the 10 year ARI storm event. The sediment/control dams will be emptied by a combination of gravity and pump and pipe systems after rainfall events.

Two oil/water separators are proposed to be located in the MIA to treat oil and fuels upstream of the proposed sediment dam.

## **4.5.2 Erosion and Sediment Control**

### **4.5.2.1 Construction**

This surface water assessment has been conducted on the basis that erosion and sediment control measures will be incorporated into the detailed construction plans for the proposed MIA and changes to the CHPP. The proposed erosion and sediment control measures are consistent with the existing *Xstrata Mangoola Erosion and Sediment Control Plan*, which details the measures to minimise soil erosion and sedimentation during construction and mining operations.

All erosion and sediment control measures will be consistent with the objectives of the existing *Xstrata Mangoola Site Water Management Plan* and *Xstrata Mangoola Erosion and Sediment Control Plan*, and will be carried out in accordance with relevant guidelines for erosion and sediment control, including:

- *Draft Guidelines for the Design of Stable Drainage Lines on Rehabilitated Mine sites in the Hunter Coalfields* (DIPNR, undated); and
- *Managing Urban Stormwater Soils and Construction* (the Blue Book) *Volume 1* (Landcom, 2004) and *Volume 2E: Mines and Quarries* (Landcom, 2008), where relevant.

The erosion and sediment control measures proposed to be adopted for the construction of the MIA to control the quality of runoff include:

- establishment of erosion and sediment control measures prior to the commencement of any substantial construction works, as required;
- regular inspection of erosion and sediment control measures, to ensure controls are performing adequately;
- maintenance of erosion and sediment control measures, as required;
- applying soil ameliorant, where required, to reduce the dispersibility of the subsoils that will be disturbed and to minimise the potential for tunnel erosion and surface rilling of disturbed or reshaped areas, with the application rate to be determined by site specific soil testing as required;
- hydromulching of disturbed ground surface areas to provide for rapid revegetation. Areas will be seeded with an appropriate species mix specific to the needs of the area to be grassed;
- provision for the immediate repair or redesign of sediment and erosion controls that are not performing adequately; and
- stockpiles that are to remain undisturbed for periods of greater than six months are to be grassed.

In addition, the construction plans will detail the specific inspection, maintenance and revegetation requirements for the proposed MIA and changes to the CHPP based on the construction program schedule.

#### **4.5.2.2 Operations**

The proposed MIA and changes to the CHPP will be incorporated into the Xstrata Mangoola Coal Mine Water Management System. The MIA will be operated and managed in accordance with the *Xstrata Mangoola Site Water Management Plan* and the *Xstrata Mangoola Erosion and Sediment Control Plan*.

#### **4.5.3 Decommissioning**

The final landform and associated drainage will be addressed in detail in the Mine Closure Plan, which will be prepared at least two years prior to mine closure.

Native vegetation will be planted along any reinstated drainage channels as part of rehabilitation of the site. This is proposed to maximise the long term stability of the drainage system that will be constructed on filled and reshaped material. In-stream features such as meanders, pools and pool and riffle sequences can be designed into this drainage pathway, as necessary, to enhance the in-stream and riparian habitat created.

## 4.6 Ecologically Sustainable Development

The principles of Ecologically Sustainable Development (ESD) must be considered in the environmental impact assessment process as required by the Environmental Planning and Assessment Regulation. To justify the Project with regard to the ESD principles the benefits of the Project in an environmental and socio-economic context should outweigh any negative impacts. The ESD principles encompass the following:

- the precautionary principle;
- inter-generational equity;
- conservation of biological diversity; and
- improved valuation and pricing of environmental resources.

### 4.6.1 The Precautionary Principle

The EP&A Regulation defines the precautionary principle as:

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- (ii) an assessment of the risk-weighted consequences of various options.

In order to apply the precautionary principle, a proposal needs to ensure that there has been careful evaluation of all aspects and that every stage in the assessment and decision making process has been transparent. This EA covers an extensive and careful evaluation of all the Project components. Detailed assessment of potential impacts and necessary mitigation measures, if any, have been conducted as part of the EA (Umwelt, 2006) for the Anvil Hill Project and are also documented in this EA.

### 4.6.2 Intergenerational Equity

The EP&A Regulation defines the Intergenerational Equity as:

Intergenerational equity namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

Social equity involves concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fairer distribution of costs and benefits to improve the well being and welfare of the community, population or society (DUAP, 1997).

Intergenerational equity refers to equality between generations. It requires that the needs and requirements of today's generations do not compromise the needs and requirements of future generations in terms of health, bio-diversity and productivity.

The mitigation measures discussed in this EA have been developed to minimise the impact of the Project on the environment to the greatest extent reasonably possible. The

management of environmental issues as proposed will maintain the health, diversity and productivity of the environment for future generations.

#### **4.6.3 Conservation of Biological Diversity**

The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. Environmental components, ecosystems and habitat were considered in the EA (Umwelt, 2006) for the Anvil Hill Project. No additional impacts will result from the proposed modifications as the area affected is completely within the approved disturbance boundary.

#### **4.6.4 Valuation and Pricing of Resources**

The goal of improved valuation of natural capital has been included in Agenda 21 of Australia's Intergovernmental Agreement on the Environment. The principle of improved valuation and pricing refers to the need to determine proper values of services provided by the natural environment. The objective is to apply economic terms and values to the elements of the natural environment. This is a difficult task largely due to the intangible comparisons that need to be drawn in order to apply the values.

The proposed modifications appropriately value the environmental resources by designing the Project to avoid and minimise potential environmental impacts as much as possible. Where residual impacts remain, mitigation measures (refer to **Section 4.0**) are proposed to further reduce potential impacts on the environment.

## 5.0 Conclusion

The relocation of the MIA and the minor changes to the CHPP proposed in this EA are wholly within the disturbance boundary approved for the Mangoola Coal Mine (PA 06\_0014). The proposed modifications allow for a safer working environment for the operation of the mine by separating the main offices and workshop from the CHPP. The potential environmental impacts associated with the proposed modifications are not considered to be significant on the surrounding environment. In conclusion, the relocation of the MIA and the minor changes to the CHPP proposed in this EA provide a safer working environment with minimal environmental impact.

## 6.0 References

Department of Urban Affairs and Planning (DUAP), 1997, *Upper Hunter Cumulative Impact Study and Action Strategy*, NSW Government

Landcom, (2008). *Managing Urban Stormwater: Soils and Construction – Volume 2E: Mines and Quarries*, NSW Government

Landcom, (2004). *Managing Urban Stormwater: Soils and Construction – Volume 1*, NSW Government

Umwelt (Australia) Pty Limited (Umwelt), 2006, *Anvil Hill Project Environmental Assessment*, Prepared for Centennial Hunter Pty Limited

## 7.0 Abbreviations and Glossary

### 7.1 Abbreviations

CHPP	Coal Handling and Preparation Plant
dB	Decibel
dB(A)	A-weighted decibel
DII	Department of Industry and Investment (NSW)
DoP	Department of Planning (NSW)
EA	Environmental Assessment
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
EPL	Environmental Protection Licence
ESD	Ecologically Sustainable Development
kV	Kilovolt (1000 volts)
LEP	Local Environmental Plan
LGA	Local Government Area
m	metres
ML	Megalitres
MIA	Mining Infrastructure Area
MOP	Mining Operations Plan
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
RL	Relative Level (m AHD)
ROM	Run of mine
SEPP	State Environmental Planning Policy
TSC Act	Threatened Species Conservation Act 1995 (NSW)
Umwelt	Umwelt (Australia) Pty Limited
Yr	Year

## 7.2 Glossary

Amenity	An agreeable feature, facility or service which makes for a comfortable and pleasant life
Background Noise	Existing noise in the absence of the sound under investigation and all other extraneous sounds
Catchment Area	The area from which a river or stream receives its water
Conservation	The management of natural resources in a way that will preserve them for the benefit of both present and future generations
dB (Decibel)	A unit for expressing the relative intensity of sounds on a logarithmic scale from zero (for average least perceptible sound) to about 130 (for the average pain level)
dB(A)	A modified decibel scale which is weighted to take account of the frequency response of the normal human ear
Ecology	The science dealing with the relationships between organisms and their environment
Ecosystem	Organisms of a community together with its non-living components through which energy and matter flow
Environmental Planning and Assessment Act 1979	NSW Government Act to provide for the orderly development of land in NSW
Environment Protection and Biodiversity Conservation Act 1999	Commonwealth legislation that regulates development proposals that have an actual or potential impact on matters of national environmental significance
Habitat	The environment in which a plant or animal lives; often described in terms of geography and climate
kV (Kilo Volt)	One thousand volts
Megalitre (ML)	One million litres
Mitigate	To lessen in force, intensity or harshness. To moderate in severity
Protection of the Environment Operations Act 1997	NSW legislation administered by Department of Environment, Climate Change and Water that regulates discharges to land, air and water
Rehabilitation	The process of restoring to a condition of usefulness

Run of mine (ROM)	Bulk material extracted from a mine, before it is processed in any way
Sedimentation	Deposition or settling of materials by means of water, ice or wind action
Sediment Dam	A dam built to retard dirty runoff to allow sediment to settle out before allowing clean water discharge
Surface Infrastructure	Any man made object, facility or structure on the surface of the land
Topography	Description of all the physical features of an area of land and their relative positions, either in words or by way of a map