ANVIL HILL MINE
MODIFICATION TO PROJECT APPROVAL

ENVIRONMENTAL ASSESSMENT

Prepared by:

HANSEN BAILEY
6 / 127-129 John Street
SINGLETON NSW 2330

April 2008

for:

XSTRATA MANGOOLA PTY LTD
1st Floor, Westpac Building
39-43 Bridge Street
MUSWELLBROOK NSW 2333

ENVIRONMENTAL ASSESSMENT STATEMENT

Submission of Environmental Assessment

Under Section 75W of the
Environmental Planning and Assessment Act 1979

EA Prepared by	
Name:	James Bailey
Qualifications:	B. Natural Resources, MBA
Address:	Hansen Bailey Pty Limited PO Box 473 SINGLETON NSW 2330
In Respect Of:	Anvil Hill Mine Modification to Project Approval (06_0014)
Applicant Name:	Xstrata Mangoola Pty Limited
Applicant Address:	1st Floor, 39-43 Bridge Street MUSWELLBROOK NSW 2333
Land to be Developed:	See Appendix 1 of Project Application (06_0014 (MOD 2))
Proposed Development:	Modification to Project Approval as described in **Section 3.0** of the Environmental Assessment.
Environmental Assessment:	An Environmental Assessment for the Project is attached.
Certification:	I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge: • It is in accordance with Sections 75E and 75F of the *Environmental Planning and Assessment Act 1979*; • It contains all available information that is relevant to the environmental assessment of the activity to which the statement relates; and • The information contained in the statement is neither false nor misleading.
Signature:	
Name:	James Bailey Director Hansen Bailey Pty Limited
Date:	April 2008

EXECUTIVE SUMMARY

BACKGROUND

Project Approval (06_0014) was granted by the Minister for Planning on 7 June 2007 under the *Environmental Planning & Assessment Act 1979* to construct and operate the Anvil Hill open cut coal mine. The Project Approval is supported by the Anvil Hill Project Environmental Assessment (Umwelt, 2006).

Anvil Hill Mine is owned by Xstrata Mangoola and is located near Wybong, approximately 20 km west of Muswellbrook in the Upper Hunter Valley. The Anvil Hill Mine has approval to extract coal from an undeveloped coal reserve at up to 10.5 Million tonnes per annum run of mine coal over 21 years from the granting of a mining lease.

No on-site development works associated with the construction and/or operation of the Anvil Hill Mine have been commenced on the site to date.

THE MODIFICATION

Xstrata Mangoola seeks approval from the Minister for Planning for a modification to the Project Approval under Section 75W of the *Environmental Planning & Assessment Act 1979* to amend the timing at which specific components of the approved Anvil Hill Mine may occur.

Specifically, Xstrata Mangoola seeks approval to commence defined Early Works activities (consistent with the Anvil Hill Environmental Assessment) in parallel with the approved Wybong Road Upgrade.

The Modification will also facilitate access to the mine site for the purposes of conducting the Early Works by an alternate route to that presented in the Anvil Hill Environmental Assessment (i.e. the Bengalla Link Road (Stage 2) which has not yet been constructed).

Table 1 provides a summary of the key components of the Modification.

Table 1
Modification Summary

Feature	Description
Modification Name	Anvil Hill Mine Modification to Project Approval 06_0014
Proponent	Xstrata Mangoola Pty Limited
Modification Application Area	The area shown as the approved EA Boundary in **Figure 2**.
Project Description	• Alteration of the timing of the approved Early Works comprising: o Construction and use of the Northern Access Road and associated intersection with Wybong Road; o Establishment of a temporary site office, associated amenities and compound; o Excavation of a borrow pit for the supply of select material for civil works and disposal of unsuitable material; o Establishment of a construction pad for the Coal Handling and Preparation Plant; and o Development of temporary access roads. • Short-term site access for the Early Works from Wybong Road in lieu of the Bengalla Link Road (Stage 2) which is yet to be constructed.

STAKEHOLDER CONSULTATION

Stakeholder consultation was undertaken for the Modification with relevant regulators and near neighbour. The stakeholder consultation strategy was confirmed at a meeting with DoP and included personal briefings, presentations and correspondence. Issues raised in relation to the Early Works and the alternative site access have been included in this Modification Environmental Assessment.

IMPACT ASSESSMENT

A relevant level of impact assessment was undertaken in relation to soil and water management, traffic management, noise and dust, flora and fauna, heritage (both Aboriginal and Non-Aboriginal) and waste in accordance with the Director-General's Environmental Assessment Requirements. These assessments were undertaken in accordance with relevant State Government technical and policy guidelines.

Activities associated with, and impacts from, the Early Works are consistent with those approved in the Anvil Hill Environmental Assessment and Project Approval. Cumulative impacts from the undertaking of the Wybong Road Upgrade in parallel with the Early Works are also within approved impacts. Traffic and noise impacts from vehicles utilising the alternate site access, due to the Bengalla Link Road (Stage 2) not being completed, are also predicted to be negligible.

MANAGEMENT & MITIGATION PLAN

A detailed Management and Mitigation Plan has been developed to incorporate the Early Works, alternative transport route and cumulative impacts from the undertaking of these activities in parallel with the approved Wybong Road Upgrade.

The Management and Mitigation Plan includes procedures for: soil and water, traffic, noise and dust, flora and fauna, heritage (both Aboriginal and Non-Aboriginal) and waste in accordance with the Director-General's Environmental Assessment Requirements.

CONCLUSION

The Modification sought relates to that of the timing of preliminary mine site preparatory works. The conduct of these Early Works in conjunction with the adjacent public road upgrade is a logical proposition which will result in an effective and efficient outcome for both the Anvil Hill Mine and for the local community.

Commencing the Early Works with the Wybong Road Upgrade will provide a site office, a local source for select civil materials and a suitable disposal site for unsuitable road material in the immediate vicinity of both activities. Additionally, the undertaking of both activities in parallel will reduce the quantity of materials required to be hauled to and from external sources on the local public road network. A reduction in ancillary construction traffic flows on local roads by providing amenities in close proximity to the approved Wybong Road Upgrade will also result.

The environmental assessments conducted have confirmed that the impacts from the activities described as Early Works are consistent with that already approved by the Project Approval and are minor in nature. The assessments show that commencing the Early Works in conjunction with the upgrade of the Wybong Road will result in a net decrease in the overall impacts compared to undertaking the Early Works following the completion of the Wybong Road Upgrade. The requirement for the use of an alternate site access is required due to the Bengalla Link Road (Stage 2) not being constructed. The environmental assessments show that this temporary, short-term access required to complete the Early Works will not result in a significant impact on the environment or community.

The principles of Ecologically Sustainable Development were considered in detail in relation to the Project, with which the proposed Modification is consistent. The conclusion of the Director-General's Report after the analysis of the competing benefits and disbenefits of the Anvil Hill Mine stated that the Department is satisfied, on balance, that the benefits would sufficiently outweigh its residual costs, and that it is therefore in the public interest.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 BACKGROUND

1.1 INTRODUCTION

Project Approval (06_0014) was granted by the Minister for Planning on 7 June 2007 under the *Environmental Planning & Assessment Act 1979* (EP&A Act) to construct and operate the Anvil Hill open cut coal mine (Anvil Hill Mine). The Project Approval is supported by the "Anvil Hill Project Environmental Assessment" (Umwelt, 2006) dated August 2006 (the EA).

Anvil Hill Mine is owned by Xstrata Mangoola Pty Limited (Xstrata Mangoola) and is located near Wybong, approximately 20 kilometres (km) west of Muswellbrook and approximately 10 km north of Denman in the Muswellbrook Local Government Area.

The Anvil Hill Mine will extract coal from an undeveloped coal reserve of approximately 150 million tonnes (Mt). Up to 10.5 Million tonnes per annum (Mtpa) Run of Mine coal will be extracted, processed and transported for a period of up to 21 years from the granting of a mining lease.

No on-site development works associated with the construction and/or operation of the Anvil Hill Mine have been commenced at the site to date.

1.2 DOCUMENT PURPOSE

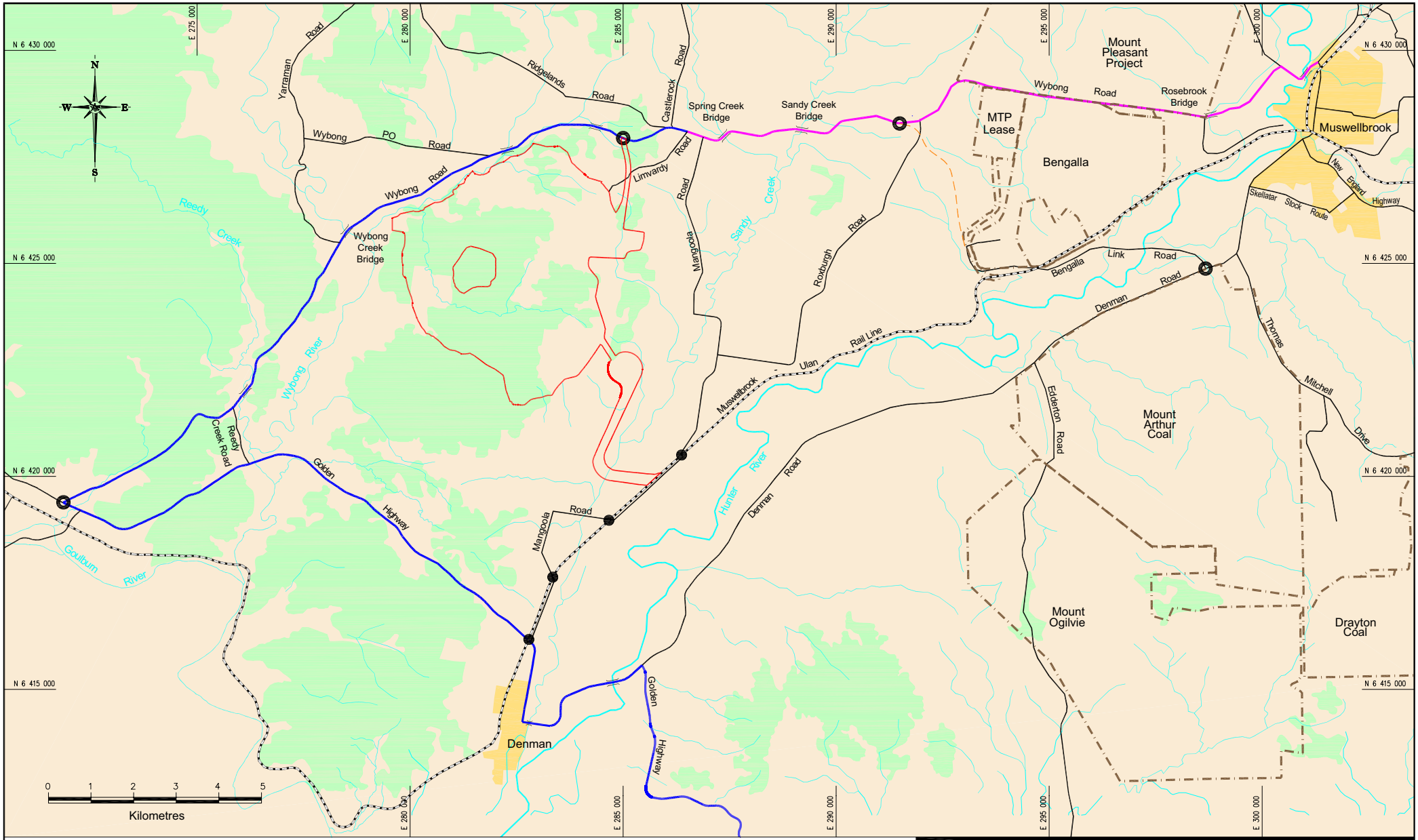
Xstrata Mangoola seeks approval from the Minister for Planning for a modification to the Project Approval) under Section 75W of the EP&A Act to amend the timing at which specific components of the approved Anvil Hill Mine may occur (the Modification).

Specifically, Xstrata Mangoola wishes to commence and conduct the following already approved onsite activities in parallel with the required Wybong Road Upgrade works:

- Construction and use of the Northern Access Road and associated intersection with Wybong Road;
- Establishment of a temporary site office, associated amenities and compound;
- Establishment of a construction pad for the Coal Handling and Preparation Plant (CHPP);
- Excavation of a borrow pit for the supply of select material for civil works and disposal of unsuitable material from the Wybong Road Upgrade and site works; and
- Development of temporary access roads between the site office, borrow pit and CHPP pad.

These on-site, preliminary construction and operational activities are referred to as 'Early Works' throughout this document.

The Modification sought is consistent with the approved Anvil Hill Mine development, although the Modification will allow the Early Works to occur concurrently with the Wybong Road Upgrade. The Modification will also facilitate access to the mine site for the purposes of conducting the Early Works by an alternate route (see **Figure 1**) to that presented in the EA (i.e. the Bengalla Link Road (Stage 2) which has not yet been constructed).



EA Disturbance Boundary
Roads
Heavy Vehicle Transport Route
Light Vehicle Transport Route
Bengalla Link Road Stage 2
Creeks
Mining Leases

Rail Crossing
Project Approval Required - Intersection Upgrades
Bridges

Hansen Bailey

xstrata coal

Co-ordinate System: MGA Zone 56
Sources : DoL (2007) & XCN (2008)

ANVIL HILL COAL MINE

Alternative Site Access Routes

Cad File: 02524J.dwg	Date: 08.04.08	Drawn: JD	Figure 1

1.3 DOCUMENT STRUCTURE

This Environmental Assessment (the Modification EA) has been prepared to support an Application to the Department of Planning (DoP) for the Modification.

The Modification EA has been compiled in accordance with the Director-General's Environmental Assessment Requirements (EARs) which were issued by DoP on 24 January 2008 and are reproduced in full in **Appendix A**. A checklist including each EAR and indicating where each issue is addressed in this EA is provided in **Section 5.0.**

Section 2.0 provides information on the existing environment relevant to the Modification. **Section 3.0** includes a detailed description of the Modification and its need, while **Section 4.0** describes the relevant regulatory framework.

Section 5.0 details stakeholder consultation undertaken and any issues raised. **Section 6.0** outlines identified impacts in relation to the Modification. **Section 7.0** provides a detailed plan of management and mitigation measures proposed to be implemented during the Modification. A conclusion is provided in **Section 8.0**.

Sections 9.0 to **11.0** provide a list of abbreviations, all referenced documents and the project team for the Modification respectively.

2.0 EXISTING ENVIRONMENT

This section provides an overview of the existing environment relevant to the Modification. It includes a description of the Anvil Hill Mine, the Wybong Road Upgrade, the existing environmental management initiatives in place and an update on land ownership relevant to the Early Works.

2.1 ANVIL HILL MINE

Project Approval was granted to construct and operate the Anvil Hill Mine which included (at least):

- Extraction of up to 10.5 Mtpa ROM coal operating 24 hours per day, 7 days per week;
- Coal handling and processing facilities;
- Water management infrastructure;
- Mine access from Wybong Road;
- Site infrastructure including office, staff amenities, workshops, conveyors, internal access and haul roads and ancillary services;
- Peak construction workforce of 200 employees and an operational workforce of up to 240 employees; and
- Rail loop and rail loading infrastructure for the transport of the product coal.

The EA defined a project approval boundary and a project disturbance boundary (see **Figure 2**) within which construction and operation will generally occur. Within this boundary, the Northern Access Road is clearly defined. Section 1.1.3 of the EA states "*The Project comprises the design, construction and operation of …. Mine access road including a new intersection on Wybong Road, internal access roads and haul roads*" (Umwelt, 2006).

Section 2.2 of the EA describes activities within the construction phase of the Anvil Hill Mine which are required prior to the commencement of the operational phase of the mine. It states "*These works will initially include establishing site access from Wybong Road and temporary construction facilities such as offices, maintenance workshops, equipment and supply storage and yards, and construction employee facilities*" (Umwelt, 2006).

The commitment to upgrade Wybong Road is described in Section 5.10.4 of the EA and in the Project Approval.

2.2 WYBONG ROAD UPGRADE

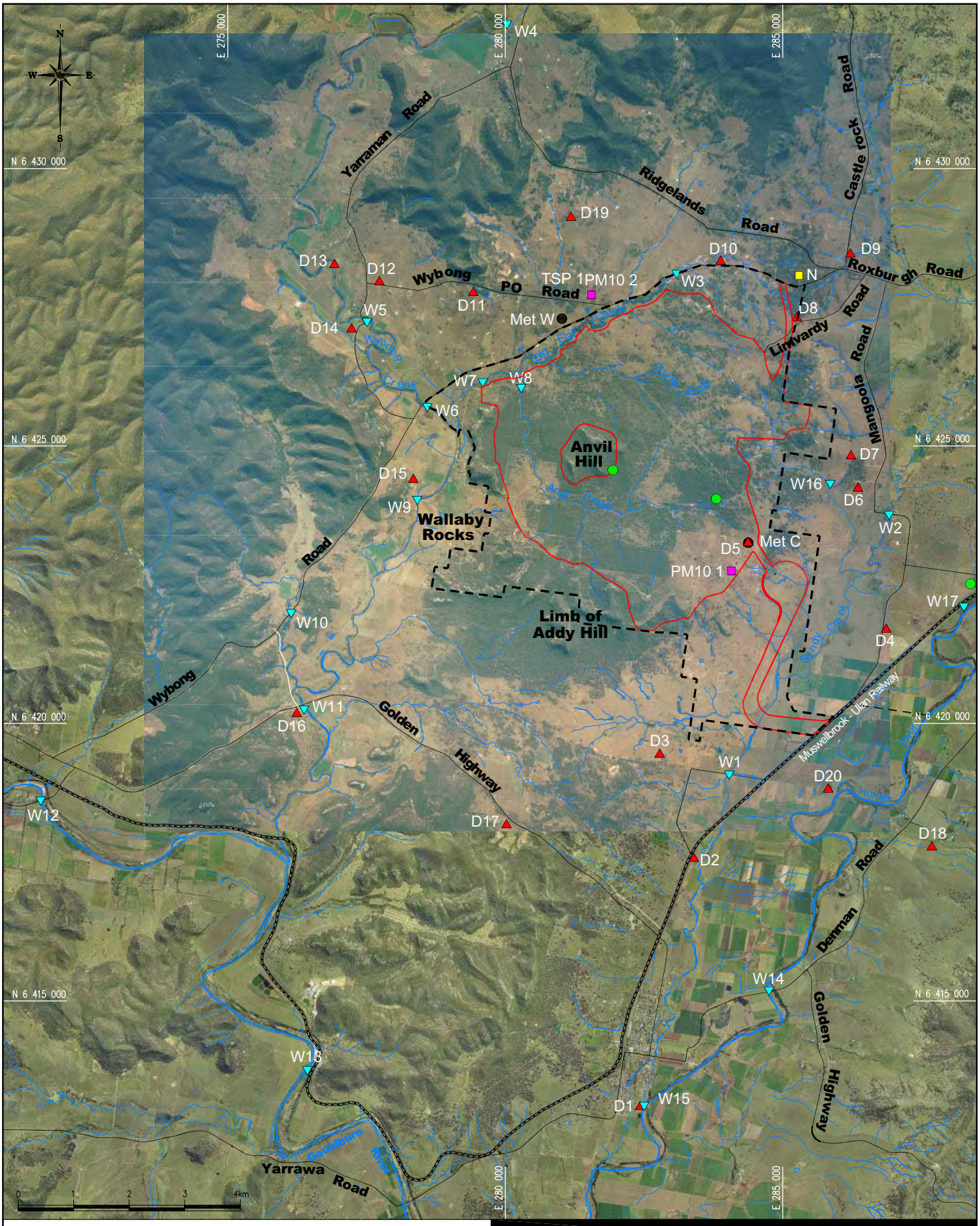
2.2.1 Anvil Hill EA

The EA assumed that project related traffic, including employee movements would be restricted to the use of the Bengalla Link Road (Stage 2) to access the site from Wybong Road. Further, Condition 52 of the Project Approval, described further in **Section 2.2.2**, states that no project related traffic will use Reedy Creek Road, Mangoola Road or Roxburgh Road to gain access to or exit the site.

The EA identified that the following upgrade works would be required along Wybong Road to facilitate the anticipated additional traffic movements associated with the Anvil Hill Mine (as per Statement of Commitment (SOC) 6.11.2):

- Expansion of the existing carriageway width;
- Line marking;
- Safety signage; and
- Upgrade school bus zones and stops.

The upgrade works are to be undertaken in consultation with Muswellbrook Shire Council (MSC) and Roads & Traffic Authority (RTA) and include works from the intersection with Bengalla Link Road to the mine access road. Additionally, the intersection of Wybong Road and the mine access road are to be a Type B rural layout with a left hand turn auxiliary lane from Wybong Road into the proposed access road (as per SOC 6.11.3).



EA Disturbance Boundary
Project Boundary
Indicative Noise Monitoring Locations
Dust Monitoring Locations
HVAS Monitoring Locations
Surface Water Monitoring Locations
Meteorological Stations
Indicative Blast Locations

Hansen Bailey

xstrata coal

Source : Umwelt (2006)
Co-ordinate System: MGA Zone 56

ANVIL HILL COAL MINE

Existing Environment & Monitoring Network

Cad File: 02515J.dwg	Date: 08.04.08	Drawn: JD	Figure 2

2.2.2 Project Approval

Conditions 50-52 of the Project Approval relate to the upgrade of Wybong Road and state:

"*Traffic Management*

50. Prior to carrying out any development on site, the Proponent shall upgrade:

(a) the Bengalla Link Road intersections with Wybong Road and Denman Road, to the satisfaction of the RTA and Council;

(b) Wybong Road and its intersection with the mine access road to the satisfaction of Council;

(c) the Golden Highway/Wybong Road intersection to the satisfaction of the RTA;

(d) lighting and signposting of the relevant intersections to the satisfaction of the RTA/Council; and

(e) all bus stops affected by the proposal to the satisfaction of Council.

51. Prior to carrying out any development on site, the Proponent shall prepare (and subsequently implement) a construction traffic management plan for the project to the satisfaction of the RTA and Council; and following approval, implement the plan to the satisfaction of the RTA and Council.

52. No project related traffic shall use Reedy Creek Road, Mangoola Road or Roxburgh Road to get to or from the site, except in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Note: This condition does not apply to any employees that may reside on Reedy Creek Road, Mangoola Road or Roxburgh Road."

The Project Approval Appendix 3 – Revised Statement of Commitment (SOC) states:

"Traffic and Transport

6.11.2 Wybong Road will be upgraded in association with Council, from the intersection with Bengalla Link Road to the proposed mine access road. This includes an upgrade to a sealed carriageway minimum 6.5 metres wide, road marked centreline to relevant standards, enhancement of safety and advisory signage, and upgrade of sections to ensure safe operation of school bus zones and stops. All works will be undertaken in consultation with Council and to the standards recommended in the detailed traffic assessment in Appendix 16.

6.11.3 The intersection of Wybong Road and the mine access road will be a Type B rural layout with a left turn auxiliary lane from Wybong Road into the proposed access road."

It is proposed to conduct the Early Works in conjunction with the Wybong Road Upgrade as there are synergies between the two activities and as such will result in an effective and efficient outcome for both the Anvil Hill Mine and for the local community.

2.3 ENVIRONMENTAL MANAGEMENT

2.3.1 Monitoring

Xstrata Mangoola presently undertakes a comprehensive Environmental Monitoring Program (EMP) in the vicinity of the Anvil Hill Mine.

This EMP allows ongoing background data to be collected and will assist Xstrata Mangoola in measuring performance against its regulatory expectations and enable management of environmental risks.

The existing monitoring network relevant to the Modification is shown on **Figure 2**. It will be continued to be relied upon and enhanced as required for the duration of the Modification. The EMP encompasses (at least) the following:

- Two meteorological stations;
- 20 dust depositional gauges;
- Three High Volume Air Samplers (HVAS), including a Total Suspended Particulate (TSP) matter sampler and two Particulate Matter less than 10 microns (μm) (PM_{10}) monitors;
- 53 groundwater monitoring locations;
- 17 surface water monitoring locations; and
- Phased implementation of continuous environmental monitoring programs as required under the Project Approval.

2.3.2 Procedures

Xstrata Mangoola has developed a number of environmental procedures that identify potential environmental impacts and provide a process to appropriately manage potential impacts during the Early Works. These are included in full in **Appendix B** and will be revised and enhanced as required.

Within each Procedure, relevant Forms are required to be completed and approved by the HSEC Department prior to surface disturbance activities commencing. Procedures are listed in **Table 2** with further discussion provided below.

Pre-Clearing Surveys

Where clearing is proposed, a pre-clearing survey must be conducted in accordance with this procedure (GEN-HSE-PRO-0001). A specific pre-clearing survey form accompanies this procedure (GEN-HSE-FRM-0003) to provide a checklist and a pre-clearing report template which focuses on the identification and forward management of habitat trees and threatened species, seed collection, etc.

Habitat Tree Felling

Where habitat trees are identified during the Pre-Clearing Survey, the Habitat Tree Felling Procedure - GEN-HSE-PRO-0002 describes the steps and responsibilities associated with removing habitat trees. A specific Habitat Tree Felling Form – GEN-HSE-FRM-0004 accompanies the procedure and provides a checklist and reporting template to manage fauna within the habitat tree prior to clearing.

Classification of Tree Hollow Sizes

This procedure (GEN-HSE-PRO-0003) facilitates record keeping in relation to a cleared tree hollow size classification is kept in relation to tree hollows within felled hollow bearing trees using the Habitat Tree Hollow Records Form (GEN-HSE-FRM-0005). This will facilitate an understanding of pre-clearance tree hollow density within the cleared areas.

These records will be kept to enable comparison of pre-mining and post-mining rehabilitation to show tree hollow achievements in the rehabilitation area.

Site Visit

This procedure (GEN-HSE-PRO-0004) stipulates that a site visitor's form (GEN-HSE-FRM-0001) is to be completed by all contractors that are required to undertake work for Xstrata Mangoola on or in the vicinity of the Anvil Hill Mine. This is designed to identify, assess and manage any potential health, safety, environment and community hazards.

A separate Ground Disturbance Permit (GDP) (GEN-HSE-FRM-0002) form is required if ground disturbing works are proposed which must be approved by the HSEC Department. GEN-HSE-FRM-0002 aims to identify and adequately assess any potential issues for the specific area requested in relation to (at least): land ownership; community relations; flora and fauna; cultural heritage (both Aboriginal and Non-Aboriginal) and sediment and erosion control.

Salvage and Reinstatement of Tree Hollows

This procedure (GEN-HSE-PRO-0006) facilitates the management in-tact hollows (post clearing) identified for re-use in the offset areas and/or post-mining revegetation areas as either nest box or ground installation. The proposed and final location of the tree hollow is recorded in the Tree Hollows Record Form (GEN-HSE-FRM-0005).

Nest Box – Salvaged Tree Installation

This procedure (GEN-HSE-PRO-0007) facilitates a consistent approach for the installation of nest boxes and salvaged hollows to achieve reinstatement success.

2.4 LAND OWNERSHIP

Table 2 lists property ownership surrounding the Early Works and indicates if a receiver (residence) is located on the property.

Table 3 should be read in conjunction with **Figure 3** which illustrates land ownership and receivers surrounding the Early Works.

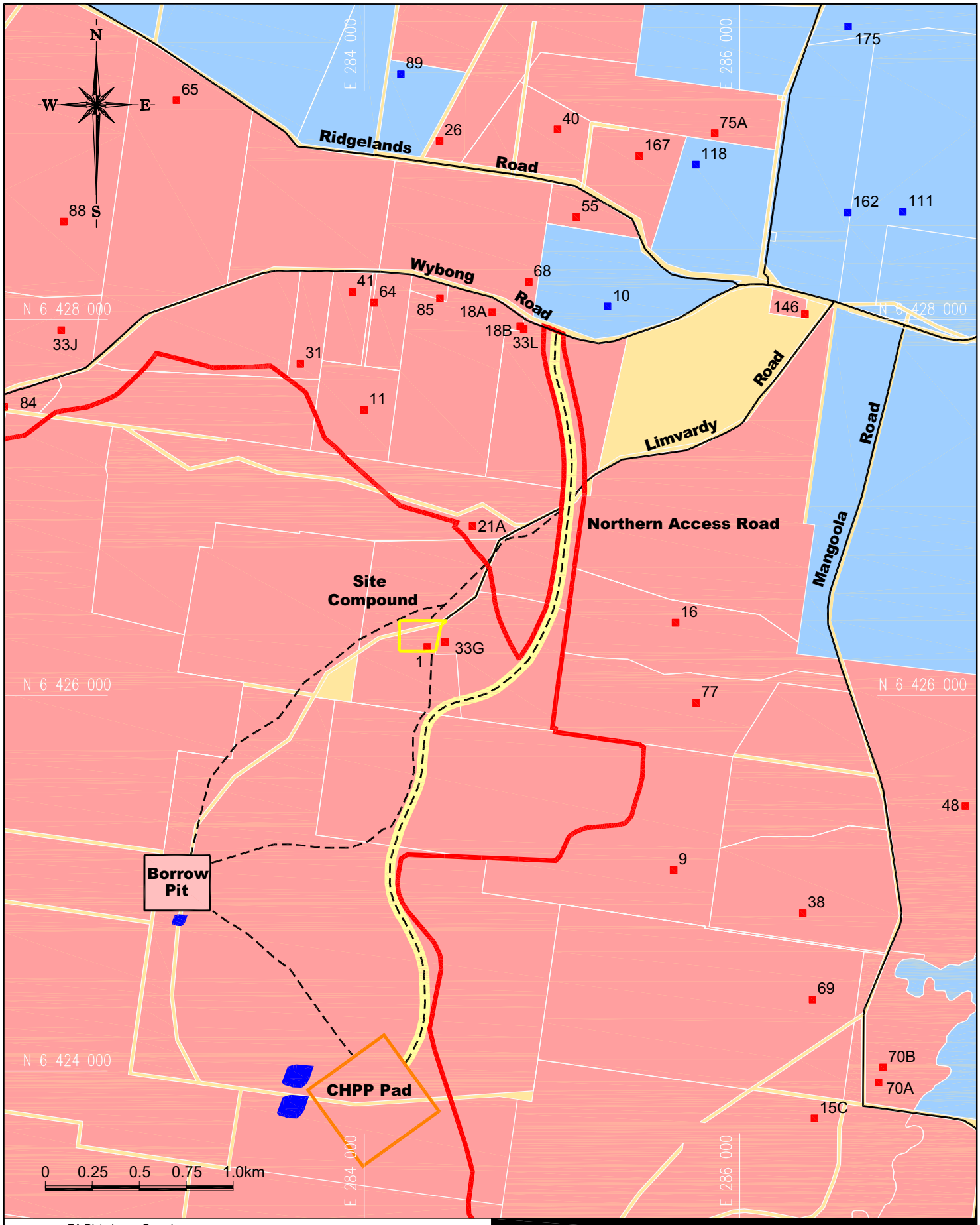
All of the land where the Early Works are proposed is owned by Xstrata Mangoola. Several private properties exist to the north and east of the Northern Access Road along Wybong Road.

Table 2
Environmental Procedures

Reference	Type	Description
GEN-HSE-PRO-0001	Procedure	Pre Clearing Survey
GEN-HSE-PRO-0002	Procedure	Habitat Tree Felling
GEN-HSE-PRO-0003	Procedure	Classification of Tree Hollow Sizes
GEN-HSE-PRO-0004	Procedure	Site Visit Procedure
GEN-HSE-PRO-0006	Procedure	Salvage and Reinstatement of Tree Hollows
GEN-HSE-PRO-0007	Procedure	Nest Box-Salvaged Tree Installation
GEN-HSE-FRM-0001	Form	Site Visit Form
GEN-HSE-FRM-0002	Form	Ground Disturbance Permit Form
GEN-HSE-FRM-0003	Form	Pre Clearing Survey Form
GEN-HSE-FRM-0004	Form	Habitat Tree Felling Form
GEN-HSE-FRM-0005	Form	Tree Hollow Records Form

Table 3
Non-Mine Owned Land Ownership

Residence ID	Owner
10	PJ & AM Hurney
89	Santa Beef Breeders Pty Limited
111	DMA Carey
118	JW & SL Ward
162	AH & JA Thiecke
175	IV & CA Ingold



EA Disturbance Boundary
Sedimentation Dams
Temporary Access Roads
Existing Roads
Xstrata Owned (Residence)
Privately Owned (Residence)
Crown Road

Hansen Bailey

xstrata coal

Source: Xstrata Mangoola (2008)
Co-ordinate System: MGA Zone 56

ANVIL HILL COAL MINE

Land Ownership

Cad File: 02902G.dwg	Date: 08.04.08	Drawn: JD	Figure 3

3.0 MODIFICATION DESCRIPTION

This section describes the various components of the Modification, provides details on the required amendments to conditions of the Project Approval being sought and includes a discussion on the Modification need.

Xstrata Mangoola is applying to the Minister for Planning for a modification to Project Approval under Section 75W of the EP&A Act to allow an adjustment in the timing of the Early Works.

It is proposed that the Early Works will be conducted in parallel with the Wybong Road Upgrade. Commencing the Early Works with the Wybong Road Upgrade will provide a site office, a local source for select civil materials and a suitable disposal site for unsuitable road material in the immediate vicinity of both activities. Additionally, the undertaking of both activities in parallel will reduce the quantity of materials required to be hauled to and from external sources on the local public road network. A reduction in ancillary construction traffic flows on local roads by providing amenities in close proximity to the approved Wybong Road Upgrade will also result.

The Modification as sought is described further below.

3.1 EARLY WORKS

Figure 4 illustrates the Early Works and associated disturbance within which activities will generally occur.

The Early Works will occur within the disturbance boundary as defined in the EA and include:

- The construction and use of the northern section of the approved Mine Access Road (Northern Access Road) and associated intersection with Wybong Road;
- Establishment of a temporary site office, associated facilities and compound;
- Excavation of selected material from an on-site borrow pit for use in civil works;
- Disposal of unsuitable earthworks' material within the designated borrow pit area;
- Establishment of a construction pad for the CHPP; and
- Development of temporary access roads.

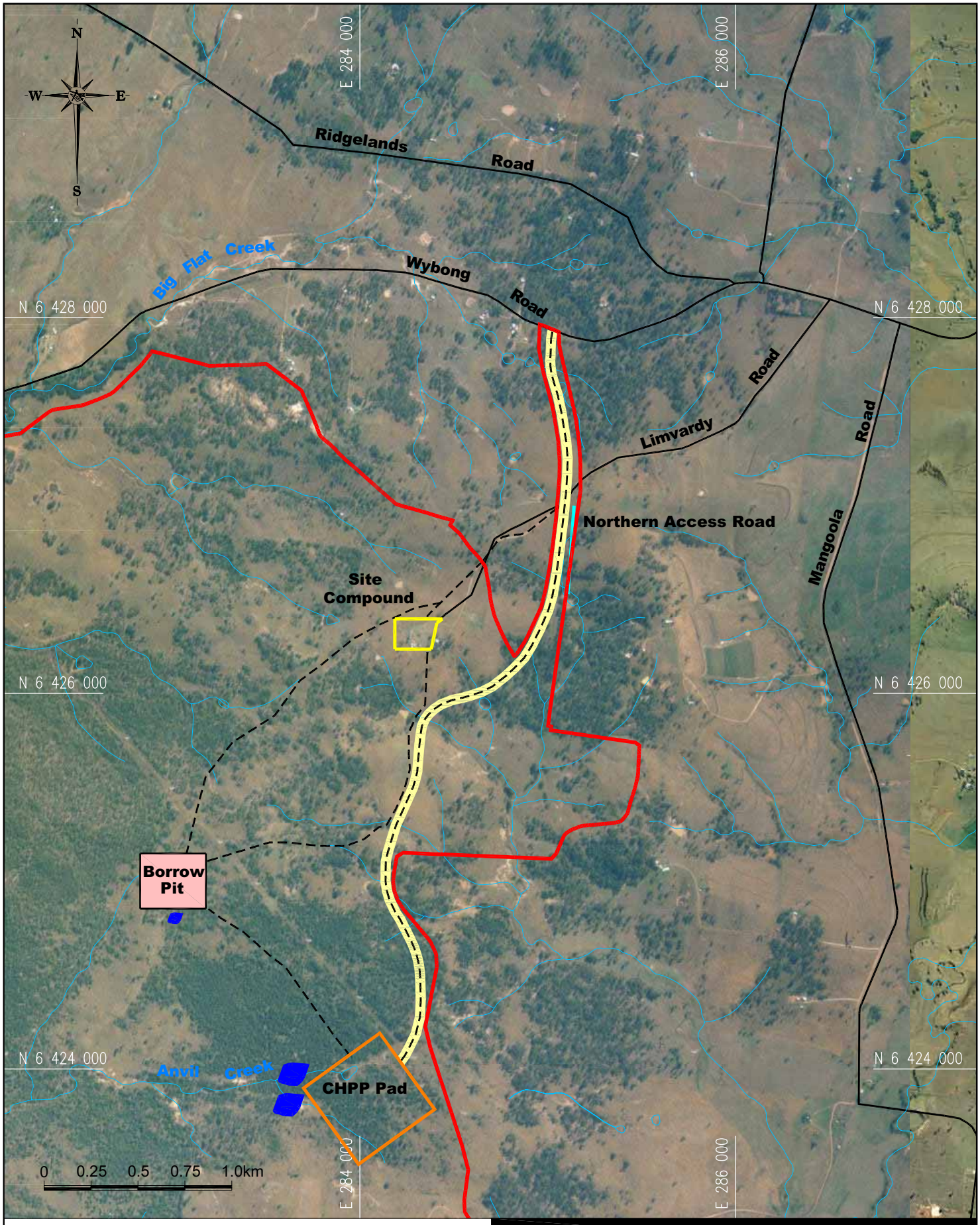
3.1.1 Northern Access Road

Background

The alignment and associated disturbance of the proposed Northern Access Road is consistent with that described in the EA and as such Xstrata Mangoola is seeking approval to construct it in accordance with the Project Approval, but at an earlier time, concurrent with the Wybong Road Upgrade. By constructing the Northern Access Road in parallel with the approved Wybong Road Upgrade works, site access would be established allowing a site office and compound, construction water supply and borrow pit for the Wybong Road Upgrade to be developed.

Construction

The Northern Access Road will be sealed and will commence at an intersection with Wybong Road in the north and extend south disturbing a nominal area of approximately 20 hectares within the approved disturbance area. A proposed 50 m wide corridor will allow for the strategic placement of the alignment to minimise environmental impacts, the installation of sediment and erosion control, cut and fill works and other associated activities. To facilitate the storage of topsoil from the construction of the Early Works, topsoil stockpiles will be established along the length of the Northern Access Road in delineated areas. Preference will be given to previously cleared areas where practical, to limit vegetation disturbance.



EA Disturbance Boundary
Sedimentation Dams
Temporary Access Roads
Drainage
Existing Roads

Hansen Bailey

xstrata coal

Source : Xstrata Mangoola (2008)
Co-ordinate System: MGA Zone 56

ANVIL HILL COAL MINE

Early Works Indicative Layout

Cad File: 02851N.dwg	Date: 08.04.2008	Drawn: JD	Figure 4

As shown on **Figure 4** temporary access roads will be required to facilitate movement between the Northern Access Road, site compound, borrow pit and CHPP pad. These additional temporary access roads will fall within a nominal 20 m corridor. Appropriate sediment and erosion control structures will be installed at strategic locations along the alignment of each.

The Northern Access Road will also intersect Limvardy Road (existing public gravel road) which will initially be utilised to access the site to commence construction activities on the Northern Access Road. Limvardy Road will require ongoing maintenance to provide site access to commence the Early Works. Construction of the Northern Access Road will utilise standard road construction methods (i.e. clearing and grubbing, stripping of topsoil, excavation works, haulage of materials and placing and compaction of road material).

All pavement material required for road construction will be sourced from suitable regional suppliers to ensure that it meets the relevant road construction criteria. Where practical, road sub-base materials will be sourced form the borrow pit as described in **Section 3.1.3** with additional material sourced from suitable regional suppliers. Detailed preliminary design works in relation to the construction of the Northern Access Road have identified indicative cut and fill, drainage and material requirements which are shown in **Table 4**.

3.1.2 Site Office & Compound

Background

As part of the Early Works, it is proposed to construct a site office and compound which will be accessed initially from Limvardy Road and then progressively via the Northern Access Road and internal temporary access roads. This is to be located within the approved project disturbance boundary as defined in the EA. The establishment of a site office and compound is necessary to assist in the effective on-ground project coordination of the construction works and to provide amenities for staff associated with the Early Works and approved Wybong Road Upgrade. The site office and compound will also provide the opportunity for contractors to retain heavy machinery and other materials on-site rather than trafficking these to and from town centres on a daily basis.

Construction

An existing house which has been acquired by Xstrata Mangoola and is located approximately 3 km along Limvardy Road will be utilised as a site office. The office will be established in the 'Anshaw' house. The house is within the approved disturbance boundary as presented in the EA. All other materials required to establish the site compound and associated infrastructure will be transported to the site.

Table 4
Indicative Materials Budget for Northern Access Road

Material	Quantity
Road sub-base material	20,000 m^3
Road base material	17,000 m^3
Drainage pipes / headwalls & reinforced concrete box culvert	350 m
Additional drainage material	1,000 m^3
Bitumous surface reseal	2,500 t

The site office and compound will disturb approximately 3 hectares and include:

- An approximately 5,000 m^2 hardstand area;
- A 650 m^2 site office complex with lunch shed and first aid room;
- Two female toilet facilities with shower room;
- Six male toilet facilities with shower room;
- Security fence;
- Two 10,000 litre potable water tanks;
- Two 10,000 litre sewerage tanks;
- 500 m^2 plant repair and maintenance area;
- 1,000 m^2 car parking area;
- 1,000 m^2 plant and equipment parking area;
- 500 m^2 fuel storage area and wheel wash facilities;
- 1,000 m^2 storage area; and
- Relevant services infrastructure to supply electricity, water and telecommunications to the site.

Appropriate security facilities will be established for the protection of plant and equipment, where required.

Potable water and any required sewage system will be established in accordance with MSC requirements to allow for flexibility of the use of portable equipment.

An indicative materials budget for the construction of the site office and compound indicates road base materials of approximately 2,000 m^3 will be required and will be sourced where possible from the on-site borrow pit described in **Section 3.1.3**.

3.1.3 Borrow Pit & Unsuitable Earthworks Material Disposal Area

Background

A borrow pit will be required to be established to provide suitable base materials for use in construction activities and an additional area (adjacent to the borrow pit) will be required to dispose of unsuitable earthworks materials from the Wybong Road Upgrade and Early Works. Crushing activities will also be undertaken at the borrow pit to reduce rock material to a suitable size for use as a base material.

Additional earthworks will be required to ensure appropriate sediment and erosion control to maintain clean water catchment quality, including the construction of a sediment dam immediately adjacent to the borrow pit area as shown on **Figure 4**.

Construction

The exact location of the borrow pit will be determined through further field inspections, giving consideration to (at least): proximity to drainage lines, archaeology, ecology and available supplies of suitable gravels and base materials. The borrow pit and associated topsoil stockpiles, vegetation stockpiles, sediment dam and contour drains will encompass a disturbance area of approximately 10 hectares as shown in **Figure 4** and is located within the approved project disturbance boundary. Approximately 140,000 m^3 of material will be extracted from the borrow pit for use in the Wybong Road Upgrade and Early Works.

An area adjacent the borrow pit will also be utilised to dispose of unsuitable earthworks materials generated from the Wybong Road Upgrade and Early Works. These materials will be placed in a clearly defined area and be generally comprised of redundant soil, rock and bitumen. Upon commencement of coal mining operations, these materials will be disposed of in-pit at a suitable depth. All other waste materials (including general waste and/or hazardous waste) will be removed from site and disposed of by a licensed waste contractor as described further in **Section 7.8**.

A clearly delineated bioremediation area will be established within the borrow pit to store and treat hydrocarbon contaminated material in the event of a hydrocarbon spill during the Wybong Road Upgrade or Early Works.

3.1.4 CHPP Construction Pad

A construction pad for the CHPP will be required to be established as an interim laydown area for the Early Works and to facilitate the future construction of the CHPP as per the Project Approval.

The CHPP construction pad will disturb approximately 500 m x 500 m. Temporary access roads will be required to be established from the Access Road to the CHPP construction pad and from the Borrow Pit to the CHPP construction pad to facilitate the movement of employees, material and equipment.

Material from the borrow pit will be used as fill in the construction and levelling of the CHPP pad.

Blasting may be required for rock breakage during the execution of the Early Works and if blasting is required it will be undertaken in compliance with the Project Approval. The Maximum Instantaneous Charge used would be substantially less than modelled and approved. The EA modelled Maximum Instantaneous Charge Limits that were consistent with open cut production blasts required to sustain the approved production levels.

Relevant sediment and erosion controls will be implemented (as shown in **Table 4**) to reduce any temporary impacts on drainage lines associated with Anvil Creek.

3.2 CONSTRUCTION, EQUIPMENT & MANNING

3.2.1 Construction

Construction activities associated with the Early Works and approved Wybong Road Upgrade will only occur from Monday to Saturday between 7:00 am to 6:00 pm and Sunday and public holidays between 8:00 am to 6:00 pm.

Consistent with the Project Approval, other activities may occur outside these hours which fulfil the following requirements:

- Development that is inaudible at residences on privately owned land;
- The delivery of materials to the site as requested by Police or other authorities for safety reasons; or
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

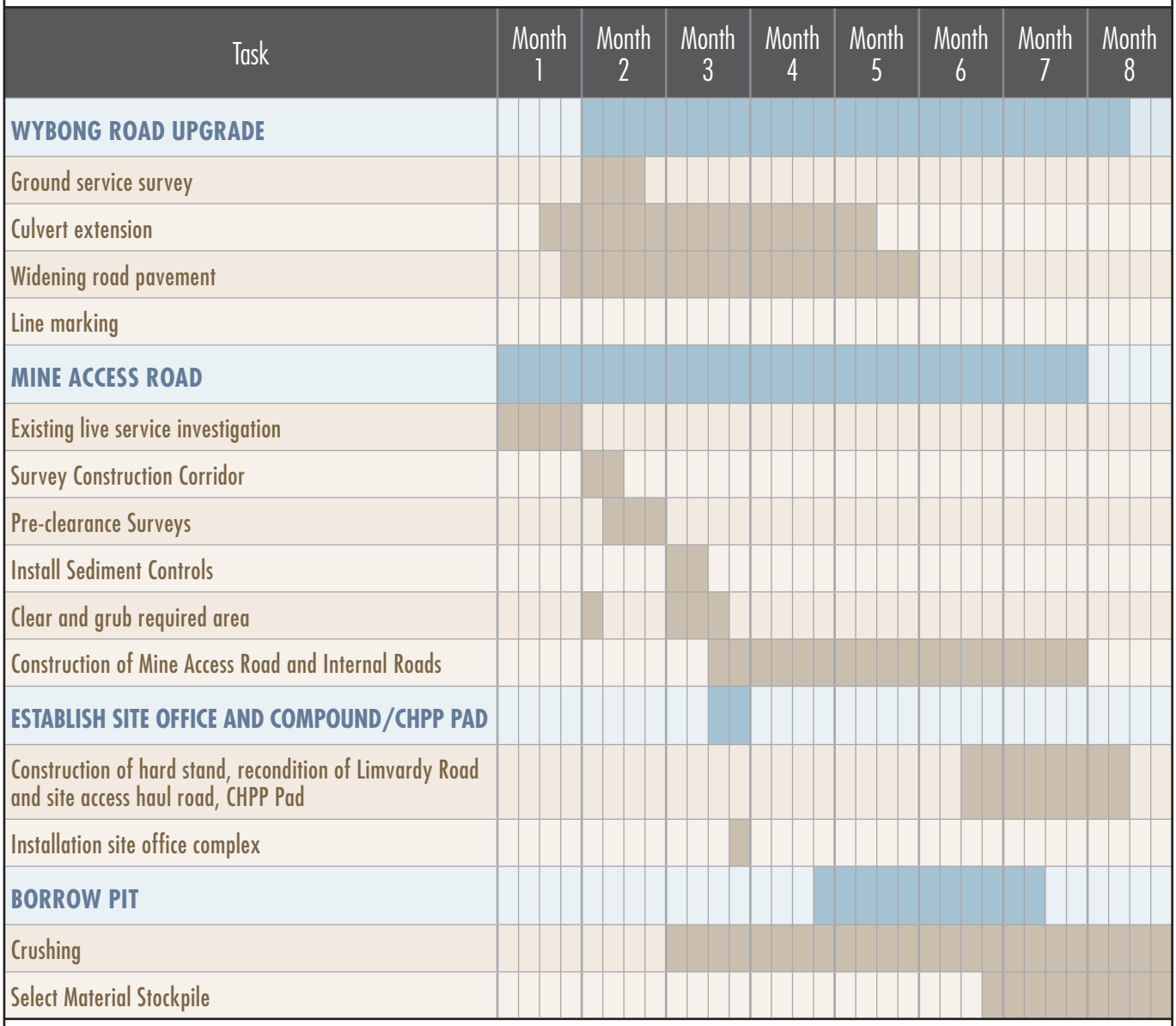
Figure 5 provides an indicative construction schedule for the Modification of approximately eight months, dependant on weather. The Wybong Road Upgrade will commence upon receiving a construction certificate from MSC which will be prior to the commencement of the Northern Access Road. The construction of the Northern Access Road will occur over approximately six months with the establishment of the site office and compound, CHPP pad and the borrow pit commencing within this time.

Employees, materials and equipment required for the Wybong Road Upgrade will also be utilised for the Early Works.

An approximate peak workforce of 40 persons per day will be required to undertake both the Early Works and Wybong Road Upgrade.

3.2.2 Site Access

The EA and subsequent Project Approval envisaged that the Bengalla Link Road (Stage 2) would be completed prior to the requirement for the commencement of the Early Works and as such most traffic to the mine site would enter via this road network.



HansenBailey

xstrata coal

ANVIL HILL COAL MINE

Indicative Construction Schedule

Filename: ANV003 - Indicative Construction Schedule 0208.indd | Date: 07.04.08

Figure 5

An alternate site access is required to conduct the Modification in lieu of the completion of the Bengalla Link Road (Stage 2) as shown in **Figure 1**.

Peak vehicle movements of approximately 50 heavy and 40 light vehicles per day (averaging 20 heavy vehicles and 30 light vehicles per day) are anticipated to be required for the Wybong Road Upgrade and Early Works. All heavy vehicles will access the site from the west along Wybong Road, with light vehicles accessing site from both the east and west.

Plant, materials, site amenities, diesel, small plant hire and other deliveries will be regularly delivered for the duration of the Early Works.

An indicative list of shared equipment to be utilised for both the construction of the Wybong Road Upgrade and Early Works is provided in **Table 5** which is substantially fewer than that approved in the EA for construction and operation of the Mine. Minor maintenance work may be required to be undertaken on the site and will be completed within a clearly delineated area within the site office compound.

Table 5
Indicative Construction Equipment List

Equipment Type	Size	Number
Excavator	12 - 65 t	8
Dozer	D6 - D10	4
Grader	120 -140	2
Roller	2.5 - 12 t	4
Compactor	825	1
Scraper	631	2
Watercart	40,000 L	4
Bogey Truck	13 t	2
Articulated Truck	D 400	2
Mobile Crusher		1
Screener		1
Road Line Making Machine		1

3.3 PROJECT APPROVAL CONDITIONS

This Modification also seeks to alter conditions of the Project Approval relating to activities required "Prior to carrying out any development on site" to allow the Early Works to occur prior to this time. All Early Works activities are described in the EA and approved in the Project Approval.

The suggested amendments to relevant conditions of Project Approval as sought are described in **Table 6**.

3.4 MODIFICATION NEED

Schedule 3, Conditions 50-51 of the Project Approval prohibits the commencement of any 'development works' on site prior to the completion of various road and intersection upgrades associated with Wybong Road (see **Section 2.2.2**).

Preparations to commence the approved Wybong Road Upgrade are currently being progressed with MSC in accordance with the conditions of Project Approval.

The approved Wybong Road Upgrade requires various items of plant, materials and a workforce to complete the construction over an approximately six month period (weather dependent).

Materials will need to be sourced and disposed of at appropriate locations and the workforce will require a base from which to operate.

The EA assumed that the Bengalla Link Road (Stage 2) would be completed prior to the commencement of construction activities required for the Anvil Hill Mine. This road is yet to be constructed. This Modification will allow access to site to allow the commencement of the approved activities that will be associated with Early Works.

Further, the ability for the Early Works to commence in parallel with the approved Wybong Road Upgrade will provide a site office, a local source for select civil materials and a suitable disposal site for unsuitable road material in the immediate vicinity. The construction of the Early Works will reduce the quantity of materials required to be hauled to and from external sources on the local public road network.

The Modification will also reduce ancillary construction traffic flows on local roads and through the township of Denman and Muswellbrook by providing amenities in close proximity to the approved Wybong Road Upgrade.

Table 6
Amendments to Project Approval Conditions to allow Early Works

Condition	Detail
Definitions	Addition of the following: **"Early Works** Construction and operation of: the Northern Access Road; temporary access roads, site office, associated amenities and compound; CHPP Pad; and borrow pit for the supply of select materials for civil works and disposal for waste material."
Schedule 3 Conditions 11, 23, 27, 31, 50, 51; and Schedule 5, Condition 1	Amend Conditions relating to the timing of the preparation and approval of management/ monitoring plans and strategies which is required "Prior to any development on site". These conditions would be amended to include "(excluding the Early Works)" immediately following "Prior to any development on site".
Schedule 3 Condition 50 (a)	Amend condition to exclude requirement to upgrade Bengalla Link Road-Wybong Road intersection until its construction has been completed by inserting "(following the completion of its construction)" immediately following "Denman Road".

4.0 REGULATORY FRAMEWORK

This section of the Modification EA describes the regulatory framework relevant to the modification to Project Approval as sought. It provides detail in relation to legislative considerations relevant to the Modification.

4.1 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

4.1.1 Modification Under Section 75W

Project Approval (06_0014) was granted under the EP&A Act by the Minister for Planning on 7 June 2007 to construct and operate the Anvil Hill Mine. The Project Approval is supported by the EA.

Section 75W of the EP&A Act provides for the modification of planning approvals issued under Part 3A of the Act as follows:

> *"(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification."*

On 24 January 2008, DoP confirmed that "*the Department believes that the proposed modifications require approval under Section 75W*" of the EP&A Act (see **Appendix A**).

Accordingly, it is available for the Minister for Planning to modify the Project Approval under Section 75W of the EP&A Act as sought.

4.1.2 Section 75W Approval Process

The determination of the Modification must follow the process as specified under Section 75W of Part 3A of the EP&A Act. On 24 January 2008, a delegate of the Director-General issued EARs under Section 75W(3) of the EP&A Act for the Modification application (see **Appendix A**). The EARs are addressed throughout this EA with a checklist referencing where each item is addressed in **Section 5.0**.

The Minister is empowered to modify the Project Approval (with our without conditions) or disapprove of the modification pursuant to Section 75W(4) of the EP&A Act.

4.2 OTHER REGULATORY REQUIREMENTS

4.2.1 Roads Act 1993

Wybong Road Intersection

The *Roads Act 1993* (Roads Act) provides for the dedication of classified and unclassified roads and confers certain functions to the Roads & Traffic Authority (RTA) in relation to the management of roads. Under Section 138 of the Roads Act, consent from the RTA is required to erect a structure or carry out work in, on or over a public road.

Section 75V of the EP&A Act provides "*an authorisation of the following kind cannot be refused if it is necessary for carrying out of an approved project and is to be substantially consistent with the approval under this part…*". The authorisations referenced include an approval under Section 138 of the Roads Act.

An approval under Section 138 of the Roads Act will be sought from MSC prior to the construction of the Wybong Road / Northern Access Road intersection.

Limvardy Road Intersection

The Roads Act governs roads in NSW providing for those managed by MSC and establishes procedures for opening and closing a public road. Further, the Roads Act regulates the carrying out of various activities on public roads. The construction of the Northern Access road will intersect the existing Limvardy Road.

Prior to the construction of the Northern Access Road on the Limvardy public road, the relevant approval will be sought from MSC (as the appropriate roads' authority) under Section 138 of the Roads Act. Such an approval must be granted consistent with this Modification pursuant to Section 75V of the EP&A Act.

As a requirement indicated in the EA, Xstrata Mangoola is progressing the closure of all unnecessary Crown Roads within the disturbance boundary under the provisions of Section 34 of the Roads Act.

4.2.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides for the licensing of pollution by the Department of Environment and Climate Change (DECC) which administers the POEO Act.

Schedule 1 of EPA-licensed Activities Part 1 Activities premises-based will be triggered by the Early Works which states:

> "*Coal mines that mine, process or handle coal and are: ….*
>
> *(2) open cut mines that: …..*
>
> *(b) have disturbed, are disturbing or will disturb a total surface area of more than 4 hectares of land by:*
>
> *(i) clearing or excavating, or*
>
> *(ii) constructing dams, ponds, drains, roads, railways or conveyors, or*
>
> *(iii) storing or depositing overburden, coal or carbonaceous material or tailings*.
>
> *Extractive industries:*
>
> *(1) that obtain extractive materials by methods including excavating, dredging, blasting, tunnelling or quarrying or that store, stockpile or process extractive materials, and*
>
> *(2) that obtain, process or store for sale or re-use an intended quantity of more than 30,000 cubic metres per year of extractive material.*
>
> *Crushing, grinding or separating works that:*
>
> *(1) process materials including sand, gravel, rock, minerals, slag, road base or demolition material (such as concrete, bricks, tiles, asphaltic material, metal or timber) by crushing, grinding or separating into different sizes, and*
>
> *(2) have an intended processing capacity of more than 150 tonnes per day or 30,000 tonnes per year."*

Section 75V of the EP&A Act provides "*an authorisation of the following kind cannot be refused if it is necessary for carrying out of an approved project and is to be substantially consistent with the approval under this part…*" The authorisations referenced include an Environment Protection Licence (EPL).

An EPL will be sought prior to activities commencing on site for which an EPL is required.

4.2.3 Mining Act 1992

The mining of coal in NSW is controlled by the *Mining Act 1992* (Mining Act), administered by the Minister for the Department of Primary Industries (DPI).

Section 5 of the Mining Act requires a Mining Lease be granted before conducting any mining and Section 65(2) of the Mining Act requires that there be "*appropriate development consent*" as a prerequisite to the granting of a Mining Lease.

Section 75V of the EP&A Act provides "*an authorisation of the following kind cannot be refused if it is necessary for carrying out of an approved project and is to be substantially consistent with the approval under this part…*". The authorisations referenced includes a Mining Lease.

As such, an application for a Mining Lease has been sought from DPI.

5.0 STAKEHOLDER CONSULTATION

A stakeholder consultation program for the Modification was undertaken which aimed to identify stakeholders' issues in relation to the Modification and ensure that these issues were addressed as part of the Modification EA process.

Stakeholders were identified based on proximity to the Modification and the EARs. Regulatory agencies and other stakeholders were identified as parties who may have an interest in the Modification. Identified stakeholders included; immediate neighbours, DoP, MSC, RTA and the Anvil Hill Mine Community Consultative Committee (CCC).

Table 7 lists the timing and extent of stakeholder consultation undertaken.

The objective of this stage of the consultation program was to respond to issues raised and to develop appropriate strategies to manage impacts associated with the Modification. In response to discussions held with DoP during January 2008 in regard to the Modification, DoP issued the EARs on 24 January 2008.

The method and nature of consultation with the local community was determined in consultation with DoP. The near neighbour considered to have a direct interest in the Modification was provided a briefing with relevant issues raised incorporated into the Modification EA. Feedback from stakeholders is summarised in **Table 8**.

The EARs are reproduced in full in **Appendix A**, while **Table 9** lists the requirements and where each is addressed in this EA. No issues additional to that required by the EARs were raised by stakeholders in relation to the Modification.

Table 7
Stakeholder Consultation Timeline

Date	Detail	Method
17 January 2008	DoP Preliminary Consultation	Meeting at DoP office where Early Works were presented, EARs requested and proposed consultation program discussed.
6 December 2007, 8 January 2008 and 22 January 2008	MSC Meetings	Discussion and presentations on the Modification.
17 March 2008	MSC Environment Committee Meeting	Presentation provided detailed information on local road upgrades and Early Works.
19 February 2008	Anvil Hill CCC Presentation	Presentation provided detailed information on local road upgrades and Early Works.
17 March 2008	MSC Traffic Committee Meeting (RTA representative attended)	Presentation provided detailed information on local road upgrades and Early Works program (Northern Access Road).
5 March 2008	RTA Letter sent requesting attendance at Traffic Committee Meeting for any requirements for inclusion in the Modification EA	Letter and phone call to confirm attendance at meeting. A RTA representative was in attendance at Traffic Committee meeting.
11 March 2008	Near neighbour consultation meeting	Discussion held and figures presented regarding proposed Early Works and local road upgrades.

Table 8
Stakeholder Consultation Issues Summary

Date	Stakeholder	Issue	EA Section
18 February 2008	MSC Environment Committee	• A member from Denman made the comment that traffic flow into Denman could possibly increase business opportunities in Denman. • There were no comments regarding the Early Works program and focus of comments was in relation to the Wybong Road upgrade.	N/A N/A
20 February 2008	Anvil Hill CCC Meeting	• No issues raised at this meeting regarding the Early Works.	N/A
11 March 2008	Property Owner 10 as shown on **Table 3** and **Figure 3** and	• No issues raised regarding Early Works Program from private landowner or their legal representative who was also present at the meeting.	N/A
17 March 2008	MSC Traffic Committee Meeting	• No negative issues raised regarding Early Works (Northern Access Road) focus at this meeting was more on the local road intersection upgrades.	N/A

Source: Xstrata Mangoola (2008)

Table 9
Environmental Assessment Requirements

Issue	Description	EA Section
General Requirements	The Environmental Assessment must include:	
	• A detailed description of the proposed modification including the need for the modification;	**3.0**
	• Consideration of any relevant statutory provisions;	**4.0 & 8.0**
	• An assessment of the environmental issues associated with the modification (including the key issues specified below), which includes: ○ A description of the existing environment; ○ An assessment of the potential impacts of the modification;	 **2.0** **6.0**
	○ A description of the measures that would be implemented to avoid, minimize, mitigate, offset, manage and/or monitor the impacts of the modification; and ○ A conclusion justifying the modification, taking into consideration the environmental impacts of the modification, the suitability of the site, and the benefits of the modification.	**7.0** **8.0**
Key Issues	• Soil and water management;	**6.1 & 7.1**
	• Traffic management;	**6.2 & 7.2**
	• Noise and dust;	**6.3, 7.3, 6.4 & 7.4**
	• Flora and fauna; and	**6.5 & 7.5**
	• Heritage – both Aboriginal and non-Aboriginal.	**6.6, 6.7, 7.6, & 7.7**
References	The Environmental Assessment must take into account relevant State Government technical and policy guidelines. While not exhaustive, guidelines which may be relevant to the modification are included in the attached list.	**6.0 & 7.0**

Issue	Description	EA Section
Consultation	During the preparation of the Environmental Assessment, you should consult with: • Muswellbrook Shire Council; • Roads and Traffic Authority; and • The local community. The consultation process and the issues raised must be described in the Environmental Assessment.	**5.0**

Xstrata Mangoola has an established stakeholder consultation program which will continue to be implemented throughout the operation of the Anvil Hill Mine. This includes regular consultation with the CCC, landholders, representatives of key regulatory authorities, industry and the Aboriginal community.

Anvil Hill Mine is actively involved in communicating its environmental management initiatives internally to its employees and contractors, and externally through:

- External Reporting including Xstrata Coal's website;
- Structured Stakeholder Engagement Program;
- Complaints management and environmental contact line; and
- Regulatory planning processes.

Internal communications with Xstrata Mangoola staff and contractors will occur through verbal communication sessions, toolbox talks, notice boards, intranet and via e-mail as appropriate. Inductions and regular training of all employees (commensurate with the job description of each) will include detailed environmental and community components focusing on management and mitigation measures as described in **Section 7.0**.

6.0 IMPACT ASSESSMENT

The potential environmental impacts of the Modification as identified throughout the planning and consultation process have been assessed as part of this EA. The findings of the relevant environmental assessments undertaken for each component of the Modification are described below.

6.1 SOIL & WATER MANAGEMENT

6.1.1 Background

The *Soil Survey and Land Resource Assessment Report* prepared for the EA was reviewed as part of the assessment for the Modification to identify the predominant soil types of the area relevant to the Early Works.

The review found that Yellow Solodic soils are the dominant soil group with broad areas of soil intergrading between Yellow Solodics and Brown Clays on the eastern boundary.

Yellow Solodic soils were found to be weakly structured with textures ranging from clayey loams to sandy loams, with moderate infiltration capacity and moderate to good water holding capacity. Yellow Solodic soils are structurally stable, non-dispersive, non-saline and generally neutral to mildly alkaline. Yellow Solodic soils are suitable for post-mining vegetation establishment and do not require special management.

Brown Clays were found to maintain a weak blocky structure with texture ranging from clayey loams to sandy loams, which will allow for moderate infiltration and water holding capacity. Brown clay soils are structurally stable, non-dispersive to slightly dispersive, non-saline and generally mildly alkaline. Brown clay soils are suitable for post-mining vegetation establishment and do not require special management (GSS Environmental, 2006).

6.1.2 Impact Assessment

Activities associated with the Early Works which have the potential to cause erosion, sedimentation and runoff of sediment laden water include:

- Vegetation clearing and topsoil stripping;
- Stockpiling of topsoil; and
- Construction of access road and infrastructure.

As illustrated on **Figure 4**, a sedimentation dam will be constructed down-slope of the borrow pit to contain runoff and sedimentation. Temporary sediment control structures will be utilised to ensure all water runoff from the disturbed areas is treated.

6.2 TRAFFIC

6.2.1 Background

A Traffic Impact Assessment was conducted as part of the Modification EA by Parsons Brinckerhoff and is reproduced in full in **Appendix C**. This assessment included a consideration of the alternate site access routes to be utilised in lieu of the Bengalla Link Road (Stage 2) which is yet to be constructed.

Background traffic volumes were assessed along the Golden Highway, Denman Road, Wybong Road and Kayuga Road. A growth factor of 1.5% per annum was used to convert all traffic counts to a 2008 equivalent to allow for consistency with the Muswellbrook Western Roads Strategic Study.

Based on an estimate of light and heavy vehicle volumes and the number of employees required during the construction period, the peak period for light vehicle traffic is likely to be the last week of Month 2 when up to 35 light vehicles would need to access the site each day. The peak construction period is likely to be the first week of Month 5, when approximately 50 heavy vehicles and 20 light vehicles would need to access the site each day.

As discussed in **Section 3.1**, all heavy vehicles will access the site from the west along Wybong Road, with light vehicles accessing site from both the east and west.

As the majority of employees accessing the site are anticipated to be from Muswellbrook, Scone, Singleton, Aberdeen, Cessnock, Maitland and Newcastle, the designation of the route via Kayuga Road as the light vehicle access route is appropriate. The alternative heavy vehicle access route would accommodate all heavy vehicles and a small number of light vehicle traffic from Denman and outside the region.

6.2.2 Impact Assessment

The Traffic Impact Assessment assessed the likely traffic performance at key intersections for the alternative light and heavy vehicle routes. As summarised below, the generated traffic volumes due to the Modification will be very low compared to background levels and are unlikely to result in any significant impact on the local traffic network capacity.

Aberdeen Street / Kayuga Road Intersection

The traffic generation and distribution analysis found that approximately 13 additional vehicles/hour would be expected to use the Aberdeen Street / Kayuga Road intersection. Due to these low numbers in addition to the low background traffic volumes, the intersection is not expected to experience capacity constraints.

Wybong Road / Kayuga Road Intersection

Based on the traffic generation and distribution analysis, the Early Works would generate 13 left-turning light vehicles from Kayuga Road onto Wybong Road during the morning peak and 13 right-tunning return light vehicles during the afternoon peak. As such, this intersection is not expected to experience capacity constraints as the two movements are complimentary.

Wybong Road / Northern Access Road Intersection

Based on predicted peak hour volumes, generated traffic of the Modification would include during the morning peak:

- 13 left-turning light vehicles from Wybong Road (east) to Northern Access Road;
- 7 light and 6 heavy left-turning vehicles from Wybong Road (west) to Northern Access Road; and
- 6 left-turning heavy vehicles from Northern Access Road to Wybong Road (west).

Based on predicted peak hour volumes, generated traffic of the Modification would include during the afternoon peak:

- 13 right-turning light vehicles from Northern Access Road to Wybong Road (east);
- 7 light and 3 heavy left-turning vehicles from Northern Access Road to Wybong Road (west); and
- 3 right-tuning vehicles from Wybong Road (west) to Northern Access Road.

As such, this intersection is not expected to experience capacity constraints as generated traffic volumes are not significant during these peak periods.

Golden Highway / Wybong Road Intersection, Sandy Hollow

Based on predicted peak hour volumes, the Modification would generate 6 left-turning heavy vehicles from Wybong Road to the Golden Highway, and 7 right-turning light vehicles and 6 right-turning heavy vehicles from the Golden Highway to Wybong Road during the morning peak period. Similarly, during the afternoon peak period, the generated traffic would include 7 light vehicles and 3 heavy vehicles turning left from Wybong Road to the Golden Highway, and 3 heavy vehicles would turn right from the Golden Highway to Wybong Road.

Due to these low numbers in addition to the low background traffic volumes, the intersection is not expected to experience capacity constraints.

Golden Highway / Palace Street / Crinoline Street Intersection, Denman

Indicative traffic volumes generated by the Modification would include during the morning peak:

- 7 through light vehicles from Palace Street to the Golden Highway (north);
- 6 right-turning heavy vehicles from the Golden Highway (east) to the Golden Highway (north); and
- 6 left-turning heavy vehicles from the Golden Highway (north) to the Golden Highway (east).

Indicative traffic volumes generated by the Modification would include during the afternoon peak:

- 7 through light vehicles from the Golden Highway (north) to Palace Street;
- 3 right-turning heavy vehicles from the Golden Highway (east) to the Golden Highway (north); and
- 3 left-turning heavy vehicles from the Golden Highway (north) to the Golden Highway (east).

Due to these low numbers of vehicles in addition to the low background traffic volumes, it is unlikely that this intersection will experience capacity constraints due to the traffic generated by the Early Works.

Capacity Issues with Kayuga Bridge

Kayuga Bridge is one-lane bridge that does not permit overtaking or passing. A potential traffic impact is the ability of this bridge to cater for any additional traffic generated by the Modification.

The Traffic Impact Assessment reviewed peak traffic volumes and the design capacity of the bridge to assess its remaining capacity.

The assessment concluded that the bridge has adequate capacity to meet the additional traffic generated by the Early Works.

Maintenance and Safety Issues on Wybong Road

The Traffic Impact Assessment also reviewed the following maintenance and safety concerns associated with Wybong Road which included:

- Narrow seal width;
- Lack of edge lines, centrelines and poor delineation;
- Curves and crests;
- Poor surface condition with excessive patching;
- Squeeze points with culverts and vertical geometry of causeways; and
- 100km/h speed limit.

As the Modification is likely to generate 12 heavy vehicles and 20 light vehicles per peak hour, the individual exposure to these safety risks would be low and can be mitigated through management procedures as discussed in **Section 7.2.**

6.3 ACOUSTICS

6.3.1 Noise

A Noise Impact Assessment was conducted for inclusion in the Modification EA by Wilkinson Murray for each of traffic and construction noise and is reproduced in full in **Appendix D**. A summary of key components is provided below.

Noise impacts for the Early Works have been assessed in accordance with the NSW Government's Environmental Criteria for Road Traffic Noise (ECRTN) and the RTA Environmental Noise Management (ENM) Manual. In addition, the DECC NSW Industrial Noise Policy (INP) and Environmental Noise Control Manual (ENCM) have been employed in the assessment of construction noise impacts.

The methodology utilised and impacts identified for each of traffic noise and construction noise is discussed separately below.

Traffic Noise Assessment

Criteria for assessment of noise from traffic on public roads are set out in the ECRTN and are reproduced in **Appendix D.** In terms of the ECRTN road classifications, the Golden Highway is considered a "freeway/arterial" road and Wybong Road, Kayuga Road and Aberdeen Street are categorised as "local" roads (see **Figure 1**).

In order to assess traffic noise from the Modification, the Noise Impact Assessment relied upon the existing traffic counts undertaken by PB at various locations on the local road network as discussed further in **Section 6.2**). In accordance with ECRTN, the background traffic data was utilised to identify roads which would exhibit a significant increase in traffic noise (i.e. > 2 dbA) due to the Early Works. Wybong Road was identified as requiring further modelling to calculate specific noise levels at residences.

Noise contours were obtained for the relevant sections of road using procedures based on the CoRTN (Calculation of Road Traffic Noise UK DoE Traffic Noise Prediction Method, 1988) prediction algorithms.

Traffic noise along the light vehicle route is predicted to increase by a maximum of 1 dBA which is within ECRTN allowances. On the heavy vehicle route, traffic noise levels on Wybong Road (west of the Northern Access Road) are predicted to increase by up to 5 dBA (under a worst-case scenario) during the construction works associated with the Modification.

Noise contours indicating the area of land that would be exposed to noise levels exceeding the ECRTN 50 dBA night time criterion have been calculated of which there are 13 private residential dwellings, 11 of which are included in the existing zone of affectation for noise or dust in the Project Approval. Traffic noise criteria are predicted to be exceeded for a few weeks over the approximately eight month period at two additional residences and thus it is considered that any traffic noise impacts would be short-term in nature.

Construction Noise Assessment

Construction noise levels at residences identified in the Project Approval were calculated for each of the Early Works' activities using the ENM model.

Calculated noise levels were calculated at each remaining private residence in terms of both individual construction activities associated with the Early Works and the cumulative noise level from the Modification. Noise levels were then compared with the daytime criterion at each residence from the Project Approval.

Noise levels are determined to be generally dominated by the construction of the Northern Access Road which utilises the most items of equipment of the Modification. Several residences to the south and west will experience noise impacts from the construction of the borrow pit, however the levels from those operations are predicted to be generally in the order of 20-25 dBA which would likely be inaudible. It is unlikely that all proposed activities would be concurrent and the calculated cumulative level is therefore conservative and indeed would likely be significantly lower for much of the construction period.

Predicted worst-case construction noise levels are well within the criteria stipulated in the Project Approval at all privately owned residences.

6.3.2 Blasting

Minor blasting may be required for rock breaking during the construction of the CHPP Pad. Blasts at this location would occur at least 4 km from the nearest private residence and at least 800 m from any sensitive natural feature, Aboriginal rock shelter or significant non-Aboriginal feature identified in the EA.

Any required blasting will be conducted in accordance with the Project Approval between 9:00 am and 3:00 pm and exhibit lower impacts that that predicted in the EA for both vibration and overpressure.

6.4 AIR QUALITY

6.4.1 Background

An Air Quality Impact Assessment was conducted as part of the Modification EA by Holmes Air Sciences which included an assessment of worst-case air quality impacts associated with the Early Works. This Assessment is reproduced in full in **Appendix E**.

No significant new sources of dust have been introduced since the EA was prepared, although wetter conditions are now more prevalent and so dust deposition and concentration levels are likely to be slightly lower than those reported in the EA.

6.4.2 Impact Assessment

As previously noted in **Section 3.1.3**, the area of land disturbed as a result of extraction and emplacement at the borrow pit (and associated waste storage area) is estimated to be approximately 8 hectares. The Early Works are expected to occur over approximately eight months (through Autumn to Spring 2008) and thus, winds during this period would be predominantly from the west-northwest.

The equipment required for the Early Works as described in **Section 3.2** will be strategically deployed to several locations across the approved disturbance area, whereby buffer distances to privately owned land is at least 150 m from the closest activity (i.e. construction of the Northern Access Road).

Dust emissions from the Early Works will be significantly less than those from the approved construction and mining. Air quality impacts as a result of the Early Works will be easily controlled to a level sufficient to avoid off-site impacts on surrounding privately-owned land by the application of standard dust mitigation measures discussed in **Section 7.4**.

6.5 FLORA & FAUNA

6.5.1 Background

The Ecological Assessment undertaken for the EA identified 17 vegetation communities within the proximity of the Anvil Hill Mine. In addition to these vegetation communities, a total of six flora species, two endangered populations and one Endangered Ecological Community (EEC) listed under the *Threatened Species Conservation Act 1995* (TSC Act) were identified.

The Assessment also identified a range of fauna species within the Anvil Hill Mine site and surrounding areas including 122 bird species, 13 reptiles, nine amphibians, 44 mammals and 24 aquatic fauna species.

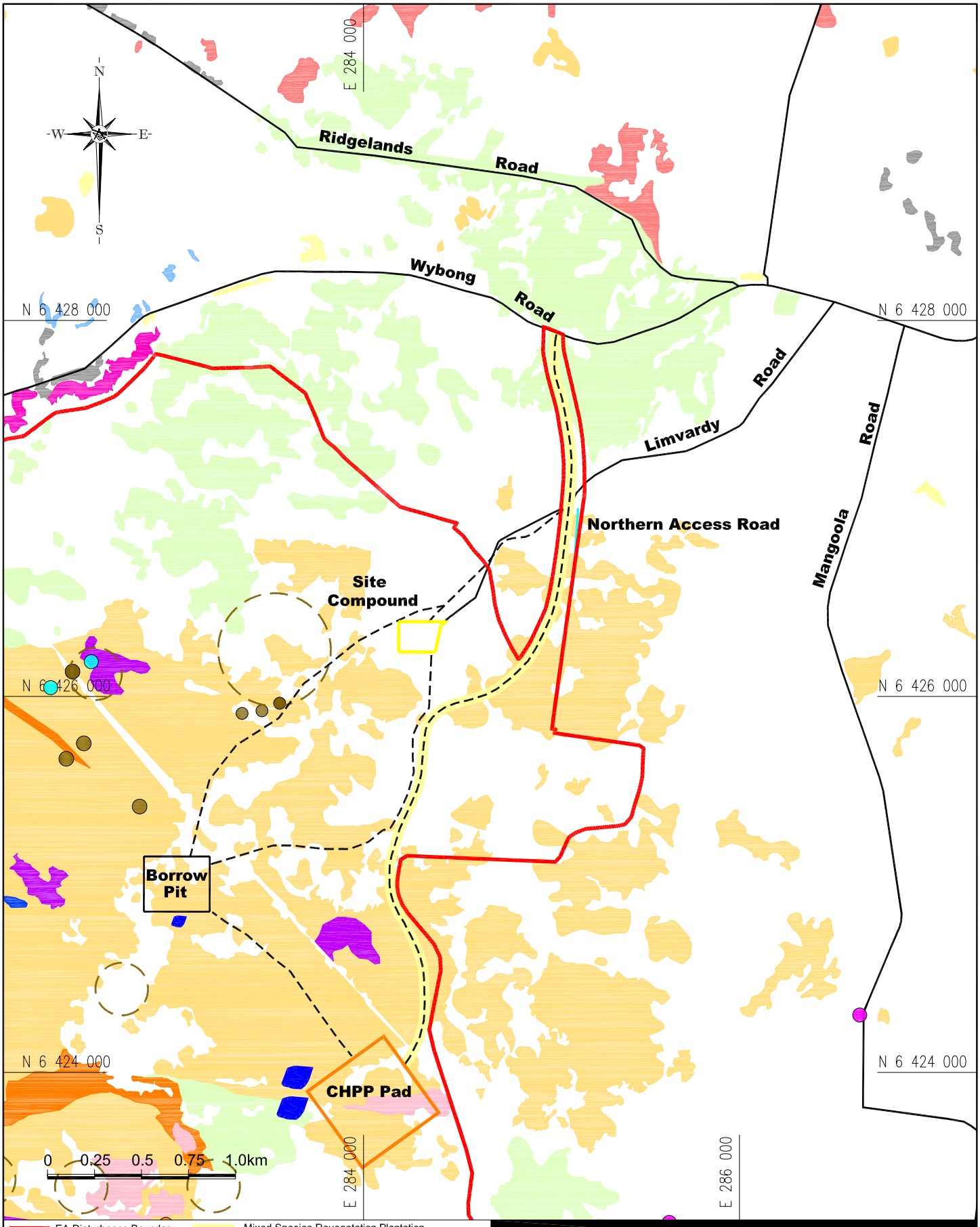
Of these, a total of 19 fauna species listed as threatened under the TSC Act were recorded including two species listed as vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

6.5.2 Impact Assessment

The EA ecological assessment was reviewed as part of the assessment for the Modification to determine if any threatened vegetation communities, flora or fauna have been identified within the areas proposed to be disturbed by the Early Works.

Vegetation Communities

The two most prominent vegetation communities present in the Early Works area are Ironbark Woodland Complex and Distributed Grasslands with a small area of Slaty Box Woodland over part of the Northern Access Road and Paperbark Woodland within the CHPP pad (see **Figure 6**). These communities are not listed under the TSC Act or EPBC Act. Consistent with the EA, part of these vegetation communities will be cleared to allow the Early Works to occur.



EA Disturbance Boundary
Sedimentation Dams
Temporary Access Roads
Existing Roads
Acacia Pendulum
Pomaderris Queenslandica
Cymbidium Canaliculatum
Goodenia Macbarronii Area
Goodenia Macbarronii
Derived Grassland
Rough-barked Apple Woodland
Forest Red Gum Riparian Woodland
Mixed Species Revegetation Plantation
Slaty Box Woodland
Bulloak Woodland
Weeping Myall Woodland
Paperbark Woodland
Ironbark Woodland Complex
Drooping Sheoak Woodland
Exotic Rushland
Swamp Oak Riparian Forest
Spotted Gum Open Forest

Source : Xstrata Mangoola (2008)
Umwelt (2006)
Co-ordinate System: MGA Zone 56

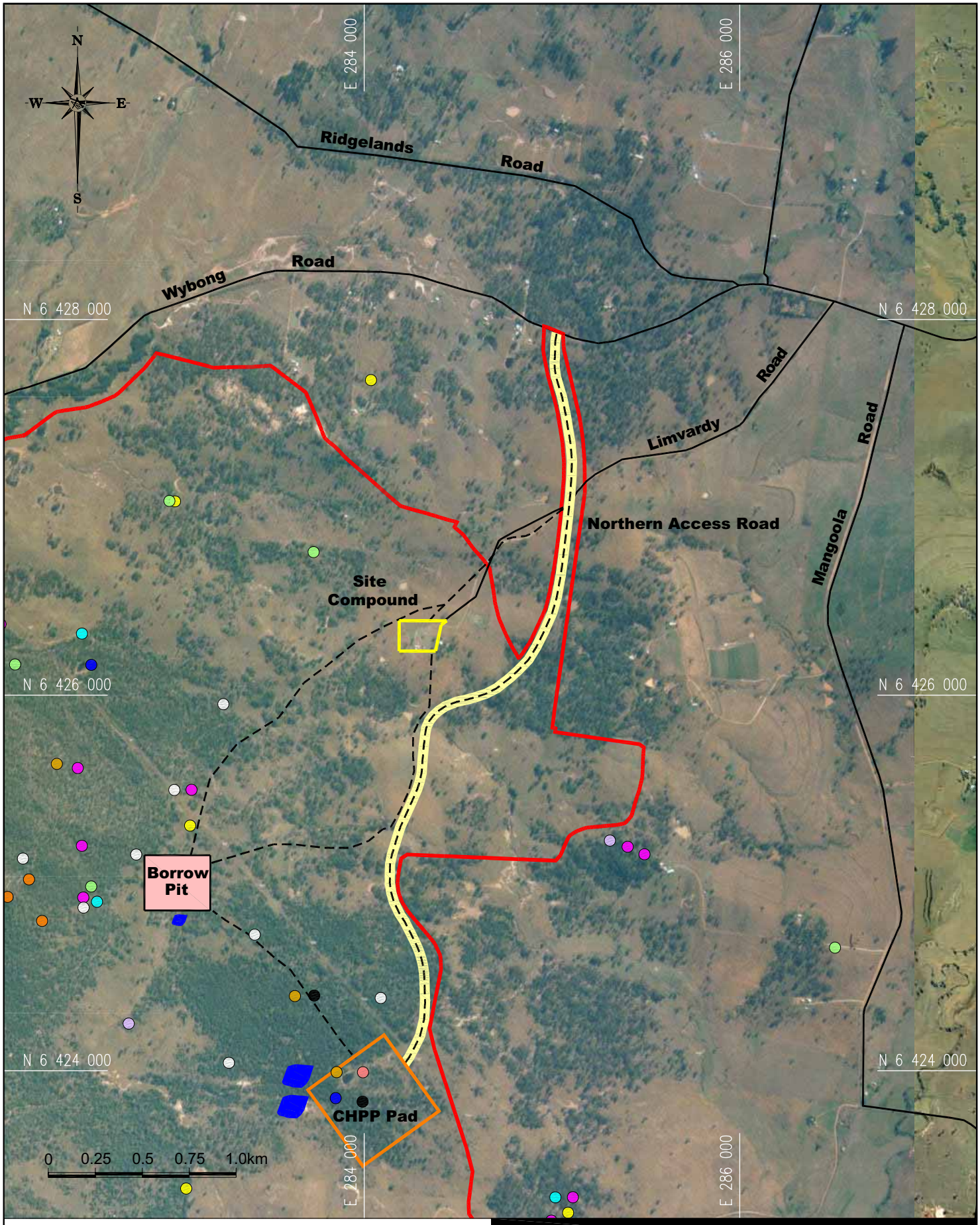
Hansen Bailey

xstrata coal

ANVIL HILL COAL MINE

Vegetation Communities & Threatened Flora

Cad File: 02891H.dwg	Date: 08.04.08	Drawn: JD	Figure 6



EA Disturbance Boundary
Sedimentation Dams
Temporary Access Roads
Existing Roads
Eastern Bent Wing Bat
Eastern Cave Bat
Large Eared Pied Bat
Brown Treecreeper
Diamond Firetail
Glossy Black Cockatoo
Grey Crowned Babbler
Hooded Robin
Large Footed Myotis
Rainbow Bee Eater
Speckled Warbler

Hansen Bailey

xstrata coal

Source : Xstrata Mangoola (2008)
Umwelt (2006)
Co-ordinate System: MGA Zone 56

ANVIL HILL COAL MINE

Threatened Fauna

Cad File: 02892G.dwg	Date: 08.04.08	Drawn: JD	Figure 7

Threatened Flora

A small area of *Goodenia macbarronii* is present approximately 400 m south of the borrow pit (see **Figure 6**). *Goodenia macbarronii* is listed as a vulnerable species under the TSC Act and EPBC Act. This species will not be impacted upon during the construction or utilisation of the borrow pit.

No other threatened flora has been identified as occurring within the areas where the Early Works will be constructed.

Threatened Fauna

The following threatened fauna species listed on the TSC Act or EPBC Act were recorded within the proposed CHPP construction pad area (see **Figure 7**):

- Eastern Bentwing-bat (Vulnerable under TSC Act);
- Eastern Cave Bat (Vulnerable under TSC Act);
- Large-eared Pied Bat (Vulnerable under TSC Act and EPBC Act); and
- Large Footed Myotis (Vulnerable under TSC Act).

A number of other fauna species listed as being threatened under the TSC Act or EPBC Act have been recorded within the vicinity of the borrow pit (see **Figure 7**) and include:

- Brown Tree Creeper (Vulnerable under TSC Act);
- Diamond Firetail (Vulnerable under TSC Act);
- Speckled Warbler (Vulnerable under TSC Act);
- Grey-crowned Babbler (Vulnerable under TSC Act); and
- Hooded Robin (Vulnerable under TSC Act).

Both the borrow pit and CHPP pad are located in areas approved to be disturbed in the EA.

With the implementation of the mitigation measures described in **Section 7.5**, impacts on these species are anticipated to be less than approved in the EA and Project Approval.

6.6 ABORIGINAL HERITAGE

6.6.1 Background

The EA identified 173 Aboriginal sites within the proximity of the Anvil Hill Mine including 69 within the approved disturbance area and 98 in the project offsets areas.

These sites are primarily artefact scatter sites (88 sites) and isolated finds (69 sites) (Umwelt, 2006).

6.6.2 Impact Assessment

The *Aboriginal Archaeological Assessment Report* prepared by Umwelt in August 2006 for the EA was reviewed as part of the assessment for the Modification to determine the extent of Aboriginal sites located within the area where the Early Works are required to be undertaken. From this review it was determined that Aboriginal sites are not located within the footprint of the Early Works.

A number of Aboriginal sites are located within relatively close proximity of the Early Works. All of these Aboriginal sites were assessed in the EA as being of low Archaeological significance.

The Early Works have been designed to avoid any impacts or disturbance to any known Aboriginal sites.

6.7 NON-ABORIGINAL HERITAGE

6.7.1 Background

The *Historical Heritage Assessment Report* prepared by Umwelt in June 2006 for the EA was reviewed as part of the assessment for the Modification to identify Non-Aboriginal heritage which may potentially be impacted upon by the Early Works.

The EA identified 19 Non-Aboriginal sites within the proximity of the Anvil Hill Mine including 12 within the approved disturbance area and seven outside. In terms of the Early Works, only Site 4 (Ham House 1 and Creamery) and Site 7 (Bundabulla) are located in moderately close proximity to the Early Works.

Ham House 1 and Creamery contains the ruins of a slab house and nearby Creamery. According to Umwelt (2006), the "house has an unusual layout; it appears linear with two rooms, a breezeway and two further rooms" and was assessed as being of high local heritage significance.

Bundabulla is described by Umwelt (2006) as a "Weatherboard Victorian villa with later extensions to side and rear…intact interior with Wunderlich ceilings and lining boards. Setting includes a stand of mature eucalypts, fences and a remnant garden." This site was assessed as being of moderate local heritage significance.

6.7.2 Impact Assessment

Bundabulla is located adjacent to the proposed Early Works' site office (former Anshaw residence) and will not be impacted upon by the Early Works.

The Ham House 1 and Creamery is located approximately 700 m south of the borrow pit and east of the CHPP Pad and will not be impacted upon by the Early Works.

6.8 WASTE

6.8.1 Background

Anvil Hill will minimise the amount and responsibly manage the waste generated as a result of the Early Works. As a result of the Modification, various wastes will be generated which will be managed to negate impacts on the surrounding environment.

6.8.2 Impact Assessment

The following wastes may be generated as a result of the Modification:

- General Waste: including food scraps and wrappers, non-recyclable plastic packaging, rubber products, polystyrene cups, plant waste, damaged pallets or wood products that can not be reused, stationary, and damaged air filters;
- Recyclable Waste: including paper and cardboard, aluminium cans, glass bottles, and plastics which show the recyclable logo 1, 2 or 5;
- Regulated Waste: including waste oil, used oil filters, oily rags, used oil drums, waste grease and blackjack, and hydrocarbon contaminated soil;
- Other Waste: including engine coolant, degreaser and other solvents, lead acid batteries, light vehicle used tyres and used printer cartridges; and
- Sewage Waste.

Negligible environmental harm will result from the generation and disposal of these wastes.

7.0 MANAGEMENT & MITIGATION PLAN

This section provides a summary of all management, monitoring and mitigation measures proposed to be implemented throughout the Early Works to minimise any potential impacts.

7.1 SOIL & WATER MANAGEMENT

7.1.1 Sediment & Erosion Control

Prior to disturbance of land, appropriate erosion and sediment controls will be designed and constructed according to the guidelines *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) (the Blue Book). Recommendations from the *Draft Guidelines for Establishing Stable Drainage Lines on Rehabilitated Minesites* (DLWC, 1999) will also be implemented.

Where practicable, runoff from undisturbed catchments will be diverted around the construction activities via diversion drains and banks to discharge into natural watercourses. Runoff from disturbed areas will be retained on site in sediment dams and allowed to settle prior to discharge into the natural system. Drains, diversion banks and channels will be compacted and stabilised as they are constructed.

Sediment and erosion controls will be designed to ensure effective management of clean surface water and sediment laden runoff. Sediment mobilisation and erosion will be minimised by:

- Installing erosion and sediment controls prior to disturbance of any land;
- Limiting the extent of the disturbance to the minimum that is practical;
- Ripping of rehabilitation areas to promote infiltration;
- Reducing the flow rate of water across the ground particularly on exposed surfaces and in areas where water concentrates;
- Progressively rehabilitating disturbed land and constructing drainage controls to improve stability of rehabilitated land;
- Protecting natural drainage lines and watercourses by the construction of erosion control devices such as diversion banks and channels and sediment retention dams. Steep gradients will require the installation of rock riprap, geotextile fabric sediment filters or other suitable measures;
- Restricting access to rehabilitated areas; and
- Ongoing monitoring of surface water quality as described in **Section 2.3.1** and shown on **Figure 2**.

All erosion and sediment controls shall be inspected at a minimum of weekly intervals and within 24 hours of a major rainfall event (i.e. greater than 20 mm in 24 hours). Regular routine maintenance shall be undertaken to replace damaged sediment control structures and maintain other temporary measures.

7.1.2 Soil Management

The following management techniques (consistent with the EA) will also be employed to mitigate potential impacts to soils during transport and stockpiling operations:

- Strip yellow solodic and brown clay soils to no greater than 150 mm;
- Topsoil will be maintained in a slightly moist condition during stripping and material will not be stripped in either an excessively dry or wet condition;
- If stockpiling of greater than three months is anticipated, stockpiles will be seeded and fertilised as soon as possible; and
- Generally, stockpiles will be maintained at a maximum height of 3 m;

- The surface of soil stockpiles will be left in as coarsely textured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established to prevent anaerobic zones forming; and
- All soil stockpiles will not be located within 40 m of watercourses and will have adequate erosion and sediment controls.

7.2 TRAFFIC

The following mitigation and management measures will be implemented for the Modification to minimise any potential traffic impacts:

- Brief employees travelling in light vehicles to preferentially use the New England Highway / Aberdeen Street intersection to minimise the potential for westbound traffic on Kayuga Bridge to be impeded;
- Brief staff and heavy vehicle operators on the interim light and heavy vehicle access routes. The site induction will also cover safe driving practices;
- Install a Type B (AUR) T-intersection (with an auxiliary passing lane) at the Wybong Road / Northern Access Road intersection;
- Prohibit any Modification related vehicle travel on Reedy Creek, Mangoola and Roxburgh Roads; and
- Install signage at each end of Reedy Creek Road to restrict access by Anvil Hill Mine traffic.

7.3 ACOUSTICS

7.3.1 Noise

Anvil Hill Mine will implement the following mitigation measures with regard to management of noise impacts:

- A construction noise monitoring program will include weekly attended noise monitoring at the closest residential receiver(s) (see **Figure 3**). Measured noise levels will be compared to Anvil Hill Project Approval Criteria, both in terms of $LA_{eq,15min}$ and LA_{max}, with the results provided on the Xstrata website;
- Mobile plant will be assessed on a regular basis to ensure compliance with sound power levels identified in **Appendix D**. Where practicable, low noise emitting plant will be selected over other plant;
- Activities known to generate excessive noise at off-site receptors during certain hours or during adverse weather conditions will be avoided at those times or when such conditions prevail;
- All equipment will be operated in a manner that will minimise noise emissions, such as minimising the travelling distance of equipment in reverse to reduce the noise generated by reversing beepers and maintaining plant, machinery and haul roads in a good condition;
- Personnel and contractors will be vigilant at all times in identifying and controlling operations and activities that might result in the generation of excessive noise. Noisy operations or equipment which are identified as affecting privately owned residences will be reported to the supervisor promptly; and
- All personnel and contractors will receive training in the importance of noise minimisation and in noise control procedures.

7.3.2 Blasting

Anvil Hill Mine will implement the following mitigation measures with regard to the management of minor blasting required for the construction of the CHPP Pad:

- No blasting will occur within 500 m of Wybong Road;
- Vibration and overpressure will be measured for each blast at representative locations (see **Figure 2**);

- No impacts to Anvil Hill, the Rock, items of European heritage or Aboriginal heritage (contrary to that approved in the EA) will occur; and
- Notifications will be provided via advertisement and the blasting hotline as required by conditions of Project Approval.

7.4 AIR QUALITY

The implementation of the following dust mitigation measures throughout the duration of the Early Works will ensure that dust emissions are controlled to the level at which no adverse effects will occur on privately owned land. These controls will include:

- The use of water carts to maintain all trafficked areas and all worked dusty areas in a damp condition;
- The use of clearly defined routes for traffic and the imposition of speed limits for all vehicles travelling on unsealed surfaces;
- Plant and equipment will be maintained in a proper and efficient condition and operated in a proper and efficient manner;
- Regular inspections by Environmental staff to ensure visible, airborne dust levels from Early Works activities are managed;
- All personnel and contractors will receive training in the importance of dust minimisation and in dust control procedures;
- Personnel and contractors will be vigilant at all times in identifying and controlling operations and activities that might result in the generation of excessive dust. Dusty operations which affect privately owned residences will be reported to the supervisor promptly;
- Pre-stripping is kept to the minimum practical area;
- During adverse weather conditions, when dust is difficult to control, all practicable steps will be taken to minimise dust, including:
  - Relocating works activities to less exposed areas;
  - Modifying work activities; or
  - Temporarily stopping work activities until conditions improve.
- Any long term topsoil stockpiles to remain in excess of three months will be revegetated;
- Regular review and reporting of air quality monitoring data from the established networks described in **Section 2.3.1**; and
- Should airborne dust impacts affect visibility on public roads, all works will cease until the situation has been remedied.

7.5 FLORA & FAUNA

The Early Works have been designed to minimise impacts or disturbance to any threatened vegetation communities or threatened species of flora.

Suitably qualified personnel will inspect all disturbance areas as part of the Pre-Clearing Procedure (discussed further in **Section 2.3.2**) to ensure that no unapproved impact on *Goodenia macbarronii* or any other threatened species of flora or fauna will occur.

No vegetation clearing associated with the Early Works will be undertaken without an approved GDP.

During vegetation clearing, the Habitat Tree Felling Procedure discussed in **Section 2.3.2** (and **Appendix B**) will be strictly followed at all times to ensure no adverse impacts occur on threatened flora.

Clearing activities will cease if any suspected threatened habitats or flora or fauna species are encountered during clearing with the Environmental Supervisor contacted immediately. Any fauna captured during clearing will be relocated by suitably qualified persons.

7.6 ABORIGINAL HERITAGE

The following mitigation measures will be followed during the construction of the Early Works to ensure no impact on Aboriginal heritage occurs:

- The Aboriginal sites located within close proximity of the Early Works will be delineated in the field by a suitably qualified person to ensure that they are not accidentally disturbed by construction operations or trafficked by personnel or machinery;
- These sites will be fenced and signposted and adequate training provided to all employees on the site as to their location and the requirement to not disturb the sites;
- Prior to any surface disturbance, a GDP as described in **Section 2.3.2** will be completed which shall include consideration of any Aboriginal archaeological material;
- If Aboriginal Cultural Heritage material or sites other than human remains are identified during construction activities associated with the Early Works then the Environmental Coordinator will contact an Archaeologist to assess the site; and
- Monitoring for human remains and Aboriginal Cultural Heritage material will be undertaken during the topsoil stripping and overall construction activities associated with the Modification:
    - If human remains are encountered, all works will cease in the area and the Project Manager will contact the police. During this time no one will interfere with the surrounding area;
    - An Environmental Representative will notify DECC and representatives of the local Aboriginal community if human remains are determined to be of Aboriginal origin. Appropriate management measures will be determined through consultation with DECC and the Aboriginal community. Representatives of the Aboriginal community will be present during all investigations of Aboriginal remains;
- Adequate training will be provided to all employees working on the Modification in relation to management requirements; and
- No disturbance of any Aboriginal site will occur prior to the approval of the Aboriginal Cultural Heritage Management Plan required by Project Approval Condition 46.

7.7 NON-ABORIGINAL HERITAGE

The following management and mitigation measures will be followed during the construction of the Early Works to ensure no impact on Non-Aboriginal heritage occurs:

- Bundabulla will be delineated and excluded from the site compound (see **Figure 4**) and adequate training provided to all employees working on the Modification as to its location and management requirements;
- Ham House 1 and Creamery will be delineated in the field by suitably qualified personnel and avoided by the Early Works; and
- Prior to any disturbance of any Non-Aboriginal heritage item, a GDP as described in **Section 2.3.2** will be completed which shall include consideration of all EA and Project Approval commitments.

7.8 WASTE

A Waste Management System (WMS) (incorporating waste reuse and recycling) will be developed for the Early Works which will address all issues relevant to the management of waste in accordance with the POEO Act. The WMS will utilise an approved, independent waste contractor working within the provisions of the POEO Act to remove and report wastes. Anvil Hill will also maintain an on-site tracking register for all wastes generated.

Complimenting this, the waste segregation component of the WMS will ensure each waste stream is disposed of in the appropriate receptacles for recycling, reuse and/or disposal, as discussed below.

7.8.1 General Waste

General waste will be disposed of into speciality bins labelled 'General Waste'. Any items that are contaminated with hydrocarbons (such as oily rags and absorbent material) will not be permitted within these bins, whilst hydraulic hoses will be drained entirely of oil prior to disposal in the general waste receptacles for reuse, recycling and/or disposal.

7.8.2 Recyclable Waste

Recyclable wastes generated by the Modification will be disposed of into the speciality bins labelled 'Recyclable Waste' for removal and reprocessing off-site.

7.8.3 Regulated Waste

Regulated waste includes waste such as hydrocarbons which are required to be removed by a licensed contractor.

Additionally, regulated waste must be tracked using a DECC approved record keeping system in accordance with Part 3 of the *Protection of the Environment Operations (Waste) Regulations 2005* (Waste Regulations).

With the exception of hydrocarbon contaminated soil, all Hydrocarbon waste will be collected and stored in a designated location onsite on honey comb pallets or in a bunded area in accordance with *Australian Standard (AS) 1940: The storage and handling of flammable and combustible liquids* (AS 1940).

Other wastes such as engine coolant, degreaser and other solvents, lead acid batteries, light vehicle used tyres and used printer cartridges will be stored in designated areas as per the relevant Material Safety Data Sheet and AS 1940. There are not expected to be large quantities of any of these wastes as part of the Early Works.

The sewerage tanks proposed to be installed at the site office and compound will be emptied and the waste removed from site on an as-required basis by a licensed sewage disposal contractor in accordance with the requirements of the POEO Act.

7.8.4 Other Management Measures

All regulated waste storage areas will be located away from watercourses (or drainage lines) to prevent water pollution.

Any refuelling will be undertaken in defined areas. Any hydrocarbon spills that occur which are greater than 5 litres will be reported as an incident through the Xstrata Mangoola incident reporting system. Spills will be isolated and cleaned up where safe to do so using designated spill kits which comply with AS 1940. All refuelling areas will be designed and managed in accordance with AS 1940 which shall include adequate bunding and storage requirements.

A bioremediation area will also be set up onsite as a delineated area adjacent the borrow pit for the disposal and management of hydrocarbon contaminated soil.

Training on ways of minimising the production of waste streams, reuse and recycling options and management strategies for each major waste stream relevant to key work areas will continue to be implemented. All personnel and contractors will be provided with regular training.

8.0 CONCLUSION

The Modification sought relates primarily to that of the timing of preliminary mine site Early Works. The conduct of these Early Works in conjunction with the adjacent public road upgrade is a logical proposition which will result in an effective and efficient outcome for both the Anvil Hill Mine and for the local community.

Commencing the Early Works with the Wybong Road Upgrade will provide a site office, a local source for select civil materials and a suitable disposal site for unsuitable road material in the immediate vicinity of both activities. Additionally, the undertaking of both activities in parallel will reduce the quantity of materials required to be hauled to and from external sources on the local public road network. A reduction in ancillary construction traffic flows on local roads by providing amenities in close proximity to the approved Wybong Road Upgrade will also result.

The environmental assessments conducted have confirmed that the impacts from the activities described as Early Works are minor in nature and consistent with that already approved by the Project Approval and as described in the EA. The assessments also propose that conducting the Early Works in conjunction with the upgrade of the Wybong Road will result in a net decrease in the overall impacts when compared to undertaken each individually. Undertaking both the Early Works and Wybong Road upgrade in parallel will create synergies with regard to sharing of equipment and manning, reducing material haulage distances on public roads and by providing a shared office and amenity facilities for employees in close proximity to both works.

The requirement for the use of an alternate site access is also required due to the Bengalla Link Road (Stage 2) not being constructed.

The environmental assessments show that this temporary, short-term access required to complete the Early Works will not result in a significant impact on the environment or community.

The suitability of the mine site for the Early Works was addressed in the EA. The rigorous scrutiny of this EA with an ultimate Project Approval being granted confirms the suitability of the site as proposed in this Modification.

The Modification as sought will result in the most effective and efficient construction of the Early Works at Anvil Hill Mine and the required upgrade of Wybong Road.

The Director-General's Environmental Assessment Report for the Anvil Hill Project dated June 2007 considered the Project in the context of the objects of the EP&A Act and the principles of Ecologically Sustainable Development (ESD) at pages 21-22 as follows:

> *"The objects of the EP&A Act are outlined in Section 2.7, and these objects have informed the Department's assessment of the project. With regard to the principles of ESD, the Department acknowledges that global warming/climate change presents a clear threat of serious or irreversible environmental damage, as well as the threat to intergenerational equity and a threat to the conservation of biological diversity. However, it must also be acknowledged that the downstream energy and other socio-economic benefits generated by the project would also benefit future generations, particularly through the shoring up of national and international energy needs.*
>
> *The precautionary principle dictates that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as reason for postponing measures to prevent environmental degradation."*

The Department acknowledges that there is still considerable scientific uncertainty regarding the effects and impacts of global warming/climate change, and has not used this uncertainty as a reason for not considering measures to prevent environmental degradation associated with global warming/climate change. Consideration of such measures is provided below.

The ultimate project-related measure to avoid the threat posed by global warming/climate change would be to refuse the project. However, the Department does not believe this approach is reasonable or practicable, as:

- *the project's contribution to global warming would be very small; there is a demonstrable need for the project to meet society's basic energy needs;*
- *refusing the project would not likely result in any reduction in global greenhouse gas emissions, as the need for coal would almost certainly be filled by another mine in Australia or overseas; and*
- *the project would have considerable socio-economic benefits (see Section 4.11)."*

The conclusion of the Director-General's Report after the analysis of the competing benefits and disbenefits is set out at page 73 as follows:

"After considering all the impacts of the project in detail, in accordance with the objects of the EP&A Act and the principles of ecologically sustainable development, the Department is satisfied, on balance, that the project's benefits would sufficiently outweigh its residual costs, and that it is therefore in the public interest."

Having regard to the fact that the proposed modification involves no material change to the Project other than to permit the Early Works to be constructed concurrently with the upgrade of Wybong Road, the earlier conclusions of the Director-General in his Report on the competing benefits and disbenefits of the Project in the context of ESD remain pertinent.

9.0 ABBREVIATIONS

Abbreviation	Description
CCC	Community Consultative Committee
dBA	The peak sound pressure level, expressed as decibels (dB) and scales on the 'A-weighted' scale, which attempts to closely approximate the frequency response of the human ear
DECC	NSW Department of Environment and Climate Change
DoP	NSW Department of Planning
DPI	NSW Department of Primary Industries - Mineral Resources
EA	Anvil Hill Environmental Assessment
EARs	Environmental Assessment Requirements
ESD	Ecologically Sustainable Development
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999 (Cth)
EPL	Environmental Protection Licence
EP&A Act	Environmental Planning and Assessment Act 1979
HVAS	High Volume Air Samplers
Mt	Million tonnes
Mtpa	Million tonnes per annum
MSC	Muswellbrook Shire Council
m^3	Cubic metres
Modification EA	This document
POEO Act	Protection of the Environment Operations Act 1997
Receiver	Privately owned properties within or adjacent to the EA Boundary containing a residence
Roads Act	Roads Act 1993
ROM	Run of Mine
RTA	NSW Roads and Traffic Authority

10.0 REFERENCES

- Australian & New Zealand Environment & Conservation Council (1992) *Australian Water Quality Guidelines for Fresh and Marine Waters*.
- Australian & New Zealand Environment & Conservation Council (2000) National Water Quality Management Strategy. *Australian Guidelines for Water Quality Monitoring and Reporting*.
- Department of Environment & Conservation (2004) *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW*.
- Department of Environment & Conservation NSW (2005a) *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*.
- Department of Environment & Conservation NSW (2005b) *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*.
- Department of Environment & Conservation NSW (2005c) *Draft Guidelines for Threatened Species Assessment*.
- Department of Environment & Conservation NSW (2005d) *NSW DEC Air Quality Guidelines*.
- Department of Urban Affairs and Planning (1998) *Assessment of Aquatic Ecology in EIA*.
- Environmental Protection Authority NSW (1985) *Environmental Noise Control Manual*.
- Environmental Protection Authority NSW (1999) *Environmental Criteria for Road Traffic Noise*.
- Environmental Protection Authority NSW (2000) *NSW Industrial Noise Policy*.
- Landcom (2004) *Managing Urban Stormwater: Soils and Construction*.
- NSW Fisheries (1999) *Policy and Guidelines: Aquatic habitat Management and Fish Conservation.*
- NSW Heritage Office (2001) *Assessing Heritage Significance* (Part 2 of the NSW Heritage Manual).
- Roads & Traffic Authority (2002) *Guide to Traffic Generating Development and Road Design*.
- Umwelt (2006) *Anvil Hill Project, Environmental Assessment*.

11.0 EA STUDY TEAM

Section	EA Component	Team Member	Company
Project Management			
	Grant Farrar	Operations Manager	Xstrata Mangoola
	Jane Yelland	HSEC Manager	
EA Management			
	James Bailey	Project Director	Hansen Bailey
	Dianne Munro	Project Manager	
Stakeholder Consultation			
	Evelina Hendry	Stakeholder Relations Co-ordinator	Xstrata Mangoola
	James Bailey	Project Director	Hansen Bailey
EA Sections			
	Executive Summary	Dianne Munro	Hansen Bailey
1.0	Background	Dianne Munro	Hansen Bailey
2.0	Existing Environment	Daniel Sullivan	Hansen Bailey
3.0	Modification Description	Dianne Munro	Hansen Bailey
4.0	Regulatory Framework	Dianne Munro	Hansen Bailey
5.0	Stakeholder Consultation	Daniel Sullivan	Hansen Bailey
6.0	Impact Assessment	Daniel Sullivan & Melissa Walker	Hansen Bailey
7.0	Management & Mitigation Plan	Dianne Munro	Hansen Bailey
8.0	Conclusion	James Bailey	Hansen Bailey
9.0	Abbreviations		
10.0	References		
11.0	EA Study Team		
Appendices			
Appendix A	Environmental Assessment Requirements		
Appendix B	Environmental Procedures		
Appendix C	Traffic Impact Assessment	Damien Chee	Parsons Brinckerhoff
Appendix D	Noise Impact Assessment	Tim Dean	Wilkinson Murray
Appendix E	Air Quality Impact Assessment	Nigel Holmes	Holmes Air Sciences
Drafting and Graphics Design by Pegasus Technical Pty Limited and Greenpond TSG			
Legal Advice provided by Blake Dawson			