Xstrata Mt Owen Pty Limited

Modification of Glendell Mine Operations

Response to Submissions

October 2007

Umwelt
Environmental Consultants

Modification of Glendell Mine Operations
Response to Submissions

Prepared by

Umwelt (Australia) Pty Limited

on behalf of

Xstrata Mt Owen Pty Limited

Project Director:	Barbara Crossley	
Project Manager:	Tim Crosdale	
Report No.	2461/R01/FINAL	Date: October 2007

Umwelt
Environmental Consultants

2/20 The Boulevarde
PO Box 838
Toronto NSW 2283

Ph: 02 4950 5322
Fax: 02 4950 5737
Email: mail@umwelt.com.au
Website: www.umwelt.com.au

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 Introduction

This document has been prepared in response to a request from the Director-General in accordance with section 75H(6) of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) that Xstrata Mt Owen (XMO) prepare a response to the issues raised during the public exhibition period for the Modification of Glendell Mine Operations (Modified Glendell operations). This report outlines XMO's Response to Submissions and focuses on the issues raised by government agencies and the community during the public exhibition period.

Government agency submissions were received from Department of Environment and Climate Change (DECC), Department of Water and Energy (DWE), Department of Primary Industries (DPI), Heritage Council of NSW, NSW Roads and Traffic Authority (RTA) and NSW Mine Subsidence Board (MSB). The issues raised by government agencies are addressed in **Section 2.0**. The community submissions received are addressed in **Section 3.0**.

For each primary issue, the theme of the matters raised is noted in bold, followed by a response in normal type.

1.1 Summary of Issues Raised in Submissions

A total of 20 submissions were received during the Environmental Assessment (EA) exhibition period. Of these, 15 objected and 1 supported the modified Glendell operations. The reasons given for supporting the modified Glendell operations project were primarily in relation to socio-economic benefits, particularly in relation to employment. The government agency submissions did not expressly support or object to the modified Glendell operations.

2.0 Government Submissions

This section focuses on the issues raised by government agencies including DECC, DWE, RTA and MSB. The response to the specific issues raised by each government agency area detailed in the following sections.

A submission was received from DPI which raised no objections to the modified Glendell operations subject to a number of conditions. These conditions related to:

- appointment of a suitably qualified environmental officer;
- obtain approval for final landform design that exceeds 10 degrees; and
- submission of a Mining Operations Plan (MOP) incorporating the modified Glendell operations and preparation of an Annual Environmental Management Report (AEMR).

All of these conditions have been reinforced in the revised Statement of Commitments provided in **Appendix 1**.

A submission was also received from the Heritage Council of NSW which raised no specific issues in relation to the modified Glendell operations and stated it considers the proposed management strategy for historic heritage items to be appropriate.

2.1 Department of Environment and Climate Change

The DECC submission stated that:

- DECC notes the commitment to seek to develop a blasting protocol with adjoining coal mines, and strongly supports this.
- The reduction in area of disturbance coupled with the amelioratory measures proposed in the EA will constitute a significant improvement in the amelioration for the impacts on biodiversity of the modified mine construction and operation activities compared with the amelioration measures required as part of the previously approved operations.
- Acknowledges the extensive aboriginal archaeology survey and salvage within the Glendell mine site and the management of remaining sites in accordance with the Aboriginal Heritage Management Plan as committed in the EA.

The DECC also raised a number of issues in relation to air quality and noise which are specifically addressed in **Sections 2.1.1** and **2.1.2**.

2.1.1 Air Quality

Background PM_{10} Assumptions of the Air Quality Modelling

During the adequacy review of the EA the DECC requested further clarification of the modelling assumptions used in the air quality assessment (refer to Appendix 5 of the EA) in relation to the background PM_{10} levels within the surrounding area. Within their submission, the DECC acknowledge that the additional information provided clarifying the background PM_{10} levels adequately addressed these concerns.

The air quality impact assessment concludes that the operation of the mine is predicted to result in exceedences of the DECC's impact assessment criteria for annual average PM_{10} and deposited dust at receptor no. 110 (south-east of the mine site) in the early stages of the project (years 1.5 and 3). The maximum predicted annual average PM_{10} concentration at this location is 40.9υg/m³, while the maximum dust deposition rate is predicted to be 4.7g/m²/month.

Significant adverse air quality impacts are likely to occur at this receptor and it is recommended that if Development Consent is granted, conditions that require the applicant to negotiate with the effected landholder should be included.

As outlined in Section 5.2.6 of the EA (p. 5.13) the air quality assessment has predicted cumulative dust levels at Residence 110 will exceed the relevant criteria for PM_{10} annual (30 ug/m^3) and dust deposition (4 g/m^2/month) during Year 1.5 and Year 3 of the modified Glendell operations.

Residence 110 is located approximately 4 kilometres to the south-east of the Glendell Mine site. Moreover, the modified north to south mine progression will ensure that mining operations will be located further north of Residence 110 in the initial stages of mining.

The modeling results for Residence 110 in relation to PM_{10} annual and dust deposition are reproduced in **Table 2.1**. Predicted exceedences of the relevant air quality criteria are shown in bold in **Table 2.1**.

Table 2.1 - Air Quality Predictions Residence 110

Criteria	Due to Modified Glendell Operations Only					Due to Modified Glendell Operations, Other Mines and Non-modeled Background Sources				
	Y1.5	Y3	Y6	Y9	Y12	Y1.5	Y3	Y6	Y9	Y12
Dust Deposition[1] (g/m^2/month)	0.1	0.2	0.2	0.2	0.2	**4.6**	**4.7**	0.9	0.9	0.7
PM_{10} Annual Average[2] (ug/m^3)	0.8	0.9	1.6	1.6	1.2	**40.6**	**40.9**	10.2	10.1	7.9

Note 1: Source Table 12 Holmes Air Sciences 2007 (EA Appendix 5)
Note 2: Source Table 14 Holmes Air Sciences 2007 (EA Appendix 5)

As stated in Section 5.2.6 of the EA (p. 5.14), the modeling of cumulative impacts is suggesting that the influence of the Glendell Mine to annual average PM_{10} and dust deposition levels at this residence is very small and the modified Glendell operations are unlikely to be causing the exceedance. This is demonstrated in the specific modeling results for Residence 110 (refer to **Table 2.1**), which highlights the small contribution to the predicted cumulative impacts at this residence.

Importantly, the air quality modeling results for Residence 110 (refer to **Table 2.1**), also highlight that annual average PM_{10} concentrations and dust deposition levels would be above 30 μg/m³ and 4 g/m²/month even without the inclusion of the predicted contributions from the modified Glendell operations.

The air quality impact assessment (refer to Appendix 5 of the EA) noted that the impacts at Residence 110 are predicted to be due to operations at the nearby Camberwell Mine. This

residence is within the Camberwell mine acquisition area, as defined under the existing development consent.

On this basis, XMO do not believe that specific negotiation with this landholder in relation to air quality impacts from the modified Glendell operations is warranted.

The maximum 24-hour average PM_{10} concentration during Year 9 operations is predicted to occur at Residence 14. It is recommended that the proponent is required to undertaken continuous PM_{10} monitoring in the vicinity of this residence.

As outlined in Section 5.2.8 of the EA (p. 5.15), XMO maintains an extensive air quality monitoring network, including dust deposition, Total Suspended Particulates (TSP) and PM_{10} HVAS, and continuous PM_{10} monitors associated with the Mt Owen Complex (refer to Figure 5.14 of the EA). XMO is committed to continue to monitor dust deposition and dust concentration levels within the area surrounding the Glendell Mine site over the life of the operation to verify that predicted impact criteria are not exceeded and dust controls are effective.

XMO have committed to the extending the existing Mt Owen Complex air quality monitoring to include a continuous PM_{10} monitor within the Camberwell Village area. The location of the proposed continuous PM_{10} monitor is shown on Figure 5.14 of the EA. As shown on Figure 5.14, the proposed continuous PM_{10} monitor will be located in the northern extent of Camberwell village in the vicinity of Residence 14. Furthermore, an additional continuous PM_{10} monitor will be installed between the Glendell mine site and Camberwell village. This monitor will used as a reference monitor in the management of air quality impacts.

2.1.2 Noise

Noise levels at Residences 61 and 62 are predicted to exceed the project specific noise levels by greater than 5 dB(A). It is recommended that the proponent enter into a negotiated agreement with the two affected parties.

As discussed in Section 5.3.2.3 of the EA (p. 5.24), noise modelling indicates a number of private residences and parcels of vacant land may experience noise levels from the proposed Glendell operations in excess of the relevant project specific noise criteria. Properties which are predicted to be significantly impacted by the proposed Glendell operations, i.e. where project specific noise level (PSNL) is predicted to be exceeded by greater than 5 dB(A), will be purchased by XMO at the request of the landholder. This commitment includes the purchase of Residences 61 and 62 (refer to Section 6.3.3 (p. 6.4) of the EA). Property purchases will be undertaken in accordance with the relevant procedures set by DoP in the modified development consent. In addition, XMO currently offers negotiated agreements to all residences within the acquisition zone as described further in **Section 3.7.3**.

Appendix 6 of the NIA presents the 'Probability of night time noise exceedance' for all identified 68 receiver locations. The 37dBA line marked on the presented graphs in many cases is higher than the PSNL of 35dB(A). Therefore the probability of exceedence of PSNL will be higher in many cases than these graphs suggest.

A key aspect of XMO's noise management commitments is the investigation of reported exceedences of relevant project specific noise criteria at private residences on a case by case basis (refer to Section 5.3.6 (p. 5.29) of the EA). This includes the monitoring of noise emissions at a particular receiver for comparison with the predicted cumulative noise exceedence probabilities outlined in the noise impact assessment (refer to Appendix 6 of the EA).

The preparation of probability distribution curves in Appendix 6 of the noise assessment (refer to Appendix 6 of the EA) is designed to aid in the long term management of the operation following the commencement of operation. XMO will use the probability distribution curves as the basis for their management of their noise impacts. Monitoring results from continuous noise monitors are compiled as probability distribution curves on a seasonal basis and these are compared with the predicted noise levels in the probability distribution curves.

The comparison of monitoring results to the predicted cumulative distribution curves allows for an accurate determination of the noise source in the context of the complex operating and meteorological environment. This approach is consistent with noise management and monitoring processes at the Mt Owen Complex. Should monitoring indicate noise impacts from Glendell, XMO will investigate reasonable and feasible measures to mitigate noise at the affected receiver.

It is noted that the information provided in Appendix 6 of the noise assessment includes 37 dB(A) lines on each of the presented graphs which is incorrectly marked as the Project Specific Noise Level. Whilst this is recognised that this may be misleading, as a management tool the probability of exceedence of 37 dB(A) and 40 dB(A) as indicated in the Table A6.2 in Appendix 6 of the noise assessment is correct.

2.1.3 Water Quality

The EA predicts a water surplus of up to 600 megalitres per year. The EA states that surplus water will be disposed of to the 'Greater Ravensworth Water Sharing System'. Consequently, DECC has recommended a condition that prohibits the discharge of polluted water from Glendell to the environment.

As outlined in Section 5.5.3 (p. 5.36) of the EA, the water management system is designed to capture surface water runoff from pits, emplacement and operational areas, and any groundwater make within the pits. The water collected is proposed to be reused within the modified Glendell operations, and Mt Owen Complex and surrounding Xstrata operations through the Greater Ravensworth Water Sharing System.

Mt Owen and Ravensworth East mines have licensed water discharge points under the existing Environment Protection Licences (EPL) for these operations. It is proposed to incorporate the modified Glendell operations into the existing Mt Owen Complex water management system (refer to Section 2.5.2.1 (p. 2.14) of the EA). In order to improve the efficiency of the Mt Owen Complex water management system, XMO may consider the relocation of existing licensed water discharge points to within the Glendell mine site. The relocation of any existing licensed water discharge point would be undertaken in consultation with the DECC and in accordance with relevant EPLs.

The EA provides no analysis of the ability of the 'Greater Ravensworth Water Sharing System' to operate in compliance with the Hunter River Salinity Trading Scheme if it receives the predicted additional inflows from Glendell. The onus will remain on each participant in this 'sharing system' to ensure that their water is managed to comply with the rules of the Scheme.

The surplus water produced by Glendell Mine will be made available off site for use within the Mt Owen Complex and surrounding Xstrata operations through the Greater Ravensworth Mine Water Sharing System. As outlined in Section 5.5.6 (p. 5.38) of the EA, it is anticipated that there is sufficient capacity in the Greater Ravensworth Mine Water Sharing System to

operate in compliance with the current HRSTS limits for these mines, with predicted inputs from Glendell.

Access to the Greater Ravensworth Mine Water Sharing System will also reduce the need for discharges from the XMO Complex through the HRSTS and will maximise the potential for re-use of lesser quality mine water.

2.2 Department of Water and Energy

2.2.1 Creek Diversions

DWE raised a number of issues during the adequacy review of the EA in relation to the creek diversions and groundwater interception as part of the modified Glendell operations. In response to these issues, additional information clarifying these issues, as well as a number of meetings with DWE representatives have been undertaken.

The DWE submission acknowledges the further clarification of these issues, particularly in relation to the satisfaction of DWE creek diversion requirements in terms of hydrological, geomorphic and ecosystem functions of the diversion channel. Based on this the DWE state that the Department is satisfied that the proposed Bettys Creek diversion will be constructed in a satisfactory manner.

The DWE also note that the proposed creek diversions will need to be constructed in accordance with a Part 2 Permit under the Water Act 1912. This requirement was acknowledged within Table 3.2 (p. 3.4) of the EA, and will be undertaken in consultation with DWE.

2.2.2 Groundwater

The alluvium connected to Bowmans Creek is embargoed under Section 113A of the *Water Act 1912*. The interception of surface waters and associated alluviums is not acceptable and as such the proponent must ensure that the interception of alluvial groundwater is prevented. A Groundwater Management Plan must be developed which defines trigger levels for depressurisation or water quality impacts within the Bowmans Creek alluvium, and remedial actions should those triggers be exceeded.

DWE notes the provisional nature of the western delineation of the pit. The western limit of mining operations must be determined upon verification of minimal interference with Bowmans Creek alluvium.

As noted in Section 5.5.6.2 of the EA (p. 5.39), to minimise impacts on Swamp Creek alluvials, the revised Glendell Mine plan includes the relocation of the western extent of mining approximately 350 metres eastward of the 1996 approved mine plan (refer to Figure 1.4 of the EA). The Swamp creek alluvials form part of the alluvial system associated with Bowmans Creek. This boundary of the western extent of the revised pit in relation to the determined extent of the Swamp Creek alluvium was depicted on Figure 2.6 of Appendix 8 of the EA.

As a result of the movement of the mining boundary, over the first 18 months of the modified Glendell operations up to approximately 400 metres of the eastern edge of Swamp Creek alluvium may be intersected. Based on the extensive assessments of the Swamp Creek alluvium (refer to Appendix 8 of the EA), it was not predicted that any significant inflow of groundwater from the Swamp Creek alluvials will occur.

Nevertheless, it is proposed that prior to the commencement of mining along the edge of the Swamp Creek alluvium, a series of test pits will be excavated along the 400 metre section of the western boundary of the open cut pit. It is considered that if any areas of high permeability are encountered they will not be of any significant length and will be in discrete areas that can be readily managed. If areas of high permeability alluvium are encountered, contingency measures will be put in place to ensure that significant inflows of groundwater do not occur. Contingency measures that may be considered include:

- construction of a cut off embankment, grout curtain or similar to seal off areas of high permeability; and

- relocation of the western limit of the pit boundary further away from the alluvium to avoid intersecting areas of high permeability.

In addition to the test pits, during the initial stages of mining it is proposed to monitor inflows from the alluvium. If significant inflow rates are sustained, contingency measures as identified above will be explored and appropriate measures implemented.

These management commitments will be outlined in a Groundwater Management Plan to be developed for the modified Glendell operations. The requirement to prepare a Groundwater Management Plan has been reinforced in the revised Statement of Commitments included in **Appendix 1**.

2.2.3 Final Void Management

More explanation is needed as to the justification of the final void, its location and dimensions and influence on groundwater behaviour.

Figure 5.6 of the EA identifies the proposed final void associated with the modified Glendell operations, which will be located in north western extent of the Glendell mine site. Section 5.3 of the Water Resources Assessment (refer to Appendix 8 of the EA) provided an assessment of the final void associated with the modified Glendell operations.

The modified Glendell operations will result in a substantial reduction of the final void, reducing the final void from approximately 140 million m^3 approved in 1997 to approximately 65 million m^3. This reduction in void volume will also result in a reduced catchment area of the final void and hence reduced potential surface inflows.

Previous modelling undertaken by PPK (1997) addressed the anticipated response should groundwater levels be permitted to recover in the pit after the completion of mining. PPK (1997) concluded that groundwater levels would not recover above the height of the Barrett coal seam floor at the anticline apex. The pit floor elevation at this point is approximately 25 mAHD. Detailed modelling of predicted surface inflow to the final void has been undertaken assuming a starting water level in the pit of 25 mAHD. Modelling assumed no groundwater inflows above 25 mAHD and no ground water leakage, but allows for direct rainfall, evaporation and catchment runoff.

Modelling using the historical meteorological sequence for Scone (1973 to 2006) indicates that the water level in the void will rise approximately one metre to a maximum elevation of approximately 26 mAHD (refer to Section 5.3 of Appendix 8 of the EA). Modelling indicates that at this elevation, the void water level will reach long term equilibrium with surface inflows during an average year being approximately equivalent to evaporation losses. Water levels may fluctuate around this level depending on prevailing wet and dry conditions.

Final ground level surrounding the void will be in excess of 70 mAHD resulting in approximately 44 metres of freeboard being available before spills from the void to the surrounding drainage system would occur. As a result, it is considered that the final void will become a self-contained system that will not overflow or discharge saline minewater to the surrounding environment.

A final void management plan must be required, in order to provide justification for a final void, its configuration and location, and what post-mine life groundwater behaviour either with or without a void.

XMO have committed to the development of a mine closure plan for Glendell at least five years prior to anticipated mine closure, in accordance with Xstrata Coal NSW standards for mine closure (refer to Section 5.1.3.4 (p. 5.9) of the EA). This plan will specifically address the major aspects of conceptual decommissioning and define future care and maintenance requirements for the site and ongoing monitoring and management. As part of the preparation of this mine closure plan, a final void management plan will be developed (refer to Revised Statement of Commitments in **Appendix 1**).

During the development of the mine closure plan, consultation with a range of internal and external stakeholders including DoP, DPI, Council, other relevant government agencies, and the local community, will be undertaken.

2.3 NSW Roads and Traffic Authority

The intersection of the New England Highway/Hebden Road shall be upgraded to current design and construction standards in accordance with the RTA's Road Design Guide to the satisfaction of the RTA and Council. This shall include as a minimum:

- **street lighting shall be installed at the intersection in accordance with relevant Australian Standards; and**
- **any non-compliant shoulder widening shall be designed and constructed to comply with the RTA's Road Design Guide.**

The intersection of New England Highway and Hebden Road operates as a priority controlled intersection. There is a left turn slip lane and right turn lane provided on the New England Highway to minimise delays from the turning traffic. The analysis of the existing performance of the intersection (refer to Appendix 12) indicated that it is currently operating with ample spare capacity, minimal delays and virtually no queues. This correlates closely with observations on site during the peak periods.

As outlined in Section 5.8.3.5 (p. 5.57) of the EA, the modified Glendell Mine operations will generate approximately 32 per cent more traffic than is currently forecast to exist on Hebden Road during peak traffic periods. This impact is significantly less than the previously approved Glendell Mine, which had approval to generate approximately 100 per cent more traffic on Hebden Road.

In traffic capacity terms the additional traffic generated by the proposed Glendell operations can be readily accommodated. Estimates of traffic performance (delays, queues and congestion) under the peak traffic conditions indicate that Levels of Service will exceed those generally adopted for design purposes i.e. at or better than Level of Service C for the New England Highway and Hebden Road Intersection.

As such, the traffic assessment (refer to Appendix 12 of the EA) concluded that the New England Highway and Hebden Road intersection will continue to operate at the existing levels of service with the addition of construction and operational traffic from the proposed Glendell operations during peak traffic conditions.

It is understood that there is street lighting currently installed in the area at the New England Highway / Hebden Road intersection. As such, XMO have committed to review the adequacy of the lighting in consultation with the RTA to determine whether it is appropriate. (refer to **Appendix 1**).

2.4 NSW Mine Subsidence Board

The EA has not addressed the issue of any underground resource potential in the subject areas of the proposed infrastructure. If coal resource potential exists, the design of the infrastructure will need to take in account relevant design parameters.

It was noted in Table 3.2 of the EA (p. 3.5) that the Glendell mine site is located in the Patrick Plains Mine Subsidence District and that approval from MSB for proposed buildings under Section 15 of the Mine Subsidence Compensation Act will be required.

There is underground coal resource potential within the proposed infrastructure area however; there are currently no plans to mine this coal resource. It is proposed to install demountable buildings within the proposed infrastructure area. As such, should it be considered feasible to mine these underground resources in the future, and specific design limitations are determined in consultation with MSB, the proposed buildings can be easily modified or relocated.

3.0 Community Submissions

3.1 Cumulative Impacts

The environmental impacts on the village will increase as the mine travels south.

The impacts will increase significantly when combined with the already unacceptable Ashton Mine.

Glendell Mine will finish beside the Ashton Mine, therefore we will receive at the very least double the emissions.

It is my concern that the proposal of this mine is not warranted as the cumulative effect of the mines that operate in vicinity of Camberwell Village are already causing considerable health problems.

Cumulative impacts of noise and air quality will result from this expansion. The residents of the village and the surrounding rural areas are already experiencing impacts in terms of noise and emissions, e.g. dust, diesel emissions blasting noise and vibration.

Dust and noise are major impacts and any further increase in any operation will increase these impacts on my property.

There has been a huge increase in mining activities in this area and there are several other large applications pending.

As outlined in Section 1.1.1 of the EA (p1.2) an objective of the modification to Glendell operations is to revise the approved mine plan to consider the status of surrounding operations to minimise cumulative impacts on the community.

As outlined in Section 2.2.2 of the EA (p2.3), the current approved Glendell Mine Plan involves commencing mining in the southern extent of the Glendell Mine site and progressing in a general northerly direction. The revised mine plan proposes to commence mining within the northern extent of the Glendell Mine site with subsequent mining initially advancing in a southerly direction to approximately Year 9 of operations prior to turning and continuing in a northerly direction.

Ashton Coal Mine is located immediately south of the Glendell Mine site, between Glendell and Camberwell Village. Ashton Coal mine has approval for the operation of an underground mining operation supplemented by a small open cut mine for the first seven years of operation. Based on the approved mining operations at Ashton the open cut operation is expected to cease in 2011. Given the current status of the Ashton operations, commencement of mining within the southern extent of the Glendell Mine site, in accordance with the approved operations, would increase potential impacts on Camberwell Village located south of the Glendell Mine site (refer to Section 2.6.1 of the EA (p2.15)).

The proposed north to south direction of mining will substantially reduce the potential off site environmental impacts associated with the proposed Glendell operations by reducing the cumulative dust and noise impacts to south and south-east of the mine, considering approved timing of the adjacent and nearby Ashton and Camberwell open cut operations.

In addition, the integration of Glendell Mine in the processing and management frameworks of the Mt Owen Complex provides for a reduction in off site air quality and noise impacts. In

particular, this will be achieved through removing the need for the duplication of the coal handling and transportation infrastructure associated with the approved Glendell operations.

Environmental impacts have been assessed for each component of the modified Glendell operations as well as the cumulative impacts associated with the modified operations and nearby development. Section 5.1.1.5 of the EA (p5.5) identifies the surrounding mining operations that have been considered in this assessment. Surrounding mining operations included in the cumulative assessment of impacts associated with the modified Glendell operations included; Mt Owen, Ravensworth East, Ashton mine (including open cut and coal handling operations), Camberwell Mine, Glennies Creek Colliery, and Ravensworth Operations, including Narama and Ravensworth West mines.

Potential cumulative impacts associated with the modified Glendell operations have been discussed throughout Section 5.0 of the EA and are addressed in each of the relevant specialist reports included as appendices to the EA. Potential cumulative noise impacts have been assessed in relation to surrounding mining operations (refer to Section 5.3.5 of the EA (p. 5.27)). In addition, potential cumulative air quality impacts have been considered within the detailed air quality assessment (refer to Section 5.2 of the EA (p5.9)). The details of these assessments will be discussed further in **Sections 3.2.4** and **3.3.7** respectively, to address the specific issues raised by the community

The key points from the cumulative assessment of other aspects of the modified Glendell operations include:

- The detailed site water balance indicated that the modified Glendell operations will be a net producer of water over the life of the mine. Surplus water from Glendell will be made available for use within the Mt Owen Complex and other Xstrata mining operations through the Greater Ravensworth Mine Water Sharing System.

- There is sufficient capacity within the local road network to accommodate the modified Glendell operations and will not significantly impact on traffic and road safety of the local road network.

The proposed development will make the development, approved nearly twenty years ago, significant operation in terms of area and production. This will necessarily increase noise and emissions from the site and impacts on the community.

The proposed development was approved nearly twenty years ago, therefore the conditions need up-grading to match 2008 conditions.

As outlined in Table 2.1 of the EA (p. 2.1), the modified Glendell operations propose to increase the rate of production to up to 4.5 million tonnes per annum (Mtpa) Run-Of-Mine (ROM) coal for a period of up to 16 years. The approved Glendell operations included the extraction of up to 3.6 Mtpa ROM coal for a minimum of 16 years, with a total consent period of 30 years.

Despite the proposed increased production rates, the revision of the approved Glendell Mine plan and integration of infrastructure requirements into the approved Mt Owen Complex will substantially reduce the approved disturbance area associated with the Glendell Mine. The approved disturbance area will be reduced by approximately 86 hectares, which represents an 11 per cent reduction in the approved Glendell Mine disturbance area (refer to Figure 1.4 of EA).

It should be noted that the assessment of the environmental impacts has considered the modified Glendell operations in entirety. In effect, this means that the current modification

process assesses the entire operation against current expectations in terms of environmental mitigation and management approaches, despite the fact that the mine could progress under the less stringent conditions of the existing development consent.

3.2 Noise

3.2.1 Existing Environmental Noise Levels

Two of the public submissions received raised specific issues related to existing concerns associated with potential noise impacts from Mt Owen Complex at their residences. These private residences (Residence 79 and 100) are located outside of the acquisition zone of Mt Owen Mine, as defined under the existing Mt Owen consent (DA 14-1-2004).

The noise assessment (refer to Appendix 6 of the EA) has predicted that the noise levels from the modified Glendell operations at these residences is below the relevant project specific noise level. XMO have acknowledged the issues raised within these submissions in relation to potential noise impacts from Mt Owen Complex and are currently addressing these concerns in accordance with existing noise management processes of the Mt Owen Complex. This has included undertaking additional noise monitoring at these residences.

As such, existing issues associated with potential noise impacts from the Mt Owen Complex at these residences will not be discussed further, aside from where specific issues have been raised in relation to the modified Glendell operations. These issues are addressed in the following sections.

3.2.2 Noise Assessment Report

There are a range of understating and inaccuracies of the noise predictions.

The noise levels that are predicted in the report are not true and accurate, levels in the area are already exceeded. How can a mine stay within the limits with a large range of weather conditions?

We have absolutely no confidence in the noise assessment predictions and monitoring results contained within the EA.

A comprehensive noise impact assessment has been undertaken by Advitech Pty Limited (refer to Appendix 6 of the EA). This assessment provides details of existing noise levels within surrounding areas, determines the noise impact assessment criteria based on existing noise levels and the relevant DECC guidelines, predicts noise levels that are expected to result from the modified Glendell operations and provides an assessment of these noise levels against the relevant criteria.

The noise assessment has been conducted on an iterative basis to enable incorporation of feasible noise control measures to minimise the noise impacts on nearest private residences (refer to Section 5.3.6 of the EA (p 5.28)). In addition, the modified mine plan and adopted noise controls seek to minimise the contribution of the modified Glendell operations to cumulative noise impacts.

It should be noted that this noise assessment has considered the modified Glendell operations in entirety. In effect, this means that the current modification process assesses the entire operation against current expectations in terms of current noise criteria and noise

management approaches, despite the fact that the mine could progress under the less stringent conditions of the existing development consent.

The noise impact assessment has been undertaken in accordance with the DECC's Industrial Noise Policy (INP). In accordance with the INP, a Rated Background Level (RBL) has been determined for the areas surrounding the Glendell Mine site, to form the basis of the assessment of noise impacts associated with the modified Glendell operations (refer to Section 5.3.1 of the EA (p. 5.21)).

Noise monitoring results presented in Table 5.4 of the EA (p. 5.21) show that the RBLs are generally around 30 dB(A) in the typically rural areas of Middle Falbrook and Glennies Creek Roads, but are elevated to above 45 dB(A) close to the New England Highway within Camberwell Village. The results from the monitoring program show that road noise from the New England Highway has a measurable effect on the noise environment of Camberwell Village. The results from monitoring indicated the elevated background noise levels within 200 metres of the highway, with background noise levels within Camberwell Village decreasing further north of the highway.

The INP requires assessment of predicted noise levels under certain meteorological conditions that have the potential to enhance noise impacts where it is considered that the noise enhancing conditions are significant features of the prevailing meteorological environment. An assessment of prevailing meteorological conditions has been undertaken based on the meteorological data recorded from the Glendell, Mt Owen Mine and Ashton Coal weather stations (refer to Section 5.3.1 of the EA (p5.21)).

Based on this assessment of existing meteorological conditions, noise levels have been calculated for all potentially affected residences for five conceptual mine plan stage years (1.5, 3, 6, 9 and 12) and for four meteorological scenarios representative of weather conditions within the area surrounding Glendell Mine as follows:

- neutral (to very unstable) conditions with a 3 m/s breeze from the north-west,
- neutral (to very unstable) conditions with a 3 m/s breeze from the south-east,
- a 3°/100 metres temperature inversion without any localised drainage flow, and
- calm isothermal conditions.

Operational noise levels at residences were calculated using the Environmental Noise Model (ENM). This model has been endorsed by DECC for environmental noise assessment. ENM can be used to predict noise levels under various meteorological conditions and accounts for topography and equipment positioning for each conceptual mine stage plan.

The ENM was used to predict noise impacts, for representative mine plan stages and meteorological scenarios, for 66 private residences within the area surrounding the Glendell mine site. The resultant 69 point (including 3 noise monitoring locations) noise model provided the basis for the assessment of potential noise impacts and the generation of noise contours. Noise contours for each mine plan stage year and each meteorological scenario have also been produced. The results of the single point noise level calculations and the noise contours are contained in Appendix 6 of the EA.

The noise impact assessment conservatively predicted that the worst case noise impacts within the surrounding area are predicted to occur during times of medium strength north-westerly winds which occur less than 10 per cent of the time.

In addition to the predictive modelling provided within the noise impact assessment, XMO have committed to continue to implement the noise monitoring network currently in place for the Mt Owen Complex. This includes the ongoing operation of three continuous noise monitors within the Glennies Creek and Middle Falbrook areas. The in-built 24 hour audio facility and the weather station network are currently used to facilitate the identification of mine related noise and for complaint investigation. This type of information, along with a suitable filter to remove extraneous noise, will be used to assess compliance with predicted noise levels for the modified Glendell operations. In addition, XMO proposes to install a further two continuous noise monitors, one reference monitor located between Glendell Mine and Ashton Mine and one within Camberwell Village (refer to Figure 5.14 of the EA).

The prediction of noise impacts at another residence located a further 800 metres from the Glendell mine site is higher than those for our residence. Our property has a direct line of sight to Glendell and is located at a higher elevation.

The prediction of noise impacts at the closest noise receiver exceeding the relevant noise criteria and predicting that noise at our residence will not exceed criteria is beyond belief.

How is it possible that the noise level indicated in the noise assessment suddenly drop below 40dB approximately 200 metres from our home when it is located at a higher elevation to the mine site? This has no topographical merit. Clearly indicates that XMO's attempts to exclude us from their acquisition area for no apparent reason.

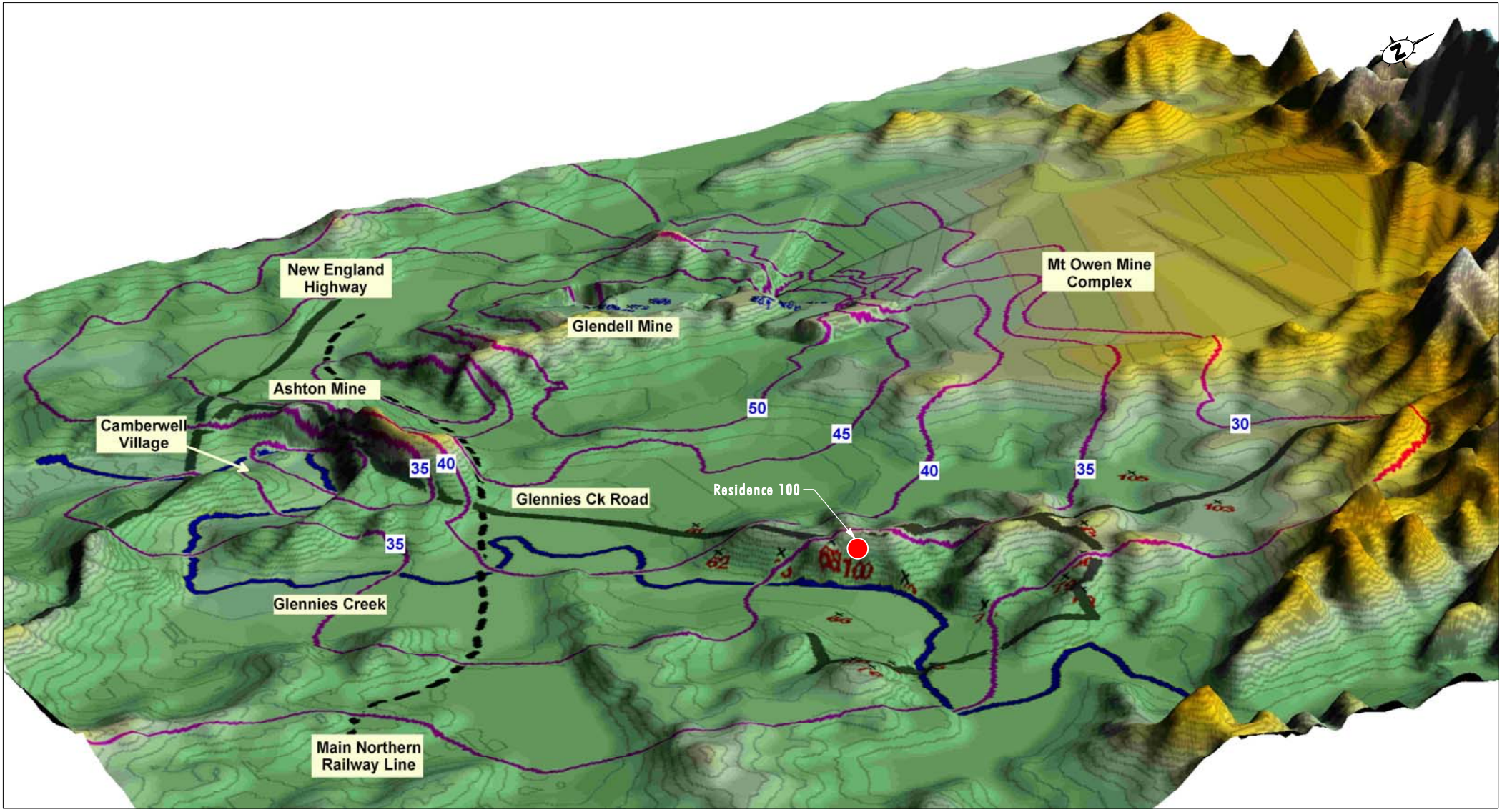
These issues were raised within a public submission in relation to Residence 100. As indicated on Figure 1.6 of the EA, Residence 100 is privately owned and is located approximately 2.5 km to the east of the Glendell Mine site. The location of this residence has been determined through review of aerial photography (current to December 2006) and confirmation by site observation.

The ENM is a computer-based modelling software package used to predict the noise levels from a range of different noise sources. In addition to the noise source sound power levels, the location of each noise source and the location of the receivers, ENM's noise models include detailed topographical data and consider the influence of user defined weather conditions. As stated above, this model has been endorsed by DECC for environmental noise assessment.

ENM models were developed for five stages of the mine's operation using detailed mine plans. The mine plans were then incorporated into the topographic data of the region. Best available data the location of each of the identified receivers was included into the topographical model. The noise source models for the type of equipment planned for use in the five stages of the mine's operation were then included in the detailed mine plans and the noise impact predicted for a range of weather conditions.

The topographical data used in the ENM models, shown in **Figure 3.1**, indicates Property 100, located on the eastern side of Glennies Creek Road, is shielded from the modified Glendell operation by a natural landform immediately to the west of the property. The close proximity of a barrier like this can provide significant attenuation of noise. The results in the Noise Impact Assessment suggest the natural landform could provide attenuation in excess of 10 dB.

Figure 3.1 also shows how the propagation of noise in Year 1.5 under 3.0 m/s NW wind conditions is influenced by the changes in landform elevation. The Year 1.5 operations under 3.0m/s NW winds have been predicated as the worst case noise level from the modified Glendell operations within the Glennies Creek Road area. The influence of



Legend

Noise Contours for Year 1.5 (Standard equipment) under 3.0m/s NW winds

FIGURE 3.1

Topographical Base for Environmental Noise Model

landform elevation changes on noise levels, as shown in **Figure 3.1**, is consistent with the results predicted by ENM and replicated by industrial and infrastructure developers who use acoustic barriers to shield noise generating developments.

By way of comparison, the prediction noise levels at private residences located in proximity to Residence 100, including Residences 66, 70, 75 and 77 (refer to Figure 1.6 of the EA), will be up to 33 dB(A) during Year 1.5 operations with standard equipment under 3.0 m/s NW winds. Whilst these private residences, located further from the Glendell mine site, have been predicted to experience noise levels higher than Residence 100, they are still within the relevant PSNL.

As stated above, XMO have committed to the investigation of elevated noise levels on a case by case basis at the request of the landholder. This will include additional noise monitoring at the residence to determine relevant noise impacts and appropriate management strategies.

3.2.3 Sleep Disturbance

We strongly believe that the EA has not addressed the issue of sleep disturbance in an appropriate manner.

Noise impacts will come from the bulldozers and the clack from their tracks

The noise assessment included a specific assessment of the potential sleep disturbance impacts associated with the modified Glendell operations (refer to Section 5.3.2.4 of the EA (p. 5.25)). The noise impact assessment (refer to Appendix 6 of the EA) noted that noise sources that have the potential to cause sleep disturbance include the use of air horns to control equipment movement in the pit, reversing beepers and the clatter of bulldozer tracks. While these noise sources may be individually audible, monitoring and modeling results indicated noise from sources such as reversing beepers would not exceed the Rated Background Noise Level in surrounding areas.

Other sources of sleep arousal include track clatter from bulldozers, which occurs intermittently and its potential to cause sleep disturbance is dependent on the location, orientation and speed of the machine. As such, this source of potential sleep disturbance will be addressed as part of the management of noise emissions from the proposed Glendell operations as discussed further below.

We currently complain about excavator noise within the night disturbing our sleep. This is due to track noise, reverse beepers, constant whining and revving of excavator engines and so on. The effects are very dependent on weather conditions in particular winds from north-west and during temperature inversions. Because of the affects of these weather conditions the assertions in the noise assessment are without substance and downplaying the affect to the extreme.

As discussed above, the two notable sources that could lead to sleep disturbance are air horns used on excavators to control truck movement and track clatter from dozers. XMO has installed smart alarms on mining equipment as an operational noise management strategy. Smart alarms are self adjusting alarms that measure background noise and alter noise output accordingly.

Similarly with dozer track clatter, another operational noise management strategy is the use of rubber tracked dozers within the mining fleet to reduce impacts from track clatter. It is also noted that current industry research and development is aimed at reducing track clatter where proven technology exists.

Track clatter has been included in all the noise models of the modified Glendell operations (refer to Section 6.6 of Appendix 6 of the EA). The potential to cause sleep disturbance is dependent on the location, orientation and speed of the machine and can be addressed as a management issue until a proven technical solution is available. Management measures include the design of pit sequencing to provide protection for machinery during night time periods, where practicable during adverse weather conditions (refer to Section 6.3.6 and 6.3.7 (p. 6.4 of the EA).

Additional sources of sleep disturbance are reversing beepers on mining equipment. Reversing beepers can cause community concern because they are audible. However, they are used because there are no proven robust alternatives that can assure the same high level of safety within the mining environment. Should a suitable alternative be identified that can assure a high level of safety and minimise nuisance to the local community it will tested and installed if found to be satisfactory.

3.2.4 Limits on Operation

Request that Glendell be bound by the same mining conditions as Ashton i.e. between 7 am and 10 pm.

A curfew should be placed on this operation in an effort to allow residents to enjoy undisturbed night time sleep.

The operation is not an essential service like power generation and the operation should be scaled back to normal business hours of 9 to 5.

Request a curfew on all mining operations at 10 pm nightly.

As outlined in Table 2.1 of the EA (p. 2.1) Glendell operations are currently approved to operate on a 24 hours per day, 7 day per week basis. The modified Glendell operations are not seeking to amend the approved operating hours. The modified Glendell operations seek to minimise the potential environmental impacts on surrounding areas. As discussed in **Section 3.1**, the proposed north to south progression of the modified Glendell operations seeks to reduce environmental impacts of the modified Glendell operations in areas to the south of the mine.

In addition, a prominent topographical feature of the surrounding area is a ridgeline to the south of the Glendell Mine site which runs in an east to west direction, with an elevation of approximately 100 to 115 mAHD (refer to Figure 5.1 of EA). Camberwell Village is situated immediately south of the ridgeline with an elevation of approximately 60 mAHD to a peak of 95 mAHD (refer to Figure 5.2 and Plate 1 of EA). In addition, the Ashton open cut mine and overburden area is located between Glendell and Camberwell Village, with the maximum overburden elevation being 130 mAHD. As shown on Figure 5.2 of the EA, the intervening ridgeline and Ashton overburden emplacement area provide a substantial elevated barrier between Glendell Mine site and Camberwell Village to the south.

The noise impact assessment has indicated that there will be periods of time when meteorological conditions in the region of Camberwell Village when the propagation of noise from Glendell towards the village will be enhanced. Conservatively, the worst case noise impacts within the village are predicted to occur during times of medium strength north westerly winds which occur less than 10 per cent of time. This noise environment within the village is predicted to occur during the later stages of the modified Glendell operations. By this time the Ashton Open cut operation is scheduled to have ceased, reducing the potential cumulative noise impacts on the Camberwell Village area. During these times of adverse

weather conditions the relevant project noise criteria within the village could be exceeded at a number of private residences.

As outlined in Section 5.3.6 of the EA (p. 5.28), management of noise includes measures to control noise at the source, controlling the transmission of noise through barriers or screens and/or controlling noise at the receiver. XMO proposes to control noise at the source, primarily through the use of equipment with appropriate sound attenuation fitted.

The noise assessment noted that the orientation and surrounding topography of Glendell Mine is not conducive to the effective use of screens or bunds for the control of noise. Despite this, XMO proposes to carefully consider the location of machinery within the pit during times when potential noise propagation is greatest. Where possible, machines will be selectively located at lower elevations during times when noise levels at the receivers are exacerbated by weather conditions.

XMO have also committed to purchase, as the landholders request, properties which are predicted to be significantly impacted by the proposed Glendell operations, i.e. where PSNL is predicted to be exceeded by greater than 5 dB(A). In addition, XMO will maintain the current acquisition rights of all properties located within the existing Glendell acquisition zone, despite not being predicted to be significantly impacted by noise.

Furthermore, XMO will investigate reported exceedences of relevant project specific noise criteria at private residences on a case by case basis. This approach is consistent with noise management and monitoring processes at the Mt Owen Complex. Should monitoring indicate noise impacts from Glendell, XMO will investigate reasonable and feasible measures to mitigate noise at the affected receiver.

3.2.5 Cumulative Noise Impacts

Noise levels are already above relevant acquisition level from XMO and the noise levels will be increased if this proposal is approved.

The Glendell project includes mining in the northern extent of the mining area in close proximity to Mt Owen. This will result in noise impacts at our residence.

The incessant noise is forever there.

As outlined in **Section 3.1**, the noise impact assessment (refer to Appendix 6 of the EA) included an assessment of potential cumulative impacts associated with modified Glendell operations.

The noise assessment noted that the noise environment at receivers surrounding Glendell is also affected by mining and rural activity in surrounding areas. Other mining operations contributing to the existing noise environment surrounding Glendell include the Mt Owen Complex (Mt Owen and Ravensworth East mines), Glennies Creek Colliery, Ashton Mine, Camberwell Mine and Liddell Colliery.

The cumulative noise impact assessment (refer to Section 5.3.5.2 of the EA (p. 5.27)) indicated that predicted noise levels would remain within the relevant acceptable noise criteria defined by the INP. It was also acknowledged that due to the variability of weather conditions and mining operations, achievement of these levels is not always realistically possible.

As such, the noise impact assessment determined the probability of exceedence of the noise limits at the receiver locations (refer to Appendix 6 of the EA). Cumulative noise effects will

be assessed on a case-by-case basis in accordance with the existing noise monitoring and management procedures utilised at the Mt Owen Complex, which include comparison of monitored noise levels to cumulative probability curves of noise impacts at each respective residence (refer to Section 5.3.5.2 of the EA (p. 5.27)).

As outlined in Section 5.3.6.1 (p. 5.29) of the EA, XMO will continue to implement the noise monitoring network currently in place for the Mt Owen Complex. This includes the ongoing operation of three continuous noise monitors within the Glennies Creek and Middle Falbrook areas. XMO proposes to install a further two continuous noise monitors, one reference monitor located between Glendell Mine and Ashton Mine and one within Camberwell Village.

Given the substantially closer proximity of the Glendell site to our home we have no doubt the noise level from the Glendell proposal will exceed the current noise levels.

Existing noise is generated from XMO mining activity located 3.5 kilometres from my residence and the new proposal is located at 2.5 kilometres. Logic says that cumulative will increase in the area when Glendell commences.

These issues were raised within a public submission in relation to Residence 100. As indicated on Figure 1.6 of the EA, Residence 100 is privately owned and is located approximately 2.5 kilometres to the east of the Glendell Mine site. As outlined in **Section 3.2.2**, the intervening topography (refer to **Figure 3.1**) between the Glendell Mine site and this residence has influenced the predicted noise levels from the modified Glendell operations.

As outlined in Section 5.3.5.2 (p. 5.28) of the EA, the noise impact of the combined Mt Owen, Ravensworth East and Glendell Mines have been assessed for the worst case mining and weather scenarios (refer to Appendix 6 of the EA). The results of this analysis show that the cumulative effect of all three operations would be less than 0.5 dB(A) above Glendell operating alone.

3.3 Air Quality

3.3.1 Existing Air Quality

There are no air quality monitoring sites in the vicinity of our property. This is of concern to us we have not been appropriately represented in the conclusions reached by this monitoring.

This issue was raised within a public submission in relation to Residence 100. As indicated on Figure 1.6 of the EA, Residence 100 is privately owned and is located approximately 2.5 kilometres to the east of the Glendell Mine site along Glennies Creek Road.

The air quality impact assessment (refer to Appendix 5 of the EA) utilised an extensive array of air quality monitors within the area surrounding the Glendell Mine site. This extent of the existing air quality monitoring network is depicted on Figure 5.7 of the EA, and included over 50 dust deposition gauges and 9 High Volume Air Samplers measuring TSP and PM_{10} dust concentration. Dust deposition data for the period 2003 to 2006, and PM_{10} and TSP data from 2001 to 2006 have been considered in the air quality assessment (refer to Appendix 5 of the EA).

As indicated on Figure 5.7 of the EA, the air quality monitoring used in the assessment provided extensive coverage of the area surrounding the Glendell Mine site. The extent of

the air quality monitoring network includes coverage of the key receiver areas of Camberwell Village, Glennies Creek Road and Falbrook area.

Existing monitoring shows that current PM_{10} levels in this area are above average.

The exceedences of existing air quality goals within Glennies Creek Road are of great concern to us. Also the monitoring location on Glennies Creek Road has been moved, but there is no indication about where the monitor has been moved to.

Dust in the atmosphere is already too high.

Section 5.2.3 of the EA (p. 5.11) includes an analysis of the existing air quality from the areas surrounding the Glendell Mine site. This analysis highlighted a number of exceedences of relevant air quality criteria. In relation to dust deposition, the majority exceedences were recorded on mine owned land within close proximity to existing mining operations.

Of the 10 gauges on privately owned land, only two sites (Mt Owen D16 and Glendell D24) have measured annual average levels above 4 g/m^2/month in at least one of the past four years. XMO has recognised the exceedences at D16 in 2003, 2004 and 2005 and sought to address these in accordance relevant development consent conditions. Monitored levels in 2006 and 2007 were below 4 g/m^2/month. The location of Glendell D24 (refer Appendix 5 of EA) suggests that the main dust sources contributing to the measured levels would be Ashton Mine, Rixs Creek Mine and Camberwell Mine as well as some agricultural activities.

As outlined in Section 5.2.3.2 of the EA (p. 5.12), monitored annual average PM_{10} concentrations have been below the DECC's 30 $\mu g/m^3$ criterion at all monitoring locations except at the Glennies Creek Road (PM_{10}-3) site where exceedences were recorded from 2002 up to 2004. This unit is located on mine owned land directly adjacent to the existing Ashton Open Cut overburden emplacement area. As such, this monitor was relocated to the Falbrook area, which is more representative of potential dust emissions from the Mt Owen and Ravensworth East mines.

PM_{10} 24 hour maximum concentrations have been recorded in concentrations above the relevant DECC criterion of 50 $\mu g/m^3$ on a number of occasions in each year between 2001 and 2006 (refer to Section 5.2.3.2 of the EA (P. 5.12)). The PM_{10} 24 hour criterion is a measure of the maximum expected PM_{10} dust concentrations within an area and includes the contribution of a range of sources including other mining activities, traffic on unsealed roads, local building and construction activities, farming, animal grazing and periodic events such as bushfires.

Dust Should be Looked at Daily not an Average Over Years

The DECC's guidelines, *'Approved Methods and Guidance for the Modeling and Assessment of Air Pollutants in NSW, August 2005'* (DECC 2005) specifies air quality assessment criteria relevant for assessing impacts from dust generating activities. The air quality goals relate both to dust concentration and dust deposition. These goals were utilised in the air quality assessment.

The air quality criteria relating to dust deposition, PM_{10} annual average and TSP are averaged on an annual basis. The effectiveness of these annualised air quality criteria is a question for relevant government regulators. It is noted that the PM_{10} 24 hour criterion is a measure of the maximum expected PM_{10} dust concentrations within an area over a 24 hour period. This criterion is generally the most constraining criteria and is designed to focus on daily rates, as requested by this community submission.

3.3.2 Air Quality Impact Assessment

To suggest that the dust at the Glendell site will be contained neatly within the mines limits and that there will be little impact on this area is an insult to the intelligence of the local community.

The air quality assessment (refer to Appendix 5 of EA) follows the procedures outlined in the 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' (DEC, 2005).

The assessment used a modified version of the US EPA ISCST3 model, referred to as ISCMOD. ISCMOD is a computer-based dispersion model that predicts ground-level dust concentration and dust deposition levels, due to the potential dust generating activities associated with the proposed modifications. The dispersion modeling takes account of local meteorology, terrain information and uses dust emission estimates to predict air quality impacts for five representative stages (Years 1.5, 3, 6, 9 and 12) of the proposed Glendell operations. The stages were selected to represent a range of mine production levels and active pit locations, including the mine stages where dust emissions are expected to be highest.

The calculated emissions take account of proposed air pollution controls and mitigation strategies including passive controls such as those built into the mine plan (for example stockpile size and alignment, and length of haul roads) and active controls which include the intensity of watering and extent of rehabilitation. These mitigation strategies are further discussed in Section 5.2.7 of the EA.

Overall, the air quality assessment has indicated that when considered in isolation the modified Glendell operations are unlikely to result in exceedences of the air quality goals at any surrounding private residences. However, the conclusions of the air quality impact assessment do not imply all emissions from the modified Glendell operations will remain within the boundary of the mine site. Figures 5.9 to 5.12 of the EA depict the predicted Year 9 project specific contours for each of the relevant air quality criteria. These predictions are considered the worst case predictions for the modified Glendell operations and clearly indicate that all off site emissions are predicted to be below relevant DECC criteria.

These predictions do not seek to imply that all dust will be contained on site, but are focused on the quantity of dust received at surrounding residences, relative to relevant health and amenity criteria. Lower dust levels from the modified Glendell operations will be experienced at greater distances from the Glendell mine site.

Dust Impacts on Cattle

The air quality impact of the modified Glendell operations was assessed by comparing estimates of dust concentrations and deposition levels with DECC air quality criteria. The air quality criteria have been set for the protection of human health and to minimise nuisance impacts. The air quality criteria would also be expected to protect the health and amenity of other mammals.

Andrews and Sriskandarajah (1992) conducted two research trials to investigate the effects of coal mine dust on dairy farms in the Hunter Valley. The results of their study suggested that coal mine dust, at levels much higher than would be experienced in practice, had no effect on the production of dairy cows. Also, the amount of soil ingested by dairy animals for typical grazing behaviour far outweighs the quantity of dust ingested by consumption of deposited dust on the pasture.

3.3.3 Dust Emission Composition

Not only the amount of dust but the composition of dust should be considered. We recommend that the dust deposited on neighbouring areas be examined for its components and appropriate action taken to reduce/remove possible adverse impacts on the residents.

Particulate matter (dust) emissions were estimated using emission factors for each dust generating activity. For example, a typical emission factor for bulldozer stripping topsoil is 14 kilograms per hour (kg/h). This emission factor takes into account all sources of particulate matter arising from the operation of the bulldozer, including exhaust emissions generated through diesel combustion.

The air quality impact of the proposed Glendell operations was assessed by comparing estimates of dust concentrations and deposition levels with the DECC air quality criteria. The air quality criteria have been set for the protection of human health and to minimise nuisance impacts. The criteria are derived from epidemiological studies which assess pollutant concentrations against health effects, including asthma.

The sulphur content of Australian diesel is too low and mining equipment is too widely dispersed over mine sites to cause sulphur dioxide goals to be exceeded even in mines that use large quantities of diesel. For this reason, no detailed study of SO_2 emissions from the mine has been undertaken. For the same reason, NO_x and CO emissions have not undergone a detailed modelling assessment. The issues have been addressed in other EAs and Commissions of Inquiry and have been shown not to be matters that need to be investigated in detail.

3.3.4 Impacts on Drinking Water Quality

No clean water for us just a sludge that lies in our tanks.

Health impacts are considered to be enhanced by the contamination of drinking water supplies.

Drinking water collected from the roof of our house is full of dust and diesel fumes and then washes into the tanks.

Health problems are now evident and this has been definitely linked to the contaminated water. I request that both Ashton and Mt Owen Mines have the water tested independently at least three times a year for heavy metals and diesel.

Increased operations will increase dust levels and have greater affect on my water quality.

The Camberwell community rely solely on tank water and dust impacts on its quality.

Water quality in the tanks for drinking is contaminated with dust and diesel.

The community has raised specific concerns about impacts on rainwater tanks. All rain contains traces of dust and other pollutants that are incorporated into the rain drops as they fall through the atmosphere. In addition, rainwater collected from a roof contains dust that settles on the roof. Water supplied from rivers and dams for public water supply systems also contain similar deposited sediment. The potential for emissions of dust from mining operations to adversely affect rainwater from roofs is a question of degree rather than the property of dust from mining. By consideration of dust deposition levels (that is,

deposition related to dust fallout on surfaces rather than suspended particles), a calculation can be used to illustrate the magnitude of the effects.

If a typical roof area is taken to be 400 square metres then the dust fallout, in an area predicted to experience a dust deposition level of 4 g/m^2/month (annual average), would be 19.2 kg/year. This is the theoretical maximum rate of accumulation in an area where the dust fallout is at the level where a property would experience dust deposition levels in exceedence of the relevant DECC air quality criteria for cumulative dust deposition. As outlined in **Section 3.3.2**, the air quality assessment has indicated that relevant air quality criteria will not be exceeded at any private residence surrounding the Glendell mine site. The calculation assumes that all the dust that settled on the roof finds its way into the tank and none is blown off the roof between rain fall events.

Depending on the nature of the overburden (the main source of dust) mining dust will be largely insoluble, inert and denser than water and will settle to the bottom of the tank and form sediment which will remain on the bottom unless mechanically disturbed. If the tank was not cleaned, over a 20 year period the maximum theoretical accumulation would be 384 kilograms. If the density of the sediment is taken to be 2 g/cubic cm then the depth of the sludge, after 20 years, would be 6.1 centimetres for a 2 metre diameter tank. Provided the water off-take from the tank is above this level then the sediment would be unlikely to enter the water taken from the tank.

Even in the absence of mining dust, the build-up of sediment will occur. In an area remote from sources of dust, where dust deposition levels may be only 1 or 2 g/m^2/month (annual average), the build-up over 20 years would be of the order of 1.5 to 3 centimetres.

These above calculations show that in practice, compliance with the DECC's air quality assessment criteria for dust deposition provides protection against the adverse effects on rain water collected from roofs.

The rate of sediment build-up could be reduced by the use of first-flush systems if necessary. These systems divert the first 40 or so litres so that it does not enter the tank. Further, XMO will replace or install water filters on tanks if there is demonstrated exceedence of dust criteria attributable to the modified Glendell operations, following a request from a resident. The extensive dust monitoring network that XMO has committed to as part of the modified Glendell operations will enable accurate assessment to be made in this regard.

3.3.5 Fine Particulates

Most alarming for us is the dangerous fine dust particles you cannot see that we believe is the catalyst for causing an array of respiratory health issues.

Dust concentration refers to airborne dust and is measured in micrograms per cubic metre (µg/m³). Relevant criteria for dust concentration are defined in terms of two classes, TSP and PM_{10}.

TSP relates to all suspended particles which are usually in the size range of zero to 50 micrometres (µm). Particle sizes larger than 50 µm are typically measured in dust deposition levels. The human respiratory system has in-built defensive systems that prevent particles larger than approximately 10 µm from reaching the more sensitive parts of the respiratory system. Particles with aerodynamic diameters less than 10 µm are referred to as PM_{10} and the impact of these is assessed by reference to the annual average and 24-hour average PM_{10} assessment criteria specifically developed to provide protection against health effects. Particles larger than 10 µm will not affect health. In practice, particles larger than 30 to 50 µm settle out of the atmosphere too quickly to be regarded as air pollutants.

As stated in **Section 3.3.2**, the DECC air quality criteria have been set for the protection of human health and to minimise nuisance impacts. The criteria are derived from epidemiological studies which assess pollutant concentrations against health effects, including asthma. The suite of ambient air quality criteria used in the assessment is comprehensive and would be expected to protect against all harmful effects of the emissions from the project including health and nuisance effects.

The air quality assessment has predicted that dust concentration, in relation to both PM_{10} and TSP, are not exceeded at any private residence in the area surrounding the Glendell mine site.

3.3.6 Cumulative Air Quality Impacts

It is clear that dust emissions are increasing in this area also when Glendell mine is operating the dust emissions will increase further.

The dust generated must increase. The affect of increased dust on our residences will be exacerbated by the strong westerly winds which are a feature of this area.

The air quality assessment has provided an assessment of the cumulative dust emissions associated with the modified Glendell operations, surrounding mining operations and other sources of dust generation within the surrounding area. The cumulative emissions associated with these sources have been predicted in relation to TSP, annual average PM_{10} and dust deposition.

The approach adopted for the cumulative assessment has been to model the dispersion emissions from Glendell and mining operations in the immediate vicinity including Mt Owen, Ravensworth East, Liddell, Camberwell, Narama and Ashton. In order to take into account the contribution of other non-modeled sources of dust, the cumulative emissions predictions included uniform constant background levels for annual average TSP, annual average PM_{10} and dust deposition as follows:

- 27 $\mu g/m^3$ for annual average TSP;
- 5 $\mu g/m^3$ for annual average PM_{10};
- 0.5 g/m^2/month for annual average deposited dust.

As outlined in the air quality assessment (refer to Appendix 5 of EA), historically, a value of 10 $\mu g/m_3$ has been used to account for non-modeled sources of TSP. A recent study for Hunter Valley Operations (**Holmes Air Sciences, 2007**) examined model predictions and measurements and found that the non-modeled contribution to annual average TSP levels could be higher than 10 $\mu g/m_3$, at around 27 $\mu g/m^3$. This higher background level of TSP has been included in the cumulative air quality modeling. In addition, the DECC have supported the use of a background level of 5 $\mu g/m^3$ for non modelled sources of PM_{10} in the air quality model (refer to **Section 2.1.1**).

Overall, the assessment has indicated that apart from Residence 110, cumulative dust emissions are not predicted to exceed the relevant DECC dust criteria at surrounding private residences over the life of the proposed Glendell operations. The contribution of the modified Glendell operations to the predicted cumulative exceedence at Residence 110 is less than 1.6 ug/m^3 over the life of the modified Glendell operations, as discussed in **Section 2.1**.

There can be no doubt when Glendell is operating, the 24 hr maximum concentration exceedences will increase.

The assessment of short-term (24-hour average PM_{10}) impacts has always been difficult. The approach Holmes Air Sciences have used in the preparation of the air quality assessment is the same as that applied for all projects assessed since the first version of the DECC modelling guidelines were produced in 2000. The approach has been accepted by DECC on previous occasions and was developed in consultation with them over a number of years.

It is noted that if real time dust monitoring and proactive management is in place then it is possible to manage emissions from the mine in such a way as to ensure that they do not contribute significantly to exceedences when background levels are high or when they exceed the criterion. As outlined in **Section 3.3.6**, XMO have committed to a range of proactive dust management strategies, including the expansion of the existing dust monitoring network for the Mt Owen Complex to include additional continuous PM_{10} monitoring sites within the Camberwell Village area.

3.3.7 Dust Management

Request better dust control, the systems now in place are not working with the Valley being totally polluted.

The proposal is supported provided the mine operates with best practice dust control measures.

As outlined in Section 5.2.7 of the EA (p. 5.14), XMO committed to implement a range of dust control measures including:

- minimising areas disturbed by mining activities and prompt rehabilitation of disturbed areas following completion of mining;
- watering road surfaces, including haul roads, and hardstand areas using water carts, where required;
- continued monitoring of meteorological conditions and consideration of weather data in the timing of blasts to minimise the impacts of blast generated dust, particularly on residents to the south and south-east of the project;
- ongoing use of an alarm generated for elevated dust levels from the Mt Owen Complex continuous PM_{10} monitoring network and notification of operational personnel to review the ability to restrict dumping where practical on exposed faces during periods of high wind;
- expanding the existing dust monitoring network for the Mt Owen Complex to include additional monitoring sites in the Camberwell Village area;
- provision of in-pit dumping locations for periods of high wind, where practicable;
- restricting vehicle movements to formed and watered roads, particularly during periods of potentially high dust generation; and
- use of adequate stemming in blast holes.

3.4 Greenhouse

Greenhouse pollution in the area is already saturated.

The enhanced greenhouse effect and climate change is recognised as a global environmental issue. Given the global nature of the issue, the Greenhouse assessment (refer to Section 5.2.9 of the EA (p. 5.15)) has included an assessment of the greenhouse emissions from transport and end use of coal produced by the modified Glendell operations. The greenhouse assessment calculated that the annual average emissions from the transport and end use of coal will be equivalent to 0.01 per cent of global greenhouse gas emissions.

In recognition of the global scale of this issue, Xstrata have committed to a range of broad initiatives aiming to minimise and mitigate greenhouse emissions from all of its operations. These initiatives are outlined further below.

The EA fails to convince of a strong commitment to managing greenhouse impacts albeit some funding is provided into research and development.

At present, the key greenhouse and energy management initiatives for the coal industry are focused on research and development, participation in Government and Industry led programmes and specific management initiatives at an operational level. As outlined in Section 5.2.9.6 of the EA (p. 5.20) Xstrata has committed to a broad range of corporate and operational greenhouse and energy management initiatives. Further information on these commitments is provided below.

At a corporate level key greenhouse and energy initiatives include:

- Xstrata and other coal producers are contributing to the $300 million COAL 21 Fund, to work with the electricity generation industry and demonstrate promising technologies for reducing greenhouse gas emissions from coal-fired power stations. The COAL 21 Fund is a world first whole –of-industry approach to greenhouse gas abatement.

- Xstrata is a member pf the Futuregen Alliance in the United States. This initiative aims to build the world's first integrated near zero-emission coal-fuelled power plant. Xstrata is contributing $25 Million over the next 10 years to this project.

- Xstrata Coal also financially support the Cooperative Research Centre for Coal in Sustainable Development (CCSD) and the CRC for Greenhouse Gas Technologies (CO2CRC), one of the world's leading collaborative research centres focused on carbon dioxide capture and geological storage.

- Signatory to the Greenhouse Challenge Plus Program. This program enables Australian companies to form working partnerships with the Australian Government to improve energy efficiency and reduce greenhouse gas emissions.

- Active involvement in the Federal Government's Energy Efficiency Opportunities program. This program is an Australian Government initiative that encourages large energy-using businesses to improve their energy efficiency. It does this by requiring businesses to identify, evaluate and report publicly on cost effective energy savings opportunities. Under this program Xstrata is implementing measures to reduce the Company's use of all forms of energy, not just electricity.

In addition to these initiatives, Xstrata is undertaking a range of specific actions across its operations including:

- capturing methane from old workings at Teralba underground mine in NSW to an Envirogen power station on the site, generating electricity which is fed into the national grid;
- operation of a 12 MW on-site, gas fired power station at Oaky Creek Mine in Queensland using methane extracted from the mine. The power station is expected to save around 341 000 tCO2-e per annum; and
- investing $15 Million to conduct methane drainage trials at underground operations at the Bulga Complex in NSW.

At an operational level, XMO have committed to the assessment of the viability of the following approaches to improve energy efficiency and reduce greenhouse emissions from the proposed Glendell operations:

- use of energy management systems; and
- seeking continuous improvement in energy efficiency in the mining fleet, stationary equipment, mining processes and coal preparation.

XMO will continue to assess and implement energy and greenhouse management initiatives during the design, operation and decommissioning of modified Glendell operations.

3.5 Blasting

Blasting will cause further damage to our houses, sheds and concrete areas.

A detailed blasting assessment has been undertaken to assess the potential vibration and airblast impacts associated with blasting at Glendell (refer to Appendix 7 of the EA). In addition to meteorological and geological constraints, blasting practices at the Glendell mine site are constrained by electricity and rail infrastructure in close proximity to the site. The approach to the blasting assessment was to identify the key design limitations of blasting practices in relation to relevant criteria for surrounding infrastructure, private residences and sensitive land uses, including Camberwell Church (refer to **Section 3.5.1**).

The blasting assessment indicated that with the incorporation of detailed design of blasts and active monitoring, blasting practices will meet relevant airblast and vibration criteria at surrounding infrastructure, private residences and Camberwell Church over the life of the modified Glendell operations.

XMO will implement a range of specific blast controls including the detailed monitoring of blasts, use of a no blast window during times of adverse weather conditions, and development of a blasting protocol in consultation with relevant infrastructure providers and surrounding mining operations. As outlined in Section 5.4.5 (p. 5.32) of the EA, XMO have committed to the detailed monitoring of blasts over the life of the mine at relevant infrastructure locations, Camberwell Village and Camberwell Church to inform the detailed design of blasts and modification of blast designs as necessary.

As outlined in **Section 3.1**, the north to south progression of mining of the modified Glendell operations, will reduce cumulative impacts, including blasting, on areas to the south through minimising interactions with surrounding mine operations. In addition, XMO have committed

to developing blasting protocols with surrounding mining operations, including Ashton Coal and Integra Coal to further minimise cumulative blasting impacts on surrounding areas. This management initiative was specifically supported by the DECC in their submission (refer to **Section 2.1**).

3.5.1 Blasting Impacts on Church

St Clements Church is of historical value and is presently being shaken and damaged by the blasting from existing mining operations.

The church is already suffering from the effects of mining and the structure has major cracks and windows have already been replaced.

St Clements Church has significant damage to the structure due to mining and age, it cannot withstand anymore damage from another mine from ground vibration and overpressure. St Clements requires inspected and evaluated by a structural engineer.

The environmental impact study of Glendell did not take into account the Church's stability.

The potential impacts of the blasting practices on Camberwell Church (St Clements) were raised as an issue through community consultation. In response, the blasting assessment (refer to Section 5.4.4 (p. 5.32) and Appendix 7 of the EA) included the prediction of airblast and vibration levels at Camberwell Church (refer to Table 5.9 (p. 5.31) of the EA). As indicated in the assessment, the predicted blasting results at the Church are below the relevant criteria for all stages of the modified Glendell operations.

XMO recognises the sensitivity of this issue for the local community and has made the following commitments in relation to the management of blasts at the Church:

- installation of a blast monitor at the Church to monitor blasting events at the Church to inform the detailed design of blasts and modification of blast designs as necessary; and

- designing blasts so that predicted vibration levels at the Camberwell Church are less than 2 mm/s, which is below the residential amenity criteria of 5mm/second, which is well below relevant structural criteria.

3.6 Environmental Monitoring

At least one high volume sampler should be installed in the village to measure the amounts of contaminants in the air as well as its composition, e.g. heavy metals.

Current noise monitoring is ineffective.

As highlighted throughout the EA, XMO currently maintain an extensive environmental monitoring network within the areas surrounding the Mt Owen Complex. The existing monitoring network utilises a range of continuous noise and dust deposition, TSP and PM_{10} HVAS, and continuous PM_{10} monitors in addition to blast monitors. The location of the existing environmental mentoring network is outlined on Figure 5.14 of the EA. As indicated on Figure 5.14 of the EA, the existing environmental monitoring network provides extensive coverage of the Glennies Creek Road and Falbrook areas.

As outlined in Section 5.3.6.1 of the EA (p. 5.29), XMO will continue to implement the noise monitoring network currently in place for the Mt Owen Complex. XMO proposes to install a further two continuous noise monitors, one reference monitor located between Glendell Mine and Ashton Mine and one within Camberwell Village (refer to Figure 5.14 of the EA).

XMO is committed to continue to monitor dust deposition and dust concentration levels within the area surrounding the Glendell Mine site over the life of the operation to verify that predicted impact criteria are not exceeded and dust controls are effective. The existing Mt Owen Complex air quality monitoring will be extended to include a continuous PM_{10} monitor within the Camberwell Village area (refer to Figure 5.14 of the EA).

XMO's commitments to monitoring of blasting practices of the modified Glendell operations have been outlined in **Section 3.5**.

The current monitoring system must be upgraded to include occupier-activated noise monitoring systems which allow land owners to activate the monitors when the noise is considered excessive to their amenity.

The monitoring for noise, dust and vibration should be upgraded to occupier-activated.

The existing noise monitors for the Mt Owen Complex, and the modified Glendell operations will include the use of continuous noise monitors within the Glennies Creek, Middle Falbrook and Camberwell Village areas (refer to Section 5.3.6.1 (p. 5.29) of the EA). The in-built 24 hour audio facility and the weather station network will be used to facilitate the identification of mine related noise and for complaint investigation. This type of information will be used to assess compliance with predicted noise levels for the modified Glendell operations.

The dust monitoring program will incorporate the use of continuous monitoring within the surrounding areas which has been implemented by XMO as an effective dust management tool at the Mt Owen Complex in terms of responding to elevated dust levels within surrounding areas and reporting of results to relevant stakeholders (refer to Section 5.2.8 (p. 5.15) of the EA). The continuous monitoring network will be linked to an alarm generated for elevated dust levels from the proposed Glendell continuous PM_{10} monitoring network and notification of operational personnel to review the ability to restrict dumping where practical on exposed faces during periods of high wind.

As outlined in **Section 3.5**, XMO will undertake detailed monitoring of blasts over the life of the mine at relevant infrastructure locations and Camberwell Church to inform the detailed design of blasts and modification of blast designs as necessary.

No mine should be self-monitored; independent company should be involved, more input from residents on the mines performance.

As outlined above, XMO have committed to the ongoing use of the existing environmental monitoring network of the Mt Owen Complex and the extension of this network to include areas within Camberwell Village.

The results of environmental monitoring will be made publicly available through various environmental management reporting mechanisms. One such mechanism is the preparation of an AEMR which will report on environmental performance of the modified Glendell operations. XMO has also committed to the commissioning of regular independent environmental audits of the modified Glendell operations (refer to Section 6.10.3 (p. 6.10) of the EA), which will provide an independent review of the environmental performance of the modified Glendell operations.

In addition, environmental monitoring results will also be reviewed by the Mt Owen Complex Community Consultative Committee (CCC). As committed in Section 6.10.4 (p. 6.10) of the EA, the Mt Owen Complex CCC will include the amalgamation of the Mt Owen, Ravensworth East and Glendell CCC.

3.7 Socio Economic Impacts

3.7.1 Socio Economic Impact Assessment

The EA does not address the very negative socioeconomic effect of residents of the Glennies Creek/Camberwell area due to mining. Those effects include: loss of community due to acquisition, transient population, detrimental impact on marketability and property values and decreased quality of life due to environmental impacts.

As discussed in **Section 3.1**, the EA has assessed the modified Glendell operations in entirety and in accordance with current community and regulatory expectations. This assessment has highlighted that the environmental impacts of modified Glendell operations are less than or equal to the impacts of the approved Glendell operations. As such, the area of surrounding land significantly impacted by the modified Glendell operations is, in most cases, less than that of the approved Glendell operations.

In relation to property acquisitions, the modified Glendell operations will not increase areas of acquisition associated with the approved Glendell and surrounding mining operations. The noise impact assessment (refer to Section 5.3.2.3 (p. 5.24) of the EA) has indicated that two private residences are predicted to have noise levels in excess of 5dB(A) above the relevant PSNL. These private residences are within the current acquisition zone for the approved Glendell operations. In addition there are three parcels of private land where predicted noise emissions exceed the PSNL by greater than 5 dB(A) on more than 25 per cent of the property. These properties are located within the current acquisition zone of the Mt Owen Complex.

Furthermore, XMO has committed to maintain the acquisition rights of a further two private residences within the current Glendell acquisition zone, despite not being predicted to be significantly impacted (refer to Section 5.3.6 (p. 5.28) of the EA). This commitment will provide certainty for all property owners within the current Glendell acquisition zone.

In an assessment of social and economic considerations a ritual incantation that the project will provide increased employment, with a simple designation of the number of person to gain employment, without more, is insufficient.

One of the major benefits of any major project is the distribution of wealth in the project both in development of infrastructure and the continued redistribution of wealth through labour principally, and profits to a lesser extent. An assessment of the economic benefits through wage distribution and stability of labour relationships is missing from the assessment.

Section 5.9 of the EA (p. 5.57) provides the socio-economic assessment of the modified Glendell operations. In addition to highlighting the benefits of the modified Glendell operations in relation to employment (refer to **Section 3.7.2**), the socio economic assessment also assessed the impacts associated with training, economic contributions, infrastructure and housing, and community issues.

Central to the socio-economic benefits of the modified Glendell operations is the distribution of wealth within local and broader community. This benefit is outlined in Section 5.9.5.2 (p. 5.61) of the EA. As outlined in this section, the provision of employment at Glendell and the benefits of the modified Glendell operations to employment at Ravensworth East and Mt Owen mines will have significant economic flow on effects in the local and regional communities. Substantial industry expenditure occurs locally, in the townships of Singleton and Muswellbrook, but is also likely to be directed to the broader Hunter and NSW region.

As previously discussed, the mining industry employs 15.53 per cent of the Singleton workforce compared to the New South Wales average of 0.54 per cent, and the percentage of high income earners in Singleton is significantly higher than the Hunter and State averages. Based on known expenditure patterns of mine employees (Coakes Consulting, 2000), it is likely that a significant proportion of this amount would be spent in Singleton and the surrounding townships.

Capital infrastructure expenditure for the project is in the order of $24 million. The federal government will gain revenue from the project, in the form of company tax, excise on imported equipment and goods, fuel excise and other assorted taxes such as the goods and services tax and income tax.

The state government can expect economic benefits from the project including revenue from rail freight, port charges, payroll tax and a number of other taxes, royalties and payments for services from statutory bodies.

Local government receives financial returns from rates and charges paid by company employees and by other people attracted to the area as a result of the flow-on effects of employment in the mining industry.

3.7.2 Employment

The proposed operations include vastly different numbers of employees compared to the 600 employees of the approved operations. In defence of the fewer employee numbers required for the Glendell operations, the proponent suggests this as being a positive result, as it will result in a lesser impact on infrastructure and housing within the local area. This justification by the proponent can be assessed as being a null and void argument. Surely the originally estimated workforce would bring with it a flow on effect for supporting infrastructure e.g. local shops providing goods and services and local tradespersons and suppliers with increased housing requirements, the list goes on.

The modified Glendell operations will create up to 100 construction and 150 operational jobs over the life of the mine. This is a reduction from the approved Glendell operations, which were to include a workforce of up to 600 employees.

As stated in Section 5.9.5.2 (p. 5.61) of the EA), the key driver for the reduction in employment are the improvements in efficiency, both in relation to the mining process and the integration of coal handling and processing operations with the Mt Owen Complex. These gains in efficiencies have a range of benefits including the contribution of the ongoing viability of the Glendell Mine. In addition to this, securing the viability of Glendell mine will also substantially contribute to the ongoing viability of the Mt Owen Complex operations.

The socio economic assessment outlines the elevated population growth rates within the Singleton area relatively to NSW average (refer to Section 5.9.1 (p. 5.58) of the EA). This population growth has been underpinned by the growth in the mining industry in recent times. A key issue associated with the increased population growth is the decrease in housing

availability and affordability. In recent times the availability of quality housing within the Singleton Local Government Area (LGA) has decreased, with a shortage of rental properties and a recent upward pressure on housing prices (Singleton Council 2006).

In addition to the benefits of increased efficiency in mining operations and securing the viability of Glendell and Mt Owen Complex operations, the proposed employee numbers of the modified Glendell operations will also result in a smaller impact on infrastructure and housing within the local area (refer to Section 5.9.5.2 (p. 5.62) of the EA).

In addition to the benefits associated with expenditure in the local area and direct employment, the socio economic assessment identifies a range of other flow on effects in terms of indirect employment. The NSW Minerals Council State of the Industry 2006 Report states that approximately three to four additional indirect jobs are created for each job in the minerals industry (NSW Minerals Council, 2006). Based on this, the proposed modifications have the potential to create up to a further 600 indirect employment opportunities.

The Union supports jobs in the coal industry which this Modification will provide. This support is conditional upon the application of industry wages, conditions and regular employment.

With an outcome of reasonable coal industry consistent wages and conditions of employment and enhanced employment numbers equal to the original proposed, that would benefit persons engaged to work at the Modification, their families and their communities, the Union supports the Modification.

The specific employment conditions of the modified Glendell operation is beyond the scope of the EA process. XMO, being a responsible employer, will ensure that all employment conditions will be in accordance with relevant requirements.

3.7.3 Property Acquisition

The acquisition zone should extend to cover all properties inconvenienced by the mine not just the favoured few.

The acquisition zone should be re-evaluated to include Camberwell Village in that zone.

All properties should be in the acquisition zone.

The acquisition zone is inappropriate to the amount of noise and dust that will be emitted from the mine and all areas should be in the acquisition zone.

There are properties located further away from the existing Mt Owen mining operations that are within the existing acquisition zone. It is inconceivable that these areas are within the acquisition/buffer area and we are not.

All residents within the Glennies Creek/Camberwell areas should be treated equally and all should be placed in the acquisition zone.

For coal mining developments, acquisition criteria are defined for blasting, air quality and noise impacts on private land. An acquisition zone is an area of private land that is predicted to be significantly impacted by a proposed coal mine development. Essentially an acquisition zone recognises the significance of predicted impacts on private land, and provides the landholder with rights to request acquisition by the relevant mining company.

In relation to blasting impacts, the acquisition zone is defined by any private residences predicted to experience blasting impacts in excess of the relevant DECC guidelines. The DECC guidelines have been adapted from the ANZECC Guidelines '*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration'* (ANZECC 1990). The ANZECC guidelines are based on human comfort levels and are much more stringent than those based on the potential for damage to structures (refer to Section 5.4.2 (p. 5.30) of EA).

As outlined in **Section 3.5**, the blasting assessment indicated that with the incorporation of detailed design of blasts and active monitoring, blasting practices will meet relevant airblast and vibration criteria at private residences over the life of the modified Glendell operations. As such there are no residences predicted to be within an acquisition zone associated with proposed blasting practices.

An acquisition zone in relation to air quality impacts is defined by any private residences predicted to experience dust deposition and/or dust concentration impacts in excess of the relevant DECC guidelines. In addition, the definition of the air quality acquisition zone also includes areas of greater than 25 per cent of private land that are predicted to experience dust levels in excess of relevant DECC criteria.

As stated in Section 5.2.5 (p. 5.12) of the EA, the air quality assessment has indicated that when considered in isolation the proposed modifications to Glendell Mine operations are unlikely to result in exceedences of the air quality goals at any surrounding private residences. As such there are no residences predicted to be within an acquisition zone associated with air quality criteria.

Notwithstanding that there are no predicted significant exceedences of relevant blasting and air quality criteria, XMO have committed to a range of effective blasting and air quality management controls, including the monitoring of impacts within the surrounding area.

The acquisition zone for noise impacts on private land is directly related to the determination of PSNL in accordance with the INP. As outlined in Section 5.3.2.1 (p. 5.22) of the EA, PSNL are based on the determination of the RBL, which is a measure of existing environmental noise within an area.

Noise monitoring results presented in Table 5.4 of the EA (p. 5.21) show that the RBLs are generally around 30 dB(A) in the typically rural areas of Middle Falbrook and Glennies Creek Roads, but are elevated to above 45 dB(A) close to the New England Highway within Camberwell Village. The results from the monitoring program show that road noise from the New England Highway has a measurable effect on the noise environment of Camberwell Village. The results from monitoring indicated the elevated background noise levels within 200 metres of the highway, with background noise levels within Camberwell Village decreasing further north of the highway.

In accordance with the procedures under the INP and the approach adopted by DoP in recent development consents, the relevant noise land acquisition criteria is expected to be similar to that outlined in **Table 3.2** (reproduced from Table 6.4 (p. 6.4) of the EA).

Table 3.2 - Land Acquisition Criteria

Location (Refer to Figure 5.16)	Land Acquisition Criteria
Rural Residences and Camberwell Village C	40 dB(A) ($LAeq_{(15mins)}$)
Camberwell Village B (refer to **Figure 5.16**)	42 dB(A) ($LAeq_{(period)}$)
Camberwell Village A (refer to **Figure 5.16**)	45 dB(A) ($LAeq_{(period)}$)

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: The noise limits apply under meteorological conditions relevant to the Project site of:

- Wind velocity up to 3 m/s at 10 metres above ground level.
- Temperature gradients up to 3°C/100 metres
- Where the wind velocity and temperature gradients are determined to be relevant to the Project site in accordance with the NSW INP.

The noise impact assessment (refer to Section 5.3.2.3 (p. 5.24) of EA) has predicted that two private residences will experience noise levels greater than 5 dB(A) above the relevant PSNL. These residences are already located within the Glendell acquisition zone and XMO have committed to purchase these residences, at the landholders request. In addition, XMO will maintain the current acquisition rights of all properties located within the existing Glendell acquisition zone, despite not being predicted to be significantly impacted by noise.

Similarly to air quality, the noise acquisition zone also includes areas of greater than 25 per cent of private land that are predicted to be significantly impacted by noise. There are three parcels of private land where predicted noise emissions exceed the PSNL by greater than 5 dB(A) on more than 25 per cent of the property. XMO have committed to purchase these properties, at the landholders request.

As outlined in **Section 3.2.4**, the noise impact assessment has indicated that there will be periods of time when meteorological conditions in the region of Camberwell Village when the propagation of noise from Glendell towards the village will be enhanced. Conservatively, the worst case noise impacts within the village are predicted to occur during times of medium strength north westerly winds which occur less than 10 per cent of time. During these periods the noise impact assessment (refer to Appendix 6 of the EA) concluded that the predicted exceedences will not be greater than 5 dB(A) above the relevant PSNL.

XMO have committed to the investigation of reported exceedences of relevant project specific noise criteria at private residences on a case by case basis. This approach is consistent with noise management and monitoring processes at the Mt Owen Complex. Should monitoring indicate noise impacts from Glendell, XMO will investigate reasonable and feasible measures to mitigate noise at the affected receiver.

There are discrepancies between the acquisition processes for Mt Owen and the commitments for Glendell in relation to fair compensation. As such we would be entitled to far less financially for our property relative to our neighbours.

As outlined in Section 5.9.6 (p. 5.64) of the EA, XMO's approach to land acquisition and compensation will be consistent with the current practices for the Mt Owen Complex. The XMO approach to the purchase of private properties or provision of compensation as a result of environmental impacts from the proposed modifications includes the following:

- provision of a consistent company representative/contact to conduct negotiations with the landowner;

- open and transparent negotiation; and

- timely response to land owner concerns and requests.

For properties with environmental impacts beyond relevant acquisition consent limits and the two private residences within existing Glendell acquisition zone not predicted to be significantly impacted the following will be undertaken at the request of the land owner:

- provision of property valuations and reimbursement of landholders should they wish to obtain an independent valuation;

- reimbursement of all reasonable land owner legal and valuation expenses incurred during the negotiation process;

- provision of the opportunity for potentially affected property owners to enter into option agreements, to provide for continued ownership of their properties and certainty of the terms of acquisition, if they choose to relocate at some time in the future; and

- reimbursement of relocation costs within the LGA.

Alternatively, reasonable compensation may be provided as negotiated with land owners, as appropriate.

XMO has implemented a program of negotiated property purchases within the acquisition zone of Mt Owen Mine defined under the existing Mt Owen Operations Development Consent (DA14-1-2004). Since the granting of the Mt Owen Development Consent in 2004, XMO has successfully negotiated the purchase of 14 of the 18 properties within the acquisition zone, highlighting the success of XMO in reaching amicable agreements with affected landholders.

All reasonable attempts will be made by XMO to reach an amicable agreement with affected land owners regarding compensation and/or acquisition if land holders wish to proceed with such arrangements. Should negotiations fail to reach agreement, XMO will readily participate in any mediation processes as deemed necessary by DoP.

3.7.4 Property Values

I am concerned about the impact this proposal would have upon the sale of my land. Previous attempts to sell property have failed due to the impacts of surrounding mining operations.

Deterioration of the potential of my property including its present value, any future value and future desirability due to current mining operations.

The issue of devaluation of land and homes due to XMO's activities does not seem to have been addressed in the Glendell EA.

Glendell proposal will persist in having a considerable detrimental impact on market ability and value to our home.

As outlined in **Section 3.7.1**, the environmental impacts of modified Glendell operations are less than or equal to the impacts of the approved Glendell operations. As such, the area of surrounding land significantly impacted by the modified Glendell operations is, in most cases, less than that of the approved Glendell operations. In effect, this means that the modified Glendell operations are consistent with current expectations in terms of environmental

mitigation and management approaches, despite the fact that the mine could progress under the less stringent conditions of the existing development consent.

XMO have committed to proactive management of environmental impacts from the modified Glendell operations on surrounding areas (refer to Section 6.0 (p. 6.1) of the EA). These management commitments seek to further minimise the impacts of the modified Glendell operations on the surrounding area.

In addition, XMO has committed to maintaining the acquisition rights of all private landholders within the existing Glendell acquisition zone, even in instance where the modified Glendell operations are not predicted significantly impact these residences. This will provide certainty for all private residences within the existing Glendell acquisition zone.

XMO have also committed to meeting relevant impact assessment criteria, in relation to dust and noise, at all surrounding private residences (refer to Section 6.0 (pp. 6.2 – 6.4) of the EA). Should these criteria be exceeded, and further monitoring confirms impacts from Glendell, XMO will, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures set out in the modified development consent.

3.7.5 Impacts on Community

The affect of existing mining operations on the local community – long time residents have been replaced by a transient community.

There are few private properties remaining that are not within existing mine acquisition zone which will continue to have a large effect on a small community.

As outlined in **Section 3.7.1**, the environmental impacts of modified Glendell operations are less than or equal to the impacts of the approved Glendell operations. As such, the area of surrounding land significantly impacted by the modified Glendell operations is, in most cases, less than that of the approved Glendell operations. In effect, this means that the modified Glendell operations are consistent with current expectations in terms of environmental mitigation and management approaches, despite the fact that the mine could progress under the less stringent conditions of the existing development consent.

In addition, XMO has committed to maintaining the acquisition rights of all private landholders within the existing Glendell acquisition zone, even in instance where the modified Glendell operations are not predicted significantly impact these residences. This will provide certainty for all private residences within the existing Glendell acquisition zone.

3.8 Visual Impacts

We believe that the Glendell proposal will have a major visual impact effect on our land. Glendell's proposal will turn our entire westerly views which are currently mainly rural views to view of their overburden mound.

The visual impact assessment statement that the visual impacts on Falbrook area are low is generalised and misleading. Our residence is located at a relatively high elevation and there is no intervening vegetation. The existing screening will not reduce this impact.

Visual impacts are dependent on the characteristics of the surrounding area, distance of operation to receivers and prominence in the view shed. Overall the visibility of the proposed Glendell operations will vary over the life of the mine dependent on the stage of the mine and location within the surrounding area (refer to Section 5.10.4 of the EA (p. 5.67)).

The views from residences to the east are dominated by grazing land and current mining operations. Long distance views of Ashton mine, Integra Coal (Glennies Creek Colliery and Camberwell mine) and Mt Owen exist from the residences to the east of the Glendell Mine site. Residences to the east of the proposed Glendell mining area along Glennies Creek Road will have some limited views of the pit area in early stages of mining and the proposed overburden emplacement area in the later stages of the mine, refer to Figure 5.32.

As outlined in Section 5.10.1.2, the proposed overburden emplacement area will be constructed to the height of the approved Glendell Mine and will not result in increased visual impacts relative to the approved Glendell operations at residences to the east of the Glendell Mine site. The closest privately owned residence to the east, along Glennies Creek Road, is located approximately 2 kilometres from the proposed Glendell Mine site. As views will be from a distance, and the proposed overburden emplacement area will not be larger than that of the approved mine plan, the potential visual impacts, including potential impacts on overshadowing of residences, are considered to be low.

3.9 Coal Chain Logistics

Additional areas of concern with respect to the socio economic consideration contained within the Environment Assessment is the paucity of any reference to the infrastructure and coal supply chain bottlenecks that mitigate any perceived socio economic benefits from the Project.

As discussed in Section 2.3.2.2 of the EA (p. 2.10), the majority of coal produced by the proposed Glendell Mine will be transported by the approved Mt Owen product coal handling and rail load out facilities. The current Mt Owen Operations Development Consent (DA 14-1-2004) provided for the upgrade of the Mt Owen rail load out facilities to an increased capacity of up to 15 Mtpa of ROM coal equivalent. The existing Mt Owen rail loading facilities will have the capacity to accommodate product coal loading and transportation associated with the modified Glendell operations. As such, the modified Glendell operations will not generate train movements above that already approved within the Hunter Valley.

However it is acknowledged that the limitations of the coal transportation infrastructure are an important issue for the coal industry. This issue is currently being addressed by relevant infrastructure owners within the coal transportation chain.

Australian Rail Track Corporation (ARTC) (2006) has developed the 2006-2011 *Hunter Valley Coal Chain Improvement Strategy,* which specifies a number of specific strategies to enhance the capacity, safety and reliability of the rail system to meet projected demand.

Specific strategies include works to address junction conflicts and increased congestion along the rail system south of Whittingham, which will improve train movements and ultimately increase the capacity of the rail network in the short to medium term. The ARTC has recently completed the Sandgate Grade Separation Project, which will allow the removal of conflicts between coal trains and other rail users and has increased the current coal capacity of the Hunter Valley Rail line to approximately 115 Mtpa (ARTC 2006).

The proposed infrastructure improvement strategy proposed by the ARTC is underlain by a $375M Commonwealth funding package to enhance the capacity of the existing rail system.

In addition to this, the NSW Government has recently granted project approval for a third coal loader at the Port of Newcastle, and for a significant increase in the throughput capacity of the existing Kooragang Coal Terminal. These approvals have increased the approved capacity of coal handling through the Port of Newcastle by over 100 Mtpa.

3.10 Community Consultation

We suggest that residents of the Camberwell community are invited to become members of the Mt Owen CCC.

I request that at least two Camberwell residents be placed on the Mt Owen CCC.

As stated in Section 6.10.4 (p. 6.10) of the EA, XMO have committed to maintaining the Mt Owen Complex CCC which includes the amalgamation of the Mt Owen, Ravensworth East and Glendell CCC. This CCC includes a number of community representatives from the surrounding area.

In early 2005 the DoP approved the amalgamation of the three CCC committees, Mount Owen, Ravensworth East, and Glendell into one committee. All committees retained their community membership and now the one CCC provides a forum that provides input into all the areas of the Mt Owen Complex. There are currently 9 community members on the committee who reside in and represent the surrounding areas of Hebden, Camberwell village, Glennies Creek, Upper and Middle Fallbrook. One vacant position exists on the committee which is being advertised through XMO's community newsletter that encompasses the Camberwell village area.

APPENDIX 1

Revised Statement of Commitments

6.0 Revised Statement of Commitments

The DGRs for the proposed modifications to Glendell Mine operations require that the EA include a draft Statement of Commitments which details the measures proposed by the Applicant for environmental mitigation, management and monitoring of the modified Glendell operations. The draft Statement of Commitments was provided in Section 6.0 of the Environmental Assessment for Modification of Glendell Mine Operations. This Revised Statement of Commitments has been prepared as part of the Response to Submissions.

If approval is granted under Section 75W of the *Environmental Planning and Assessment Act 1979* for the modified Glendell operations, the Applicant will commit to the following controls outlined in this Revised Statement of Commitments.

6.1 Production and Life of Operation

Period of Approval

6.1.1 The period of Glendell development consent will be 16 years from the date of approval of the proposed modifications to Glendell Mine operations.

Closure and rehabilitation activities may continue beyond the development consent period if undertaken in accordance with an approved Mining Operations Plan.

Mine Plans and Development

6.1.2 All mining activities will be undertaken generally in accordance with this EA.

6.1.3 A Mining Operations Plan (MOP) for the modified Glendell operations will be developed and submitted for approval of the NSW DPI, prior to the commencement of mining operations.

Limits on Production

6.1.4 ROM coal production from Glendell Mine shall not exceed 4.5 Mtpa.

Hours of Operation

6.1.5 Construction, mining and associated activities will be undertaken on a 24 hours per day, seven days per week basis.

Coal Processing and Transportation

6.1.6 All coal produced by the proposed Glendell operations will be transported by haul road to the Mt Owen Complex for processing in the Mt Owen Coal Handling and Preparation Plant (CHPP) or the Ravensworth East Mine crushing station.

6.1.7 Product coal from Glendell Mine will be transported:

- by rail via the approved Mt Owen rail load out facilities, Mt Owen rail loop and Main Northern Railway; and
- up to 1 Mtpa will be transported to domestic power stations via the approved Ravensworth East mine infrastructure.

Rejects and Tailings Management

6.1.8 All rejects and tailings produced from the processing of coal produced by the proposed Glendell Mine operations will be incorporated into the Mt Owen Complex life of mine rejects and tailings management strategy.

6.2 Air Quality

Land Acquisition Criteria

6.2.1 As noted in **Section 5.2**, if the dust emissions generated by the proposed Glendell operations exceed the criteria in **Tables 6.1**, **6.2**, and **6.3** at any private residence, or on more than 25 per cent of any privately owned vacant land, XMO will, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures set out in the modified development consent.

Table 6.1 - Long Term Land Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3

Table 6.2 - Short Term Land Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion	Percentile[a]	Basis
Particulate matter < 10 µm (PM_{10})	24 hour	150 µg/m^3	99[b]	Total[c]
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3	98.6	Increment[d]

a Based on the number of block 24 hour averages in an annual period.
b Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by DoP in consultation with DEC.
c Background PM_{10} concentrations due to all other sources plus the incremental increase in PM_{10} concentrations due to the mine alone.
d Incremental increase in PM_{10} concentrations due to the mine alone.

Table 6.3 - Long Term Land Acquisition Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Air Quality Controls

6.2.2 XMO will minimise areas disturbed by mining activities and undertake prompt rehabilitation of disturbed areas following completion of mining.

6.2.3 XMO will undertake watering road surfaces, including haul roads, and hardstand areas using water carts, where required.

6.2.4 XMO will continue monitoring of meteorological conditions and consideration of weather data in the timing of blasts to minimise the impacts of blast generated dust, particularly on residents to the south and south-east of the project.

6.2.5 Ongoing use of an alarm generated for elevated dust levels from the Mt Owen Complex continuous PM_{10} monitoring network and notification of operational personnel to review the ability to restrict dumping where practical on exposed faces during periods of high wind.

6.2.6 Expansion of the existing dust monitoring network for the Mt Owen Complex to include additional continuous PM_{10} monitoring sites within the Camberwell Village area.

6.2.7 Provision of in-pit dumping locations for periods of high wind, where practicable.

6.2.8 Restricting vehicle movements to formed and watered roads, particularly during periods of potentially high dust generation.

6.2.9 Use of adequate stemming in blast holes.

Meteorological Monitoring

6.2.10 XMO will continue meteorological monitoring at the existing Glendell Mine meteorological station in accordance with the requirements outlined in *Approved Methods for Sampling Air Pollutants in New South Wales*.

Greenhouse and Energy Management

6.2.11 XMO will assess the viability of the following approaches to improving energy efficiency and reducing greenhouse emissions from the proposed Glendell operations:

- use of energy management systems; and
- seeking continuous improvement in energy efficiency in the mining fleet, stationary equipment, mining processes and coal preparation.

XMO will continue to assess and implement energy and greenhouse management initiatives during the project design, operation and decommissioning.

6.3 Noise

Noise Impact Assessment Criteria

6.3.1 Noise emissions from the proposed Glendell operations, when measured within 30 metres of a non-mine owned residence, will not exceed the predicted worst case noise levels set out in Table 9 of **Appendix 6** (Noise Impact Assessment) unless a specific agreement is reached with the landowner in regard to noise impacts at a residence.

If XMO or another surrounding mining operation has negotiated a written noise agreement with any landowner, and a copy of this agreement has been forwarded to

DoP and DECC, then noise levels from the proposed modifications may exceed the noise limits in Table 9 of **Appendix 6** in accordance with the agreement.

Land Acquisition Criteria

6.3.2 If the noise generated by the project exceeds LAeq noise level outlined in **Table 6.4** at private residences surrounding the Glendell Mine site, XMO will, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures set out by DoP in the modified development consent.

Table 6.4 - Land Acquisition Criteria

Location (Refer to Figure 5.16)	**Land Acquisition Criteria**
Rural Residences and Camberwell Village C	40 dB(A) ($LAeq_{(15mins)}$)
Camberwell Village B (refer to **Figure 5.16**)	42 dB(A) ($LAeq_{(period)}$)
Camberwell Village A (refer to **Figure 5.16**)	45 dB(A) ($LAeq_{(period)}$)

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: The noise limits apply under meteorological conditions relevant to the Project site of:

- Wind velocity up to 3 m/s at 10 metres above ground level; or
- Temperature gradients up to 3°C/100 metres
- Where the wind velocity and temperature gradients are determined to be relevant to the Project site in accordance with the NSW INP.

6.3.3 Residences 61 and 62 are located within the current land acquisition zone of the existing Glendell Mine Development Consent (DA80/952). Both of these residences are predicted to be significantly impacted by the proposed Glendell operations and the existing acquisition rights will be maintained.

6.3.4 XMO will maintain the existing acquisition rights of all residences within the existing Glendell Development Consent.

Noise Mitigation Measures

The following noise control measures will be employed throughout the life of the project unless otherwise agreed in writing by DoP.

6.3.5 A progressive equipment replacement program that seeks to incorporate best practice noise attenuation on mining equipment.

6.3.6 Ongoing use of an alarm generated for elevated noise levels from the Mt Owen Complex continuous noise monitoring network and notification of operational personnel to review the ability to modify operations where practical during periods of adverse weather conditions.

6.3.7 Design of the out of pit dumping sequence to allow for mining equipment to dump in higher exposed areas in the day time and within protected lower areas during night time periods, where practicable during adverse weather conditions.

6.3.8 The use of a continuous noise monitoring system to assist with managing operational noise performance and determine further noise controls, as necessary.

6.3.9 XMO will amend the Mt Owen Complex Noise Management and Monitoring Plans and Protocols to include provisions for the management and monitoring of noise emissions from proposed Glendell operations.

6.3.10 XMO will investigate reported exceedences of relevant project specific noise criteria at private residences on a case by case basis. This includes the monitoring of noise emissions at a particular receiver for comparison with the predicted cumulative noise exceedance probabilities outlined in the noise impact assessment (refer to **Appendix 6**). This approach is consistent with the existing noise management and monitoring processes at the Mt Owen Complex.

6.3.11 Where it is established that the relevant project specific noise criteria have been exceeded by activities from Glendell, XMO will investigate additional noise mitigation strategies in consultation with the landholder.

Noise Monitoring

6.3.12 XMO will continue to implement the noise monitoring network currently in place for the Mt Owen Complex. XMO will continue with the ongoing operation of three continuous noise monitors within the Glennies Creek and Middle Falbrook areas.

6.3.13 XMO proposes to install a further two continuous noise monitors, one reference monitor located between Glendell Mine and Ashton Mine and one within the Camberwell Village area.

6.4 Blast and Vibration

Blasting Hours

6.4.1 Blasting will typically be restricted to between the hours of 9.00 am and 5.00 pm (EST) and 9.00 and 6.00 pm (DST) Monday to Saturday. The permissible time of blasting may be extended to 7.00 am for conditions where wind speeds are less than 4 m/s and predominantly north-westerly in direction, and where a temperature inversion does not exist.

Airblast Overpressure and Ground Vibration Criteria

6.4.2 Airblast overpressure from any blast will not exceed 120 dBL at a non mine-owned residence in existence at the date of the granting of the modified development consent, and 95 per cent of all blasts over a 12 month period will not exceed 115 dBL at any such residence, unless specific agreement is reached with the landholder.

6.4.3 Ground vibration from any blast will not exceed 10 mm/s at a non mine-owned residence and 95 per cent of all blasts over a 12 month period will not exceed 5 mm/s at the residence, unless a specific agreement is reached with the landholder.

Blasting in Proximity to Infrastructure

6.4.4 Ground vibration from any blast will not exceed 50 mm/s at the 132 kV transmission line within the Glendell Mine site, or 25 mm/s at culverts and bridges along the Main Northern Railway in the vicinity of the Glendell Mine site, unless otherwise agreed by the relevant service providers and to the satisfaction of the Director-General.

6.4.5 XMO will undertake further consultation with ARTC, including entering into an agreement to cover blasting practices in proximity to the Main Northern Railway, prior to mining being undertaken within 500 metres of the Main Northern Railway.

6.4.6 XMO will undertake further consultation with Energy Australia prior to undertaking detailed design of blasts in proximity to the 132 kV transmission line within the Glendell Mine site.

6.4.7 XMO will undertake further consultation with surrounding mining companies to seek to establish blasting protocols which minimise potential cumulative impacts of blasting practices.

Public Notice

6.4.8 During the life of Glendell Mine, XMO will:

(a) operate a Blasting Hotline, or alternate system agreed to by the Director-General, to enable the public to get up-to-date information on the blasting schedule at Glendell Mine; and

(b) advertise the blasting hotline number in a local newspaper at least four times each year.

Blast Controls

Other blast controls will include:

6.4.9 designing and undertaking blasts to ensure that vibration and airblast limits are met, including consideration of wind speed and direction prior to blasting to minimise impacts on neighbours;

6.4.10 design blasts so that predicted vibration levels at the Camberwell Church are less than 2 mm/s;

6.4.11 detailed monitoring of blasts over the life of the mine to inform the detailed design of blasts and modification of blast designs as necessary;

6.4.12 training all relevant personnel on environmental obligations in relation to blasting controls;

6.4.13 monitoring blasts at the nearest non mine-owned residence and Camberwell Church to verify whether vibration and airblast limits are met;

6.4.14 documentation of the date, location of blast holes and quantity of explosive used each day; and

6.4.15 periodic review of blast management procedures to evaluate performance and identify corrective action, if required.

6.5 Water Management

XMO has committed to the implementation of the following in relation to the management of water resources.

6.5.1 Design surface water controls to ensure that clean runoff is separated from runoff within disturbed mining and infrastructure areas. Design sediment and erosion controls to ensure any runoff from disturbed areas is appropriately treated (refer to **Appendix 8**).

6.5.2 The proposed diversions of Swamp and Bettys Creeks will be designed and constructed in accordance with the conceptual designs developed in the water resources assessment (refer to **Appendix 8**) and described in **Sections 5.5.4.1** and **5.5.4.2**.

6.5.3 XMO will install cut off embankments along Bettys Creek to restrict alluvium inflows into the proposed pit area in accordance with the conceptual design developed in the water resources assessment (refer to **Appendix 8**).

6.5.4 XMO will prepare a Groundwater Management Plan to detail the monitoring and management commitments relating to the Swamp Creek alluvial system, prior to mining occurring within this alluvial area.

6.5.5 XMO will continue the groundwater monitoring at the existing groundwater monitoring locations within the alluvium of Swamp and Bettys Creeks, aside from monitoring location NPz14 which will be impacted by the proposed Glendell operations (refer to **Figure 5.14**).

6.5.6 If groundwater monitoring indicates it is required, a barrier cut off wall within the alluvium associated with Swamp Creek will be constructed to limit groundwater seepage into the mine.

6.5.7 XMO will extend its existing surface water monitoring program to include surface water monitoring to be undertaken at Glendell (refer to **Figure 5.14**), as follows:

- two additional surface water monitoring locations on Bowmans Creek upstream and downstream of the confluence with Swamp and Bettys Creeks;
- two additional sites on Swamp Creek upstream and downstream of the proposed open cut pit; and
- two additional sites on Bettys Creek upstream and downstream of the open cut pit.

6.6 Flora and Fauna Management and Site Rehabilitation

6.6.1 XMO will implement a Rehabilitation Strategy that aims to create a stable final landform that is dominated by pastures with a minimum of 30 per cent native tree lots and corridors for the purpose of stock shade and shelter, and habitat restoration.

6.6.2 The specific rehabilitation strategies to be implemented at the Glendell Mine will be detailed within a revised Mining Operations Plan and will be consistent with the rehabilitation practices employed at the Mt Owen Complex, where relevant.

6.6.3 XMO will establish a Habitat Management Area in the south-eastern extent of Glendell Mine site (refer to **Figure 5.26**). Existing vegetation within the Habitat Management Area will be augmented through protection, regeneration and revegetation practices. Specific vegetation augmentation techniques will be outlined in a Biodiversity and Land Management Plan developed for the Glendell Mine site.

6.6.4 XMO will develop and implement a Biodiversity and Land Management Plan for Glendell Mine specifying ecological management and monitoring measures consistent with the principles of the Mt Owen Complex Flora and Fauna Management Plan, where relevant.

6.6.5 At least five years prior to anticipated mine closure, XMO will prepare a Mine Closure Plan in accordance with relevant XCN and agency guidelines and in consultation with relevant agencies.

The Mine Closure Plan will:

- define the objectives and criteria for mine closure;
- investigate options for the future use of the site, including any final void/s;
- describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and
- describe how the performance of these measures will be monitored over time.

6.6.6 XMO will obtain approval from the DPI for any final landform design that exceeds 10 degrees.

Final Void Management

6.6.7 A detailed final void management plan will be developed five years prior to mine closure.

6.7 Heritage

Aboriginal Cultural Heritage Management Plan

6.7.1 Within 12 months of granting of the modified consent, XMO will complete (and following approval implement) an Aboriginal Cultural Heritage Management Plan (ACHMP), in consultation with DECC and relevant Aboriginal stakeholders, and will incorporate the relevant outcomes of this approval. The plan will include provisions for the conservation of the seven remaining registered Aboriginal sites within the Glendell Mine site and for the management of the Bettys, Swamp and Bowmans Creek areas that fall outside the Proposed Disturbance Area which despite being salvaged, still retain Aboriginal and archaeological values that require protection. Specific initiatives under the plan will include implementation of a Management Committee composed of the XMO Environmental and Community Officer and the Mine Management and at least three representatives of the Aboriginal stakeholder groups. The Management Committee will also have access to a qualified Archaeologist to assist with issues as required. The Management Committee will have the responsibility of strategic overview and input during the implementation of the following:

- the formulation of an Aboriginal cultural heritage awareness training package to be incorporated into the mine and contractor induction process;
- fencing of remaining sites and sensitive areas outside the Proposed Disturbance Area to protect them from further disturbance. The fencing will be undertaken in accordance with the specific requirements outlined in the ACHMP;
- annual monitoring of the remaining sites and sensitive areas remaining within the Glendell Mine site by representatives of the Management Committee to monitor ongoing protection; and

- developing management procedures for control of:
  - feral animals, livestock and noxious and pest weeds;
  - erosion;
  - bushfire hazard; and
  - any other environmental management strategies or procedures which have the potential to affect the *in situ* management of sites or sensitive areas outlined in the ACHMP.

Historical Heritage

6.7.2 XMO will commission archival recording of sites identified within the Glendell Mine site (refer to **Table 5.11**) by a qualified heritage consultant to NSW Heritage Office's standards of local significance prior to the commencement of mining.

6.7.3 Install fencing to protect remaining sites (Items 4a to 4d and Item 5) to manage these sites *in situ*.

6.7.4 XMO will submit an application for exemption to the *Heritage Act 1977* to the NSW Heritage Office for relevant items within the Glendell Mine site prior to mining commencing.

6.8 Traffic and Transport

6.8.1 XMO will review the adequacy of street lighting at the intersection of the New England Highway and Hebden Road in consultation with the RTA.

6.8.2 The intersection of Hebden Road and the proposed mine access road will be relocated approximately 800 metres north along Hebden Road from the approved mine access road to provide improved sight distances and will be a Type B rural layout in accordance with Austroads guidelines.

6.8.3 XMO will obtain a Section 138 approval under the *Roads Act 1993*, from Singleton Council, prior to the conduct of these works on Hebden Road.

6.9 Visual Controls

Vegetative Screenings

6.9.1 Screening plantings in strategically located positions to limit views into the Glendell mining area from the New England Highway (refer to **Figure 5.36**) will be maintained.

Rehabilitation and Final Landform

6.9.2 Shaping, stabilisation and rehabilitation of the out of pit overburden emplacement area will be undertaken as soon as practicable as part of progressive mining to minimise the impact of the proposed Glendell operations on the visual amenity of the surrounding area.

Operational Controls

6.9.3 Ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*; and

6.9.4 XMO will aim to minimise night lighting impacts on surrounding land owners by ensuring, where practicable, that lighting plants are positioned such that light is directed towards work areas and not towards private residences.

6.10 General Environmental Management, Monitoring, Auditing and Reporting

6.10.1 Environmental management of Glendell Mine will be integrated into an updated Mt Owen Complex environmental management strategy and environmental monitoring program.

6.10.2 XMO will employ a suitably qualified environmental officer with the responsibility of coordinating environmental management practices of the modified Glendell operations

Annual Reporting

6.10.3 XMO will report on the details of the Glendell Mine operations either as an autonomous operation or as part of the Mt Owen Complex Annual Environmental Management Report (AEMR) and in accordance with the conditions of the modified development consent.

Independent Environmental Audit

6.10.4 XMO will commission and pay the full cost of an Independent Environmental Audit of Glendell operations every three (3) years as part of an audit of the Mt Owen Complex and in accordance with the conditions of the modified development consent.

Community Consultative Committee

6.10.5 XMO will maintain the Mt Owen Complex Community Consultative Committee (CCC) which includes the amalgamation of the Mt Owen, Ravensworth East and Glendell Community Consultative Committees.

Umwelt (Australia) Pty Limited
2/20 The Boulevarde
PO Box 838
Toronto NSW 2283

Ph. 02 4950 5322
Fax 02 4950 5737